

Spatial and temporal diversity of the diet of the tawny owl (*Strix aluco*)

Priestorová a časová diverzita potravy sovy obyčajnej (*Strix aluco*)

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Abstract: The author compared diet of eight owl species in Slovakia, out of which four species prey in the non-forest environment (*Bubo bubo*, *Tyto alba*, *Asio otus* and *Athene noctua*), while the other four species prey mostly in the forest (*Glaucidium passerinum*, *Aegolius funereus*, *Strix uralensis* and *Strix aluco*). Tawny owl (*Strix aluco*) has shown the highest degree of adaptability when it comes to various types of environment and broad diversity of prey. Appendix 1 presents material of total 225,441 pieces of diet, which contains 69 species of mammals and at least 147 species of birds. While *B. bubo* diet is typical especially for high presence of bigger prey species within mammals and birds (66 diagnostic taxa), diet of *S. aluco* is characterized by as many as 89 taxa with higher share than the average of all eight compared owls (taxa with values 1+ and 2+ in blocks as marked by full line). Based on the analysis of 68,070 pieces of *S. aluco* diet collected in Slovakia, it is possible to differentiate seven basic diet types: A – from lower mountains, B – from middle montane locations, C – from colder and more humid parts of mountains, D – characterized by high share of bats (Chiroptera), E – characterized by high share of slugs (Limacidae), F – from floodplain forests, and finally G – from environment strongly influenced by humans. Diagnostic species for one or several diet types are characterized by markedly higher share than Slovak average. By the large amount of analyzed samples of *S. aluco* diet it is possible to gain the knowledge about structure of several animal groups from relatively little disrupted forest ecosystems and those from environment to some degree influenced by humans. Diet types represent simplified models, which are understood in a different sense than plant communities. Individual disposition for specific food preference (e. g. Chiroptera) also plays an important role by some tawny owl's specimens. Some types of prey can be further divided into undertypes (e. g. undertypes G1 and G2 in Table 1). Diet of *S. aluco* has been examined more in detail and over a longer period of time especially in following national parks: Slovenský kras, Muránska planina and Veľká Fatra Mts. Samples from other parts of Slovakia are also presented here according to their relevance to particular diet types. Pellets of *S. aluco* were collected over a longer period of time (up to 30 years) in several sites and it is chronological periodicity in presence of diagnostic species, which stands in focus. Long-term changes in *S. aluco* diet during Holocene were examined in two parts of Veľká Fatra Mts, which are influenced by climatic changes as well as human activity (deforestation and pasture). The author has occasionally collected pellets of *S. aluco* in several mountains of Europe between Western Alps and Caucasus and from northern border in *S. aluco* areal, from Trondheim area in Norway. Furthermore, the author presents hereby his own material from pellets of *S. aluco* from the Middle East to Himalaya (in particular countries of Jordan, Israel, Lebanon, Syria, Turkey, Iran, Kyrgyzstan and Nepal).

Abstrakt: Z územia Slovenska autor porovnáva potravu ôsmich druhov sov, z ktorých štyri druhy lovia v nelesnom prostredí (*Bubo bubo*, *Tyto alba*, *Asio otus* a *Athene noctua*) a štyri druhy prevažne v lese (*Glaucidium passerinum*, *Aegolius funereus*, *Strix uralensis* a *Strix aluco*). Sova obyčajná (*Strix aluco*) je najprispôbovivejšia na rôzne typy prostredia a na široké spektrum druhov koristi. Prezentuje sa materiál 225 441 kusov analyzovanej potravy, v ktorom bolo zistených 69 druhov cicavcov (Mammalia) a minimálne 147 druhov vtákov (Aves). Kým *B. bubo* sa vyznačuje najmä početnejším zastúpením väčších druhov koristi (Mammalia a Aves; 66 diagnostických taxónov), v potrave *S. aluco* je až 89 taxónov s výrazne vyšším podielom v potrave, ako je priemer od porovnávaných osem druhov sov. Na základe analýzy 68 070 kusov potravy *Strix aluco* z územia Slovenska možno diferencovať sedem základných potravných typov: A – z nižších pohorí, B – zo stredných horských polôh, C – z chladnejších a vlhších častí pohorí, D – s vysokým podielom netopierov (Chiroptera), E – s vysokým podielom slizniakov (Limacidae), F – z nížinných lužných lesov, G – z antropicky silne ovplyvneného prostredia. Určitý vplyv pri niektorých typoch má individuálna dispozícia na uprednostňovanie špecifických druhov koristi (napr. Chiroptera). Niektoré typy potravy sa delia na podtypy (napr. podtypy G1 a G2.). Z dvoch častí Veľkej Fatry sa vyhodnocujú dlhodobé zmeny v zložení potravy *S. aluco* počas holocénu, ktoré sú ovplyvnené klimatickými zmenami, ale tiež antropickou činnosťou (odlesňovanie a pastva). V práci sa analyzujú aj vzorky potravy *S. aluco* z niektorých pohorí Európy (od Západných Álp až po Kaukaz), zo severnej hranice areálu druhu v Nórsku (Trondheim) ako aj materiál z ázijských pohorí (od Blízkeho Východu po Himaláje: Jordánsko, Izrael, Libanon, Sýria, Turecko, Irán, Kirgizstán a Nepál).

Key words: Tawny owl, *Strix aluco*, diet, Slovakia, Europe, Asia.

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Introduction

The tawny owl *Strix aluco* is an inhabitant of autochthonous deciduous and mixed forests. It is a typical ‘generalist’ species, very adaptable to different food sources and environmental conditions. Jirsík (1949) quite sharply characterizes the hunting abilities of the tawny owl: “We can but say that no other raptor hunts its prey in such versatile ways and with so many talents.” Thanks to its large distribution range and rather high density, *S. aluco* is an optimal model species for the determination of spatial and temporal diversity of species that comprise its prey.

Owl pellets often contain rather well preserved undigested remains of prey. Here we can find most frequently bones of vertebrate species and sclerotized body parts of invertebrates. Pukinskij (1977) put forward: “Without exaggeration we can claim that nine tenths of our knowledge about owl dietary relations comes from the identification of owl pellet contents.”

The identification procedures for mammals based on jaw bones was elaborated in the 19th century. The analysis of owl pellets as a method of owl diet research was first used by the German naturalist Altum (1863). This method was further systematically developed by Uttendörfer (1939, 1952). He analyzed mostly owl pellets of *A. otus*, *T. alba* and *S. aluco*. He trained several students who were dedicated to a more thorough determination of prey species not only of the class Mammalia, but also Aves, Anura and Evertebrata. März (1969) wrote a methodical handbook about the collection and identification of owl pellets and food remains. The works of Uttendörfer also included data on the diet of *T. alba* and *B. bubo* from Slo-

vakia, which were collected and identified by his student Schaefer (1933, 1938)

In the post-war period, owl pellets from the southern part of Slovakia were analyzed by the Czech authors Balát (1956) and Folk (1956) and Slovak author Randík (1956). In the 1960s the stomach contents of deceased and shot owls were analyzed by Sládek (1962). The summary of all data on the diet of raptors and owls using this method was presented in the work of Kropil & Sládek (1990). In the 1970s other Slovak authors started collecting owl pellets including Schmidt & Štollman (1972), Ginter (1971) and Darolová (1976). The pre-war efforts in the Belaer Tatra Mts. were followed by Schaefer (1972, 1974). Jánossy & Schmidt (1970) in their compound work about the diet of *B. bubo* from the whole Palearctic region presented further records of about 100 pieces of food from the Slovenský kras Mts. (Rožňava) and Malá Fatra Mts. (Terchová). Owl pellets were collected by Štollman and identified by Schmidt. Until the second half of the 1970s we have had no specific data on the diet of *S. aluco* from owl pellets. Summary data from 32 locations in eastern Slovakia was later published by Danko (1989).

The greatest collection of material on the diet of *S. aluco*, from 261 locations, was published by Uttendörfer (1939) based on material collected between 1896 and 1938 (Jirsík, 1949). In his later work, this data was updated with material from 1939 to 1949 and summarized about 58,500 pieces of animal food items (Uttendörfer 1952). This material contained about 30,000 mammal individuals of 45 species, 7,500 birds of 100 species, 7,300 amphibians of eleven species, 400 fish of ten species and

almost 2,000 invertebrate individuals. This author also recorded 41 slugs of the genus *Limax*. According to the data summary the vertebrate prey items were dominated by voles of the genus *Microtus* and birds of the species *Passer domesticus*. Therefore we can conclude that Uttendörfer mainly analyzed owl pellets from individuals hunting in strongly human influenced environments. Most European authors analyzed pellets of *S. aluco* coming from such environments: e. g. Delmee et al. (1979) in Belgium; Smeenk (1972) in the Netherlands; Southern (1954) in England; several studies from Germany (e. g. März 1954, Snurre & März 1970, Wendland 1980) and Poland (e. g. Goszczynski et al. 1993, Zalewski 1994, Bogucki 1967). In Austria, *S. aluco* diet was studied by Steiner (1961), in Czech Republic by Plesník & Dušík (1988), in Bulgaria by Simeonov (1985), in Slovenia by Lipej (1988), in Italy Contoli & Sammuri (1978), in Russia Bozsko (1967), in Estonia Balčianskione et al. (2000) and in Hungary Schmidt et al. (1971). Several of the presented works were devoted only to Mammalia and rodents such as *Microtus* and *Apodemus* sp. were determined only to genus level.

The analysis of a large number of collections from different locations shows that the increased frequency of some taxons occurs in specific environments. This has lead to the classification of dietary types which became an original addition to our knowledge about the fauna of the forest ecosystems (Obuch 1992a), further supplemented by the description of dietary type from the lowland floodplain forests (Obuch 2003), as well as typical aspects related to human impact on the environment (Obuch 2004a). All seven types were first presented at the international conference on owls in the German Harz (Obuch 2000a). Long term temporal changes were analyzed at four locations on the Muránska planina Mts. (Obuch 1997). The much scarcer material of this author from some European and Asian mountain ranges indicates the presence of several endemic species, characteristic of isolated forest enclaves in the large range from the Western Alps to the Himalayas. Data on the collection of *S. aluco* pellets from 20 Palae-arctic mountain ranges were presented at the international conference on birds of prey in Mikulov (Obuch 1999). Large sets of samples from the Czech Republic were analyzed (Obuch 1994a, Zvářal & Obuch 1996, Reiter et al. 1997, Zima et al 1998) and results from Bulgaria (Obuch & Benda, 1996) and Turkey (Obuch, 1994b) were also published. Currently a research project on the diet of *S. aluco* from nest box beddings in the central Norwegian region of Sør Trondelag is approaching completion and was referred to at its outset (Obuch & Bangjord 2008).

The main aims of this work were: (1) to determine diagnostic species in the diet of *S. aluco* in comparison with the diet of other owl species in Slovakia; (2) to classify *S. aluco* diet in Slovakia into the main dietary types; (3) to identify spatial and temporal diversity in the individual types of *S. aluco* diet and (4) to present the results of the study on *S. aluco* diet from the European and Asian parts of its distribution range.

Material and methods

Most of the author's data on the owls' diet is based on the analysis of owl pellets. In case of *S. aluco* this means especially pellets collected at sites of the owls' diurnal shelters in the rocks and buildings. Part of the material may come from the nest box bedding, where it accumulates during young feeding. Bedding may contain parts of unconsumed stored prey and deceased or consumed young. As we compared the three different types of food item identification (Zvářal & Obuch 1996), we found certain differences. In case of *A. otus* most owl pellets are collected in the winter period and show lower species diversity than samples from the nesting period (Šotnár & Obuch 1996). In *B. bubo* the most common material comes from nest bedding amongst rocks, which could be accumulated over decades. Older strata cannot be separated, since during digging of the nesting hole, the nest material is mixed up, undermining the integrity of the samples. In *Aegolius funereus*, the most common material comes from nest bedding in nestboxes or natural tree cavities hollowed out by the black woodpecker. The material from the *Glaucidium passerinum* in Slovakia was mainly collected from the winter storage in the nestboxes.

The owl pellets or nest beddings from each sample were soaked for one hour in hot 5% NaOH solution. After dissolving hair and feather debris, the sample was rinsed on a dense sieve under running water and in a container with still water. Floating body parts of insects and hollow bird bones were collected and using careful circular washing motion all debris were washed out until only bones and snail shells remained. These were further cleaned by washing the sieve with circular motion to remove stones with different weight. After drying the washed sample, we sorted out the jaw bones (maxilla and mandible, as well as some teeth) of mammals (Mammalia), beaks, tarsometatarsi, humeral and metacarpal bones (rostrum, tarsometatarsus, humerus and metacarpus) of the birds (Aves), iliac bones (os ilium) of the frogs (Anura), jaws of reptiles and salmonid fish (Reptilia, Salmonidae), pharyngeal teeth (os pharyngeum inferior) of carp fish (Cypriniformes), heads (caput) or jaws of different in-

sect orders, dorsal shell lenses of slugs (Limacidae) and pincers of crayfish and crabs (Decapoda).

The number of individuals of each taxon was calculated as the number of the most frequent body parts in the sample (e. g. left or right mandible or maxilla in mammals or reptiles, one out of four types of bones in birds, left or right iliac bone in frogs; Fig. 1, 2).

The identification of bones was carried out according to the reference collections of vertebrate skeletons from captured or deceased animals and according to the published identification characteristics (Anděra & Horáček 1982, Gromov & Erbajeva 1995, Mendellsohn & Yom-Tov 1987, Harrison & Bates 1991, Lay 1967, DeBlase 1980, Kryštufek & Vohralík 2001, 2005, 2009, Mitchell 1975). Individuals from the Pannonian populaton of *Apodemus uralensis* (Pallas, 1811) were referred to as *Apodemus microps* Kratochvíl & Rosický 1952. These individuals could be distinguished from the *A. uralensis* from eastern Europe and Asia on the basis of smaller jaw bones. Due to extensive bone fragmentation, I could not always differentiate *C. corone/cornix* and *Corvus frugilegus*, therefore I refer to them using a shared name *C. corone + frugilegus*. Some bird taxons were determined to genus level whilst lower vertebrates and invertebrates were determined to the family or order level and are referred to as „sp.“ (e. g. *Apodemus* sp. or *Coleoptera* sp.). In cases of dubious identification with a certain level of probability, the taxon is referred to as cf. (e. g. *Mus* cf. *musculus*).

Data on the owl diet in this work are evaluated using the calculations of marked differences from the mean (MDFM, Obuch 1991, 2001a). Samples in the adjusted

results tables are sorted according to the similarity and the ordering is adjusted such as the determining species with positive MDFM values arranged in columns and blocks. These blocks are enclosed in continuous line borders. Species without MDFM are arranged under a dashed line and ranked down according to total abundance. Diversity indices H' (Shannon & Weaver 1949) are given in the bottom row of the table. Less abundant and partially determined taxa are given under the table. Calculations of the MDFM and contingency tables were carried out in the Zber software application (Šipöcz 2004).

Names and boundaries of the geomorphological units of Slovakia were classified according to Mazúr & Lukniš (1980). The overview of locations where food items of *S. aluco* were found is presented in the Appendix 41. Bone samples found in sites from the Pleistocene period or earlier are referred to as fossil whilst samples found in sites from the earlier Holocene period are referred to as sub-fossil. ‘Recent’ finding places are from current period, whereas sub-recent are close to recent but with certain environmental differences. Ložek (1973) in his geological classification of the Holocene period referred to the last 500 years as the recent period and to the Middle Ages (500–1400) as the subrecent period. In the bone finding places of *S. aluco* we can distinguish preserved pellets (less than five years old), recent detritus from the disintegrated pellets in the 2 cm surface layer (5–50, 200 years at maximum) and bones from the layers at 2–5 cm, maximum 10 cm (50–200, at maximum 500 years ago) from the sub-recent period.



Fig. 1. Sorting bones after pellet processing with NaOH.
Obr. 1. Triedenie kostí po spracovaní vývržkov v NaOH.

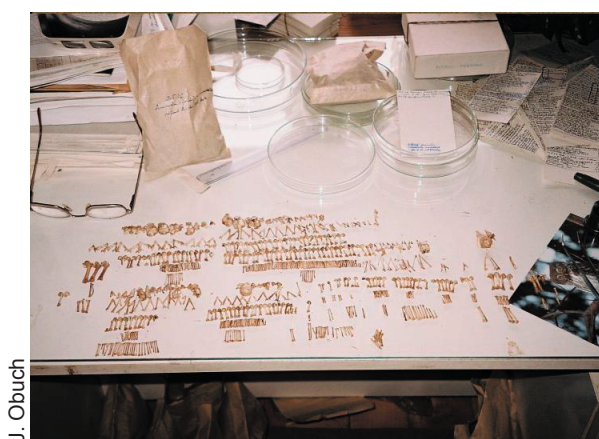


Fig. 2. Determination of bird bones from the pellets.
Obr. 2. Určovanie kostí vtákov z vývržkov.

Results and discussion

Comparison of *Strix aluco* diet with dietary ranges of other owl species in Slovakia

In order to describe differences in the hunting strategy of eight owl species in Slovakia, we have summarized mainly the data of this work's author, supplemented by partially published data on *Tyto alba* from Borská nížina Lowlands (Noga 2004). From the total number of 225,441 food items with at least 250 taxa we have included in our analysis those diagnostic taxa, which are recorded in one or several owl species (Appendix 1). As first we list the most frequently occurring species with positive MDFM in *T. alba*, *Asio otus*, *Athene noctua*, *Glaucidium passerinum*, *Aegolius funereus* and *Strix uralensis*. A total of 89 diagnostic taxa were found in *S. aluco*. The water pippit (*Motacilla alba*) is equally distributed in the diet of all eight owl species. Other, less abundant prey species

($\sum n < 20$) are given under the table. The diet of *Bubo bubo* as the largest owl species is typically composed of greater proportion of larger mammal and bird species (especially non-passerine birds and corvids). Among the owls, this species hunts the most other predators, i. e. carnivores, raptors and owls (Obuch 2000b). The most frequent lower vertebrate species in the food items of *B. bubo* is the *Rana temporaria*, *Lacerta* sp. and Cypriniformes. As in *S. aluco*, its food also comprises *Salmo trutta* and some medium sized passerine birds, e. g. *Turdus* sp.

The diet of *T. alba* is distinguished by its high proportion of synanthropic and non-forest species of mammals and passerine birds. In three cases we found a high proportion of bats in its diet (Obuch 1998a). The most prominent hunting specialization in agricultural land can be seen in *A. otus*. Winter pellets of this species are dominated by 89% of *M. arvalis* remains. *A. noctua* also forages exclusively in non-forest environments, but

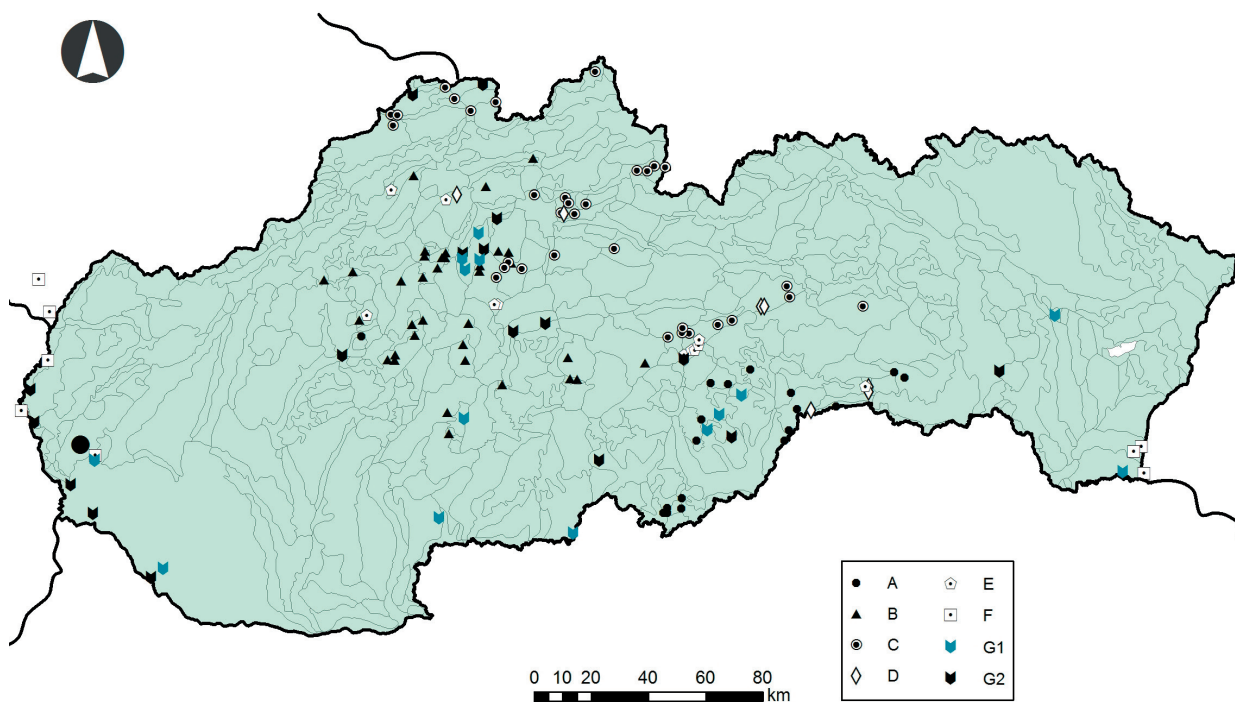


Fig. 3. Geographical distribution of the food samples of *S. aluco* and their classification into dietary types in Slovakia. For dietary types description see text. Author: F. Tulis.

Obr. 3. Poloha vzoriek potravy *S. aluco* s ich zaradením do potravných typov na Slovensku. Opis potravných typov je uvedený v texte. Autor: F. Tulis.

its diet is characterized by a higher proportion of invertebrates (52%). This proportion is even higher in arid countries (Obuch & Krištín 2004).

The four other owl species hunt mainly in forest habitats. *G. passerinum* is typical for its high proportion of passerine birds in its diet (48%). A high proportion of insectivore mammals and rodents can be found in the diet of *A. funereus* (95%). The diet of the *S. uralensis* in Slovakia has been little studied, but besides continuous forest cover, this species also enters forest patches enclosed by fields (Košice basin, Mihók in verb.). This species can winter in urban areas (e. g. Košice), hunting mainly doves and pigeons (Dravecký & Obuch 2009).

The diet of *S. aluco* appears to be the most variable in the context of the eight owl species in Slovakia ($H' = 3.05$) with the highest number of differential species from the classes Mammalia, Aves and Amphibia. A rather high proportion of Limacidae (11%) in its diet is quite unique.

Dietary types of *Strix aluco* in Slovakia

The analysis of a great number of large samples using the MDFM method, has allowed us to find several species with positive MDFM appearing in many samples. These diagnostic species characterize a certain habitat or hunting behaviour. Thus we can describe a group of samples with common diagnostic features as a specific dietary type. A single sample can represent pellet collection from a single site, or several collections from the same site or several collections from several sites with similar prey species composition (e. g. from the same mountain range). By summarizing several collections from the same site we can equalize the fluctuations in prey population cycles and the collective sample can better characterize the food niche at the sampling location. Food samples not large enough for their respective regional units were omitted from the analysis.

The first differentiation of food samples from *S. aluco* into dietary types was based on a set of 38 samples from mountain regions of Slovakia. This data set was evaluated by the MDFM method (Obuch 1992a). Dendrogram of similarity classified the diagnostic species into five groups, which were described as dietary types A, B, C, D, E. Three of these groups reflected altitudinal zones: A – lower mountain ranges, B – middle mountain zone, C – cold and wet mountains. The other two types were determined by the local specialization of *S. aluco* due to habitat conditions: D – Bat hunting specialization (Chiroptera), E – frequent consumption of slugs (Limacidae). After analysing additional samples from the plains and

basins of Slovakia, we could differentiate two other dietary types: F – floodplains (Obuch 2003) and G – strongly human-influenced habitats (Obuch 2004b).

In total we could differentiate seven dietary types of *S. aluco* in Slovakia (Tab. 1, Fig. 3), categorized according to similarity in distribution of diagnostic species. E – type was characteristic for a higher proportion of Limacidae in comparison with other dietary types. Some diagnostic species were common with types C and B. Samples of this type came mainly from beech forests of the 4th vegetation zone on calcareous ground (forest communities such as *Fagetum dealpinum*, Hančinský 1972) on the southern side of Muránska planina Mts. and in the vicinity of Harmanec in Veľká Fatra Mts. Samples from the warmer southern slopes with oak and hornbeam trees on the Muránska planina Mts. fall into the B type (Obuch 2004a). Samples from the cold and wet upper parts of the plain and from the Horehronie region with prevailing conifer forests comprise the type C. Some locations with the E type include food pellets since the year 1978. In four of these locations we could analyze a 20-year time period (Obuch 1997).

The C type from the cold and wet mountain areas is characterized by increased occurrence of mountain species of small ground mammals such as: *Sorex alpinus*, *Sicista betulina*, *Microtus tatricus* and *Microtus agrestis*. This dietary type is dominated by *Muscardinus avelanarius* (10.2%), whereas the abundance of *Apodemus flavicollis* (10.1%) is below average and the abundance of *C. glareolus* 8.7% is close to the Slovak average. Higher humidity is reflected in the presence of *Neomys fodiens*, *Arvicola amphibius* and *Rana temporaria* (24.2%).

The B type from the middle montane zone shows no characteristic diagnostic species. Some species are common with types C and E. High dominance of *A. flavicollis* is common with type A. However, type B is characteristic for its lower proportion of Aves (5.4%).

The D type with markedly high proportion of 13 bat species was identified in 14 sites from carstic regions of Slovakia (Obuch 1998a). This type includes several sub-fossil sites including the finding of Schaefer under the Muráň Mountain in the Belaer Tatras, which was described as a sample from the eagle owl from the 18th century (Schaefer 1974). The explanation of this finding can be found in the paper of Obuch (1992b). Chiroptera comprise 9–90% of the type D samples. Other characteristic prey species include *Eliomys quercinus*, which is especially abundant in earlier samples but rarely found in the fresh pellets since 1970'.

Besides the most frequently occurring *A. flavicollis*, the type A from the lower mountain ranges also shows also

a greater proportion of Aves (8.4%). Several passeriform bird species are quite frequent also in the type F (*Coccothraustes coccothraustes* and *Fringilla coelebs*). The dormouse species *Glis glis* (3.3%) is more common in the lower mountains than in colder regions (Obuch 1998b). The *Dryomys nitedula* inhabits two different areas: conifer forests in the type C and dry scrubland in the type A. Recently this species did not appear in several mountain ranges of Central Slovakia, although it could be found as *S. aluco* prey in the fossil samples from e. g. Veľká Fatra Mts. (Obuch & Darola 1980). *Crociodura leucodon* (1.4%) is the most commonly occurring insectivore.

The type F from the lowland floodplain forests (Obuch 2003) is characterized especially by the high proportion of several frog species (Anura 40%), excluding the species *R. temporaria*. Quite high is the proportion of Passeriform birds (12.2%) and lower proportion of mammals (Mammalia, 40.5%), comprising mainly non-forest species such as *Microtus arvalis*, *Apodemus agrarius*, *Micromys minutus*. Floodplain forests of both soft and hard woods are to a great extent altered to monotypic poplar stands, forming mainly forest fragments adjacent to agricultural land. *S. aluco* hunts frogs in moorlands, especially in bayous with still water. This type shares several diagnostic species of birds and mammals with type G.

The G type samples come from different parts of Slovakia from the plains to the mountain valleys. We found them mainly on the lofts of different buildings and park trees. The first G subtype G1 is distinct for the dominant occurrence of *M. arvalis* (45.2%), whereas the subtype G2 was characterized by high species diversity of prey with a high proportion of synanthropic species, including among mammals *Mus musculus* and among birds *Passer domesticus*.

Spatial and temporal diversity of the diet of *Strix aluco* in different dietary types in Slovakia

Type A from the lower mountain ranges. In this type (Tab. 2) Mammalia are the dominant food components of *S. aluco* (77.5%). The most dominant prey species was *A. flavicollis* (37.5%). The non-forest species *M. arvalis* was also quite abundant (11.7%). Aves (8.4%) also comprised a common component of the *S. aluco* diet with a very broad range of passeriform species. The most frequent species included *F. coelebs* (0.7%), *C. coccothraustes* (0.7%), *Turdus philomelos* (0.8%) and *T. merula* (0.7%). Amphibia (4.2%) were less frequent than at higher altitudes, including mainly *R. temporaria* (2.0%) and some other frog species. The most abundant

groups of Evertebrata (9.9%) included Coleoptera (6.3%), with Limacidae (3.0%) comprising a less important part of the *S. aluco* diet.

Most of the material of the dietary type A was recorded in the Slovenský kras Mts. and collected from owls which use cave entrances as their diurnal roost place. Most of them hunt bats only occasionally with Chiroptera comprising <5% of their diet. In comparison with samples from other lower mountain ranges in Slovakia, there are four bat species and the forest dormouse (*D. nitedula*) and non-forest species of small ground mammals (*C. leucodon*, *Apodemus microps* and *M. arvalis*). Evertebrata are more frequent.

A rather detailed screening of the *S. aluco* diet was conducted in the neighbouring Revúcka vrchovina Mts. Some owls rest close to the entrances of abandoned mines, inhabited by summer colonies of bat species *Miniopterus schreibersi* and *Rhinolophus euryale*. Other individuals hunt frogs in shallow marshes (seven species) or some marshland mammal species (*Micromys minutus* and *Apodemus agrarius*). *A. flavicollis* is quite dominant similarly to Cerová vrchovina Mts. where the dormouse *G. glis* is also quite abundant. The massif of Drieňová Mt. (616 m a. s. l.) belongs to the warmer part of the Strážovské vrchy Mts. with forests of the 2nd vegetation zone Kropil (1987) found higher proportion of some forest and non-forest species of passeriform birds. Increased abundance could be seen in the species *M. arvalis*, *C. glareolus* and *Neomys anomalus*. Data sample from the Malé Karpaty Mts. comprises a sum of eleven smaller pellet samples.

Slovenský kras Mts. (Table 3). In the Slovenský kras Mts., *S. aluco* used large entrances to caves and gaps as rest places. Where bats were present in higher numbers, some individuals specialized in hunting them and could be classified as the D dietary type. Thus we have observed the hunting of *Nyctalus noctula* in Zbojnická jaskyňa cave for long periods of time. The sub-recent samples from the caves Ohnište and Erňa at the entrance to the canyon Zádielská dolina valley showed that local owls have hunted the *Pipistrellus pipistrellus*. In the cave Erňa there is a large winter colony of this bat species (Matis et al. 2002) and in the recent period, there used to be an owl in the cave during the summer, not hunting bats. The dietary type D from the Slovenský kras Mts. comprises five dominant bat species (*P. pipistrellus*, *N. noctula*, *Vespertilio murinus*, *Myotis myotis* and *M. blythii*). Further seven bat species show greater frequency at some locations with the dietary type A. The total number of bat species recorded in the diet of *S. aluco* from the Slovenský kras Mts. reached 21.

Tab. 1. Distribution of diagnostic species in the dietary types of *Strix aluco* in Slovakia**Tab. 1.** Zastúpenie diagnostických druhov v typoch potravy *Strix aluco* na Slovensku

species / dietary type druhy / typ potravy	C	B	E	A	D	G2	G1	F	Σ	%
<i>Rana temporaria</i>	2+ 2658	577 2-	439 2-	320 2-	181 1-	100 2-	132 1-	0	4407	6.47
<i>Sicista betulina</i>	3+ 170	2- 4 2-	8 4-	0 1-	3 1-	4 2-	0 2-	0	189	0.28
<i>Microtus agrestis</i>	2+ 312	1- 34 1-	52 2-	20 2-	5 2-	7 1-	11 3-	0	441	0.65
<i>Microtus tatricus</i>	1+ 10	6	6 1-	0	2				24	0.04
<i>Turdus torquatus</i>	2+ 36	7	13 2-	0	1	2			59	0.09
<i>Sylvia communis</i>	1+ 7		1	3	1	1	2		15	0.02
Hymenoptera sp.	1+ 12	4	5	5		3	3		32	0.05
<i>Neomys fodiens</i>	2+ 77	12 1-	22 1-	25 1-	5 1-	4	1+ 16	4	165	0.24
<i>Neomys anomalus</i>	1+ 26	10 2-	8	1+ 46	7	7	9 1-	0	113	0.17
<i>Dryomys nitedula</i>	1+ 49	1- 4 1-	16	1+ 46	10 1-	0 1-	0 1-	0	125	0.18
<i>Arvicola amphibius</i>	2+ 263	1- 37 1-	65 1-	47 2-	12	1+ 50	31 1-	8	513	0.75
<i>Delichon urbicum</i>	1+ 67	1- 8 1-	22 1-	17 1-	2	1+ 25	11	11	163	0.24
<i>Turdus philomelos</i>	1+ 138	1+ 94	1- 80	118 1-	23	1+ 54	27	20	554	0.81
<i>Sorex alpinus</i>	1+ 34	11	1+ 49	3- 0	5 1-	0	1 1-	0	100	0.15
<i>Sorex araneus</i>	1+ 580	1+ 510	1+ 854	1- 399	1- 106	2- 38	2- 41	1- 58	2586	3.80
<i>Microtus subterraneus</i>	2+ 588	1+ 195	1- 135	1- 109	83 2-	25 3-	7 1-	23	1165	1.71
<i>Talpa europaea</i>	1+ 190	1+ 138	141 1-	84 1-	22 1-	18 1-	13 1-	11	617	0.91
<i>Muscardinus avellanarius</i>	1+ 1126	1+ 529	1256	775 1-	153 2-	66 2-	52 3-	18	3975	5.84
<i>Salmo trutta</i>	1+ 50	1+ 25	23	2- 6	7 1-	1	4 1-	0	116	0.17
<i>Apodemus flavicollis</i>	1- 1113	1+ 2252	4860	1+ 5884	1- 991	1- 510	1- 451	2- 156	16217	23.82
<i>Clethrionomys glareolus</i>	952	1+ 1055	1+ 2774	1- 1153	1- 362	1- 212	2- 122	1- 127	6757	9.93
Limacidae sp.	1- 582	1- 412	2+ 5668	2- 477	2- 228	5- 11	4- 32	6- 2	7412	10.89
<i>Dendrocopos major</i>	11	5 1-	4	1+ 19	3	4	1	5	52	0.08
<i>Lanius collurio</i>	1	2 1-	0	1+ 10		3	1	1	18	0.03
<i>Sitta europaea</i>	1- 5	7 1-	12	1+ 46	7	6	4	8	95	0.14
<i>Emberiza citrinella</i>	1- 3	5 2-	2	1+ 27	6	8	2	5	58	0.09
<i>Garrulus glandarius</i>	12	6 1-	6	1+ 42	3	5	2		76	0.11
<i>Lepus europaeus</i>	1	2	1	1+ 9	1		1	2	17	0.02
<i>Miniopterus schreibersii</i>			1- 0	1+ 13	2				15	0.02
<i>Rhinolophus euryale</i>	1- 0		1- 1	2+ 31					32	0.05
Coleoptera sp.	459	284 2-	243	1+ 989	2- 56	1- 94	1- 58	1+ 199	2382	3.50
<i>Fringilla coelebs</i>	63	1- 37 2-	46	1+ 150	27	1+ 56	29	1+ 52	460	0.68
<i>Coccothraustes coccothraustes</i>	2- 7	1- 7 3-	8	1+ 114	11	1+ 26	1- 3	1+ 27	203	0.30
<i>Parus major</i>	2- 16	2- 8 2-	24	1+ 101	16	2+ 99	15	14	293	0.43
<i>Erithacus rubecula</i>	1- 33	25 1-	40	1+ 91	1- 10	1+ 38	15	18	270	0.40
Orthoptera sp.	1- 6	14 1-	17	1+ 72	1- 1	1+ 18	1- 1	3	132	0.19
<i>Crocridura leucodon</i>	4- 1	2- 6 3-	10	2+ 219	36	2+ 67	12 1-	5	356	0.52
<i>Glis glis</i>	1- 158	182	325	1+ 519	1+ 147	3- 13	1- 39	4- 0	1383	2.03
<i>Myotis mystacinus</i>	1- 6	1- 1 1-	8	1+ 35	2+ 29		4	4	88	0.13
<i>Pipistrellus pipistrellus</i>	6- 0	4- 3 2-	60	4- 12	4+ 916	4- 0	4- 0	3- 2	993	1.46
<i>Barbastella barbastellus</i>	2- 3	2- 2	16 1-	17	3+ 121	1- 1	1- 0	1- 0	160	0.24
<i>Vespertilio murinus</i>	1- 23	1- 10 2-	17 3-	5	3+ 208	1- 4	2- 0	2- 0	267	0.39
<i>Myotis myotis</i>	2- 25	1- 17 1-	52 1-	39	3+ 277	25 2-	2 3-	0	437	0.64

Tab. 1. continuation / pokračovanie

species / dietary type druhy / typ potravy	C	B		E		A		D		G2		G1		F		Σ	%	
<i>Myotis brandtii</i>	3	1	2-	0	8	2+	24									36	0.05	
<i>Eptesicus serotinus</i>	1-	9	14	1-	17	28	2+	28		2		1	1-	0		99	0.15	
<i>Plecotus auritus</i>	4	2		17	6	1+	13		1		1					44	0.06	
<i>Myotis blythii</i>	2			8	8	1+	12		4							34	0.05	
<i>Myotis bechsteini</i>	1-	1	4	12	14	1+	14									45	0.07	
<i>Rhinolophus ferrumequinum</i>					7	1+	7									14	0.02	
<i>Eliomys quercinus</i>	11	4		6	9	1+	10									40	0.06	
<i>Lacerta muralis</i>				1	3	1+	5									9	0.01	
<i>Motacilla cinerea</i>	3	3		1	1	1+	9		1							18	0.03	
<i>Nyctalus noctula</i>	3-	3	2-	5	2-	31	4-	4	3+	246	1+	44	2-	3	1-	9	345	0.51
<i>Rhinolophus hipposideros</i>	1-	3	1-	1	10	9	1+	9	2+	15			1			48	0.07	
<i>Myotis emarginatus</i>	1-	0		2-	0	10		3	2+	16			1		1	31	0.05	
<i>Columba livia domestica</i>	3	2		4	1-	0			2+	15						24	0.04	
<i>Streptopelia decaocto</i>	1	2	1-	0	1-	0			2+	14			2			19	0.03	
<i>Apus apus</i>	1	1		1					2+	11						14	0.02	
<i>Phoenicurus ochruros</i>	3	1	1-	0	2		2	2+	13			3		1		25	0.04	
<i>Turdus merula</i>	74	39	1-	45	112		24	2+	75		21			13		403	0.59	
<i>Muscicapa striata</i>	1			6	1			1+	6							14	0.02	
<i>Carduelis spinus</i>	4		1-	3	7		2	1+	7			1		5		29	0.04	
<i>Phylloscopus collybita</i>				1	1		2	1+	7		2		3			16	0.02	
<i>Phylloscopus trochilus</i>					2		1	1+	6		2					11	0.02	
<i>Motacilla alba</i>				1	3			1+	9		4					17	0.02	
<i>Carduelis chloris</i>	1-	4	1-	0	3-	0	1-	6	1	3+	43	3	1+	8		65	0.10	
<i>Sylvia atricapilla</i>	1-	4	1-	4	1-	7	20	1-	1	2+	29	7	1+	14		86	0.13	
<i>Passer montanus</i>	2-	4	2-	1	3-	0	26	1-	2	2+	45	7	2+	34		119	0.17	
<i>Hirundo rustica</i>	5	7	1-	7	7		7	2	1+	8		4	1+	7		47	0.07	
<i>Carduelis cannabina</i>	3	1-	0	1-	2	10		1	1+	8		6	1+	9		39	0.06	
<i>Serinus serinus</i>	1-	0	1	2-	0	3		1	2+	14	1+	6	1+	7		32	0.05	
<i>Carduelis carduelis</i>	1-	4	2-	0	2-	2	1-	11	1-	0	2+	30	1+	11	2+	19	77	0.11
<i>Rattus norvegicus</i>	1-	8	1-	3	3-	2	1-	19	1-	2	3+	64	1+	19	1+	15	132	0.19
<i>Mus cf. musculus</i>	1-	32	2-	10	6-	0	2-	41	1-	28	3+	308	1+	40	1+	43	502	0.74
<i>Micromys minutus</i>	2-	18	2-	5	4-	3		75	1-	12	2+	97	2+	51	3+	99	360	0.53
<i>Apodemus microps</i>	2-	1	2-	0	3-	0		21		5	2+	33	2+	28	2+	22	110	0.16
<i>Apodemus agrarius</i>	3-	13	4-	0	6-	0	1+	221		33	1+	69	1+	62	3+	160	558	0.82
<i>Microtus arvalis</i>	1-	512	1-	527	3-	305	1+	1841		487	1+	684	3+	1466	1+	402	6224	9.14
<i>Cyanistes caeruleus</i>	1-	9	2-	1	1+	19	1+	50		6	2+	28	1+	12		8	133	0.20
<i>Crocifura suaveolens</i>	4-	1	3-	3	4-	2		86	1+	42	3+	144	1+	31	1-	5	314	0.46
<i>Apodemus sylvaticus</i>	2-	15	1-	13	4-	2		75		26	3+	130	1+	44		10	315	0.46
<i>Turdus pilaris</i>		35	1-	6	3-	3	2-	12	1-	2	3+	72	2+	31	1-	2	163	0.24
<i>Passer domesticus</i>	3-	4	4-	1	5-	2	1-	57	3-	0	3+	237	2+	77		19	397	0.58
<i>Sturnus vulgaris</i>		5		4	2-	0		11		2	2+	24	1+	9		3	58	0.09
<i>Sorex minutus</i>	122	1+	98	1-	126		157	1-	33	1-	20	1+	44	1+	51		651	0.96
<i>Rana cf. esculenta</i>	5-	0	4-	2	6-	0	1+	255	2-	13	1-	21	2-	4	3+	232	527	0.77
<i>Rana arvalis</i>	4-	0	3-	0	5-	0	3-	4	3-	1	2-	1	1-	6	4+	268	280	0.41
<i>Rana ridibunda</i>	3-	0	3-	0	4-	0	2-	5	2-	0	2-	0	1-	1	4+	154	160	0.24
<i>Pelobates fuscus</i>	5-	0	4-	2	6-	0	1-	55	3-	3	1-	10		19	4+	435	524	0.77

Tab. 1. continuation / pokračovanie

species / dietary type druhy / typ potravy	C		B		E		A		D		G2		G1		F		Σ	%
<i>Hyla arborea</i>	3-	0	2-	3	3-	3	1-	14	2-	1	1-	2	4	4+	130		157	0.23
Cypriniformes sp.								2				1	1	1+	5		9	0.01
<i>Gryllotalpa gryllotalpa</i>					1-	0		4				3	1	1+	9		17	0.02
<i>Regulus</i> sp.		7		3	1-	9		10		6		6	6	1+	9		56	0.08
<i>Periparus ater</i>		13		5		15	1-	6		3		6	1				49	0.07
<i>Streptopelia turtur</i>	—	3	—		1-	0	—	2	—		—	4	3		3		15	0.02
<i>Turdus viscivorus</i>		13		9		17		16		3		6	6				70	0.10
<i>Pyrrhula pyrrhula</i>		8		7		7		6		4		3	2		1		38	0.06
<i>Troglodytes troglodytes</i>		4		2		4		7		1			4		1		23	0.03
<i>Poecile palustris</i>		4		2		3		9		2		1					21	0.03
<i>Mustela nivalis</i>		5				3		6		2			2		1		19	0.03
<i>Picus canus</i>		3		2		5		5		3							18	0.03
<i>Anthus trivialis</i>		1		5		1		6		2		1	1		1		18	0.03
<i>Riparia riparia</i>		5		3		1		4		1			1		2		17	0.02
<i>Prunella modularis</i>		7		2		3		1		1			1		1		16	0.02
<i>Myotis nattereri</i>		2				6		4		4							16	0.02
<i>Certhia</i> sp.		3		3		3		3							2		14	0.02
<i>Tetrastes bonasia</i>		6		1		2		3		2							14	0.02
<i>Eptesicus nilssonii</i>		4				2		4		3							13	0.02
<i>Myotis daubentonii</i>						1		5		1		1	4				12	0.02
<i>Lacerta vivipara</i>		2		1		7							1				11	0.02
<i>Dendrocopos medius</i>		2		1		1		4				1			1		10	0.01
Mammalia		6479		5715		11292		12159	1+	4559		2690		2612	1-	1237	46743	68.67
Aves		738	1-	402	2-	553		1312	1-	227	2-	1124	1+	360	1+	373	5089	7.48
Amphibia, Reptilia, Pisces	2+	2721		613	2-	476	1-	674	1-	222	2-	137	1-	174	2+	1229	6246	9.18
Evertebrata	1-	1063	1-	714	1+	5934	1-	1551	2-	285	2-	133	2-	97	1-	215	9992	14.68
Σ		11001		7444		18255		15696		5293		4084		3243		3054	68070	100.00
Diversity H'		2.87		2.57		2.14		2.70		3.00		3.45		2.50		3.15	3.05	

C – cold and wet mountain ranges / chladnejšie a vlhšie pohoria; B – middle montane zone / stredne vysoké pohoria; E – +Limacidae; A – lower mountain ranges / nižšie pohoria; D – +Chiroptera; G – strongly human-influenced diet / antropicky silne ovplyvnená potrava; G1 – dominance of *M. arvalis* >30% / dominancia *M. arvalis* >30%; G2 – increased diversity of prey / zvýšená diverzita koristi; F – lowland floodplain forests / nížinné lužné lesy

The region of the Slovenský kras Mts. is dominated by oak-hornbeam forests. Before the 1950's, large parts of this land were deforested and grazed by sheep. In the present time, part of these areas was artificially forested and in some parts the area is being overgrown with a succession of scrub and woods. Woods produce seeds that are the basic food component of the most abundant forest species *A. flavicollis*. Most pellet samples of *S. aluco* from the Slovenský kras Mts. were classified as type A of the lower mountain ranges with warmer and drier climate and to subtype A1 of the carstic regions with higher proportion of bats and the fat dormouse *G. glis* (Obuch 1992). Only in the hilly part of the Zádielská dolina valley, adjacent to Volovské vrchy Mts. with prevailing beech forests, we found a higher proportion of Limacidae (42.7%) in the

pellets of *S. aluco* and thus these areas were classified as type E.

On average the three main dietary types in the Slovenský kras Mts. contained 78.9% of Mammalia with two main dominant species: *A. flavicollis* (28.3%) and *M. arvalis* (14.0%). Birds (Aves 7.2%) are also quite frequent. The frequency of lower vertebrate taxa (Amphibia, Reptilia and Pisces, 2.2%) is quite low. Evertebrata (11.8%) comprise mainly of the order Coleoptera (5.9%) and slug family Limacidae (5.7%).

Food samples of *S. aluco* from the Jasovský kras carst are characteristic for the high proportion of six typical forest mammal species (*Sorex araneus*, *S. minutus*, *C. glareolus*, *M. agrestis* and *Microtus subterraneus*). The non-forest species *M. arvalis* is also quite frequent.

The samples of *S. aluco* pellets from the Zbojnická jaskyňa cave have shown besides bats (12.7%) the composition typical for the A type with *A. flavicollis* (36%) being the most dominant prey, followed by *M. arvalis* (12%) and *C. glareolus* (9%). Periodic increases in abundance of these species could be caused by population peaks. The following peaks were observed: *A. flavicollis* in 1995, 1997 and 2002, *M. arvalis* in 2006 and *C. glareolus* in 2008–2009. In Silická ľadnica cave there was an increased proportion of *A. flavicollis* in 2002, 2005 and 2009–2010 and in Liščia diera cave in 1997 and 2006. Similarly ambiguous results associated with rodent peaks in *S. aluco* diet were found at four type E sites on the Muránska planina Mts. (Obuch 1997).

Silická ľadnica cave (Fig. 4, Appendix 2). In 34 years of sampling *S. aluco* pellets we have found 17 bat species with a presence of 4.7%. The garden dormouse *Eliomys quercinus* was more frequent in the first samples from 1976 and 1981 and then reappeared in 2006. The frequency of the most dominant species *A. flavicollis* (40.7%) was markedly below average at the beginning of the observed period and above average in the last years (since 2002). In the last three pellet collections we could see increased frequency of the accessory prey items such as *C. glareolus* and Limacidae family. The opposite development could be seen in the non-forest species *M. arvalis* with frequency above average in the first three sampling sessions, when pastures dominated the surroundings of the cave. Between 1987 and 1997 the owl abandoned the cave. This was caused by the construction of a tourist trail and railing at the entrance to the cave.

Liščia diera cave (Appendix 3). The National Nature Reserve (NPR) Domické škrapy was deforested and grazed by sheep until the 1960's. Presently this area is being overgrown with shrubs and oak-hornbeam forest. The diet of *S. aluco* which was scarcely present in the Liščia diera cave was dominated by the non-forest species *M. arvalis* (35.7%). Other mammal prey included mainly forest species. Bats preferring warmer climate such as *Rhinolophus euryale* and *R. ferrumequinum* were regularly present in the pellets. These species are present in the caves Domica and Čertova diera all year round (Uhrin et al. 2002a). The owl rested in the Liščia diera cave only for a short period during the year and it also used other shelters in the vicinity of the Domica cave, e. g. the chimney in the old building at the cave entrance. This building was repaired in 2008 and therefore the owl disappeared from the Liščia diera cave during this period. The surrounding zone with a diameter of two km from this cave is largely forest-free. The diet of the owl inhabiting this cave is very close to

the samples from Sebeslavce, which were classified as subtype G1. The current vegetation succession in the surrounding of the cave Liščia diera cave is leading to an increase in forest species, while human influence is diminishing. Because of this development this cave was classified as type A.

Maštaľná cave (Appendix 4). This cave at the eastern edge of Plešivecká planina plateau was inhabited by *S. aluco* during the whole Holocene period. The layers of the soil probe extracted at the entrance to the cave by Ložek & Horáček (1988) have shown changes in the frequency of different snail species (Gastropoda) and vertebrates (Vertebrata). Obuch (1998c) points at a certain time lag between the age of the snails falling in front of the cave entrance directly from the rock face above and the age of the bones moving from inside the cave, as owls inhabited deeper parts of the cave. In 1982 and 1994 we collected four samples of 0–5 cm surface layer of the soil from the sub-recent period in the deeper parts of the cave (samples 1–4). Sample No. 1 differs from the recent pellet samples by higher frequency of the non-forest species *M. musculus* and *A. microps*. Sample No. 2 is distinct for the increased frequency of four passeriform species and slugs of the Limacidae family. Samples No. 3 and 4 were distinct for the non-forest species *M. arvalis* and *C. leucodon*. In the samples up until 1982, the non-forest species *A. sylvaticus* and *A. agrarius* were more frequent, whereas from the 1990's the forest species *A. flavicollis* was more dominant. Even later the frequency of occurrence of the edible dormouse *G. glis* increased. In 1990's sheep grazing was stopped at the Plešivská planina plateau, followed by a strong succession of woods. The occurrence of the synanthropic species *M. musculus*, *Rattus norvegicus* and *P. domesticus* as well as fish in the food samples show that owls from the upper edge of the plateau hunt in the valley of the Slaná River and in the village Slavec.

Revúcka vrchovina Mts. (Table 4) This mountain range has similar environmental conditions as the Slovenský kras Mts. The carstic areas are smaller (Drienčanský kras Karst). Caves and gaps with large entrances suitable as diurnal rest places for owls are absent. In large parts of this area, the geological ground is formed of igneous rock. Diurnal rest places of *S. aluco* could be found in the entrances to old mines after iron ore mining had ceased (Nandraž), magnezite mines (Jelšava) or andezite rock mines (Pokoradz). Other samples of *S. aluco* pellets were collected in buildings: in a granary (Hrušov), churches (Prihradzany, Španie pole), and castle (Nižné Valice), barn (Teplý Vrch) or from the lofts of abandoned buildings (Ratková, Hámor).

Tab. 2. The diet of *Strix aluco* in Slovakia, type **A** from the lower mountain ranges**Tab. 2.** Potrava *Strix aluco* na Slovensku, typ **A** z nižších pohorí

species / mountain range druhy / pohorie	1		2		3		4		5		Σ	%
<i>Sorex minutus</i>	1+	107	1-	29		6		10		5	157	1.00
<i>Crocidura leucodon</i>	1+	180	2-	16	1-	6		17	1-	0	219	1.40
<i>Myotis mystacinus</i>	1+	30	1-	5							35	0.22
<i>Eptesicus serotinus</i>	1+	26	1-	1						1	28	0.18
<i>Pipistrellus pipistrellus</i>	1+	12									12	0.08
<i>Barbastella barbastellus</i>	1+	16	1-	1							17	0.11
<i>Dryomys nitedula</i>	1+	42	2-	1		3					46	0.29
<i>Apodemus microps</i>	1+	18		3							21	0.13
<i>Microtus subterraneus</i>	1+	77	1-	21		7	1-	0		4	109	0.69
Coleoptera sp.	1+	666		295	2-	11	3-	10	1-	7	989	6.30
Limacidae sp.	1+	394	1-	73	2-	4	4-	0	1-	6	477	3.04
<i>Microtus arvalis</i>	1+	1236	1-	297	2-	39	1+	247	1-	22	1841	11.73
<i>Micromys minutus</i>	1-	16	1+	55		2	1-	0		2	75	0.48
<i>Apodemus agrarius</i>		95	1+	120	1-	6	2-	0	1-	0	221	1.41
<i>Miniopterus schreibersii</i>		3	1+	10							13	0.08
<i>Pelobates fuscus</i>	1-	9	1+	41		5					55	0.35
<i>Rana temporaria</i>	1-	94	1+	211	3-	0	3-	1	1+	14	320	2.04
<i>Rana cf. esculenta</i>	1-	81	1+	149	1+	24	3-	0	1-	1	255	1.62
Orthoptera sp.	1-	28	1+	32	1+	12	1-	0			72	0.46
<i>Apodemus flavicollis</i>	1-	2492	1+	2321	1+	498		407		166	5884	37.49
<i>Glis glis</i>		331	1-	112	1+	60	2-	5		11	519	3.31
<i>Neomys anomalus</i>	1-	13		12		1	2+	19		1	46	0.29
<i>Coccothraustes coccothraustes</i>		54	1-	20		8	2+	28		4	114	0.73
<i>Passer domesticus</i>		27	1-	9		3	2+	18			57	0.36
<i>Dendrocopos major</i>		7	1-	0		4	1+	7		1	19	0.12
<i>Garrulus glandarius</i>		23	1-	6		3	1+	9		1	42	0.27
<i>Parus major</i>		42		43		3	1+	13			101	0.64
<i>Turdus merula</i>		56		32		6	1+	17		1	112	0.71
<i>Clethrionomys glareolus</i>		588		348	1-	41	1+	1123	1+	53	1153	7.35
<i>Talpa europaea</i>		38		20		9		10	1+	7	84	0.54
<i>Turdus philomelos</i>		72	1-	26		3		5	1+	12	118	0.75
<i>Fringilla coelebs</i>		76		38		11		6	2+	19	150	0.96
<i>Sitta europaea</i>	1-	16		21		3		6			46	0.29

The diet of five owl species from the region of Revúcka vrchovina Mts. was described in a separate study (Obuch 2000c). The food remains of *S. aluco* from the buildings are mainly composed of non-forest species, classified as type G. In the church at Prihradzaný, pellets of both *S. aluco* and *T. alba* were found. The dietary ranges of both species were very similar without significant differences. The largest collection of pellets from the castle in Nižné Valce was distinct for its high content of bird remains, especially of the *Parus* and *Passer* genera and synanthropic mammal species such as *M. musculus* and *R. norvegicus*, but also non-forest species of the genera *Apodemus* and *Crocidura* and wetland species *M. minutus* and *A. amphibius*.

The owl inhabiting the granary filled with grain at the edge of the village Hrušov concentrated on hunting forest mammal species, although the granary had a numerous population of house mice (*M. musculus*) and rats (*R. norvegicus*). This owl only used the granary as a diurnal roost place and searched for food in the forest. Therefore its food samples belong to the type A. Collections from the Hámor at Ratková are distinct for an increased proportion of frogs (sp. *R. temporaria*) and dormice (species *M. avellanarius* and *G. glis*).

Abandoned mine at Nandraž (Appendix 5, Fig. 5). In this mine, large summer colonies of *R. euryale* and *Miniopterus schreibersii* can be found and other bat species

Tab. 2. continuation / pokračovanie

species / mountain range druhy / pohorie	1		2		3		4		5		Σ	%
<i>Carduelis carduelis</i>	1-	0		5		1		4		1	11	0.07
<i>Sorex araneus</i>		246	1-	93	1-	15		36		9	399	2.54
<i>Apodemus sylvaticus</i>		45		23		6	1-	0		1	75	0.48
<i>Erithacus rubecula</i>		55		28		4		2		2	91	0.58
<i>Crocidura suaveolens</i>		48		23		8		7			86	0.55
<i>Cyanistes caeruleus</i>		21		21		4		4			50	0.32
<i>Arvicola amphibius</i>		27		15		5					47	0.30
<i>Mus cf. musculus</i>		29		10		2					41	0.26
<i>Myotis myotis</i>		27		9		3					39	0.25
<i>Rhinolophus euryale</i>		20		11							31	0.20
<i>Emberiza citrinella</i>		20		5		1		1			27	0.17
<i>Passer montanus</i>		13		5				4		4	26	0.17
<i>Neomys fodiens</i>		14		11							25	0.16
<i>Microtus agrestis</i>		12		8							20	0.13
<i>Sylvia atricapilla</i>		8		11		1					20	0.13
<i>Rattus norvegicus</i>		9		8				2			19	0.12
<i>Delichon urbicum</i>		8		5				2		2	17	0.11
<i>Turdus viscivorus</i>		13		1						2	16	0.10
<i>Hyla arborea</i>		10		4							14	0.09
<i>Myotis bechsteinii</i>		8		5		1					14	0.09
<i>Turdus pilaris</i>		9		1		2					12	0.08
<i>Sturnus vulgaris</i>		2		5				3		1	11	0.07
<i>Myotis emarginatus</i>		7		3							10	0.06
<i>Lanius collurio</i>		4		5				1			10	0.06
<i>Regulus</i> sp.		5		1		1		3			10	0.06
<i>Carduelis cannabina</i>		5		1		2		2			10	0.06
Mammalia		6317		3869		746		933		294	12159	77.47
Aves		666		355		75	1+	154	1+	62	1312	8.36
Amphibia, Reptilia, Pisces	1-	209	1+	414		32	3-	3		16	674	4.29
Evertebrata	1+	1088		413	2-	27	3-	10	1-	13	1551	9.88
Σ		8280		5051		880		1100		385	15696	100.00
Diversity H'		2.81		2.44		2.10		2.24		2.31	2.70	

1 – Slovenský kras Mts., 2 – Revúcka vrchovina Mts., 3 – Cerová vrchovina Mts., 4 – Strážovské vrchy Mts., Drieňov (Kropil 1987), 5 – Malé Karpaty Mts., leq. J. Chavko. 11 samples from 1979–1997 / 11 zberov z rokov 1979–1997

1 – Slovenský kras Mts., 2 – Revúcka vrchovina Mts., 3 – Cerová vrchovina Mts., 4 – Strážovské vrchy Mts., Drieňov (Kropil 1987), 5 – Malé Karpaty Mts., leg. J. Chavko, 11 samles from 1979–1997 / 11 zberov z rokov 1979–1997

use this cave during the winter (Uhrin et al. 2002b, c). The pellets of *S. aluco* contained eight bat species with 1.7% dominance, which means that the owl hunts them only occasionally. Population lows of the main forest species *A. flavicollis* (47.9%) and *C. glareolus* (8.5%) are reflected in small samples and increased proportion of birds in the diet (2007) or greater abundance of frogs and invertebrates (2006).

Pokoradzské jazierka lakes (Appendix 6). The owl inhabiting the NPR Pokoradzské jazierka lakes showed a quite unusual specialization within the A type. In its pellets we could find seven frog species with 20.8% dominance. Its diet differed from the floodplain type

by the presence of *R. temporaria* and Limacidae family (2.2%) and dominance of *A. flavicollis* (31%). The most frequent frog species included *Rana cf. esculenta* (13.8%) and *Pelobates fuscus* (4.1%). In recent years the size of the samples decreased due to the frequent disturbance of the owl, as this location is becoming a recreational area of the town Rimavská Sobota.

Cerová vrchovina Mts. and Bodvianska pahorkatina Mts. (Appendix 7). In the Cerová vrchovina Mts. we found the rest places of *S. aluco* in natural basalt massifs (Steblova skala, Pohanský vrch Mt. and Soví vrch Mt.), abandoned quarries (Ebeckého baňa mine under Ragáč Mt. and Šurice quarry at the Pohanský vrch Mt.). The



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Figs 4–10. Examples of sites in Slovakia where *S. aluco* diet samples were collected. **4.** Slovenský kras Mts., viewed from Silická ľadnica cave. **5.** Revúcka vrchovina Mts., lower entrance to the mine at Nandraž. **6.** Veľká Fatra Mts., overhanging rock in the Havranovo valley with bone layers from the Holocene period. **7.** Slovenský kras Mts., entrance to the Zbojnická jaskyňa cave. **8.** Veľká Fatra Mts., rock chimney in the Bystrická dolina valley, used by *S. aluco* as a diurnal roost place. **9.** Turčianska kotlina basin, church at Sebeslavce with lime trees at the forest edge. **10.** Turčianska kotlina basin, park at Mošovce.

Obr. 4–10. Prikklady lokalít zberov vzoriek potravy *S. aluco* na Slovensku. **4.** Slovenský kras, pohľad zo Silickej ľadnice. **5.** Revúcka vrchovina, dolný vchod do štólne pri Nandraži. **6.** Veľká Fatra, skalný previs v doline Havranovo s vrstvami kostí z obdobia holocénu. **7.** Slovenský kras, vchod do Zbojníckej jaskyne. **8.** Veľká Fatra, skalný komín v Bystrickej doline, ktorý využíva *S. aluco* na denný úkryt. **9.** Turčianska kotlina, kostol v Sebeslavciach s lípami na okraji lesa. **10.** Turčianska kotlina, park v Mošovciach.



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diet of *S. aluco* in this volcanic mountain range is characterized by highly dominant *A. flavicollis* (56.6%). The frequency of Aves (8.5%) was close to average for the dietary type A, with only scarce occurrence of the family Limacidae (0.4%). The majority of the more numerous species showed even distribution in all compared samples. Minor deviations from the mean were found in five species. In the Činča valley in the Bodvianska pahorkatina hills we found an owl's diurnal rest place on the loft of alone standing cottage.

Type B from the middle montane zone. The middle montane zone is characterized by deciduous forests, with prevailing beech. The structure of *S. aluco* diet was close to the average for the whole area of Slovakia (Table 5). Therefore the B dietary type has no distinct determinate taxon. However, there are taxons that differentiate other dietary types from this average type. The main food components included Mammalia (76.8%) with dominant species *A. flavicollis* (30.2%) and *C. glareolus* (14.2%).

Aves (5.4%) were a rare or accidental prey (at least of 56 species). The most dominant frog species was *R. temporaria* (7.8%), fish species *Salmo trutta* (0.3%) and most frequent invertebrates were of the order Coleoptera (3.8%) and family Limacidae (5.5%). The comparison of food samples from seven mountain ranges showed that the dominant species *A. flavicollis* had above average abundance in volcanic mountain ranges and on the southern slopes of the Muránska planina Mts., where the subdominant species *C. glareolus* was also quite frequent. Further frequently occurring species showed higher abundances in the Veľká Fatra Mts.: *S. araneus*, *M. avellanarius*, *G. glis*, *R. temporaria* and the slug family Limacidae. The amount of material analyzed from the Malá Fatra Mts. and Strážovské vrchy Mts. was too small and thus could not be classified as this dietary type.

Veľká Fatra Mts. (Table 6). The majority of *S. aluco* food samples were collected from the rocky part of the mountains characterized by calcareous and dolomite bedrock. This ground is well drained and thus leads to

Tab. 3. The diet of *Strix aluco* in Slovakia, Slovenský kras Mts., dietary types

dietary type / typ potravy		D																%				
species / sites // druhy /		D																Σ				
locality		10	9	8	D	A	A	A	A	A	A	A	A	A	A	E	%					
<i>Mus cf. musculus</i> <i>Vespertilio murinus</i> <i>Pipistrellus pipistrellus</i> <i>Crocidura suaveolens</i> <i>Myotis blythii</i> <i>Turdus merula</i> <i>Lacerta muralis</i> <i>Nyctalus noctula</i> <i>Myotis myotis</i> <i>Glis glis</i> <i>Clethrionomys glareolus</i> <i>Microtus subterraneus</i> <i>Sorex araneus</i> <i>Apodemus agrarius</i> <i>Sorex minutus</i> <i>Microtus agrestis</i> <i>Orthoptera</i> sp. <i>Barbastella barbastellus</i> <i>Apodemus flavicollis</i> <i>Eptesicus serotinus</i> <i>Myotis bechsteinii</i> <i>Myotis brandtii</i> <i>Myotis mystacinus</i> <i>Eliomys quercinus</i> <i>Rana temporaria</i> <i>Rana cf. esculenta</i> <i>Microtus arvalis</i> <i>Rhinolophus euryale</i> <i>Rhinolophus ferrumequinum</i> <i>Coccythraustes coccothraustes</i> <i>Hyla arborea</i> <i>Pelobates fuscus</i> <i>Crocidura leucodon</i> <i>Dryomys nitedula</i> <i>Muscardinus avellanarius</i>	2+	22	2	1-	2	2	2	6	1	20	55	0.46										
	1+	5	1	1	1	1	1	1	4	4	11	0.09										
	3+	384	3+	302	1-	67	2-	0	3-	1	2-	4	5-	1	4-	0	5-	6	3-	0	765	6.44
	1+	23	1+	11	1-	7	3	1	14	9	1-	21	1	1-	0	14	0.12					
	1	1	1+	5	1	1	1	5	1	1-	0	82	0.69									
	1-	1	1+	11	12	2	1	13	5	35	2	7	0.06									
	1+	5	1	1	1	1	1	1	1	2	126	1.06										
	1-	3	1-	1	3+	115	1-	0	3-	1	1-	0	4-	1	6	1	42	0.35				
	1-	21	1-	8	1+	12	1+	5	2	12	1	1-	206	10	474	3.99						
	1-	24	2-	5	1+	168	16	2+	95	17	130	1-	18	312	32	817	6.87					
	1-	3	1-	0	1+	33	2	2+	20	3	20	1-	0	1-	32	3	116	0.98				
	2-	5	2-	0	41	7	2+	35	1-	2	1+	68	3-	0	134	1-	4	296	2.49			
	12	5	5	14	3	2+	19	20	12	41	126	1.06										
	6	1-	0	16	1+	15	3	26	1-	2	61	129	1.09									
	1	1	1	8	3+	28	1-	0	2-	0	2	14	0.12									
	2	1	1	7	1+	7	5	1	1-	1	18	0.15										
	1-	125	2-	35	1+	640	67	1-	58	1-	152	1-	72	3364	28.31							
	3	1	1	2	1+	5	1+	17	1-	4	30	0.25										
	10	2	1	1	1+	7	1+	8	2-	0	8	0.07										
	2	2	10	3	1	2+	29	0	1-	1	16	0.13										
	2-	0	3	16	5	4	1	39	1-	2	43	0.95										
	1-	2	1	10	1	1	1+	30	2+	23	1-	26	94	0.79								
	115	68	220	23	1+	84	1-	26	320	2+	247	536	1-	20	1659	13.96						
	1	1	6	1	1	1	2+	19	1-	0	20	0.17										
	3	3	1-	3	2	1	1+	7	1-	0	14	0.12										
	1	1	2	2	1	1+	12	27	63	0.53												
1	1	2	2	4	1+	6	4	2	13	0.11												
1	1	2	2	4	1+	5	1-	0	12	0.10												
23	7	6	6	13	1+	13	1-	20	15	119	2	218	1.83									
4	1	1-	2	1	2	2	6	3	1+	30	49	0.41										
2-	10	2-	6	5	1-	7	9	103	1-	11	1+	280	508	4.27								

Tab. 3. continuation / pokračovanie

dietary type / typ potravý species / sites // druhy / locality		D	D	D	A	A	A	A	A	A	A	A	A	E	%					
10	9	8	A	A	5	6	3	2	1	7	Σ									
<i>Erethacus rubecula</i> Coleoptera sp. Limacidae sp. <i>Parus major</i> <i>Turdus philomelos</i> <i>Passer domesticus</i> <i>Fringilla coelebs</i> <i>Rhinolophus hipposideros</i> <i>Micromys minutus</i> <i>Apodemus sylvaticus</i> <i>Talpa europaea</i> <i>Arvicola amphibius</i> <i>Emberiza citrinella</i> <i>Garrulus glandarius</i> <i>Cyanistes caeruleus</i> <i>Apodemus microps</i> <i>Sitta europaea</i> <i>Neomys fodiens</i> <i>Neomys anomalus</i> <i>Turdus viscivorus</i> <i>Passer montanus</i> <i>Delichon urbicum</i> <i>Rattus norvegicus</i>	2	7		3	1	8	6	1+	37	6	70	0.59								
	4-	1	2-	4	2-	2	3	1-	7	3-	18	1-	14	1+	622	1-	8	698	5.87	
	2-	13	1-	15	100	2-	4	1-	4	2-	32		50		304	3+	151	673	5.66	
	1-	0	6	7	1	1	2			7	7	6			26			55	0.46	
	8	7	1-	4	2		2		5	24	1-	1	40		40		2	93	0.78	
			1-	0			2				8	1	16					27	0.22	
	9	7	2-	1	2		2		20	5	47	4						97	0.82	
	1	2	6				4	1	2	1-	1							17	0.14	
	3	3	6				2			5	4	1-	5					28	0.24	
	6	4	16	1			6			12	1		25					71	0.60	
	1		7	4			3	2		13		16						46	0.39	
	1		5	2	3		3	1		4	1	16						33	0.28	
	2	3	1	1	1		2		7	2	8							26	0.22	
	2	1		3					8	2	10							26	0.22	
	1	1	3				1	1	3	5	11							26	0.22	
	3	2					1		3		14							23	0.19	
	3		4	1				2	5	2	6							23	0.19	
	1	1	2				3		5	6								18	0.15	
	2		2				2		4	7								17	0.14	
		2						2	9									15	0.13	
	2								7									15	0.13	
	1	1	2					1	5	2								12	0.10	
	2						1			5								11	0.09	
Mammalia		823	478	1586	159	393	235	1849	533	3148	1-	165	9369	78.84						
Aves		56	52	1-	53	1+ 125	1-	17	16	163	59	386	28	855	7.19					
Amphibia, Reptilia, Pisces		1-	5	14	30	6	7	1-	1	1+ 75	1+	36	84	260	2.19					
Evertebrata		3-	14	2-	19	1-	120	2-	3-	7	39	2-	50	1-	64	1+ 926	2+	159	1400	11.78
Σ		898	563	1789	192	424	291	2137	692	4544	354	11884	100.00							
Diversity H'		2.34	2.11	2.48	2.57	2.63	2.41	2.58	2.42	2.73	2.04	2.89								
10 – Ohňišie cave, 9 – Erňa cave, 8 – Zbojnická jaskyňa cave, 4 – Dolný Vrch, 5 – Jasovský kras Mts., 6 – Slovenský kras Mts., other sites / ostatné lokality, 3 – Silická Ľadnica cave, 2 – Liššia diera cave, 1 – Maštalná cave, 7 – Zádiel, upper part of the valley / horná časť doliny																				

Tab. 3. continuation / pokračovanie

Other species (site – number) / Ostatné druhy (lokality – počet):
<i>Myotis nattereri</i> (3–4; 8–1), <i>Myotis daubentonii</i> (3–5), <i>Myotis dasycneme</i> (3–3), <i>Eptesicus nilssonii</i> (3–3; 6–1; 8–1), <i>Plecotus auritus</i> (1–2; 3–2; 6–1; 8–2; 10–1), <i>Plecotus austriacus</i> (2–1), <i>Miniopterus schreibersii</i> (2–2; 6–1; 9–1; 10–1), <i>Lepus europaeus</i> (1–2; 2–1; 3–4; 5–1; 7–1; 9–1), <i>Sciurus vulgaris</i> (5–2), <i>Spermophilus citellus</i> (1–3; 3–1), <i>Cricetus cricetus</i> (3–2; 10–1), <i>Terricola tatricus</i> (10–2), <i>Microtus oeconomus</i> (10–2), <i>Chionomys nivalis</i> (10–2), <i>Mustela erminea</i> (9–1), <i>Mustela nivalis</i> (1–3; 3–2; 5–1; 10–2), <i>Falco tinnunculus</i> (1–1; 3–2), <i>Falco subbuteo</i> (3–1), <i>Tetrastes bonasia</i> (1–3; 10–1), <i>Scelopax rusticola</i> (1–1), <i>Columba oenas</i> (3–1), <i>Columba palumbus</i> (4–1), <i>Streptopelia turtur</i> (1–1; 3–1), <i>Cuculus canorus</i> (1–3), <i>Aegolius funereus</i> (3–1; 9–1), <i>Merops alpestris</i> (9–1), <i>Picus canus</i> (1–4; 3–1; 8–1; 10–2), <i>Dendrocopos major</i> (1–7; 8–1; 9–1), <i>Dendrocopos syriacus</i> (3–1; 6–1), <i>Dendrocopos medius</i> (1–2), <i>Dendrocopos minor</i> (4–1), <i>Dendrocopos</i> sp. (3–2), <i>Alauda arvensis</i> (1–1), <i>Hirundo rustica</i> (4–2; 7–1; 8–1; 9–1), <i>Riparia riparia</i> (1–1; 3–1; 4–1; 10–1), <i>Anthus trivialis</i> (1–1; 3–2), <i>Anthus pratensis</i> (3–1), <i>Bombus garrulus</i> (1–1; 3–1), <i>Lanius collurio</i> (1–1; 2–1; 3–2), <i>Prunella modularis</i> (1–1; 10–1), <i>Acrocephalus palustris</i> (1–1; 3–1), <i>Sylvia atricapilla</i> (1–6; 3–1; 6–1; 10–1), <i>Phylloscopus trochilus</i> (10–1), <i>Phylloscopus collybita</i> (10–2), <i>Phylloscopus sibilatrix</i> (3–1; 7–2), <i>Regulus</i> sp. (1–3; 3–1; 6–1; 7–1; 9–1; 10–2), <i>Sylvia</i> sp. (1–4; 3–2; 8–1), <i>Muscicapa striata</i> (3–1; 7–3), <i>Ficedula</i> sp. (1–1), <i>Phoenicurus ochruros</i> (3–1; 9–1), <i>Luscinia megarhynchos</i> (1–1), <i>Luscinia</i> sp. (1–1; 9–1), <i>Turdus torquatus</i> (7–1; 10–1), <i>Turdus pilaris</i> (1–6; 2–1; 3–1; 6–1; 8–1), <i>Turdus</i> sp. (10–2), <i>Aegithalos caudatus</i> (1–1; 3–1), <i>Periparus ater</i> (1–1), <i>Lophophanes cristatus</i> (9–1), <i>Poecile palustris</i> (1–2; 3–2; 4–1), <i>Poecile montanus</i> (1–1; 3–1), <i>Paridae</i> sp. (1–13; 3–3), <i>Certhia</i> sp. (3–1), <i>Troglodytes troglodytes</i> (1–2; 3–1), <i>Emberiza calandra</i> (10–1), <i>Carduelis spinus</i> (3–1; 6–1; 10–1), <i>Carduelis cannabina</i> (1–3; 2–1; 5–1; 10–1), <i>Carduelis chloris</i> (1–1), <i>Pyrrhula pyrrhula</i> (1–2; 2–2; 7–2; 8–2; 9–1; 10–1), <i>Serinus serinus</i> (3–1; 5–1; 9–1), <i>Sturnus vulgaris</i> (1–1; 3–1; 9–1), <i>Garrulus glandarius</i> (1–10; 2–2; 3–8; 4–3; 9–1; 10–2), <i>Passeriformes</i> sp. (1–18; 2–2; 3–8; 4–1; 5–3; 7–1; 8–1; 10–3), <i>Aves</i> sp. (1–4; 9–1), <i>Bufo bufo</i> (9–1), <i>Rana ridibunda</i> (1–1), <i>Rana arvalis</i> (3–2; 9–1), <i>Lacerta viridis</i> (9–3; 10–1), <i>Lacerta agilis</i> (8–1), <i>Lacerta muralis</i> (1–2; 9–5), <i>Serpentes</i> sp. (1–1), <i>Salmo trutta</i> (1–3; 5–2; 8–1), <i>Cypriniformes</i> sp. (1–2), <i>Pisces</i> sp. (1–1)

relatively dry conditions even at higher elevations. Wet mixed forests can only be found in the upper parts of the valleys with marl-limestone and schist alternations. The samples of *S. aluco* pellets from the middle part of Blatnická dolina valley, slopes of Tlstá Mt. and Belianska dolina valley fell into the B dietary type. The samples from Dedošová, Selenec, Necpalská Dedošová and from the peak zone of Čierny Kameň Mt. belonged to the type C. Between 1978–1992, the frequency of family Limacidae at the opening of the Bystrická dolina valley above Dolný Harmanec village was below 10%. In this period we could see higher abundances of *S. araneus*, *M. avellanarius*, *C. glareolus* and *R. temporaria*. This species range is typical for the dietary type C. In the following period until 2009, there were alternating periods with increased frequency of *A. flavicollis* (1993, 2000, and 2005, 2007–2008) and seasons with higher frequency of Limacidae family as the substitutional diet. Therefore the recent samples from Bystrická dolina valley and Izbica cave were classified as dietary type E.

The recent food samples of *S. aluco* from the surroundings of Dolný Harmanec village differed from the samples from the Veľká Fatra Mts. of the Turiec region not only for the higher proportion of Limacidae, but also higher frequencies of *C. glareolus* and three bat species. In Havranovo near Blatnica there were higher proportions of frogs (*R. temporaria*) and beetles (Coleoptera). In Blatnická dolina valley there were greater abundances of shrews (*S. araneus*, *S. minutus*), voles (*M. arvalis*) and dormice (*G. glis*, *M. avellanarius*). Food samples of the C dietary type from Dedošová and Čierny Kameň Mt. were notable for higher abundance of *M. subterraneus*, *T. europaea* and *S. betulina*. The endemic species *M. tatricus* was more abundant at Čierny Kameň Mt., but its presence was confirmed in all studied parts of Veľká Fatra Mts.

Havranovo (Appendix 8). In total we have analyzed 15 samples from a 30 year time period collected at the site Havranovo, located in the massif of Tlstá Mt. Frogs (*R. temporaria*) and beetles (Coleoptera) were quite frequent only in the first two years. Increased frequencies of other taxons such as: Limacidae family, *M. arvalis*, *C. glareolus*, *A. flavicollis*, *M. avellanarius* were alternating. Trouts (*S. trutta*), which were more abundant in the samples from 1991 could be hunted by the owl in the Gaderský potok creek, which was approximately two km far from its diurnal roost place. After 2001 the owl abandoned this site. *S. aluco* pellet samples from the last years come from the caves Biela and Jelenia, located approximately 0.5 km from Havranovo.

Changes in *S. aluco* diet in the Veľká Fatra Mts. during the Holocene period (Table 7, Fig. 6). In 1976 an overhanging cliff was found at Havranovo, with soil layers with bones depositions from the whole Holocene period. The soil probe from this place was washed and snail shells from different layers allowed exact dating, which was carried out by Ložek. At different sites in Havranovo, other subfossile and subrecent samples were taken. At first only Mammals were determined (Obuch & Darola 1980) and later individual species of the genus *Apodemus* (Obuch 2004c) and other components (Aves, Amphibia) of the *S. aluco* diet were determined. The identification was based on the reference material deposited in Považie Museum in Žilina. In 1978 in the cave Krpcovo at the opening of the Bystrická dolina valley near Dolný Harmanec a sample of *S. aluco* diet from the Atlantic period was found. More subfossile and subrecent samples have been found since. One of them comes from the cave Izbica, which forms the entrance dome to the Harmanec cave. These samples let us mark the differences in the evolution of fauna in these two parts of the Veľká Fatra Mts.

The oldest strata in the probe from Havranovo date to the Boreal period and contained several Pleistocene species from the family Arvicolidae (*Microtus gregalis*, *Dicrostonyx gulielmi* and *Chionomys nivalis*). Findings of *A. flavicollis* from the Muridae family were scarce. The sample from the Krpcovo cave dated to the Atlantic period and showed decreasing frequency of Pleistocene species. The forest species became dominant: *A. flavicollis*, *C. glareolus* and *M. avellanarius*. This sample contained 15 bat species (Chiroptera), where in *V. murinus* young bats from the summer season could be found. During the Epiatlantic period, the garden dormouse *E. quercinus* was present in both parts of the Veľká Fatra Mts. The food sample from the Bystrická dolina valley contains all the most abundant forest rodent species (Rodentia), but in Havranovo, several non-forest species were also present: *Cricetus cricetus*, *A. agrarius*, *A. microps* and *M. arvalis* were found in this sample due to the deforestation and grazing in the human Eneolithic period. The above mentioned species were also frequent in the samples from the Subboreal and Subatlantic periods because of human activities during the Bronze and Iron Ages. The non-forest species became more common: *A. sylvaticus*, *M. musculus*. However, arboreal species were also frequent, which indicates a mosaic pattern in the distribution of forest and non-forest habitats. The highest proportion of *M. arvalis* and *A. sylvaticus* in the diet of *S. aluco* could be found after the last deforestation of Tlstá massif in the subrecent period, associated with the Wallachian colonization of the mountain regions. In the samples

from this period there were no remains of *C. cricetus* and *D. nitedula* anymore. In the samples from Dolný Harmanec from the same period, the forest species of rodents were most abundant and the owl hunted bats (Chiroptera, 13 species) in the Izbica cave. In the recent period the forest species of micromammals were most abundant at both sites. Additionally, Limacidae were abundant in the surrounding of Dolný Harmanec and *R. temporaria* and Coleoptera were abundant at Havranovo.

Malá Fatra Mts. (Appendix 9). Smaller food samples of *S. aluco* from this mountain range were classified into three types. The samples of the type B were collected in the massif of the Nitra Kľak (Obuch 1980), in Kurská dolina valley under Strážska Hoľa Mt. and near Zázrivá village. The samples near Turie village are distinct for the high proportion of slugs (Limacidae, 35.2%) and thus fall into the type E. The subrecent sample from the opening of the Hýrov canyon above Strážnavy showed a high proportion of bats (Chiroptera, twelve species, 76.8%), where species of rock fissures were the most frequent: *V. murinus*, *P. pipistrellus* and *B. barbastellus*. This sample was classified as type D.

Žiar Mts. (Appendix 10). At this site pellets of *S. aluco* were collected in the past in Moškovské skaly rocks (Obuch 1982), where the owl inhabited a rock chimney, located approximately 50 m from the nest of an Eurasian eagle owl. In the first years of the survey (until 1981) the most dominant species in the diet had been *M. arvalis*, whereas in the last sample from 1997 the abundance of Limacidae increased. The sample from the rocky cliff Sokol at Slovenské Pravno was distinct for the high proportion of *R. temporaria*. All these samples were classified as type B.

Strážovské vrchy Mts. and Súľovské vrchy Mts. (Appendix 11). The results of Kropil (1987) from the Drieňov massif in the warmest part of this mountain range are different from all other samples for their high proportion of *M. arvalis* and passeriform birds. They were classified as type A. A smaller sample from the top of Rokoš Mt. and samples from the Manínska úžina gorge show a high proportion of Limacidae, characteristic for the type E.

Vtáčnik Mts. (Appendix 12). We analyzed food samples of *S. aluco* from this mountain range in the western part of the Nitra River catchment area. This volcanic mountain range is covered with continuous forest canopy, consisting mostly of deciduous beech forests. The family Limacidae (0.7%) were virtually absent in the food of *S. aluco* in this area. Frogs (*R. temporaria*, 3.0%) and birds (Aves, 5.2%) also did not comprise an important food source. Mammals (89.1%) were dominated by *A. fla-*

Tab. 4. The diet of *Strix aluco* in Slovakia, Revúcka vrchovina Mts., types **A** and **G**
Tab. 4. Potrava *Strix aluco* na Slovensku, Revúcka vrchovina, typy **A** a **G**

dietary type / typ potravny species / sites // druhy / lokality	A	A	A	A	A	A	A	A	A	A	G	G	G	G	%			
	3	4	5	6	2	1	9	8	7	Σ								
Rana temporaria	1+	52	1+	122	2-	4	3	1-	11	1-	19	1-	0	2-	13	3	227	3.35
	1+	55	1+	176	1-	21	1-	23	1-	19	2-	0	2-	18	7	320	4.72	
	1+	18	1+	47	13	4	4	16	14	14	1	2-	4	1	118	1.74		
	1+	44	1+	119	37	11	11	32	1-	30	1-	1	2-	21	6	301	4.44	
	2	1+	13	2	9	4	4	1	4	4	1-	0	1-	0	2	22	0.32	
	8	1+	66	8	4	1-	4	2-	2	2	1	2-	3	3	100	1.48		
	1	1+	18	5	5	1	4	4	4	3	3	3	4	4	36	0.53		
	1+	9	1+	9	1+	10	2	2	2	2	2	2	2	11	0.16			
	1+	27	3	12	27	2	2	1-	0	1	33	0.49						
	33	1+	174	1+	55	12	47	2-	0	1-	36	9	393	5.80				
Clethrionomys glareolus	235	1+	979	1+	390	1+	104	1+	302	311	2-	20	2-	165	1-	39	2545	37.55
	3	2-	6	1+	17	2+	25	1+	22	2-	0	2-	4	77	1.14			
	2	2	2	1	1+	6	1	2	2	2	2	14	0.21					
	4	5	5	1	1+	9	2	6	4	31	0.46							
	2	13	4	1	1+	9	2	5	1	44	0.65							
	1	5	1	1	1+	10	2	7	27	0.40								
	5	1+	5	1+	5	1+	5	0.07										
	2-	0	0	0	0	1-	1	42	0.62									
	2-	1	3-	3	1-	4	1-	3	3+	138	1-	16	1-	165	2.43			
	2-	14	2-	71	2-	15	18	1-	38	141	3+	131	1+	276	2+	74	11.48	
Microtus arvalis	2-	3	2-	15	14	7	24	1+	57	1+	11	1+	61	3	195	2.88		
	10	1-	11	1-	0	2	11	9	1+	40	83	1.22						
	3	9	2	1	5	1	13	34	0.50									
	8	2-	11	1-	2	5	1+	61	126	1.86								
	1	4	4	4	4	4	4	23	0.34									
	2-	0	4-	0	2-	0	1	1-	5	2-	4	1	2+	137	2.02			
	1-	1	1-	7	1-	0	6	9	2+	52	1	76	1.12					
	1-	1-	0	0	3	2	21	1	25	0.37								
	1-	2	3-	3	2-	0	1	1-	3	2-	0	104	1.53					
	1	2-	0	1	2	1-	1	2+	31	36	0.53							
Passer montanus	6	6	6	2	1	1-	0	1	11	29	0.43							
	1-	0	1-	7	1-	0	3	1-	6	2+	52	3	77	1.14				
	2-	1	3-	3	2-	1	3	1-	7	2+	102	1+	10	137	2.02			
	3	13	2	2	2	2	4	1-	1	27	0.40							
	2-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2-	1	3-	3	2-	1	3	1-	7	2+	102	1+	10	137	2.02			
	3	13	2	2	2	2	4	1-	1	27	0.40							
	2-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2-	1	3-	3	2-	1	3	1-	7	2+	102	1+	10	137	2.02			
	3	13	2	2	2	2	4	1-	1	27	0.40							

Tab. 4. continuation / pokračovanie

dietary type / typ potraviny	A	A	A	A	A	A	A	A	A	A	A	G	G	G	G	%
species / sites // druhy / lokality	3	4	4	5	6	6	2	2	1	1	3	9	8	7	Σ	%
<i>Erithacus rubecula</i>	7	12	2	1	3	3							10	1	39	0.58
<i>Turdus merula</i>	4	8	6	2	2	10							3		35	0.52
<i>Sitta europaea</i>	3	12	1	3	3							1	5	1	28	0.41
<i>Myotis myotis</i>	3	6											5	2	16	0.24
<i>Sylvia atricapilla</i>	4	2	1	2	2	2							3	1	15	0.22
<i>Neomys fodiens</i>	1	5	5								1				12	0.18
<i>Sturnus vulgaris</i>					1				4				4	2	11	0.16
<i>Delichon urbicum</i>		5									1			4	10	0.15
Mammalia	389	1590	551	173	497	669	1+	181	1026	177	5253	77.50				
Aves	60	1-	117	1-	24	20	60	74	2-	2	1+	246	24	627	9.25	
Amphibia, Reptilia	1+	53	126	2-	8	1-	3	1-	14	2+	210	2-	0	2-	32	1-
Evertebrata	1+	60	1+	211	41	2-	1	50	1-	50	2-	0	2-	19	445	6.57
Σ	562	2044	624	197	621	1003	183	1323	221	6778	100.00					
Diversity H'	2.38	2.21	1.66	2.04	2.31	2.64	1.14	2.91	2.71							

3 – Ratková, Hámor, 1996–2002, 4 – Nandraž, gallery / štôľňa, 1997–2010, 5 – Jelšava, gallery / štôľňa, 7. 4. 2006 + 25. 3. 2007, 6 – Revúcka vrchovina Mts., other samples / ostatné zbary (Obuch 2000c), 2 – Hrušov, granary / sypka, 1998–1999, 1 – Pokoradz, quarry / lom, 1997–2010, 9 – Prihradzany, church / kostol, 13. 11. 2002, 8 – Nižné Valce, manor house / kaštieľ, August 2001, leg. M. Uhrin & P. Benda, 7 – Tepľý Vrch, Hlíkovičský porast, 1996–2007 + Spanie Pole, church / kostol, 5. 6. 1995, leg. P. Benda

Other species (site – number) / Ostatné druhy (lokalita – počet):
Rhinolophus hipposideros (1–1), *Myotis mystacinus* (3–2; 4–3; 7–1), *Myotis emarginatus* (4–2; 5–1; 8–1), *Myotis bechsteinii* (3–2; 4–2; 5–1), *Myotis blythii* (1–1; 8–2), *Myotis daubentonii* (7–4), *Vespertilio murinus* (8–1), *Eptesicus serotinus* (2–1; 8–1), *Nyctalus noctula* (1–1; 7–1), *Barbastella barbastellus* (4–1), *Plecotus auritus* (4–1), *Plecotus austriacus* (1–1; 8–1), *Dryomys nitedula* (5–1), *Microtus agrestis* (3–2; 4–4; 2–2), *Streptopelia decaocto* (8–1), *Strix aluco* (6–1; 1–1), *Dendrocoptes major* (7–1), *Dendrocoptes syriacus* (2–1; 1–2), *Dendrocoptes medius* (2–2), *Dendrocoptes leucotos* (4–1), *Dendrocoptes minor* (3–1), *Jynx torquilla* (1–1; 8–1), *Alauda arvensis* (8–1), *Hirundo rustica* (3–2; 4–1; 7–3), *Riparia riparia* (4–1; 7–1), *Anthus trivialis* (4–1; 1–2), *Motacilla alba* (3–1; 1–1), *Motacilla cinerea* (4–1), *Bombicilla garrulus* (3–1), *Lanius collurio* (3–4; 1–1), *Acrocephalus palustris* (7–1), *Sylvia communis* (7–1), *Phylloscopus trochilus* (5–1; 1–1; 8–2), *Phylloscopus collybita* (4–1; 8–4), *Regulus* sp. (2–1; 8–2), *Sylvia* sp. (3–1; 5–1; 2–1), *Ficedula parva* (4–1), *Ficedula* sp. (1–1), *Saxicola torquata* (4–1), *Oenanthe oenanthe* (1–1), *Phoenicurus ochruros* (2–1; 8–4), *Luscinia* sp. (3–1), *Turdus pilaris* (1–1; 8–1), *Turdus viscivorus* (4–1; 7–1), *Aegithalos caudatus* (4–1), *Periparus ater* (3–2; 4–1; 5–1; 6–1), *Lepophanes cristatus* (8–1), *Poecile palustris* (4–2), *Certhia* sp. (2–2), *Troglodytes troglodytes* (4–1; 5–1; 1–1), *Emberiza citrinella* (3–2; 4–1; 1–2; 8–2), *Emberiza schoeniclus* (1–1), *Fringilla montifringilla* (4–2), *Carduelis carduelis* (4–1; 1–4; 8–3), *Carduelis spinus* (3–2; 4–2; 1–1), *Carduelis cannabina* (1–1; 8–1), *Carduelis chloris* (2–1; 8–4; 7–1), *Pyrrhula pyrrhula* (1–1), *Serinus serinus* (8–2), *Oriolus oriolus* (8–1), *Garrulus glandarius* (4–2; 6–2; 1–2; 8–1; 7–1), *Passeriformes* sp. (3–3; 4–1; 5–1; 6–1; 1–1; 8–1), *Aves* sp. juv. (4–1; 2–1; 1–1; 8–1), *Bombina* sp. (1–1), *Hyla arborea* (4–1; 1–3; 8–1; 7–1), *Rana ridibunda* (1–4), *Rana dalmatina* (1–3), *Rana arvalis* (8–1), *Lacerta agilis* (1–1; 7–2), *Lacerta vivipara* (7–1), *Diptera* sp. (4–1), *Lucanus cervus* (4–1; 1–2), *Gryllotalpa gryllotalpa* (3–2; 2–2; 8–1; 7–1)

Tab. 5. The diet of *Strix aluco* in Slovakia, type B, middle montane zone**Tab. 5.** Potrava *Strix aluco* na Slovensku, typ B, stredné horské polohy

species / mountain range druhy / pohorie	2		7		6		5		4		1		3		Σ	%
<i>Fringilla coelebs</i>	1+	14		4		7	1-	4		4		1		3	37	0.50
<i>Apodemus flavicollis</i>	1+	780		1+	445	1+	292	1-	521	2-	90	82	1-	42	2252	30.25
<i>Clethrionomys glareolus</i>		266		1+	250	1-	62		347	1-	55	50	1-	25	1055	14.17
<i>Microtus subterraneus</i>		40		1+	46		17		71	1-	7			11	195	2.62
<i>Microtus agrestis</i>	1-	0		1+	16		4		14						34	0.46
<i>Neomys fodiens</i>					2	1+	6		3		1				12	0.16
<i>Turdus philomelos</i>		19			12	1+	14		33		8		6		94	1.26
Orthoptera sp.						1+	7		7						14	0.19
Coleoptera sp.	1-	30	2-	13	1+	41	1+	181	2-	4	1-	5		10	284	3.82
<i>Salmo trutta</i>	1-	0	1-	0			1+	18		4				3	25	0.34
<i>Sorex alpinus</i>							1+	10						1	11	0.15
<i>Sorex araneus</i>		107	1-	50	1-	30	1+	249	1-	33		18		23	510	6.85
<i>Muscardinus avellanarius</i>	1-	52		87		49	1+	251		52	1-	11		27	529	7.11
<i>Glis glis</i>	1-	13	1-	10		14	1+	103		23	1+	17	1-	2	182	2.44
<i>Rana temporaria</i>	2-	46	3-	14	2-	14	1+	366	1+	109	3-	0		28	577	7.75
Limacidae sp.	3-	11		78	4-	0	1+	196	1+	87	1-	6	1+	34	412	5.53
<i>Apodemus sylvaticus</i>		5						1	1+	6				1	13	0.17
<i>Microtus arvalis</i>	1-	62	1-	60	1-	26		167	2+	174		25	1-	13	527	7.08
<i>Erithacus rubecula</i>		6		1		2		6		2	1+	8			25	0.34
<i>Talpa europaea</i>		23	1-	13		9		59		13		6	1+	15	138	1.85
<i>Sorex minutus</i>		14	1-	7		10		44		8		3	1+	12	98	1.32
<i>Arvicola amphibius</i>	1-	2		8		4		13		8				2	37	0.50
<i>Turdus merula</i>		11		6		7	1-	3		6		4		2	39	0.52
<i>Myotis myotis</i>		1		5				5		3		1		2	17	0.23
<i>Eptesicus serotinus</i>				5				2		1		3		3	14	0.19
<i>Vespertilio murinus</i>				4				4						2	10	0.13
<i>Neomys anomalus</i>		6								3				1	10	0.13
<i>Mus cf. musculus</i>				4				1		5					10	0.13
Mammalia		1381		1037		525		1879		485		222		186	5715	76.77
Aves		80		55	1+	54	1-	109		51	1+	35		18	402	5.40
Amphibia, Reptilia, Pisces	2-	46	3-	16	2-	15	1+	384	1+	118	2-	3		31	613	8.23
Evertebrata	2-	43	1-	91		48	1+	386	1+	91	1-	11	1+	44	714	9.59
Σ		1550		1199		642		2758		745		271		279	7444	100.00
Diversity H'		1.92		2.29		2.23		2.62		2.58		2.50		2.79	2.57	

2 – Vtáčnik Mts., 7 – Muánska planina Mts., 6 – central Slovakian volcanic mountains / stredoslovenské vulkanické pohoria, 5 – Veľká Fatra Mts., 4 – Žiar Mts., 1 – Strážovské and Súľovské vrchy Mts., 3 – Malá Fatra Mts

vicollis (50.3%) along with *C. glareolus* (17.2%). Part of the analyzed material came from nestboxes. K. Šottnár (in litt.) has found a relationship between the population peaks of these two forest rodent species and the nesting succes of *S. aluco*.

Volcanic mountain ranges of Central Slovakia (Appendix 13). Irregular sampling of *S. aluco* pellets from the volcanic mountain ranges of Central Slovakia: Kremnické vrchy Mts., Štiavnické vrchy Mts., Poľana Mts. and Veporské vrchy Mts. were distinct for their absence

of Limacidae and higher proportion of Aves (8.4%) and Coleoptera (6.4%). Therefore they were provisionally classified as type B. This large area requires a more detailed survey of *S. aluco* diet for final conclusion.

Type C from the higher mountain ranges and wet areas. Higher montane zone and wetter areas of Slovakia are mostly covered with mixed conifer-deciduous forests, or artificially planted monotypic conifer woods. The diet of *S. aluco* in such conditions (Table 8) usually contained

smaller proportion of rodents from the Muridae family, especially of the forest species *A. flavicollis* (10.1%). The *M. avellanarius* (10.2%) was highly dominant and we observed a more frequent occurrence of wetland species from the Arvicolidae family: *M. agrestis* (2.8%) and *A. amphibius* (2.4%). Birds (Aves, 6.7%) showed higher abundance than in type B; especially the proportion of thrushes (*Turdus* genus, 2.8%). Frogs were also rather dominant (*R. temporaria*, 24.2%). The invertebrate prey included numerous Coleoptera (4.2%) and Limacidae (5.3%).

The comparison of food ranges of *S. aluco* from different regional units revealed marked differences, which were reflected in the number of diagnostic species (Table 8). This was associated with different natural conditions, as well as different land use in individual regions: scattered peasant inhabitation in the Kysuce region, Wallachian deforestation in the past centuries and extensive planting of spruce in the 20th century. In the Horná Orava region, *M. agrestis* (18.3%) comprised the most dominant food component of *S. aluco*. In the Kysuce region, there was a high diversity of prey as seen from the high abundance of several passeriform birds (Aves, 17.8%). In several mountain ranges of Slovakia there were an increased proportion of insectivores (Insectivora), especially of *S. araneus* and *Talpa europaea*.

Horná Orava region (Appendix 14). Most food samples of the *S. aluco* from this region were collected in nestboxes. The Horná Orava region is not based on geomorphology, but regional division. The distribution of the more frequent mammal species in the samples was heterogeneous. With the exception of *M. avellanarius*, each dominant species was abundant only in a single sample: *A. flavicollis* in Pekárka under Babia hora Mt., *S. betulina* at Peciská, *C. glareolus* and *M. agrestis* in Tichá Valley under Osobitá Mt., *S. araneus* and *A. amphibius* in Blatná dolina valley. These were all only small samples from a single season. Therefore we suppose that in a longer time frame the influence of population peaks in the individual species on the composition of the owl's diet will fade and regional influences will become more pronounced. *M. agrestis* and *R. temporaria* are the most frequent components of the diet. Invertebrates (Evertebrata 1.3%) showed smaller abundance and the slugs (Limacidae) were missing. At the site No. 4 in Appendix 14 a sum of smaller samples can be seen, including a sample from Radové skaly rocks under Osobitá Mt., where *Chionomys nivalis* was found.

Kysuce region (Appendix 15). In the Kysuce region, food samples of *S. aluco* were collected in several geo-

morphological districts found in the Kysuce Protected Landscape Area. Most of the samples were from nestboxes and nests in tree hollows from several nesting periods. In Skalité and Klokočov we could find the pellets of *S. aluco* in the lofts of buildings in the centre of the village. These samples were distinct for their high proportion of synanthropic species *M. musculus*, *R. norvegicus*, *P. domesticus* and the vole *M. arvalis* and therefore belong to subtype G2. The influence of scattered peasant inhabitation is quite apparent also in other samples, which were classified as type C. This is mainly reflected in high diversity of dietary ranges, because owls do not hunt only in the forest, but also in the fields, meadows and villages. In all these samples we could see non-forest mouse species such as *A. agrarius* (1.1%) and *A. sylvaticus* (1.4%). Half of all birds (Aves, 20.1%) are represented by thrushes (*Turdus* sp., 10.3%). Besides frogs (*R. temporaria*, 15.1%), no other prey species reach 10% dominance. Similar to the upper Orava region, in the Kysuce region the flysch geological ground causes the absence of slugs (Limacidae) and fat dormouse (*G. glis*), which are not represented in the diet of *S. aluco*.

Choč Mts. (Appendix 16). In contrast to the former two regions with flysch geological basis, the Choč Mountains are characterized by limestone and dolomite alternations. The landcover is mainly formed of mixed conifer-deciduous forests. A more detailed survey in the Choč massif was conducted in 1977–1978 (Obuch 1981). Five samples were collected at the site Biele Brehy below Predný Choč Mt. (No. 1–5). The oldest sample of detritus (No. 3) is characterized by a high dominance of *R. temporaria* and increased frequency of *M. agrestis*. Latter samples from 1989 and 2005 from this site are mostly dominated by *M. avellanarius* and *A. flavicollis*. Temporal changes in the diet of *S. aluco* are described in a separate study (Obuch 1990). Owl pellets at Šíp Mt. and the Prašivá site below Choč Mt. were collected in 1996 after a marked population peak of *A. flavicollis* following a rich crop of beech nut in the autumn of 1995. Appendix 16 shows only food samples of type C. The sample from the the Válovy site below Predný Choč Mt., which was dominated by two species of bats, was placed in Table 9.

Nízke Tatry Mts. (Appendix 17). From the large area of Nízke Tatry Mts., we could only obtain *S. aluco* pellets from two sites. The food sample from the first location was dominated by frogs (*R. temporaria*, 61.5%). The sample from 1990 from the Okno cave was dominated by the common house martin (*Delichon urbicum*, 22.1%), which were most probably hunted by the owl during their nocturnal rest on a rock overhang. According to a recover-

Tab. 6. The diet of *Strix aluco* in Slovakia, Veľká Fatra Mts.**Tab. 6.** Potrava *Strix aluco* na Slovensku, Veľká Fatra

dietary type / typ potravý	E		E		B		B		B		C		C		Σ	%
species / sites // druhy / lokality	1	2	1	2	1	2	1	2	1	2	1	2	1	2		
<i>Myotis myotis</i>	1+	18		6		1		4	1-	0					29	0.42
<i>Vespertilio murinus</i>	1+	14						4				1		1	20	0.29
<i>Pipistrellus pipistrellus</i>	1+	52	1-	1			2-	0	2-	0					53	0.77
<i>Apodemus flavicollis</i>	1+	670	1-	112	1-	43		266		212		95	1-	16	1414	20.58
Limacidae sp.	1+	513	1+	185	1-	27	1-	100	1-	69	1-	46	3-	0	940	13.68
<i>Clethrionomys glareolus</i>	1+	640	1+	191	1+	100	1-	133	1-	114	1-	67	1-	21	1266	18.42
<i>Rana temporaria</i>	1-	115		56	1-	8	1+	245		113		48	2-	1	586	8.53
<i>Turdus philomelos</i>	1-	9		2		4	1+	17		12		3			47	0.68
Coleoptera sp.	2-	35	1-	16		6	2+	160	1-	15	1+	31	1-	0	263	3.83
<i>Sorex araneus</i>	1-	93	1-	34	1-	11	2+	125	1+	113	1+	46		13	435	6.33
<i>Microtus arvalis</i>	3-	10	1-	16		13	1+	75	1+	79	1-	8	2+	38	239	3.48
<i>Glis glis</i>		80	1-	13		6	1+	53	1+	44	2-	0	1-	0	196	2.85
<i>Muscardinus avellanarius</i>	1-	172		62	1-	14		91	1+	146	1+	63	2-	2	550	8.00
<i>Sorex minutus</i>	1-	21		7		4		18	1+	22	1+	20		1	93	1.35
<i>Microtus subterraneus</i>	1-	34	1-	12		10	1-	15	1+	46	1+	35	3+	43	195	2.84
<i>Talpa europaea</i>	1-	41		16		7		29		23	1+	17	1+	9	142	2.07
<i>Sicista betulina</i>	1-	0				1					1+	8	1+	5	14	0.20
<i>Arvicola amphibius</i>	1-	3		7		3	1-	2		8		5	1+	8	36	0.52
<i>Microtus tatricus</i>	2-	0		5		4		1		1		3	1+	7	21	0.31
<i>Microtus agrestis</i>		10		1		5		3		6				1	26	0.38
<i>Salmo trutta</i>		6		2				10		8					26	0.38
<i>Sorex alpinus</i>		10		1				7		3		1			22	0.32
<i>Erithacus rubecula</i>		9		1				3		3					16	0.23
<i>Turdus torquatus</i>		7						1		5		2			15	0.22
<i>Neomys fodiens</i>		8						1		2		1		3	15	0.22
<i>Fringilla coelebs</i>		4		3				1		3		1			12	0.17
Orthoptera sp.		3				2				5					10	0.15
<i>Parus major</i>		3		2				1				2			8	0.12

ed ornithological ring the house martins were nesting on a block of flats in Liptovský Mikuláš. In the close Zbojnická jaskyňa cave a subfossil sample of *S. aluco* food was found from a period when Demänovská dolina valley was completely covered with forests. The food composition in the subrecent nest of the eagle owl (*B. bubo*) close to this cave, as well as in the middle of Jánska dolina valley testify to strong deforestation and grazing during the Wallachian colonization. In the 20th century both valleys were reforested mainly with spruce trees (Kučera et al. 2009).

Slovenský raj Mts. (Appendix 18). A substantial part of the food material of *S. aluco* type C from the Slovenský raj Mts. came from Výria jaskyňa cave in the Peklisko gorge. In 1990, a sample of detritus from the about 20 year period when the owls inhabited the cave was collected. The most abundant prey items included frogs (*R. temporaria*, 43.5%). Another three samples from this site were domi-

nated by rodents (Rodentia). In this table we also present the sample from Poráčska dolina valley in the Volovské vrchy Mts. We also recorded two samples of type D with high proportion of bats. In 1990, fresh pellets of *S. aluco* were found at the entrance of the Duča cave. This site was close to a tourist trail only 200 m from the entrance to the Dobšiná ľadová jaskyňa cave. The owl abandoned this place most probably due to frequent human disturbance. Before the discovery of the Stratená jaskyňa cave in 1972, the owl used to sit in a rock opening high in the cliff and its pellets would fall down the rock wall into the cave. After the new entrance was created, the owl abandoned this cave. Besides this owl, bats in the cave entrance zone were hunted by martens (Obuch 1995).

Type D: +Chiroptera. We suppose that the ability to specialize in hunting bats (Table 9) is only available to

Tab. 6. continuation / pokračovanie

dietary type / typ potravy	E	E	B	B	B	C	C		
species / sites // druhy / lokalita	1	2	6	3	4	5	7	Σ	%
<i>Periparus ater</i>	4		2	1	1			8	0.12
<i>Turdus merula</i>	5			1	2			8	0.12
<i>Barbastella barbastellus</i>	7	1						8	0.12
<i>Eptesicus serotinus</i>	4	1		1	1			7	0.10
<i>Myotis mystacinus</i>	4		1					5	0.07
<i>Nyctalus noctula</i>	5							5	0.07
<i>Eliomys quercinus</i>	2				3			5	0.07
<i>Sitta europaea</i>		1		3	1			5	0.07
<i>Garrulus glandarius</i>	1			2	1	1		5	0.07
Mammalia	1911	487	224	831	824	371	1+ 169	4817	70.10
Aves	82	1- 13	7	47	1+ 55	16	1- 0	220	3.20
Amphibia, Reptilia, Pisces	1- 126	58	1- 8	1+ 255	121	48	1- 1	617	8.98
Evertebrata	554	1+ 201	1- 35	261	1- 90	77	3- 0	1218	17.72
Σ	2673	759	274	1394	1090	512	170	6872	100.00
Diversity H'	2.31	2.22	2.28	2.50	2.63	2.52	2.17	2.58	

1 – Bystrická dolina valley, 1978–2009, 2 – Izbica cave, 1980–2006, 6 – Belianska dolina valley, 1990–2007, 3 – Havranovo, 1981–2010, 4 – Blatnická dolina valley, 1985–2009, 5 – Dedošová, Selenec and Necpalská Dedošová valleys, 1986–1993, 7 – Čierny Kameň 13. 8. 1980 + 14. 8. 1993, leg. J. Chavko

Other species (site – number) / Ostatné druhy (lokalita – počet):

Neomys anomalus (2–1), *Crocodyra leucodon* (1–1), *Rhinolophus hipposideros* (1–4), *Myotis bechsteinii* (1–2; 4–1), *Myotis blythii* (1–1), *Eptesicus nilssonii* (1–1), *Plecotus auritus* (1–2), *Mus cf. musculus* (3–1), *Micromys minutus* (1–1; 6–1), *Apodemus sylvaticus* (1–1; 3–1; 7–1), *Rattus norvegicus* (3–1; 5–1), *Tachybaptus ruficollis* (3–1), *Falco tinnunculus* (3–1; 4–2), *Tetrastes bonasia* (4–1), *Lyrurus tetrax* (1–1), *Columba livia dom.* (1–3; 4–1), *Columba oenas* (4–1), *Columba palumbus* (1–2; 3–1; 4–1), *Columba sp.* (1–1), *Streptopelia decaocto* (4–1), *Apus apus* (3–1), *Dryocopus martius* (4–1), *Dendrocopos leucotos* (1–2), *Delichon urbicum* (4–2; 5–1), *Anthus trivialis* (4–1), *Motacilla cinerea* (1–1; 5–1), *Prunella modularis* (1–2; 4–1), *Sylvia curruca* (3–1), *Sylvia atricapilla* (1–3), *Phylloscopus collybita* (1–1), *Phylloscopus sibilatrix* (1–1), *Regulus sp.* (1–2; 4–1), *Sylviidae sp.* (3–2; 4–3), *Muscicapa striata* (1–1), *Turdus pilaris* (3–2), *Turdus viscivorus* (1–3; 4–1), *Turdus sp.* (2–1; 4–2; 5–1), *Cyanistes caeruleus* (2–1; 3–1), *Lophophanes cristatus* (4–1), *Paridae sp.* (1–5; 3–1; 4–3; 5–1), *Certhia sp.* (3–1; 5–1), *Troglodytes troglodytes* (5–1), *Emberiza citrinella* (1–1), *Carduelis carduelis* (1–1), *Carduelis cannabina* (1–1), *Pyrrhula pyrrhula* (1–2; 3–1), *Coccothraustes coccothraustes* (1–1), *Passeriformes sp.* (1–5; 2–2; 6–1; 3–4; 4–4; 5–1), *Aves sp.* (1–1), *Lacerta agilis* (1–1), *Lacerta muralis* (1–1), *Lacerta vivipara* (1–3), *Diptera sp.* (1–1), *Hymenoptera sp.* (1–2; 3–1; 4–1)

some individuals of *S. aluco* which often encounter mass gatherings of this mammal order. There have been cases when an owl dwelled close to a bat colony, but hunted them only marginally (5%), e. g. in some caves of the Slovenský kras Mts. or in the mine at Nandraž. There have been cases documented where an owl had hunted bats at a specific site in the past, but the next owl inhabiting the same cave did not (e. g. in the caves Erňa and Izbica). In Table 9 we present nine recent to subrecent samples with Chiroptera showing higher dominance than 5%. The subfossil sample from the Krpcovo cave in Veľká Fatra Mts. and Schaefer's finding from the Muránska jaskyňa cave in the Belianske Tatry Mts. (Schaefer 1974) also fall into this category. The finding places of this dietary type of *S. aluco* were recorded in six mountain ranges at various altitudes. The rest of the prey belonged to types A, B, C and E. The owl can hunt bats which rest in rock fissures (especially species

N. noctula, *V. murinus*, *E. serotinus* and *P. pipistrellus* (Obuch 1994b)) or caves (winter or summer colonies) or in lofts. The samples from buildings where dominance of Chiroptera is >5% have not yet been classified as type D (lofts of the castles in Turčianska Štiavnička and Necpaly, the park in Banská Bystrica). In some spacious caves there is no regular summer or winter bat colonies, but bats search here for prey. An owl capable of hunting bats in such places may have a great bat species diversity in its pellets, but the dominance of bats as prey items will be low (e. g. Silická ľadnica cave, where we found 17 bat species with overall dominance only 4.7%).

The high dominance of *P. pipistrellus* in the Erňa and Ohnište caves is associated with an owl hunting them in their winter grounds. The bones at the entrance to the Hýrov canyon in the Malá Fatra Mts. were located under a rock chimney which was the diurnal roosting place of

Tab. 7. Changes in food composition of mainly *S. aluco* in the Holocene samples from the Veľká Fatra Mts., Slovakia
Tab. 7. Zmeny v zložení potravy prevažne *S. aluco* v holocénných vzorkách z Veľkej Fatry, Slovensko

site / period // lokalita / obdobie	B/B	H/A	H/EA	B/EA	B/SB	B/SA	B/ISR	H/SR	B/IR	H/R	Σ	%
column / stĺpec	1	2	3	4	5	6	7	8	9	10		
<i>Microtus gregalis</i>	5+ 164	1- 15	2	2	1- 0	2- 0	2- 0	3- 0	0	4- 0	183	1.68
<i>Dicrostonyx guilelmi</i>	3+ 39	1- 0		1+ 6				1- 0	1- 0	2- 0	45	0.41
<i>Chionomys nivalis</i>	1+ 9	2+ 30						1- 0	1- 0	2- 0	39	0.36
<i>Sorex minutus</i>		1+ 41	2	1	1- 0	6	1- 1	13	18	28	110	1.01
<i>Lacerta vivipara</i>		1+ 9								3	12	0.11
<i>Rhinolophus hipposideros</i>		2+ 73				1- 0	2	1- 6	2- 0	2- 4	85	0.78
<i>Vespertilio murinus</i>	1- 1	2+ 180	4	2	1- 4	1- 9	1- 5	1- 26	2- 4	2- 14	249	2.29
<i>Nyctalus noctula</i>	1	2+ 113	8	2	3	11	1- 2	1- 13	3- 0	3- 5	158	1.45
<i>Pipistrellus pipistrellus</i>	1- 0	2+ 101	2	3	1- 3	1- 3	1- 2	34	3- 0	53	201	1.85
<i>Plecotus auritus</i>		2+ 72		1		1- 0	1- 0	11	2- 0	3- 2	86	0.79
<i>Miniopterus schreibersii</i>		2+ 15								1- 0	15	0.14
<i>Myotis brandtii</i>		1+ 8						6		1- 0	14	0.13
<i>Myotis bechsteinii</i>		1+ 15				1	1	9		1- 2	28	0.26
<i>Eptesicus serotinus</i>		1+ 17	4	1	2	3	1	1+ 19	1- 1	5	53	0.49
<i>Barbastella barbastellus</i>		2+ 50			1	2	1	1+ 19	2- 0	8	81	0.75
<i>Eliomys quercinus</i>		1- 0	1+ 5	2		1+ 11	2	2	1- 2	2	24	0.22
<i>Muscardinus avellanarius</i>	2- 3	1- 75	1+ 29	15	28	1+ 65	2- 9	1+ 146	91	234	695	6.39
<i>Talpa europaea</i>	1	1- 15	1+ 19	5	8	13	1- 4	1+ 66	29	57	217	2.00
<i>Clethrionomys glareolus</i>	4- 0	395	1+ 103	2- 9	2- 21	1- 68	5- 1	1+ 473	1- 133	1+ 831	2034	18.72
<i>Rana temporaria</i>	3- 0	118	1+ 40	13	1- 16	1- 33	1+ 87	1- 82	1+ 245	1- 171	805	7.41
<i>Apodemus agrarius</i>	1- 0			1+ 5	1+ 10	6	4			1- 0	25	0.23
<i>Cricetus cricetus</i>	1- 0			1+ 6	2+ 21	1+ 11		1- 0	1- 0	2- 0	38	0.35
<i>Apodemus microps</i>		1- 8		1+ 10	2+ 37	9	2+ 46	3- 0	2- 0	4- 0	110	1.01
<i>Microtus arvalis</i>	1- 2	5- 0	3- 0	1+ 19	1+ 46	1+ 81	3+ 291	2- 15	75	3- 26	555	5.11
<i>Mustela nivalis</i>	2	2		3	1+ 5	1	2	1		1- 0	16	0.15
<i>Turdus pilaris</i>		2			1+ 5	3			2		12	0.11
<i>Apodemus flavicollis</i>	3- 4	302	1- 40	36	1+ 1137	1+ 226	2- 39	280	266	782	2112	19.43
<i>Micromys minutus</i>				2	3	1+ 8	4			1- 1	18	0.17
<i>Arvicola amphibius</i>		1- 1	3	2	3	1+ 13	4	6	2	10	44	0.40
<i>Bufo bufo</i>					3	1+ 5	2				10	0.09
<i>Apodemus sylvaticus</i>		1- 4	1			1+ 11	3+ 58	2- 0	1- 1	3- 1	76	0.70
<i>Mus cf. musculus</i>				2	1	1+ 8	1+ 7		1	1- 0	19	0.17
<i>Glis glis</i>						1+ 38	2- 2	40	1+ 53	93	263	2.42
<i>Microtus subterraneus</i>	1- 0	2- 7	10	4	16	1- 6	1- 3		1- 15	46	179	1.65
<i>Fringilla coelebs</i>			37	4	7	1	3	1+ 55	1	7	23	0.21
<i>Myotis myotis</i>			1	1	1	3		1+ 9	1			
	2- 4	2	2	1- 0	1- 0	1- 1	1- 1	2+ 88	1- 4	1- 24	124	1.14

Tab. 7. continuation / pokračovanie

site / period II lokalita / obdobie	B/I/B	H/A	H/EA	B/EA	B/IB	B/SA	B/ISR	H/SR	B/IR	H/R	%
column / stĺpec	1	2	3	4	5	6	7	8	9	10	Σ
<i>Sorex araneus</i>	6	1-	52	17	1-	5	1-	10	3-	1	127
<i>Turdus philomelos</i>	1-	3	1	3	5	6	5	1-	2	1+	429
<i>Salmo trutta</i>	3					1	2	6	1+	10	53
<i>Coleoptera</i> sp.	1-	0	4-	0	3	0	2-	0	3-	1	30
<i>Limacidae</i> sp.	3-	0	6-	0	3-	1	2-	0	4-	0	215
<i>Microtus agrestis</i>											846
<i>Sorex alpinus</i>											7.78
<i>Turdus merula</i>											35
<i>Erithacus rubecula</i>											0.32
<i>Neomys fodiens</i>											11
<i>Microtus tatricus</i>											29
<i>Parus major</i>											0.27
<i>Turdus torquatus</i>											11
<i>Crocodyra leucodon</i>											5
<i>Crocodyra suaveolens</i>											21
<i>Dryomys nitedula</i>											0.19
Mammalia	1+	238	1673	260	147	376	645	502	1449	1-	831
Aves	2-	0	1-	42	16	1+	52	1+	44	1-	45
Amphibia, Reptilia, Pisces	3-	0	134	1+	40	13	1-	24	1-	41	1+
Evertebrata	3-	0	6-	0	2-	4	3-	0	4-	0	48
Σ	238	1849	320	182	443	738	642	1630	1394	3432	10868
Diversity H'	1.17	2.81	2.45	3.11	2.86	2.84	2.25	2.62	2.50	2.32	3.01
BI – Biatnica, H – Dolný Harmamec; B – Boreal, A – Atlantic, EA – Epiatlantic, SB – Subboreal, SA – Subatlantic, SR – Subrecent, R – Recent											
Other species (column – number) / Ostatné druhy (stĺpec – počet): <i>Sorex caecutiens</i> (2–1), <i>Sorex minutissimus</i> (2–1), <i>Neomys anomalus</i> (2–3; 5–1; 6–3; 8–1; 10–1), <i>Myotis mystacinus</i> (8–3; 10–4), <i>Myotis emarginatus</i> (2–2; 7–1), <i>Myotis nattereri</i> (2–1; 8–2), <i>Myotis blythii</i> (2–1; 8–4; 10–1), <i>Myotis dasycneme</i> (8–4), <i>Epptesicus nilssonii</i> (2–2; 6–1; 8–1; 10–1), <i>Plecotus austriacus</i> (7–1), <i>Lepus europaeus</i> (7–1), <i>Leporidae</i> sp. (1–2), <i>Ochotona pusilla</i> (1–2), <i>Sciurus vulgaris</i> (7–1; 8–1), <i>Sicista betulina</i> (2–2), <i>Rattus norvegicus</i> (7–2; 8–1; 9–1), <i>Martes foina</i> (8–1), <i>Mustela erminea</i> (1–1; 5–1; 6–2; 8–1), <i>Sus scrofa</i> (5–1), <i>Artiodactyla</i> sp. (6–1), <i>Tachybaptus ruficollis</i> (7–1; 9–1), <i>Anatidae</i> sp. (4–1), <i>Accipiter nisus</i> (3–1), <i>Falco tinnunculus</i> (5–1; 7–1; 9–1), <i>Falco</i> sp. (2–1), <i>Tetrastes bonasia</i> (3–1; 6–2; 7–2; 8–1), <i>Lyrurus tetrix</i> (2–1; 6–1; 10–1), <i>Lagopus lagopus</i> (4–2), <i>Lagopus mutus</i> (4–5), <i>Perdix perdix</i> (4–1; 7–4), <i>Coturnix coturnix</i> (2–1; 4–1; 5–1; 7–1), <i>Rallus aquaticus</i> (4–1; 7–1), <i>Porzana porzana</i> (5–1), <i>Tringa</i> sp. (5–1; 6–3; 7–1), <i>Scolopax rusticola</i> (5–1; 7–3), <i>Columba livia</i> dom. (10–3), <i>Columba oenas</i> (5–2; 6–1), <i>Columba palumbus</i> (6–1; 7–1; 9–1; 10–2), <i>Columba</i> sp. (3–1; 7–1; 8–2; 10–1), <i>Asio otus</i> (5–1), <i>Asio flammeus</i> (4–1), <i>Aegolius funereus</i> (2–1; 5–1; 8–1), <i>Athene noctua</i> (7–1), <i>Strix aluco</i> (5–1), <i>Apus apus</i> (3–3; 9–1), <i>Picus canus</i> (5–1; 6–1), <i>Picus viridis</i> (2–2), <i>Picus</i> sp. (8–1), <i>Dendrocopos major</i> (2–2; 8–1), <i>Dendrocopos leucotos</i> (6–1; 10–2), <i>Alauda arvensis</i> (4–1; 5–1; 7–1), <i>Hirundo rustica</i> (2–4; 5–1; 6–1), <i>Delichon urbicum</i> (2–1; 6–1; 8–2), <i>Motacilla cinerea</i> (8–2; 10–1), <i>Prunella modularis</i> (10–2), <i>Sylvia curruca</i> (9–1), <i>Sylvia atricapilla</i> (10–3), <i>Phylloscopus collybita</i> (10–1), <i>Phylloscopus sibilatrix</i> (10–1), <i>Regulus</i> sp. (7–1; 10–2), <i>Sylvia</i> sp. (3–1; 7–1; 9–2), <i>Muscicapa striata</i> (10–1), <i>Ficedula</i> sp. (5–1), <i>Turdus viscivorus</i> (2–1; 6–3; 10–3), <i>Turdus</i> sp. (5–1; 8–3; 10–1), <i>Periparus ater</i> (4–1; 6–1; 7–1; 9–1; 10–4), <i>Cyanistes caeruleus</i> (2–1; 3–1; 7–1; 9–2), <i>Cyanistes</i> sp. (3–1; 7–1; 9–2), <i>Loxia curvirostra</i> (2–2), <i>Passer domesticus</i> (5–2), <i>Passer vulgaris</i> (2–1), <i>Carduelis chloris</i> (7–1), <i>Pyrrhula pyrrhula</i> (2–1; 4–1; 6–3; 8–1; 9–1; 10–2), <i>Coccothraustes coccothraustes</i> (5–1; 6–1; 8–1; 10–1), <i>Loxia curvirostra</i> (2–2), <i>Carduelis carduelis</i> (10–1), <i>Carduelis chloris</i> (7–1), <i>Europeaea</i> (5–2; 6–2; 9–3; 10–1), <i>Certhia</i> sp. (9–1), <i>Emberiza citrinella</i> (6–1; 7–1; 10–1), <i>Fringilla montifringilla</i> (2–2), <i>Carduelis carduelis</i> (10–1), <i>Corvus corax</i> (2–1), <i>Corvus corone</i> (7–1), <i>Pyrrhula pyrrhula</i> (2–1; 4–1; 6–3; 8–1; 9–1; 10–2), <i>Nucifraga caryocatactes</i> (6–1; 8–1), <i>Pyrrhura corax</i> (2–2), <i>Corvus frugilegus</i> (2–2), <i>Corvus corax</i> (2–1), <i>Corvus corone</i> (7–1), <i>Corvus frugilegus</i> (6–1), <i>Garolus glandarius</i> (2–1; 5–1; 6–3; 9–2; 10–1), <i>Nucifraga caryocatactes</i> (6–1; 8–1), <i>Pyrrhura corax</i> (2–2), <i>Corvus frugilegus</i> (2–2), <i>Corvus corax</i> (2–1), <i>Corvus corone</i> (7–1), <i>Coloeus monedula</i> (3–1; 7–2), <i>Passeriformes</i> sp. (2–10; 3–3; 4–1; 5–1; 6–1; 7–4; 8–3; 9–4; 10–1), <i>Aves</i> sp. juv. (6–2; 7–1; 8–1), <i>Bufo viridis</i> (5–3), <i>Rana cf. esculenta</i> (7–1), <i>Lacerta agilis</i> (2–3; 5–2; 7–3; 10–1), <i>Lacerta muralis</i> (10–1), <i>Colubridae</i> sp. (2–1; 6–2), <i>Cypripiformes</i> sp. (7–1), <i>Diptera</i> sp. (10–1), <i>Hymenoptera</i> sp. (9–1; 10–2), <i>Orthoptera</i> sp. (10–3)											

Tab. 8. The diet of *Strix aluco* in Slovakia, type C, higher montane zone, humid areas**Tab. 8.** Potrava *Strix aluco* na Slovensku, typ C, vyššie časti pohorí a vlhšie oblasti

species / region // druhy / oblast'	1		2		3		4		5		6		7		Σ	%
<i>Sicista betulina</i>	1+	24		25	1+	63	2-	3		13	3	1-	39		170	1.55
<i>Microtus agrestis</i>	3+	110	1+	52		51		39	2-	1	1-	3	1-	56	312	2.84
<i>Neomys fodiens</i>	1+	10	1+	18		13		10		4		3	1-	19	77	0.70
<i>Mus cf. musculus</i>	1+	7	2+	22	1-	0		3				2-	0		32	0.29
<i>Dryomys nitedula</i>		2	2+	22		13		4				1-	8		49	0.45
<i>Apodemus sylvaticus</i>			2+	12						1		1	1-	1	15	0.14
<i>Apodemus agrarius</i>			2+	12				1					1-	0	13	0.12
<i>Turdus philomelos</i>		13	2+	50	1-	15		26	1-	3		6	1-	25	138	1.25
<i>Turdus pilaris</i>		1	2+	28	1-	1		3				1	2-	1	35	0.32
<i>Fringilla coelebs</i>		3	2+	27		13		10		1		2	2-	7	63	0.57
<i>Turdus torquatus</i>		2	1+	9		7		10		2		4	2-	2	36	0.33
<i>Strix aluco</i>			1+	5											5	0.05
<i>Neomys anomalus</i>		1	1+	11		1		4						9	26	0.24
<i>Turdus merula</i>		2	2+	39	1-	6	1+	19	1-	0			2-	8	74	0.67
<i>Arvicola amphibius</i>		20	1+	51	1+	56		41		13	1-	4	1-	78	263	2.39
<i>Sorex araneus</i>		36	1+	144	1+	122	1+	134	1+	59	2-	5	2-	80	580	5.27
<i>Talpa europaea</i>		8	2-	3	1+	49	1+	59	1+	26		6	1-	39	190	1.73
<i>Limacidae</i> sp.	3-	0	5-	0	2+	317	2-	25		46		15	1-	179	582	5.29
<i>Coleoptera</i> sp.	2-	5	1-	38	1+	142	3-	10		31	1-	4		229	459	4.17
<i>Hymenoptera</i> sp.		3		1	1+	8							1-	0	12	0.11
<i>Parus major</i>				3	1+	8				2		1	1-	2	16	0.15
<i>Musccardinus avellanarius</i>	1-	28	1-	49	1+	290	1+	241		65	2-	11		442	1126	10.24
<i>Galerida cristata</i>							1+	5							5	0.05
<i>Pyrrhula pyrrhula</i>						1	1+	6						1	8	0.07
<i>Microtus subterraneus</i>	1+	44		58	1-	65	1+	134	1+	78	2-	3		206	588	5.34
<i>Microtus arvalis</i>		25		54	2-	18	1+	107	1+	46		13		249	512	4.65

the owl. Most of the twelve bat species hunted by this owl belong to species typical for rock fissures. There are no other known caves in the surroundings. Therefore the owl most probably hunted bats which searched for prey in the canyon. At the Válovy site below Predný Choč there are two species most frequent in the *S. aluco* diet: *V. murinus* and *N. noctula*. The bone finding place which served as the owl's rest place was located in a hollow 5 m from a rock crack inhabited by bats. In 1978 we recorded *S. aluco* pellets below Maretkina plateau in the Muránska planina Mts. The owl's rest place was under an overhanging rock at the opening of a rock hollow approximately 1 m above the ground. The most dominant prey species of this owl was *N. noctula*. In later years we could not find any more pellets at this place. *M. myotis* is the most dominant bat species in the above mentioned samples from the Duča and Stratená jaskyňa cave sites in the Slovenský raj Mts. This bat species hibernates in both of these caves. In 1980 we found the

detritus from the *S. aluco* pellets on elevated rocks in the Izbica entrance dome to the Harmanecká jaskyňa cave. *M. myotis* was the most dominant species from the 13 bat species found in the cave. After opening to the public, the cave was frequented by the owl for some time, because in the pellets there was a bat ring dating from 1956 (Hanák in litt.).

Zbojnická jaskyňa cave (Appendix 19, Fig. 7). This cave is located on the edge of the Silická planina plateau under the large wall of the Sokol rock. During our first visits in 1981 and 1991 we also collected detritus besides owl pellets. In the first sample of detritus, the most abundant species was *P. pipistrellus* and the non-forest species of rodents were also quite abundant. The vole species *M. arvalis* is dominant even in the sample from 2006. The detritus collected in 1991 at a different site in the cave shows different diagnostic species, which have later become a less frequent component of *S. aluco* diet. *P. pipistrellus* is one of the species hibernating in the rock

Tab. 8. continuation / pokračovanie

species / region // druhy / oblasť	1		2		3		4		5		6		7		Σ	%
<i>Apodemus flavicollis</i>	1-	47		141	1-	132	1+	230	1+	111	1-	16		436	1113	10.12
<i>Sorex minutus</i>		9		10	1-	13	1+	30	1+	21		6	1-	33	122	1.11
<i>Microtus tatricus</i>									2+	10			1-	0	10	0.09
<i>Clethrionomys glareolus</i>		66		120	1-	122	1-	103	1+	88	1-	12		441	952	8.65
<i>Delichon urbicum</i>				4	2-	1	1-	1		1	3+	49	1-	11	67	0.61
<i>Vespertilio murinus</i>					1+	9				2	2+	12	2-	0	23	0.21
<i>Myotis myotis</i>						1					1+	7	1+	17	25	0.23
<i>Rana temporaria</i>	1-	112	1-	145	2-	125		339	2-	49	1+	174	1+	1714	2658	24.16
<i>Salmo trutta</i>		1		4		7	1-	0			2		1+	36	50	0.45
<i>Glis glis</i>	2-	0	2-	1	1-	12	1-	13	2-	0		10	1+	122	158	1.44
<i>Sorex alpinus</i>		2		5		2		7		1		3		14	34	0.31
<i>Erithacus rubecula</i>		1		6		5		3			1			17	33	0.30
<i>Micromys minutus</i>						4		7						7	18	0.16
<i>Turdus viscivorus</i>		2		4		1		2			1			3	13	0.12
<i>Periparus ater</i>		2		2		3								6	13	0.12
<i>Garrulus glandarius</i>		1		1		1		3		1		1		4	12	0.11
<i>Eliomys quercinus</i>								3						8	11	0.10
<i>Dendrocopos major</i>				2		2								7	11	0.10
Mammalia	1+	442		812		1061		1183	1-	540	1-	120		2321	6479	58.89
Aves		38	2+	217		99		132	1-	16	2+	83	1-	153	738	6.71
Amphibia, Reptilia, Pisces	1-	113	1-	149	2-	137	1-	341	2-	49	1+	179	1+	1753	2721	24.73
Vertebrata	3-	8	2-	39	2+	476	2-	35		77	1-	19		409	1063	9.66
Σ		601		1217		1773		1691		682		401		4636	11001	100.00
Diversity H'		2.67		3.08		2.88		2.74		2.61		2.46		2.41	2.87	

1 – Horná Orava, 2 – Kysuce, 3 – Muránska planina Mts., central and north part, 4 – Chočské vrchy Mts., 5 – Veľká Fatra Mts., Dedošová and Čierny Kameň, 6 – Nízke Tatry Mts., 7 – Slovenský raj Mts

cracks but it was only rarely hunted by the owl between 1991 and 2000 (Hapl et al. 2002).

According to the small number of annually collected pellets, the owl used to stay in the cave only for shorter periods of time and used also other diurnal rest places in the surrounding.

Type E: +Limacidae. This dietary type of *S. aluco* was distinct for its high proportion of slugs (family Limacidae; Table 10). It was found in the samples from five mountain ranges. Typically it could be found in larger forest complexes in the middle montane zone (4th vegetation zone) on limestone ground. These forests typically belong to the forest communities of limestone beech forests (*Fagetum dealpinum*, Hančinský 1972). Along with Limacidae, the most frequent prey are the forest species of rodents: *A. flavicollis* (26.6%) and *C. glareolus* (15.2%). Birds (Aves, 3.0%) and frogs (*R. temporaria*, 2.4%) comprise less important parts of this dietary type of *S. aluco*. The

largest collection of samples of this dietary type (77%) was found at the Muránska planina Mts. thanks to regular sampling for longer periods at five sites on the southern side of this mountain unit. These results influenced the Slovak average the most. For this reason in Table 29 we can see positive values (+MDFM) only in samples from other mountain ranges: higher proportion of *C. glareolus*, *G. glis* and four bat species at Dolný Harmanec in Veľká Fatra Mts. and along with the sample from Turie in Malá Fatra Mts. with the species: *M. subterraneus*, *T. europaea* and *R. temporaria*. In Manín and Zádiel valleys we can see increased abundance of *M. arvalis*. The dominant species *A. flavicollis* and the subdominant *M. avellanarius* (6.9%) show quite even distribution in all five mountain ranges.

Bystrická dolina valley (Appendix 20, Fig. 8). In 31 years (1978–2009), 18 samples of *S. aluco* pellets were collected on the rock faces at the entrance to the Bystrická dolina valley above Dolný Harmanec village.

Tab. 9. The diet of *Strix aluco* in Slovakia, type **D**, +Chiroptera
Tab. 9. Potrava *Strix aluco* na Slovensku, typ **D**, +Chiroptera

species / sites // druhy / lokality	8	9	2	1	7	6	5	4	3	Σ	%										
Pipistrellus pipistrellus	2+	384	2+	302	1+	159	4-	0	5-	0	2-	67	3-	0	4-	0	3-	4	916	17.31	
Barbastella barbastellus	3-	0	2-	0	3+	102	1-	0	1-	2	3-	2	2	2	2	1+	11	121	2.29		
Eptesicus serotinus	1-	0	3	2+	21	17	1	1	1-	1	2-	0	2	2	5	24	0.53				
Myotis brandtii	2-	5	3-	0	2+	114	3+	84	3-	0	4-	1	1-	0	2-	0	1-	4	208	3.93	
Vespertilio murinus	3-	3	3-	1	2-	4	2+	82	1+	38	1+	115	2-	0	2-	0	1-	3	246	4.65	
Nyctalus noctula	4-	0	3-	2	3-	3	2	3-	0	3-	0	3-	12	4+	146	1+	42	2+	73	277	5.23
Myotis myotis	1-	0	0	3	4	2	3	10	2	1	1	1	1	1	1	1	1	3	29	0.55	
Myotis mystacinus	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Myotis bechsteinii	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chiroptera	---	400	---	315	---	433	167	40	228	---	155	---	---	---	---	---	---	---	---	---	---
Chiroptera %	---	44.54	---	55.95	---	76.91	49.41	8.97	12.74	---	89.08	---	---	---	---	---	---	---	---	---	---
Crocidura leucodon	2+	23	---	7	---	---	---	---	1-	6	---	---	---	---	---	---	---	---	---	---	---
Mus cf. musculus	2+	22	---	2	---	---	2	---	1-	2	---	---	---	---	---	---	---	---	---	---	---
Apodemus agrarius	1+	12	---	5	---	---	2	---	14	---	---	---	---	---	---	---	---	---	---	---	---
Microtus arvalis	1+	115	1+	68	2-	13	40	1-	26	1+	220	2-	1	2-	4	3-	0	487	9.20		
Crocidura suaveolens	1+	23	1+	11	1-	0	1	1-	7	---	---	---	---	---	---	---	---	---	---	---	---
Turdus merula	1	1+	11	---	---	---	---	---	12	---	---	---	---	---	---	---	---	---	---	---	---
Turdus philomelos	8	1+	7	---	---	---	1	1	4	---	---	---	---	---	---	---	---	---	---	---	---
Lacerta muralis	1+	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Fringilla coelebs	9	7	1+	8	---	---	2	1-	1	---	---	---	---	---	---	---	---	---	---	---	---
Rana temporaria	3-	0	2-	3	1+	32	2+	40	2+	59	2-	16	1-	0	1+	25	6	181	3.42		
Sorex araneus	1-	5	2-	0	1-	4	4	2+	32	41	3	8	---	---	---	---	---	---	---	---	---
Microtus subterraneus	1-	3	2-	0	2-	0	3	1+	13	33	2	2	2+	2	2	2	7	83	1.57		
Muscardinus avellanarius	1-	10	1-	6	2-	2	5	1+	32	64	1	1	1+	25	8	153	2.89				
Coleoptera sp.	1-	1	4	1-	0	0	1	12	19	---	---	---	---	---	---	---	---	---	---	---	---
Limacidae sp.	1-	13	1-	15	3-	0	2-	0	1+	45	1+	100	1-	0	2+	54	2-	1	228	4.31	
Clethrionomys glareolus	1-	24	2-	5	1-	21	1-	9	1+	61	1+	168	1-	3	25	1+	46	362	6.84		
Glis glis	21	1-	8	2-	2	2	1-	2	1-	6	1+	104	1-	0	1-	2	1-	147	2.78		
Apodemus flavicollis	1-	125	2-	35	3-	15	1-	41	90	1+	640	3-	3	3	6	991	18.72				
Apodemus sylvaticus	6	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Rana cf. esculenta	2	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sorex minutus	6	---	---	1	---	1	---	---	5	16	---	---	---	1	2	2	2	33	0.62		
Talpa europaea	1	---	---	---	---	---	2	4	7	---	---	---	---	2	2	2	22	0.42			
Parus major	---	---	6	---	---	3	---	---	7	---	---	---	---	---	---	---	---	---	---	---	---
Plecotus auritus	1	---	---	---	---	5	---	---	2	---	---	---	---	2	3	3	13	0.25			
Myotis blythii	1	---	5	---	---	---	---	---	1	---	---	---	---	1	4	4	12	0.23			

Tab. 9. continuation / pokračovanie

species / sites // druhy / lokality	8	9	2	1	7	6	5	4	3	Σ	%
<i>Anvicola amphibius</i>	1			2	2				2	12	0.23
<i>Micromys minutus</i>	3	3								12	0.23
<i>Coccothraustes coccothraustes</i>	3		2							11	0.21
<i>Eliomys quercinus</i>	2	2	1	2						10	0.19
<i>Dryomys nitedula</i>	4				2				1	10	0.19
<i>Erethacus rubecula</i>	2					7			1	10	0.19
Mammalia	823	478	495	285	319	1586	171	1-	165	237	4559
Aves	1+	56	1+	52	32	11	1-	10	53	1-	2
Amphibia, Reptilia, Pisces	2-	5	1-	14	1+	37	1+	42	2+	60	1-
Evertebrata	2-	14	1-	19	3-	0	3-	0	1+	57	1+
Σ	898	563	564	338	446	1789	174	272	249	285	5293
Diversity H'	2.34	2.11	2.35	2.19	2.49	2.48	0.88	2.59	2.46	3.00	

8 – Ohnište cave, Slovenský kras Mts., subrecent to recent, samples up to 2004 / suma zberov do r. 2004, 9 – Erňa cave, Slovenský kras Mts., 16. 2. 1994 + 17. 2. 1995, pellets and older bones / vývržky a staršie kosti, 2 – Strážavy, kaňon Hýrov, Malá Fatra, older bones / staršie kosti, 19. 3. 1978, 1 – Predný Choč-Váľovy, Chočské vrchy Mts., older bones / staršie kosti, 20. 5. 1978, 7 – Pod Maretkinou, Muránska planina Mts., 16. 5. 1978, 6 – Zbojnická jaskyňa cave, Slovenský kras Mts., detrit 1981 + 1991 and pellets 1981–2010, 5 – Stratená jaskyňa cave, Slovenský kras Mts., 9. 7. 1990, 4 – Duča cave, Slovenský kras Mts., 9. 7. 1990, 3 – Izba, Harmareňská jaskyňa cave, Veľká Fatra Mts., 16. 4. + 23. 11. 1980, entrance hall / vstupná sieň, subrecent

The owl mostly used the rock chimney at the rock face as its diurnal rest place. There was one year when the owl used an overhanging rock which originally served as night rest for ravens (Obuch 2007). During the latest period the owl has mostly inhabited the Krpcovo cave. The samples from the first decade (1978–1991) showed higher abundance of *S. araneus*, *M. avellanarius* and *C. glareolus* and thus belonged rather to the subtype C2 with lower abundances of *R. temporaria* and *S. betulina*. Only after 1983 we could see the alternation of population peaks of *A. flavicollis* (1993, 2000, 2007–2008) with years when Limacidae became dominant as the substitutional prey (1997, 1999, 2006, 2009). Fautistically significant was the finding of the garden dormouse (*E. quercinus*), which was found in fresh pellets collected in 1997 and 2004.

Muránska planina Mts., dietary types. The first detailed survey at the Muránska planina Mts. was conducted in 1979–1983 (Obuch 1985b). The topic of *S. aluco* dietary types in the territory of the Muránska planina National Park was described in a separate study (Obuch 2004a). In Table 11 we can see the results from pellet sampling until the year 2010. 80% of the 17,544 food items collected belonged to type E. Using the MDFM methods (Obuch 2001), therefore, these kinds of samples mostly influenced the average, and diagnostic species for other food types stood out. In type E, the Limacidae family shows higher frequency than average (33.4%), whereas the percentage in other dietary types is sometimes much lower. The most marked group of species with positive MDFM value for dietary type C comes from the top of the plateau and valleys of the northern part of the National Park, belonging to the Horehronie region. The most significant (3+) distinguishing feature is the high proportion of *S. betulina* (3.6%), but also other species (2+) such as *T. europaea*, *A. amphibius*, *M. agrestis*, *M. subterraneus*, *R. temporaria* and the order Coleoptera. Type B samples from the warmest sites at the southern edge of the plateau are dominated by forest rodent species including *A. flavicollis* and *C. glareolus*. The bat species *N. noctula* is more frequent in a single sample of type D and several samples of subtype G2 from the square in Tisovec town contain synanthropic passeriform species: *P. domesticus*, *D. urbicum*, *H. rustica* and *Apus apus*.

Muránska planina Mts., type C (Appendix 21). The owl pellets of this type were found at the upper edge of the plateau (Jaskyňa pod Kl'akom cave, Zbojská) and in the northern part of the plateau in the rocks of Malá Stožka Mt. and Župková Magura Mt., in the loft space

Tab. 10. The diet of *Strix aluco* in Slovakia, type E, +Limacidae**Tab. 10.** Potrava *Strix aluco* na Slovensku, typ E, +Limacidae

species / mountain range sruhy / pohorie		4	3	2	1	5		Σ	%		
Limacidae sp.		4680	1-	698	63	76	1+	151	5668	31.05	
Limacidae sp. %		33.42		20.34	35.20	26.48		42.66			
<i>Myotis myotis</i>	1-	26	1+	24	1			1	52	0.28	
<i>Vespertilio murinus</i>	1-	3	1+	14					17	0.09	
<i>Barbastella barbastellus</i>		8	1+	8					16	0.09	
<i>Pipistrellus pipistrellus</i>	2-	7	2+	53					60	0.33	
<i>Glis glis</i>		214	1+	93	1	7		10	325	1.78	
<i>Clethrionomys glareolus</i>		1857	1+	831	1-	11	43	1-	32	2774	15.20
<i>Turdus torquatus</i>	1-	4	1+	7	1			1	13	0.07	
<i>Microtus subterraneus</i>	1-	76	1+	46	1+	8	2	3	135	0.74	
<i>Rana temporaria</i>	1-	236	1+	171	2+	26	6	2-	0	439	2.40
<i>Talpa europaea</i>	1-	68	1+	57	2+	14	2		141	0.77	
<i>Sorex araneus</i>		692	1-	127	1+	15	16	1-	4	854	4.68
Coleoptera sp.		172		51	1+	9	3	8	243	1.33	
<i>Turdus merula</i>		32		5	1	1+	5	2	45	0.25	
<i>Microtus arvalis</i>		238	1-	26	6	1+	15	1+	20	305	1.67
<i>Nyctalus noctula</i>		21		5				1+	5	31	0.17
<i>Erithacus rubecula</i>		24		10				1+	6	40	0.22
<i>Delichon urbicum</i>		20	1-	0				2	22	0.12	
<i>Muscardinus avellanarius</i>		980		234	8	21	1-	13	1256	6.88	
<i>Apodemus flavicollis</i>		3930		782	2-	8	68	1-	72	4860	26.62
<i>Sorex minutus</i>		91		28	1	6			126	0.69	
<i>Turdus philomelos</i>		63		11		4		2	80	0.44	
<i>Arvicola amphibius</i>		54		10	1				65	0.36	

of a horse barn at the Pätina forester's house and at the hunting lodge in Trsteník valley. At two sites (Malá Stožka, Trsteník), the dominance of Limacidae was >20%, but the incidence of forest rodent species *A. flavicollis* and *C. glareolus* was low and Limacidae were not substitutional prey during population lows of these rodent species, as could be seen in the dietary type E. The pellet samples from the Pätina forester's house were distinct for their higher proportional content of *S. betulina* and Coleoptera. The owl inhabited the forester's house after it had been abandoned. The sample from the rocks at Župkova Magura above Dlhá valley is characterized by higher proportions of *R. temporaria* and *N. fodiens*. The samples from Zbojská, lacking *S. betulina* and showing an increased content of five mammal species are classified as subtype C2 (Obuch 2004a).

Muránska planina Mts., type E (Table 12). The dietary type E at the Muránska planina Mts. is represented by pellet material from five sites, mainly collected on the southern slopes of the mountain range with prevalent beech forest cover. The samples from all of these sites were collected

during several seasons and we present them in separate timeline tables. A typical site of type E at the Muránska planina Mts. is the Šarkanica cave in the Martincová valley with the highest number of samples and a total sum of 6,527 prey items. The abundances of prey from this site were the closest to the average of the whole Muránska planina Mts. The elevated Voniaca valley shows the highest dominance of the hazel dormouse *M. avellanarius*. Lower sites in Javorníková and Javorníčková valleys and at Brestová had the most dominant species *M. arvalis* and *R. temporaria*. At Brestová there was relatively high species diversity especially because of higher proportion of various passerines (Passeriformes). The eudominant species *C. glareolus* (13.3%) showed an even distribution at all five sites.

Šarkanica cave (Appendix 22). The Šarkanica cave is located in the middle of the Martincová Valley in the Šarkanica National Nature Reserve with preserved climax forest communities. The cave is hardly accessible, located in the middle of a rock wall, so the owl experienced only low disturbance and large quantities of food remains ac-

Tab. 10. continuation / pokračovanie

species / mountain range sruhy / pohorie	4	3	2	1	5	Σ	%				
<i>Microtus agrestis</i>	40	11			1	52	0.28				
<i>Sorex alpinus</i>	36	11	1	1		49	0.27				
<i>Fringilla coelebs</i>	35	7			4	46	0.25				
<i>Parus major</i>	17	5		2		24	0.13				
<i>Salmo trutta</i>	15	8				23	0.13				
<i>Neomys fodiens</i>	14	8				22	0.12				
<i>Cyanistes caeruleus</i>	18	1				19	0.10				
<i>Turdus viscivorus</i>	13	3		1		17	0.09				
Orthoptera sp.	14	3				17	0.09				
<i>Eptesicus serotinus</i>	12	5				17	0.09				
<i>Plecotus auritus</i>	15	2				17	0.09				
<i>Dryomys nitedula</i>	16					16	0.09				
<i>Periparus ater</i>	11	4				15	0.08				
<i>Sitta europaea</i>	11	1				12	0.07				
<i>Myotis bechsteinii</i>	10	2				12	0.07				
<i>Crociodura leucodon</i>	7	1			2	10	0.05				
<i>Rhinolophus hipposideros</i>	6	4				10	0.05				
Mammalia	8467	2398	1-	77	185	1-	165	11292	61.86		
Aves	409	95		4	1+	17	1+	28	553	3.03	
Amphibia, Reptilia, Pisces	1-	258	1+	184	2+	26	6	1-	2	476	2.61
Evertebrata		4869	1-	755		72	79	1+	159	5934	32.51
Σ	14003	3432		179	287		354	18255	100.00		
Diversity H'	2.04	2.32		2.22	2.23		2.04	2.14			

4 – Muránska planina Mts., type E, 3 – Veľká Fatra Mts., Dolný Harmanec, 2 – Malá Fatra Mts., Turie, pod Ostrou, 1 – Súľovské vrchy Mts., Manín + Strážovské vrchy Mts., Rokoš, 5 – Slovenský kras Mts., Zádielská dolina valley, upper part / horná časť

cumulated in the cave. There is no timber logging allowed within a 1 km radius of the cave. The fluctuations in the proportions of the diagnostic species can therefore be directly linked to the natural population cycles of several species of rodents. The rodent population dynamics in this area is influenced by the seed crop of several tree species with beech being the most prevalent.

During a period of 31 years (1979 to 2010) 20 samples were collected at this site. The seasonal comparison 1979–1996 (Obuch 1997) shows a contrast between the peaks of *A. flavicollis* and its lows reflected in higher proportion of Limacidae family in the pellets. After collecting additional samples in 2010, doubling the total number of prey items, the long-term trends became more pronounced. The incidence of Limacidae was markedly above average only in three periods: 1979–1980, 2005–2006 and 2009–2010. Between 1981–2005 there was an oscillation in proportions of the four most abundant mammal species: *A. flavicollis*, *C. glareolus*, *M. avellanarius* and *S. araneus*. In January 2005 we could see the end of the rodent population increase after the rich seed crop in the

autumn of 2004. The sample from June 2005 contained average proportions of *A. flavicollis* and *C. glareolus*, but the proportion of Limacidae increased above average and remained at high level throughout 2006.

Voniaca valley (Appendix 23). In the first years of the survey, an owl inhabited the cave Voniaca 1 and food samples were quite small. An increased proportion of Limacidae could be seen in the samples from the 1980's. From 2000 the owl inhabited the cave Voniaca 2 and a rock chimney in the vicinity of the cave. The largest samples from 2005 were deposited during the population peak of the forest species *A. flavicollis* and *C. glareolus*. The eudominant species *M. avellanarius* (9.5%) showed an even distribution in all samples.

Javorníková and Javorníčková valleys (Appendix 24). In 1979 we found detritus and pellets of *S. aluco* in a small cave located in the Javorníková valley. After the opening of the hiking trail leading to a local waterfall, the owl abandoned this place. In 1992, owl pellets were found between trees standing at the upper edge of a rock face in the Javorníčková valley approximately 1 km from

Tab. 11. The diet of *Strix aluco* in Slovakia, comparison of dietary types at the Muránska planina Mts.**Tab. 11.** Potrava *Strix aluco* na Slovensku, porovnanie typov potravy *S. aluco* na Muránskej planine

species / dietary types // druhy / typy potravy		E	C		B		D		G		Σ	%
Limacidae sp.		4680	1-	317	2-	78	2-	45	4-	0	5120	29.18
Sicista betulina	3-	8	3+	63		1		1			73	0.42
Talpa europaea	1-	68	2+	49		13		4			134	0.76
Arvicola amphibius	1-	54	2+	56		8		2		3	123	0.70
Coleoptera sp.	1-	172	2+	142	1-	13		12		1	340	1.94
Hymenoptera sp.	1-	3	1+	8						3	14	0.08
Salmo trutta		15	1+	7							22	0.13
Fringilla coelebs		35	1+	13		4		2		1	55	0.31
Parus major		17	1+	8		3				2	30	0.17
Turdus torquatus		4	1+	7							11	0.06
Musccardinus avellanarius		980	1+	290		87		32	1-	1	1390	7.92
Dryomys nitedula	1-	16	1+	13		3		2			34	0.19
Vespertilio murinus	1-	3	1+	9		4					16	0.09
Neomys fodiens	1-	14	1+	13		2					29	0.17
Microtus agrestis	1-	40	2+	51	1+	16		3			110	0.63
Microtus subterraneus	1-	76	2+	65	2+	46	1+	13		1	201	1.15
Rana temporaria	1-	236	2+	125	1-	14	2+	59		3	437	2.49
Sorex araneus		692	1+	122		50	1+	32	1-	1	897	5.11
Apodemus flavicollis		3930	2-	132	1+	445	1-	90	1-	22	4619	26.33
Clethrionomys glareolus		1857	1-	122	1+	250		61	1-	5	2295	13.08
Turdus philomelos		63		15	1+	12		1		1	92	0.52
Microtus arvalis		238	1-	18	1+	60	1+	26	1+	9	351	2.00
Nyctalus noctula	1-	21	1-	1		1	3+	38			61	0.35
Passer domesticus	1-	1							2+	9	10	0.06
Delichon urbicum	1-	20		1		3			2+	12	36	0.21
Hirundo rustica		6		1					1+	6	13	0.07

the former finding place. Since 2000, the owl pellets were deposited on the south-western edge of the rocks. The sample from the Javorníková valley contained increased proportions of *M. arvalis* and *R. temporaria*, whereas the first sample from the Javorníčková valley, the low content of *A. flavicollis* was compensated by other mammal species such as: *C. glareolus*, *M. avellanarius* and *S. araneus*. Two peaks of *A. flavicollis* and two peaks of *Limacidae* were identified in the samples collected till 2000. On the basis of the last four samples, the diet of the owl inhabiting this place was classified as type E.

Brestová (Appendix 25). In 1979, we collected a sub-recent sample from 2–10 cm of soil and fresh pellets from the 0–2 cm top soil layer on a rock ledge at the high rock chimney at Brestová, located on the right side of the entrance to the Hrdzáva dolina valley. The sub-recent sample contained increased proportion of *M. arvalis* and the fresh pellets contained increased proportion of *R. temporaria*. After 1983 a pair of ravens built their nest

on a rock above the chimney and the owl then abandoned the site. In 1996 we found pellets at a different site below a rock overhang and a hollow beech tree and in 2005 also at the Hurbanovská cave. Since there were considerable time gaps between the pellet samplings, we could not observe alternations of the population peaks of *A. flavicollis* and periods of higher proportion of *Limacidae* in the food of *S. aluco*. However, the total ratio of dominant species matches the description of the dietary type E.

Odštepená skala rock (Appendix 26). An individual of *S. aluco* used the rock massif opposite to Odštepená skala rock on the left side of the Hrdzáva dolina valley as its diurnal rest place. Since the 1990's one of the rock ceilings in this massif has been used by climbers as a shelter. This has led to frequent disturbance of the owl and therefore lower numbers of pellets at this site. The detritus collected in 1979 contained increased proportions of *M. arvalis* and *R. temporaria*. The highest proportion of *Limacidae* was

Tab. 11. continuation / pokračovanie

species / dietary types // druhy / typy potraviny	E		C		B		D		G		Σ	%
<i>Apus apus</i>	1-	1							1+	6	7	0.04
<i>Glis glis</i>		214	1-	12	1-	10		6		2	244	1.39
<i>Mus cf. musculus</i>	1-	0				4				3	7	0.04
<i>Rattus norvegicus</i>	1-	1		3		1				2	7	0.04
<i>Sorex minutus</i>		91		13		7		5			116	0.66
<i>Turdus merula</i>		32		6		6				2	46	0.26
<i>Sorex alpinus</i>		36		2				1			39	0.22
<i>Myotis myotis</i>		26		1		5				3	35	0.20
<i>Erithacus rubecula</i>		24		5		1					30	0.17
<i>Eptesicus serotinus</i>		12		5		5					22	0.13
<i>Cyanistes caeruleus</i>		18		2							20	0.11
Orthoptera sp.		14		5							19	0.11
<i>Turdus viscivorus</i>		13		1		2				2	18	0.10
<i>Plecotus auritus</i>		15		1		2					18	0.10
<i>Periparus ater</i>		11		3							14	0.08
<i>Sitta europaea</i>		11		2							13	0.07
<i>Myotis bechsteinii</i>		10		1		2					13	0.07
<i>Crocodyria leucodon</i>		7				4					11	0.06
<i>Myotis blythii</i>		7		1						2	10	0.06
<i>Pipistrellus pipistrellus</i>		7				3					10	0.06
<i>Barbastella barbastellus</i>		8						2			10	0.06
Mammalia		8467		1061	1+	1037		319	1-	57	10941	62.36
Aves	1-	409	1+	99		55	1-	10	3-	58	631	3.60
Amphibia, Reptilia, Pisces	1-	258	2+	137	1-	16	2+	60		3	474	2.70
Evertebrata		4869		476	2-	91	1-	57	2-	5	5498	31.34
Σ		14003		1773		1199		446		123	17544	100.00
Diversity H'		2.04		2.88		2.29		2.49		3.15	2.27	

found in the pellets collected between 1979 and 1982. In the first half of the 1980's, there was a wind throw at the Odštiepená Rock and a large clearing formed as a result. After this event the diet of the owl showed a marked increase in the content of *M. avellanarius* and *Sorex minutus*. The last several pellet samples were collected at uneven time intervals and smaller samples were collected. The positive MDFM values of *A. flavicollis* and *C. glareolus* in the samples from 1996, 2002 and 2003 do not allow us to confirm if their populations peaked in these years.

Type F: floodplain forests. The description of this dietary type in *S. aluco* has been published in a separate paper (Obuch 2003) on the basis of samples from eleven sites in the vicinity of the rivers Morava, Danube, Latorica and Tisa. This dietary type is characterized by the high proportion of frogs (Table 13). After the limit of the proportion of Anura was set at 15%, three of the presented samples did not conform to this condition and were reclassified

as type G. The frog species *R. temporaria* did not occur in the samples of this dietary type. The frog species *R. dalmatina* and *R. lessonae* are difficult to discern from the characteristics of the os ilium and I therefore present them collectively as green frogs in the synklepton *Rana kl. esculenta*. This synklepton occurred more frequently at three sites close to the River Morava and Jurský Šúr. In these three samples the more frequent species included *R. ridibunda*, at two sites there was an increased abundance of *Pelobates fuscus* and *Hyla arborea*. The most dominant species in the food of *S. aluco* in the Latorický luh National Nature Reserve was *Rana arvalis*.

Mammals (Mammalia, 40.5%) represent an equally frequent prey for *S. aluco* as frogs. The proportion of birds (Aves, 12.2%) in the diet of *S. aluco*, especially of the family Fringillidae, was rather high. The soft and hard floodplain forests form larger stands along the large rivers. Some of them are partially recultivated for the more timber-productive monotypic poplar stands.

Tab. 12. The diet of *Strix aluco* in Slovakia, Muránska planina Mts., type E**Tab. 12.** Potrava *Strix aluco* na Slovensku, Muránska planina, typ E

species / sites sruh / lokalita	1	2	3	4	5	Σ	%
Limacidae sp. %	35.54	30.96	39.39	19.92	20.74		
Limacidae sp.	2320	443	1426	1- 289	1- 202	4680	33.42
Orthoptera sp.	1+ 12				2	14	0.10
<i>Muscardinus avellanarius</i>	522	1+ 136	1- 182	95	1- 45	980	7.00
<i>Turdus philomelos</i>	29	1+ 17	1- 7	9	1	63	0.45
<i>Sorex araneus</i>	278	1+ 102	1+ 234	1- 28	50	692	4.94
<i>Talpa europaea</i>	1- 18	6	1+ 30	12	2	68	0.49
<i>Microtus subterraneus</i>	1- 16	10	1+ 34	12	4	76	0.54
<i>Microtus agrestis</i>	1- 12	1	1+ 19	5	3	40	0.29
<i>Arvicola amphibius</i>	1- 8	2	1+ 27	1+ 16	1	54	0.39
<i>Glis glis</i>	107	22	1- 41	1+ 37	1- 7	214	1.53
<i>Nyctalus noctula</i>	2- 0		10	1+ 10	1	21	0.15
<i>Delichon urbicum</i>	7	1	2	1+ 10		20	0.14
<i>Turdus merula</i>	11	6	7	1+ 8		32	0.23
<i>Salmo trutta</i>	1- 0		1	2+ 13	1	15	0.11
<i>Rana temporaria</i>	2- 36	2- 4	68	2+ 68	2+ 60	236	1.69
Coleoptera sp.	67	1- 7	1- 28	1+ 44	1+ 26	172	1.23
<i>Microtus arvalis</i>	1- 44	1- 16	67	2+ 80	1+ 31	238	1.70
<i>Apodemus flavicollis</i>	1951	387	1- 824	413	1+ 355	3930	28.07
<i>Sorex minutus</i>	39	14	29	1- 4	5	91	0.65
<i>Myotis myotis</i>	1- 5	6	8	7		26	0.19
<i>Clethrionomys glareolus</i>	822	183	480	223	149	1857	13.26
<i>Sorex alpinus</i>	20	3	7	1	5	36	0.26
<i>Fringilla coelebs</i>	17	8	5	3	2	35	0.25
<i>Erithacus rubecula</i>	13	5	2		4	24	0.17
<i>Cyanistes caeruleus</i>	7	2	4	5		18	0.13
<i>Parus major</i>	5	1	8	3		17	0.12

From the recording of vocalizations, Lešičko (2001) confirmed the presence of 31 breeding pairs of *S. aluco* in the inundation zone of the River Danube at Bodíky in a 13.6 km² area of the floodplain forest. However, the hunting range of the owls often reached beyond the boundaries of the floodplain forest and they often searched for prey in the surrounding agricultural land. In our samples we see that the mammal species with the highest dominance was *M. arvalis* (13.2%). Further abundant species included the non-forest species of the *Apodemus* genus. Frogs become the dominant prey item of *S. aluco* only at sites, where they are very concentrated, such as in the bayous or other dammed water bodies. For example in the Jurský šúr National Nature Reserve, frogs showed a dominance of 18.5% in the flooded alder forest, but in the drier Panonský háj only 3.2%. The owl could hunt the present frog species also in the water bodies outside the floodplain forest. An example of these is the

Pokoradzské jazierka lakes National Nature Reserve (Appendix 6), where the *R. temporaria* is also present. In Table 13 only the diagnostic and more frequent species can be seen, because the full lists of species and seasonal changes at some locations have already been published (Obuch 2003).

Type G from the strongly human-influenced environment. *S. aluco* was originally a forest hunter, but it can adapt to hunting in other environments and utilize different food sources. Part of its population lives in the vicinity of human settlements and hunts in non-forest environments. In the conditions of Central Europe, the non-forest environments are sustained by human activity and form either agricultural or urbanized land. In Slovakia, the most dominant small mammal species in agricultural land is the common vole (*M. arvalis*). This species makes up the most important food source for several species of birds

Tab. 12. continuation / pokračovanie

species / sites sruhy / lokality	1	2	3	4	5	Σ	%
<i>Dryomys nitedula</i>	3		7	5	1	16	0.11
<i>Plecotus auritus</i>	10	1	3	1		15	0.11
<i>Neomys fodiens</i>	4	2	3	5		14	0.10
<i>Turdus viscivorus</i>	9	1	2	1		13	0.09
<i>Eptesicus serotinus</i>	4	2	3	2	1	12	0.09
<i>Periparus ater</i>	7	3		1		11	0.08
<i>Sitta europaea</i>	8		1	2		11	0.08
<i>Myotis bechsteinii</i>	2	2	3	3		10	0.07
<i>Barbastella barbastellus</i>	8					8	0.06
<i>Sicista betulina</i>	2		4	1	1	8	0.06
<i>Pipistrellus pipistrellus</i>	4	1			2	7	0.05
<i>Myotis blythii</i>	1	3		3		7	0.05
<i>Crocidura leucodon</i>	2	1	2	2		7	0.05
<i>Coccothraustes coccothraustes</i>	5		1	1		7	0.05
<i>Hirundo rustica</i>	1	3	1	1		6	0.04
<i>Rhinolophus hipposideros</i>	5				1	6	0.04
<i>Neomys anomalus</i>	4	2				6	0.04
<i>Myotis nattereri</i>	2	2		1		5	0.04
<i>Columba oenas</i>	2		3			5	0.04
<i>Picus canus</i>	1	1	1	2		5	0.04
<i>Garrulus glandarius</i>	1	1		2	1	5	0.04
Mammalia	3900	911	2022	968	666	8467	60.47
Aves	189	1+ 66	1- 75	1+ 66	1- 13	409	2.92
Amphibia, Reptilia, Pisces	2- 39	2- 4	69	2+ 84	2+ 62	258	1.84
Vertebrata	2399	450	1454	1- 333	1- 233	4869	34.77
Σ	6527	1431	3620	1451	974	14003	100.00
Diversity H'	1.88	2.07	1.97	2.39	2.00	2.04	

1 – Šarkanica, 2 – Voniaca, 3 – Odštiepená skala, 4 – Brestová, 5 – Javorníková a Javorníčková dolina / valleys

of prey and owls. Some food samples of *S. aluco* with a dominance of *M. arvalis* higher than 30% were classified as subtype G1. Some individuals and breeding pairs of *S. aluco* living in urban environments, especially in parks, besides the synanthropic species of mammals, consume a high proportion of passerines. There is no single dominant prey species, so the samples of this type are characterized by high species diversity and are classified as subtype G2. The food samples of these two subtypes have been found in different geomorphological units of Slovakia.

Subtype G1: dominance of *M. arvalis* >30%. The dominance of *M. arvalis* ranges between 31% and 82%. We have found several smaller food samples of *S. aluco* in several geomorphological units showing similar species ranges. These are summarized in Table 14 (Turčianska kotlina basin, Podunajská rovina plain, Revúcka vrchovina Mts. and Východoslovenská rovina plain). In the summarized samples the fluctuations in the frequencies of some

low abundance species become more pronounced, e. g. the proportion of *Sorex* sp. in the colder Turčianska kotlina basin and the proportion of *Crocidura* spp. in the warmer parts of the Revúcka vrchovina Mts. The non-forest species of the genus *Apodemus* are represented by high proportions of *A. agrarius* and *A. microps* in the samples from the Východoslovenská rovina lowland, or *A. sylvaticus* in the Turčianska kotlina basin and on the Podunajská rovina plain. In the larger sample sets with higher numbers of samples from each site (Sebeslavce and Mošovce in the Turčianska kotlina basin), the higher quantity of diagnostic species emphasizes the specific characteristic of the corresponding sampling site: more forest species in Sebeslavce and more synanthropic species in Mošovce.

Sebeslavce (Appendix 27, Fig. 9). A 13th century church surrounded by old lime trees is located in the area of an abandoned medieval village (two remaining inhabited houses). Half of the territory within a two km

Tab. 13. The diet of *Strix aluco* in Slovakia, type F, floodplain forests
 Tab. 13. Potrava *Strix aluco* na Slovensku, typ F, lužné lesy

species / sites // druhy / lokality	3	5	6	4	1	8	2	7	Σ	%							
Rana cf. esculenta	2+	118	1+	28	2-	9	1+	24	15	2-	19	1-	0	1-	19	232	7.60
Hyla arborea	3-	0	16	1-	3	1+	52	1+	9	3	1-	23			24	130	4.26
Rana ridibunda	2-	9	3-	1	11	1-	23	1+	10	1+	8	1+	89	1-	13	154	5.04
Pelobates fuscus	1-	18	3-	0	1	2-	28	2-	0	1-	0	1+	325	2+	36	435	14.24
Rana arvalis	39.47	18.53	27.43	44.33	74.29	47.8	53.52	2	2+	119	44.89	40.01				268	8.78
Anura %																	
Sorex araneus	2+	28	3	1-	4	2	18	3	58	1.90							
Sorex minutus	1+	24	3	1-	4	1	14	5	51	1.67							
Clethrionomys glareolus	1+	27	8	27	1+	14	31	16	127	4.16							
Microtus arvalis	1+	73	1-	17	1+	188	1+	21	65	1-	1	1-	1	33	402	13.16	
Passer montanus	1+	18	1+	8	5	1	2	0	34	1.11							
Passer domesticus	3	1+	8	1	1	6	1	19	0.62								
Carduelis cannabina	1+	24	3	1-	4	1	14	5	51	1.67							
Regulus sp.	1+	7	1	7	2	1	1	9	0.29								
Muscardinus avellanarius	1+	5	1	5	1	1	1	9	0.29								
Carduelis carduelis	1	1+	7	1	1	6	4	1	1	0	1	1	1	7	18	0.59	
Fringilla coelebs	1-	0	1+	11	1+	20	3	1	1	2	1-	8		1+	8	19	0.62
Micromys minutus	2-	1	2+	28	1+	37	1	31	104	2	1	31	2-	1	99	3.24	
Apodemus agrarius	3-	0	2-	0	1+	51	1-	0	1+	104	2	1	2-	5	160	5.24	
Sylvia atricapilla	1	1	2	2	1	6	1	1	1	2	1	2	1	1	14	0.46	
Mus cf. musculus	6	1	1	1	1	1	1	1	1	2	1	29	7	7	43	1.41	
Coleoptera sp.	1-	8	1-	3	3-	5	2	2	135	37	1+	135	4	40	199	6.52	
Apodemus flavicollis	1-	12	9	1	42	1-	0	1	1	2	1	37	1+	56	156	5.11	
Coccothraustes coccothruastes	2	2	1	3	8	7	1	1	1	2	1+	2	1+	13	27	0.88	
Turdus philomelos	1	1	3	3	8	7	1	1	1	1	1	1	1	7	20	0.65	
Microtus subterraneus	2	2	5	4	5	1	1	1	1	7	1	12	2	2	23	0.75	
Apodemus microps	2	2	5	4	4	6	3	3	2	12	2	3	2	2	22	0.72	
Erithacus rubecula	3	1	1	1	1	5	8	1	1	8	1	3	2	2	18	0.59	
Rattus norvegicus	1	1	2	2	1	3	1	1	1	1	1	1	3	1	11	0.36	
Parus major	1	1	2	2	1	3	1	1	1	1	1	1	3	1	11	0.36	
Turdus merula	2	2	1	3	7	12	3	5	23	0.75							
Delichon urbicum	2	2	1	3	7	12	3	5	23	0.75							
Talpa europaea	2	2	1	3	7	12	3	5	23	0.75							
Apodemus sylvaticus	4	1	1	1	1	1	1	1	1	1	1	1	2	1	10	0.33	
Nyctalus noctula	4	1	1	1	1	1	1	1	1	1	1	1	2	1	9	0.29	
Gryllotalpa gryllotalpa	4	1	1	1	1	1	1	1	1	1	1	1	2	1	9	0.29	

Tab. 13. continuation / pokračovanie

species / sites // druhy / lokality	3	5	6	4	1	8	2	7	Σ	%
<i>Cyanistes caeruleus</i>	2	3	1			1		1	8	0.26
<i>Sitta europaea</i>	4					3		1	8	0.26
<i>Carduelis chloris</i>	1	4	1			2			8	0.26
<i>Arvicola amphibius</i>	1	1	4			2			8	0.26
Mammalia	189	87	1+	38	1-	373	1-	13	142	1237 40.50
Aves	52	2+	96	14	1	57	1+	16	68	373 12.21
Amphibia, Reptilia, Pisces	164	1-	45	43	1+	26		38	211	1229 40.24
Invertebrata	2-	8	1-	2	2	137	4	1+	49	215 7.04
Σ	413	232	649	97	35	1087	71	470	3054	100.00
Diversity H'	2.64	3.42	2.73	2.12	1.63	2.62	2.05	2.83	3.15	

3 – Malé Leváre, filling station / čerpačka, 12. 8. 1993, 5 – Jurský šúr, alder forest / jelšina, 24. 2. 1998 + 7. 7. 1998 + August 2000, leg. M. Noga, 6 – Ptruksa, Latorica River, 21. 4. 1999 + 20. 5. 1999 + 26. 10. 1999 + 17. 5. 2000 + 16. 11. 2000 + 10. 9. 2001, 4 – Horný les, 1. 7. 1998, leg. M. Noga, 1 – Břeclav, Kančí obora, 8. 4. 1998, leg. J. Chytil, 8 – Malé Trakany, Tisa River, cottages / chatky, 20. 5. 1999 + 27. 10. 1999 + 18. 5. 2000 + 16. 11. 2000, 2 – Ranšpurk, June 1993, leg. J. Chytil, 7 – Boľany, gamekeeper's house / horáreň, 21. 8. 1997 + 21. 4. 1999 + 20. 5. 1999 + 26. 10. 1999, + 16. 5. 2000 + 16. 11. 2000 + 10. 9. 2001 (Obuch 2003)

radius is covered with woodland and the other half with meadows and pastures. Worked fields only cover about 10% of the territory. In contrast to the Liščia diera site with overgrown pastures, at this site an acute boundary between the forest and the managed agricultural land can be seen. In the samples from the period 2002–2009 we could identify population peaks of the forest species *A. flavicollis* (2002, 2005, 2008) and of the non-forest species *M. arvalis* (2006–2007). We could also observe a high proportion of *R. temporaria* in the summer period 2003 and of the fat dormouse *G. glis* in 2009.

Mošovce (Appendix 28, Fig. 10). The pellets of *S. aluco* were mainly located in the loft of a barn which belonged to the manor house on the edge of a large park. The building was demolished in 2005. Part of the park is adjacent to the built-up part of the village, whereas the other part consists of agricultural land and trout fish pools. In some years, the owl searched for its prey mainly in the village (increased proportion of *P. domesticus* in 1995 and 1999), or in the park and around the pools (+*R. temporaria* and *A. flavicollis* in 2001). The high dominance of *M. arvalis* with the maximum proportion of 88% in 2005 indicates that the owl collected most of its food in the agricultural land.

Subtype G2 with increased diversity of prey (Tab 15). For this subtype we combined several small samples from a single geomorphological unit, similarly as in the case of G1 (Table 14). In column eight we cumulate further sampling sets from several geomorphological units. The identification of eight samples with abundances >200 individuals in each sample yielded 48 diagnostic species, grouped in larger blocks. In the case when I evaluated 16 samples, seven of them showed an incidence of < 100 individuals and three were without diagnostic species. The collection of pellets and nest beddings was conducted in parks in the larger cities (Bratislava, Košice, Banská Bystrica), but most of the material came from smaller towns and some came from remote settlements and small forest patches in the vicinity of rivers. If we manage to collect a larger amount of material, the subtype G2 may be further differentiated.

The average dominance of *M. arvalis* was 16.8%, *A. flavicollis* 12.5%. Other species did not reach 10%. The samples from Borská nížina plain were distinct for their majority of synanthropic and non-forest species of mammals and birds. A relatively frequent frog species was *P. fuscus*.

A similar ecological niche between mammal and bird prey can be seen in the sample from Nižné Valice in the Revúcka vrchovina Mts., characterized however by higher proportions of *Crocidura* sp. and *Apodemus* sp.

Tab. 14. The diet of *Strix aluco* in Slovakia, subtype **G1**, *Microtus arvalis* >30%
Tab. 14. Potrava *Strix aluco* na Slovensku, podtyp **G1**, *Microtus arvalis* >30 %

species / sites // druhy / lokality	7	2	1	8	4	9	5	6	3	Σ	%								
<i>Microtus arvalis</i>	1+	172	1+	164	86	53.09	28	1-	291	58	205	134	328	1466	45.21				
<i>Microtus arvalis</i> %	82.29	63.32	53.09	50.00	31.12	36.02	50.74	44.37	43.44										
<i>Pelobates fuscus</i>	2+	13			1-	0			6	1-			0	19	0.59				
<i>Apodemus sylvaticus</i>	3	2+	20	1+	12				2	1-	1	4	1-	2	44	1.36			
<i>Sorex minutus</i>	1+	10	3	1+	8	11			6	1-	4	4	1	44	1.36				
<i>Sorex araneus</i>	1+	8	2						2	1-	4	4	2	41	1.26				
<i>Limacidae</i> sp.					1+	1	4	3	1-	0	32	0.99							
<i>Glis glis</i>					1	1	2	2	0	2-	39	1.20							
<i>Arvicola amphibius</i>					1	1	3		7		31	0.96							
<i>Turdus philomelos</i>					1	1	3		10		27	0.83							
<i>Apodemus flavicollis</i>	3-	1	2-	8	1-	7	7	1+	271	1+	59	1-	16	1-	43	13.91			
<i>Clethrionomys glareolus</i>	1-	2	1+	21	2	3	3	1+	54	1+	12	1-	4	1-	15	122	3.76		
<i>Micromys minutus</i>	4		5		7			2-	2	1+	9	10	7	51	1.57				
<i>Crocodyra suaveolens</i>								2-	0	2+	16	1+	3	31	0.96				
<i>Crocodyra leucodon</i>								3	1+	9				12	0.37				
<i>Apodemus agrarius</i>		1-	0					3-	0	1+	14	3+	48	2-	0	62	1.91		
<i>Apodemus microps</i>	6				1			2-	0	1	2+	20	1-	0	28	0.86			
<i>Rana arvalis</i>										1+	6			6	0.19				
<i>Passer domesticus</i>	2	2	7		7			3-	1	1-	4		2+	57	77	2.37			
<i>Carduelis carduelis</i>							1		1				1+	9	11	0.34			
<i>Fringilla coelebs</i>					1				8	1	1		1+	18	29	0.89			
<i>Turdus pilaris</i>									10				1+	19	31	0.96			
<i>Mus cf. musculus</i>					6			2-	0	5	1		8	1+	16	40	1.23		
<i>Rana temporaria</i>	2-	0	2-	0	1-	0	3		47	1-	0	2-	3	1-	4	1+	75	132	4.07
<i>Coleoptera</i> sp.					1				11		7		7	1+	32	58	1.79		
<i>Muscardinus avellanarius</i>					2			1	21		1		4	16	52	1.60			
<i>Turdus merula</i>					2				11					5	21	0.65			
<i>Rattus norvegicus</i>	1	1	1						7		2	4	3	19	0.59				
<i>Neomys fodiens</i>									7		1		6	16	0.49				
<i>Erithacus rubecula</i>									7		1	1	6	15	0.46				
<i>Parus major</i>									6	3		2	4	15	0.46				
<i>Talpa europaea</i>									5		2		6	13	0.40				
<i>Cyanistes caeruleus</i>					4					3			5	12	0.37				
<i>Delichon urbicum</i>									1		5	1	4	11	0.34				
<i>Microtus agrestis</i>									6				5	11	0.34				

Tab. 14. continuation / pokračovanie

species / sites // druhy / lokality	7	2	1	8	4	9	5	6	3	Σ	%
Mammalia	189	245	130	51	767	149	358	259	1-	464	2612 80.54
Aves	2-	5 1-	13 1+	29	84 1-	11 1-	26 1-	13	1+	177	360 11.10
Amphibia, Reptilia, Pisces	15	2-	0 1-	3	47	2-	0 1-	7	20	1+	79 5.37
Evertebrata	1-	0 1-	1 1-	0	37	1	13	10	1+	35	97 2.99
Σ	209	259	162	56	935	161	404	302	755	3243	100.00
Diversity H'	0.84	1.55	2.05	1.70	2.33	1.99	2.17	2.19	2.45	2.50	
7 – Kirt', 14. 10. 2003, Juhoslovenská kotlina basin, 2 – Martin, open-air museum / skanzen, 19. 5. 2002 + Marské vršky, 9. 6. 1984, Turčianska kotlina basin, 1 – Jurský šúr, Panónsky háj, 1998, leg. M. Noga + Gabčíkovo, park, 15. 3. 2000, Podunajská rovina lowland, 8 – Kyslyhbel, 11. 6. 1996, Štiavnické vrchy Mts., 4 – Sebeslavce, 2002–2009, Turčianska kotlina basin, 9 – Dolné Semerovce, Potok, 19. 5. 2005, Podunajská pahorkatina Mts., 5 – Tepľý Vrch, game yard / obora, 5 samples / zberov, 1982–2007 + Španie Pole, church / kostol, 5. 6. 1995, leg. P. Benda + Prihradzany, church / kostol, 13. 11. 2002, Revúcka vrchovina Mts., 6 – Vranov nad Topľou, r. 1990, leg. P. Kaňuch + Biel, manor house / kaštieľ, r. 2000–2001, Východoslovenská nížina lowland, 3 – Mošovce, park, 1995–2005, Turčianska kotlina basin											
Other species (site – number) / Ostatné druhy (lokality počet):											
<i>Sorex alpinus</i> (4–1), <i>Neomys anomalus</i> (2–1; 4–6; 9–1; 3–1), <i>Rhinolophus hipposideros</i> (4–1), <i>Myotis mystacinus</i> (4–2; 5–1; 3–1), <i>Myotis emarginatus</i> (4–1), <i>Myotis myotis</i> (5–2), <i>Myotis daubentonii</i> (5–4), <i>Eptesicus serotinus</i> (4–1), <i>Nyctalus noctula</i> (4–1; 5–1; 3–1), <i>Plecotus auritus</i> (4–1), <i>Lepus europaeus</i> (8–1), <i>Sciurus vulgaris</i> (4–1), <i>Ter-ricola subterraneus</i> (5–4; 6–2; 3–1), <i>Mustela erminea</i> (4–1), <i>Mustela nivalis</i> (2–1; 4–1), <i>Streptopelia decaocto</i> (2–1; 3–1), <i>Streptopelia turtur</i> (1–2; 3–1), <i>Picus viridis</i> (4–1; 3–3), <i>Dendrocopos major</i> (5–1), <i>Hirundo rustica</i> (5–3; 3–1), <i>Riparia riparia</i> (5–1), <i>Anthus trivialis</i> (4–1), <i>Motacilla alba</i> (3–4), <i>Lanius collurio</i> (4–1), <i>Prunella modularis</i> (4–1), <i>Acrocephalus palustris</i> (5–1), <i>Sylvia communis</i> (5–1; 3–1), <i>Sylvia atricapilla</i> (4–3; 5–1; 3–3), <i>Phylloscopus trochilus</i> (3–2), <i>Phylloscopus collybita</i> (1–1; 3–1), <i>Regulus</i> sp. (4–1; 3–5), <i>Sylviidae</i> sp. (1–1; 3–2), <i>Ficedula albicollis</i> (4–1), <i>Phoenicurus ochruros</i> (3–3), <i>Turdus viscivorus</i> (2–1; 4–4; 5–1), <i>Periparus ater</i> (3–1), <i>Sitta europaea</i> (5–2; 3–2), <i>Certhia familiaris</i> (3–1), <i>Troglodytes troglodytes</i> (2–2; 4–1; 9–1), <i>Emberiza citrinella</i> (7–1; 2–1), <i>Carduelis spinus</i> (3–1), <i>Carduelis cannabina</i> (2–1; 4–1; 6–1; 3–3), <i>Carduelis chloris</i> (2–1; 4–1; 5–1), <i>Pyrrhula pyrrhula</i> (9–2), <i>Coccothraustes coccothraustes</i> (1–1; 8–1; 9–1), <i>Serinus serinus</i> (1–3; 3–3), <i>Passer montanus</i> (7–1; 1–4; 6–2), <i>Sturnus vulgaris</i> (1–3; 4–3; 5–2; 3–1), <i>Oriolus oriolus</i> (6–1), <i>Garrulus glandarius</i> (4–1; 5–1), <i>Passeriformes</i> sp. (4–2; 6–1; 3–1), <i>Hyla arborea</i> (7–1; 1–1; 5–1; 6–1), <i>Rana ridibunda</i> (1–1), <i>Rana cf. esculenta</i> (7–1; 1–1; 6–2), <i>Lacerta agilis</i> (5–2), <i>Lacerta vivipara</i> (5–1), <i>Salmo trutta</i> (3–4), <i>Cypriniformes</i> sp. (6–1), <i>Diptera</i> sp. (4–2), <i>Hymenoptera</i> sp. (3–3), <i>Gryllotalpa gryllotalpa</i> (5–1), <i>Orthoptera</i> sp. (5–1)											

Frogs were present with the klepton of *R. cf. esculenta*. The samples from Bratislava and surroundings are similar to the samples from the floodplain forests for their high proportion of mainly forest passerines. In the city park in Banská Bystrica, *S. aluco* hunted mainly passerines of the genus *Turdus*, as well as *N. noctula*, a bat species often inhabiting apartment blocks. The owl inhabiting the loft of the manor house at Turčianska Štiavnička hunted several species of bats, and its diet was dominated by forest species of small mammals. In two samples from the Kysuce region, the marshland species *A. amphibius* and *R. temporaria* were the most dominant.

Turčianska Štiavnička, manor house (Appendix 29). The owl was most often seen inhabiting one of the chimneys of the manor house at Turčianska Štiavnička. The bottom of the chimney was unfortunately not accessible. As long as there were openings in the roof, the owl spent her time in the loft of the building, where food pellets were also found. After the reconstruction of the roof in 2001, no further pellets could be found at this place. During our sampling under the roof we found a colony of about 50 individuals of *R. hipposideros* and rarely also *M. myotis* and *M. emarginatus*. In the food pellets of *S. aluco* we identified eight bat species with 7.0% dominance, which indicates some level of specialization for hunting bats in this place. In 2004 a summer colony of *M. myotis* (Boďová & Obuch 2006) began forming in the loft. However, we lacked material which would confirm a gradual increase in the proportion of bats in the diet of this individual of *S. aluco*. A similar case of partial specialization for bat hunting could be seen in the loft of the manor house at Necpaly. There were six bat species with a total dominance of 12.5% in a small sample of *S. aluco* diet. At the Turčianska Štiavnička manor house there is a large park with gradually increasing forest stands. Besides the synanthropic species *M. musculus*, *P. domesticus*, and *M. arvalis* there were also high

Tab. 15. The diet of *Strix aluco* in Slovakia, subtype **G2** with high prey diversity**Tab. 15.** Potrava *Strix aluco* na Slovensku, podtyp **G2** s vysokou diverzitou koristi

species / sites // druhy / lokality	1	7	2	6	5	4	8	3	Σ	%
<i>Passer domesticus</i>	1+ 65	91	2-	1 2-	7 1-	9 1-	18	27	19	237 5.80
<i>Pelobates fuscus</i>	1+ 8	1	1							10 0.24
<i>Coleoptera</i> sp.	2+ 37	1- 18	1	11	10	11 1-	2	4	94	2.30
<i>Apodemus sylvaticus</i>	2+ 48	52	6 1-	12 2-	0 3-	0 1-	4	8	130	3.18
<i>Mus cf. musculus</i>	2+ 104	1+ 126	2-	3 3-	3 1-	10	34 1-	10	18	308 7.54
<i>Microtus arvalis</i>	1+ 106	1+ 276	1-	26 1-	71	46	90 1-	44 1-	25	684 16.75
<i>Micromys minutus</i>	11	1+ 61	7 1-	7	9 1-	2 2-	0 1-	0	97	2.38
<i>Crocidura leucodon</i>	1- 3	1+ 52	8 2-	0 1-	0 2-	0	4		67	1.64
<i>Crocidura suaveolens</i>	11	1+ 102	1-	1	22 1-	1 2-	3 1-	4 2-	0	144 3.53
<i>Passer montanus</i>	2	1+ 31	3 1-	2	1 1-	1	5		45	1.10
<i>Rana cf. esculenta</i>	3	1+ 16					2		21	0.51
<i>Apodemus agrarius</i>	2-	0 1+ 61	2-	0 1-	0 1-	1	4	3	69	1.69
<i>Apodemus microps</i>	1	1+ 21	1+ 10	1-	0	1-	0	1	33	0.81
<i>Talpa europaea</i>		1- 0	1+ 8				2	4	4	18 0.44
<i>Sylvia atricapilla</i>	1 1-	3	2+ 14	3	5	3			29	0.71
<i>Coccothraustes coccothraustes</i>		7	1+ 7	8		2	2		26	0.64
<i>Erithacus rubecula</i>	1- 0	10	1+ 10	1+ 12	4	1	1		38	0.93
<i>Turdus merula</i>	1- 2 2-	3	4	2+ 44	3	8	8	3	75	1.84
<i>Turdus pilaris</i>	2- 0 3-	1	1	2+ 61	2 1-	1 1-	1	5	72	1.76
<i>Turdus philomelos</i>	1- 1 2-	1	5	1+ 27	6 1-	2	10	2	54	1.32
<i>Carduelis chloris</i>	3 1-	4	1	2+ 29	1 1-	1	3	1	43	1.05
<i>Parus major</i>	1- 4	40	7	1+ 24	7 1-	2	9	6	99	2.42
<i>Motacilla alba</i>				1+ 6			3		9	0.22
<i>Columba livia dom.</i>	1 1-	0		1+ 12			1	1	15	0.37
<i>Nyctalus noctula</i>	1- 0 2-	0	2+	41	1 1-	1	1		44	1.08
<i>Rattus norvegicus</i>	1- 2 1-	13	2	1+ 31	2 2-	0	8	6	64	1.57
<i>Orthoptera</i> sp.		1- 0	2+	16	2				18	0.44
<i>Limacidae</i> sp.	1		1+	7	2		1		11	0.27
<i>Fringilla coelebs</i>	3 1-	5	5	1+ 24	1+ 11	1-	2	4	56	1.37
<i>Carduelis carduelis</i>	1 1-	3	1+	15	1+ 7			4	30	0.73
<i>Myotis myotis</i>		5		1-	0	2+ 13	2	5	25	0.61
<i>Clethrionomys glareolus</i>	1- 8 1-	36	1+ 23	2-	8	1+ 30	2+ 89	16 1-	2	212 5.19
<i>Muscardinus avellanarius</i>	1- 0	21	1 1-	3	2	2+ 31	8		66	1.62
<i>Myotis emarginatus</i>		1				1 2+	14		16	0.39
<i>Rhinolophus hipposideros</i>		1- 0				2 2+	13		15	0.37
<i>Sorex araneus</i>	8 1-	3	1-	0	1	2+ 23	2	1	38	0.93
<i>Sorex minutus</i>	4	3	2	1	1	1+ 8	1		20	0.49
<i>Microtus agrestis</i>						1+ 6		1	7	0.17
<i>Microtus subterraneus</i>	3	6	1-	0	1	1+ 12	2	1	25	0.61
<i>Apodemus flavicollis</i>	2- 10	165 1-	19	89	36	1+ 1104	1+ 82	2-	5	510 12.49

proportions of forest species: *A. flavicollis*, *C. glareolus* and *M. avellanarius*, as well as a rare occurrence of the northern birch mouse (*S. betullina*).

Banská Bystrica, city park (Appendix 30). The diet of the *S. aluco* in the city park at Banská Bystrica was studied by Poláček (2009). In App. 30 you can see the

evaluation of species proportions in the samples accumulated from 2007 at half-yearly and 2008 at quarterly intervals. We found fluctuations in the proportions of several eudominant species. In 2006 there was an increased proportion of *M. arvalis*, in the first quarter of 2008 the highest occurrence of *N. noctula* and *T. pilaris*

Tab. 15. continuation / pokračovanie

species / sites // druhy / lokality	1	7	2	6	5	4	8	3	Σ	%						
<i>Delichon urbicum</i>	4	2-	0		5		2+	14	2	25	0.61					
<i>Hirundo rustica</i>				1			1+	7		8	0.20					
<i>Apus apus</i>							1+	10	1	11	0.27					
<i>Carduelis cannabina</i>			1	1	1		1+	5		8	0.20					
<i>Arvicola amphibius</i>	1-	0	11	1-	1	3	6	6	2+	23	50	1.22				
<i>Rana temporaria</i>	2-	0	1-	13	1-	0	2-	1	9	1-	2	9	3+	66	100	2.45
<i>Cyanistes caeruleus</i>		1	13	3	9	1	1								28	0.69
<i>Sturnus vulgaris</i>		6	4		5	2		2		5					24	0.59
<i>Serinus serinus</i>		1	2	2	1	3		3		2					14	0.34
<i>Streptopelia decaocto</i>		5	1	1	3			4							14	0.34
<i>Phoenicurus ochruros</i>		1	4		3			4		1					13	0.32
<i>Glis glis</i>			4			4	1	4							13	0.32
Mammalia	320	1026	1-	116	1-	290	167	1+	453	214	1-	104	2690	65.87		
Aves	106	1-	246	1+	99	1+	333	76	2-	49	1+	151	64	1124	27.52	
Amphibia, Reptilia, Pisces	11	1-	32	1-	1	3-	1	11	2-	2	13	3+	66	137	3.35	
Evertebrata	1+	39	1-	19	3	1+	36	14	11	1-	7	4	133	3.26		
Σ	476	1323	219	660	268	515	385	238	4084	100.00						
Diversity H'	2.49	2.91	3.26	3.24	3.13	2.66	3.37	2.79	3.45							

1 – Bogdanický vršok, 13. 8. 1993 + Malacky, park, 12. 8. 1993 + Vysoká pri Morave, 13. 8. 1993 (Obuch & Kürthy 1995), Borská nížina lowland, 7 – Nižné Valice, manor house / kaštieľ, leg. M. Uhrin & P. Benda, 1. 8. 2001, Revúcka vrchovina Mts., 2 – Bratislava, Sad Janka Kráľa, 2008, 2 samples / zbery (Poláček & Obuch 2008) + Kalinkovo, riverine forest / ľuh, 3. 5. 1988, leg. J. Chavko + Malé Vranie, Gabčíkovo, 20. 1. 2002, Podunajská rovina lowland, 6 – Banská Bystrica, park, 2002–2008 (Poláček 2009), Zvolenská kotlina basin, 5 – Trnovo, Turiec River, 19. 2. 1983 + Kláštorské lúky, 2005, 3 samples / zbery + Dvorec, 25. 7. 2005 + Necpaly, park and manor house / park a kaštieľ, 2000–2006, Turčianska kotlina basin, 4 – Turčianska Štiavnička, manor house / kaštieľ, 1996–2001, Turčianska kotlina basin, 8 – Brodzany, park, 15. 7. 1979, Nitrianska pahorkatina Mts. + Prievidza, forest park / lesopark, r. 2009, Hornonitrianska kotlina basin + Slovenská Ľupča, castle / zámok, August 1995, leg. M. Uhrin, Zvolenská kotlina basin + Halíč, park, 25. 5. 2006, Lučenská kotlina basin + Tisovec, square / námestie, 1999–2005, Muránska planina Mts. + Ďurkov, manor house / kaštieľ, 20. 7. 1997, leg. Š. Matis + Košice, park, 26. 3. 2001, Košická kotlina basin, 3 – Klokočov, school / škola, 22. 10. 1991 + Skalité, church / kostol, 24. 8. 1995, Kysuce

Other species (site – number) / Ostatné druhy (lokalita – počet):

Neomys anomalus (7–2; 6–1; 5–1; 4–1; 3–2), *Neomys fodiens* (8–1; 3–3), *Myotis mystacinus* (5–1; 4–3), *Myotis blythii* (7–2; 8–2), *Myotis daubentonii* (4–1), *Vespertilio murinus* (7–1; 5–2; 4–1), *Eptesicus serotinus* (7–1; 8–1), *Barbastella barbastellus* (4–1), *Plecotus auritus* (3–1), *Plecotus austriacus* (7–1), Leporidae sp. (1–1), *Sicista betulina* (4–3; 3–1), *Ondatra zibethicus* (4–1), *Columba oenas* (8–1), *Streptopelia turtur* (8–3; 3–1), *Picus viridis* (8–1), *Dendrocopos major* (6–2; 4–1; 8–1), *Dendrocopos medius* (8–1), *Jynx torquilla* (7–1; 8–1; 3–1), *Alauda arvensis* (1–1; 7–1), *Anthus trivialis* (4–1), *Anthus pratensis* (5–1; 8–1), *Motacilla cinerea* (4–1), *Lanius minor* (2–1), *Lanius collurio* (2–3), *Acrocephalus palustris* (1–1), *Sylvia communis* (2–1), *Sylvia borin* (2–2; 6–1; 8–1), *Sylvia* sp. (6–1), *Phylloscopus trochilus* (7–2; 2–3; 6–1), *Phylloscopus collybita* (7–4; 6–1; 5–1; 8–1), *Phylloscopus sibilatrix* (6–1), *Regulus* sp. (7–2; 2–1; 6–1; 8–1; 3–1), *Sylviidae* sp. (2–13; 6–4), *Muscicapa striata* (2–4; 5–1; 3–1), *Ficedula albicollis* (6–1), *Ficedula* sp. (2–1), *Saxicola torquata* (4–2), *Luscinia* sp. (8–2), *Turdus torquatus* (6–1; 3–1), *Turdus viscivorus* (5–3; 8–3), *Turdus* sp. (5–1; 3–1), *Aegithalos caudatus* (2–1), *Periparus ater* (6–4; 5–2), *Lepidopanes cristatus* (7–1), *Poecile palustris* (6–1), *Poecile montanus* (2–1), *Sitta europaea* (7–5; 5–1), *Emberiza citrinella* (7–2; 6–1; 5–1; 4–1; 8–2; 3–1), *Fringilla montifringilla* (6–1), *Carduelis spinus* (2–1; 6–4; 8–2), *Pyrrhula pyrrhula* (6–1; 4–1; 8–1), *Oriolus oriolus* (7–1), *Garrulus glandarius* (7–1; 6–3; 3–1), *Coloeus monedula* (8–3), Passeriformes sp. (1–2; 7–1; 2–2; 6–1; 5–3; 8–5), Aves sp. (1–1; 6–1), Aves sp. juv. (7–1), *Hyla arborea* (7–1; 8–1), *Rana arvalis* (7–1), *Salmo trutta* (5–1), Cypriniformes sp. (8–1), Pisces sp. (5–1), Hymenoptera sp. (8–3), *Gryllotalpa gryllotalpa* (1–1; 7–1; 8–1), Dermaptera sp. (6–1), Insecta sp. (2–2; 6–1)

in the 2nd quarter of 2008. The increased proportion of invertebrates (Limacidae and Orthoptera) observed after the vegetation period in 2008 was an interesting finding. All the rest of the more frequent species showed quite even distribution during the sampling period 2002–2008. Birds (Aves, 37 species, 50.5%) were found

with higher dominance than mammals (Mammalia, 13 species, 43.9%). Amphibians were represented by only one individual of *R. temporaria*. Evertebrata (5.5%) were represented by several orders. This was also the first case documented when the *N. noctula* (6.2%) was hunted all year round, most probably from the colonies

hibernating in the apartment blocks. The content of synanthropic species, especially *M. musculus* (0.5%) and *P. domesticus* (1.1%) was rather low. The birds belonged among the dominant groups only thanks to the genus *Turdus* (20,2%).

The food of *Strix aluco* in other countries (Fig. 11)

Czech Republic (Appendix 31). The material from *S. aluco* food remains was processed from eight regions: Nízky Jeseník Mts., Zlínsko region, Moravský kras Mts., Pálava Mts., Podyjí National Park, Třeboňsko region, Dačisko region, or Pošumavie region. After the first evaluation of the samples from these areas (Obuch 1994), we characterized the differences in diagnostic

species as follows: higher proportion of smaller passeriform birds at Pálava Mts., larger bird species at Zlínsko region, increased local occurrence of several species of mammals (*A. agrarius*, *D. nitedula*, *G. glis*, *C. leucodon*) in the Nízky Jeseník Mts., Zlín Region, Podyjí NP. Higher proportion of frogs and marshland mammals in the Třeboňsko and Pošumaví regions. A small sample from the Dačicko region is characterized by increased dominance of *M. arvalis*, the sample from the Moravský kras Mts. by higher proportion of non-forest or synanthropic species and Limacidae. Later the material from Pálava Mts. was extended and published separately (Gaisler et al. 1996). The material from the Moravský kras Mts. was published by Zima et al. (1998), from Zlínsko region by Zvářal & Obuch (1996) and from Podyjí NP by Reiter

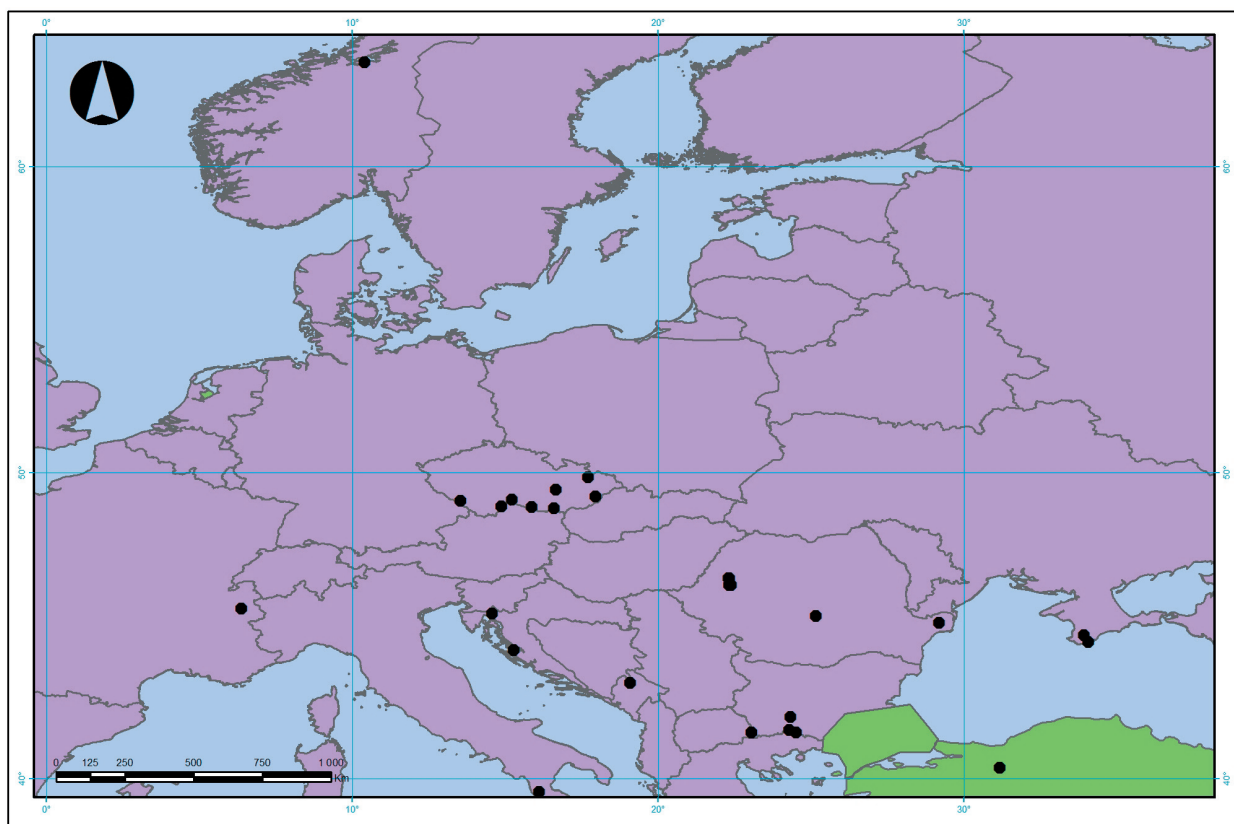


Fig. 11. Geographical distribution of *S. aluco* food samples in Europe. Black dots – sample sites, violet – Europe, green – Asia. Author: F. Tulis.

Obr. 11. Poloha vzoriek potravy *S. aluco* v Európe. Čierne body – miesta zberov, fialová plocha – Európa, zelená plocha – Ázia. Autor: F. Tulis.

et al. (1997). The updated material in Appendix 31 has almost doubled (17,433 food items) and its evaluation has significantly extended the number of diagnostic species with positive MDFM.

The common vole *M. arvalis* showed the highest dominance (67.1%) in the Dačicko region, similar to the material from Hradec Králové in the Polabská nížina plain (Plesník & Dusík 1988). The proportion of this species in all other observed regions did not reach over 30%, which is the limit for the subtype G1 in Slovakia. The fat dormouse *G. glis* is hunted by the owls more frequently in three regions (Podyjí NP, Moravský kras Mts. and Nízký Jeseník Mts.) with greater rock and moraine cover, which provides suitable refuges for this species. The bank vole *C. glareolus* shows higher dominance in large forest complexes in the

Podyjí NP, Pošumaví region and Nízký Jeseník Mts. The proportion of larger birds in the Zlínsko region and smaller passerines in the Pálava region has since increased. Several species of the Paridae family are more frequent in the *S. aluco* diet in the Podyjí NP. The proportion of seven bat species (Chiroptera) has increased in the Moravský kras Mts. In the subrecent samples there are other species such as the garden dormouse (*E. quercinus*) and the pygmy field mouse (*A. microps*). Frogs of the species *R. temporaria* are quite frequent in Pošumaví region, Nízký Jeseník Mts. and Moravský kras Mts., whereas the species *R. cf. esculenta* and *P. fuscus* are typical components of *S. aluco* diet in the Třeboňsko region and floodplain forests at the Morava River (two samples from Břeclav were classified as type F together with other samples from Slovakia). The major

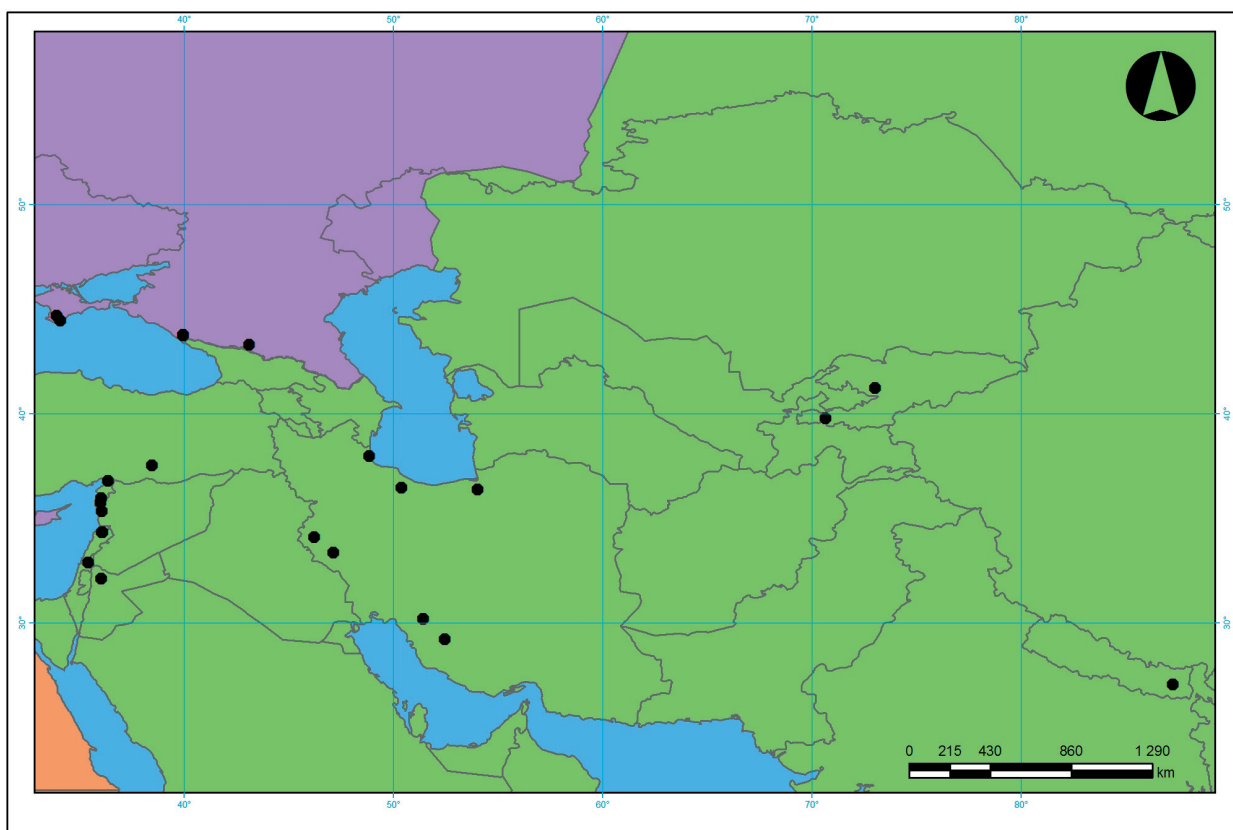


Fig. 12. Geographical distribution of *S. aluco* food samples in Asia. Black dots – sample sites, violet – Europe, green – Asia. Author: F. Tulis.

Obr. 12. Poloha vzoriek potravy *S. aluco* v Ázii. Čierne body – miesta zberov, fialová plocha – Európa, zelená plocha – Ázia. Autor: F. Tulis.

part of the material from the Zlinsko region was collected from nest boxes. Considering the rather high number of young *S. aluco* in the samples it is difficult to discern whether the remains of the found individuals were consumed by parents and siblings (cannibalism and cainism) or naturally deceased.

Norway, Sør-Trøndelag region (Table 16). At the northern limit of *S. aluco* distribution in central Norway (Sunde et al. 2001) we analyzed 446 samples from nest boxes at 132 sites from twelve regions. In total 27,396 prey items were identified from the the food remains. Vertebrates (Vertebrata) comprised: mammals (Mammalia, 20 species, 81.4%), birds (Aves, 78 species, 14.5%), one amphibian species (Amphibia, 3.8%) and one reptile species (Reptilia, 0.05%). Invertebrate prey contained beetles (Coleoptera, 0.2%) and one slug of the Limacidae family. The most dominant prey species in the food of *S. aluco* was the field vole (*M. agrestis*, 43.1%). Significant proportions were covered by other four subdominant species: *M. glareolus* (17.1%), *S. araneus* (15.8%), *Turdus pilaris* (8.6%) and *R. temporaria* (3.8%). The proportion of other species did not exceed 2%.

The differences in prey species dominance between regions were compared. The most dominant species *M. agrestis* was found in the upper parts of the Orkdalen and Gauldalen valleys and in the Malvik region. In Midtre Gauldal, some rarer species were abundant: *Microtus oeconomus* and *S. betulina*. On the western coast in the Hemne and Snillfjord regions, *S. aluco* hunted higher numbers of insectivores including *S. araneus* and *S. minutus* and the rodent species *Clethrionomys rufocanus*. Thrushes, including mainly *T. pilaris*, make up the highest proportion of *S. aluco* prey in the surroundings of Trondheim in the Byneset, Gauldal, Nidelva and Jonsvatnet regions. In the Rissa region, higher proportions of *A. sylvaticus* and *Sturnus vulgaris* were recorded.

The Mediterranean region (Appendix 32). All samples of *S. aluco* pellets from Southern Europe, found in the montane regions of the Mediterranean, occurred at rock faces, in the diurnal rest places of this owl species. Only the sample from Slovenia was found in an abandoned building. Smaller food samples of *S. aluco* from several mountain ranges reflect the great variability and adaptability of this owl species to the local food sources. In relation to the sample size we can see changes in the number of diagnostic species. The small sample from the Velebit mountain range was marked by an increased proportion of the vole species *Microtus lichtensteini* and the bat species *Pipistrellus kuhlii*. In the southern Italian massif of Monte Polino there were pellets found with

high proportion of invertebrates of the Coleoptera order and Limacidae family. A sample of West Mediterranean forest fauna could be seen in the food sample from the Savoy Alps below Mont Blanc, including the endemic subspecies *Microtus multiplex* and the garden dormouse *E. quercinus*. Samples from Tara canyon in the Durmitor Mts. in Montenegro are remarkable for the endemic species *Dinaromys bogdanovi* and high dominance of *G. glis*. A valuable finding was made in the Bulgarian Rhodope mountains, where the snow vole *Chionomys nivalis* was found at lower altitudes, as well as faunistically significant occurrence of the bat species *Tadarida teniotis* (Obuch & Benda 1996).

Romania (Appendix 33). Large samples of *S. aluco* pellets were collected in the Apuseni Mountains at four sites in the Bihariei Mts. and Padurea Craiului Mts. The proportions of small mammals, but also birds, frogs and slugs was close to the proportion found in dietary types A and B in Slovakia. There was a difference in the occurrence of *Ch. nivalis* in the middle montane zone, similarly to its occurrence in the Rhodope mountains in Bulgaria. In the West Carpathians this species is typically found in the alpine zone above the timber line. During the Pleistocene, this species was distributed over the whole territory of Slovakia, but after the spread of forests during the Atlantic period, it was pushed high up to the mountains. However, in the Southern Carpathians and in the Balkans, some steppe refuges were preserved at lower altitudes and this species also thrives as a steppe species in Anatolia and in the mountains of Syria and Lebanon, as well as in the Zagros mountain range in Iran. The occurrence of this species in the subrecent sample from the Ohnište cave in the Zádielská dolina valley is evidence to the claim that along with the species *M. tatricus* this species occurred in the steppe enclaves of the Slovenský kras Mts.

Some food samples of *S. aluco* from the Apuseni Mts., but also from the Piatra Craiului Mts. and Gura Ponicevei cave in the Banat region document that this owl species often hunts bats in the karst regions of Romania. The owl pellets from the Danube delta are dominated by Orthoptera and the most common mammal species is the black rat (*Rattus rattus*).

Crimea peninsula and Caucasus (Appendix 34). The samples of *S. aluco* pellets from the Crimea peninsula were collected on the steep southern slopes above the sea and on the northern edge of the mountain plateau above the village of Sokolinoe. The southern side of the mountain range is characterized by a more temperate climate and some endemic plant species. The area of the mountain



J. Obuch



J. Obuch



J. Obuch



J. Obuch

Figs 13–16. Examples of sites in Asia where *S. aluco* diet samples were collected. **13.** Jordan, entrance to the Iraq al Wahai cave near Ajun Castle. **14.** Lebanon, Quadisha valley, site of *S. aluco* pellet sampling. **15.** Syria, forested valley near Qal Castle at Salahidin. **16.** Turkey, valley above Tsevlík village near the Mediterranean coast.

Obr. 13–16. Príklady lokalít zberov vzoriek potravy *S. aluco* v Ázii. **13.** Jordánsko, vchod do jaskyne Iraq al Wahaj pri hrade Ajun. **14.** Libanon, údolie Quadisha, miesto zberu vývržkov *S. aluco*. **15.** Sýria, zalesnené údolie pri hrade Qal at Salahidin. **16.** Turecko, údolie nad osadou Cevlik pri Stredozemnom mori.

range is too small to support the evolution of an isolated endemic form of a mammal species. The survival of the *R. rattus* population in the forests above the southern coast of the Black Sea is a scientific curiosity. The Caucasus mountain range is isolated from other European mountain ranges by large plains. The pellets of *S. aluco* were collected in the European part of the Central Caucasus at several places in the middle of the Baksan valley and in the Western Caucasus in the Krasnaja Poljana canyon.

The food samples of *S. aluco* contained several endemic species of the order Insectivora (*Talpa levantis*, *Sorex caucasicus*, *S. volnuchini*, *Neomys teres*) and Rodentia (*Sicista caucasica*, *Chionomys gud*, *Ch. roberti*, *Microtus majori*), as well as other species distributed over large areas from Eastern Europe to Asia (*M. rossiameridionalis*, *A. uralensis*, *A. agrarius*, *A. amphibius*, *D. nitedula*, *C. suaveolens*). Comparison of the mandible sizes of the fat dormouse *G. glis* from Slovakia, Montenegro, Western

Caucasus and Elborz mountain range in Iran show that the West Caucasian population is characterized by the smallest mandible size. The population from the forests on the northern slopes of the Elborz Mts. showed the largest average mandible size.

The Near East (Table 17, Fig. 12). The pellets of *S. aluco* were collected in the forest enclaves of the Mediterranean parts of the Near East countries: Turkey, Syria, Lebanon, Israel and Jordan. The studied owl species here used the same types of diurnal roost places as in Slovakia or in other European mountain ranges: forest-sheltered rock hollows and chimneys or dense woods. However, the forests in these arid conditions do not form the same continuous complexes as we know them in Europe. The trees are often of shrub growth, reaching heights of 5 to 10 m and are often exploited for cattle grazing and extensive wood logging without any planned forest growth. The food of *S. aluco* thus contains a great proportion of non-forest, steppe and semi-desert species. The results from our first expedition to Turkey are presented in the work of Obuch (1994b). The occurrence of dormice in the food of seven owl species in the Middle East is described in the contribution to the conference in Edirne (Obuch 2001b). The faunistic data on the occurrence of bats in the pellet samples in Turkey were evaluated in the work of Benda & Horáček (1998), in Syria by Benda et al. (2006) and in Jordan by Benda et al. (2010b). In Turkey there was a high proportion of bats in *S. aluco* diet in the Nemrut Dag massif, in Syria in the food of *T. alba* by the River Euphrates and in Jordan in the food of *S. aluco* from the Iraq al Wahai cave.

The southernmost part of the *S. aluco*'s range of distribution in the Near East was in northwestern Jordan, in the oak forests surrounding the town of Ajun (Andrews 1995). A rest place of this owl species was found in the Iraq al Wahai cave (Fig. 13), with a large nesting colony of Egyptian fruit bats (*Rousettus aegyptiacus*). The owl hunted mainly the young of this species, as well as other smaller bats. Invertebrates (Solifugida, Coleoptera and Orthoptera) and lizards (Lacertidae) were frequently found in the food pellets of this owl. In the small sample from the rock canyon close to the Hula Reserve in the Jordan valley in Israel, the most frequent species included the non-forest species *Acomys cahirinus* and *Meriones tristrami*. The food of *T. alba* in Hula was markedly dominated by the vole species *Microtus guentheri* (Obuch & Benda 2009). This vole species is also hunted by the owls inhabiting the cedar forest at 1900 metres altitude in the Quadisha valley in the Lebanon mountain range (Fig. 14). In the lower parts of this valley, food pellets of *S. aluco* were

found under a rock face, containing a smaller vole species *Microtus* cf. *socialis*. Other species including *Ch. nivalis*, three species of the genus *Apodemus* (*A. witherbyi*, *A. flavicollis* and *A. mystacinus*) were also frequent, as well synanthropic species such as *P. domesticus* and *Mus* cf. *macedonicus*, bats *P. pipistrellus*, reptiles of the Scincidae family. There was a high dominance of Limacidae. At two sites in the mountains near the Mediterranean Sea in Syria, the most dominant prey species of *S. aluco* was the broad-toothed field mouse (*A. mystacinus*). The food sample from the castle Qal at Salahidin (Fig. 15) contained numerous Coleoptera and the sample from the town Rabbiah contained the frogs *Hyla savignyi* and the forest dormouse (*D. nitedula*).

The pellet material from Turkey came from four very distinct sites: Tsevlik village (Fig. 16) on the Mediterranean coast close to the border with Syria, from the rocks above the Belem Pass at 1300 metres altitude, below Nemrut Dag Mt. in southeastern Turkey (Obuch 1994b) and from Lake Abant in northwestern Turkey at 1700 metres altitude. The geographical differences are reflected in the different species in the food samples: the dominant prey species at Tsevlik is *R. rattus*, at Belem species *A. witherbyi* and *Cricetulus migratorius*. A sample from the cave below the village of Karadut at Nemrut Dag Mt. contained 14 bat species and a great number of the house martin *Delichon urbicum* from a colony nesting in an overhanging rock. Another sample from the same place contained mainly aquatic creatures: frogs, especially *Bufo viridis* and *R. ridibunda*, carps from the Cypriniformes family and crabs (Decapoda). Several typical Caucasian species extend through the forest zone around the Black Sea to the northwestern Turkey, where they meet the forest species originally from the Balkans. The food sample from Lake Abant at the town of Bolu came from the beech-fir forests at 1,600 metres altitude. Although this small sample of *S. aluco* diet was collected on the Asian continent, we can see typical representatives of European fauna: *A. uralensis*, *M. rossiameridionalis*, *M. glareolus*, *M. avellanarius* and *G. glis*. The Middle-Eastern type of fauna includes *A. witherbyi*.

Iran, Kyrgyzstan, Nepal (Appendix 35). There are two regions with relatively humid climate and forest growth in Iran, inhabited by *S. aluco*: the northern slopes of the Elborz Mts. and eastern slopes of the Bogrov Dag Mts., which capture the precipitation from the evaporating Caspian Sea. The southern slopes of the Zagros Mts. are humidified by the water evaporating from the Persian Gulf. The Caspian Sea provides much greater humidity and the coastal forests are high and with continuous cano-

py. The southern slopes of Zagros Mts. are covered with discontinuous thin forests with oaks as the most frequent tree species. Similarly to the Caucasus Mts., also in the northern Elborz Mts. there are endemic forest mammal species: *Apodemus hircanicus*, *Microtus dorothea* and *Crociodura suaveolens caspica*, which together with the large local subspecies of the fat dormouse *Glis glis* form the food basis of the *S. aluco*. At higher altitudes (Derez Naud site), the non-forest species *Microtus irani* is also present. The smaller food samples of *S. aluco* from the forests of Zagros Mts. are dominated by *A. witherbyi* and the steppe gerbil species *Meriones persicus*. At two sites in the rocky valleys at Firuz Abad and Bisahpur, we found a very similar dietary specialization of *S. aluco* as at the Turkish Nemrut Dag Mt. The owls concentrated on hunting frogs (*R. ridibunda*, *B. viridis*), carp and crab (Decapoda). Khaleghizadeh (2011) reports about the food of *S. aluco* from pellets collected in the pine forest at the Persepolis archeological site in the Fars province. The results are similar to those published by Obuch (2011) from this location about the diet of *A. otus*. The most dominant component of the diet comprises birds (Aves, 73%). The most frequent mammal species is *Microtus irani* (8%).

In 1988 and 1990 we conducted a survey of the *B. bubo* diet in Southern Kyrgyzstan (Obuch & Rybin 1993). A small number of *S. aluco* pellets were found in the Alai Mts. covered with thin archa juniper forests near the town of Kalek. The owl here hunted the montane species of voles: *Microtus carruthersi* and *Alticola argentatus*. In the dense walnut tree (*Juglans regia*) forests on the humid southern side of the Fergana Mts., we could also find the endemic forest rat species *Rattus turkestanicus*.

In the Sivalik Mts. in eastern Nepal, a diurnal rest place of *S. aluco* was found on a mountain ridge above the shepherd settlement of Dur Pany. The most frequent prey species in the pellets from this place included endemic mammal species living in the humid rhododendron forests: *Microtus sikimensis*, *Rattus eha*, *Soriculus caudatus*, *S. gruberi* and *S. nigrescens*. These forests are periodically burnt and turned into fields by the local inhabitants. After a certain period of raising crops and grazing they are abandoned and overgrown with woods again.

Notes on the occurrence of selected species in the diet of *S. aluco*. The *Apodemus flavicollis* is a dominant forest rodent in Slovakia, dependent on trees producing a rich crop of seeds, including mainly beech, oak and hornbeam. In lower mountain ranges (type A) some of these tree species produce a rich crop almost every year. In the middle montane zone (types B and E) the population cycle of

this rodent species depends mainly on the crop of beech nuts. In the higher and wetter mountain ranges (type C), the forest cover is mainly formed by naturally occurring or planted spruce trees, which produce smaller amounts of seeds. Thus the *A. flavicollis* is not as dominant here as at lower altitudes and its frequency in the diet of *S. aluco* is quite similar to *M. avellanarius* and *C. glareolus*.

The *Eliomys quercinus* is originally a west Mediterranean species which came to Central Europe in the Epiatlantic period due to the warmer climate, but also because of the first large-scale deforestation and grazing. This species is quite common in South-west Europe and spreads to our territory from Germany over the Šumava Mts. in Bohemia. Since the 1960's the Central European population of this dormouse species in Romania, Hungary, Slovakia, Moravia, Poland and Belarus to the Baltic states experienced a sharp decline or extinction over the majority of its former territory. This may have been partially caused by the changes in agricultural practice in these countries during the Communist period, especially through the reduction of grazing, forestation of steeper slopes, or natural spreading of tall herbs and shrubs.

The proportion of the dormouse species *Glis glis* in the diet of *S. aluco* is in linear relation to the number of rocks in its hunting range. In Slovakia, this species is most abundant in the Slovenský kras Mts., in the Czech Republic in the Moravský kras Mts and in the Podyjí National Park and shows a high 30% dominance in the samples from the Tara canyon in Montenegro and Krasnaja Poljana in the Caucasus Mts. This species is also found in deciduous forests, so it is absent in the Kysuce region of Slovakia, but also in the Šumava Mts. in Bohemia with their prevailing conifer forests.

In the part on material and methods we described how the pellets and nest beddings were processed using NaOH. This method is not commonly used by other researchers studying the owl diet. The most common method involves simple mechanical disintegration of the pellets. However, when using this method, a prey body consumed by the owl may later appear in two or more pellets, e. g. the remains of a single adult hare may appear in three pellets of an Eurasian eagle owl. In periods of prey abundance, the owls preserve their prey in caches and later consume some body parts. Thus the remains of a single individual may be counted several times. If the researcher cannot find particular parts of the skeleton allowing identification of the prey species, the prey is then recorded at higher taxonomic level. Thus the results contain large number of individuals identified at genus or family level, and smaller numbers of identified species. However, as we processed

Tab. 16. Comparison of the diet of *Strix aluco* in some parts of the Sør Trondelag region (Norway)
 Tab. 16. Porovnanie potravy *Strix aluco* v niektorých regiónoch v kraji Sør Trondelag (Nórsko)

species / region druh / oblasť	Selbu	Meldal	M. Gaudal	Orkdal	Malvik	Snillfjord	Hemne	Byneset	Gaudal	Nidelva	Jonsvatnet	Rissa	Σ	%
<i>Aegolius funereus</i>	1+ 6								1				7	0.03
<i>Lemmus lemmus</i>	2+ 23	1+ 11	3	1- 0		1- 0	4		7				50	0.18
<i>Microtus agrestis</i>	451	1+ 1184	1+ 1131	1+ 1560	1+ 997	842	1- 1313	1- 668	1- 866	745	973	1074	11804	43.09
<i>Microtus oeconomus</i>		3	2+ 19							1			23	0.08
<i>Neomys fodiens</i>	8	1- 11	1+ 38	1+ 49	14	19 1- 18	34	16	26	16	24	25	280	1.02
<i>Sicista betulina</i>			2+ 24	4		1+ 18	3	1- 0				1- 0	49	0.18
<i>Clethrionomys rufocanus</i>	2- 0	30	2- 5	2- 6	3- 0	2+ 144	2+ 179	3- 0	3- 2	3- 1	3- 1	1- 17	385	1.41
<i>Sorex minutus</i>	8	1- 5	1- 8	1- 14	1- 4	2+ 52	1+ 66	10 1- 12	1- 12	2 2- 1	2 2- 1	27	209	0.76
<i>Erithacus rubecula</i>	2	1	2	1- 0	4	1+ 15	1+ 21	2	3	3	2	4	59	0.22
<i>Sorex araneus</i>	159	2- 105	1- 270	1- 253	1- 219	1+ 683	1+ 1187	1+ 398	1- 257	1- 164	1- 239	397	4331	15.81
<i>Prunella modularis</i>			1	2	2		1+ 7	1				1	14	0.05
<i>Phylloscopus collybita</i>		3		1		1	1+ 16	1	3			1	26	0.09
<i>Parus major</i>	1	1		3	1	5	1+ 14	6	6	1	5	6	49	0.18
<i>Clethrionomys glareolus</i>	153	1- 212	1+ 486	1- 400	277	341	1+ 906	289	1+ 605	293	321	411	4694	17.13
<i>Turdus merula</i>	1	4	11	14	3	7	1+ 30	8	1+ 18	1- 2	5	7	110	0.40
<i>Turdus philomelos</i>	9	20	2- 6	38	20	1- 14	1+ 82	22	1+ 66	22	28	39	366	1.34
<i>Mus cf. musculus</i>	3	1- 2	11	20	12	11 2- 8	5	1+ 34	1+ 39	17	8	16	178	0.65
<i>Turdus iliacus</i>	2	1- 1	4	7	7	8	15	4	1+ 18	7	9	1+ 22	104	0.38
<i>Turdus cf. torquatus</i>	1	4	5	1- 0	3	1- 0	2- 0	1+ 12	8	1	8	2+ 28	70	0.26
<i>Turdus pilaris</i>	1- 48	125	1- 97	284	136	5- 5	1- 177	1+ 290	1+ 544	2+ 244	155	244	2349	8.57
<i>Fringilla coelebs</i>	1- 2	1- 7	1- 10	1- 15	13	1- 10	35	1+ 38	1+ 60	1+ 23	1- 10	25	248	0.91
<i>Rana temporaria</i>	2- 4	2- 12	2- 19	1- 54	82	1+ 126	173	1+ 133	117	1+ 90	1+ 148	89	1047	3.82
<i>Arvicola amphibius</i>		9	1- 2	2+ 48	2- 0	6	2- 4	2- 0	2+ 51	1- 0	2- 0	2- 0	120	0.44
<i>Cyanistes caeruleus</i>		1		1		2	3	1	1+ 7	2	2	1	20	0.07
<i>Emberiza schoeniclus</i>			2	4		1	8	6	1+ 14	1	3		39	0.14

Tab. 16. continuation / pokračovanie

species / region druh / oblasť	Selbu	Meldal	M. Gauldal	Orkdal	Malvik	Snillfjord	Hemne	Byneset	Gauldal	Nidelva	Jonsvatnet	Rissa	Σ	%
<i>Carduelis chloris</i>		2	1	3	1		6	7	1+ 10	4	5	6	45	0.16
<i>Coleoptera</i> sp.	1-	0	1-	8	8		5	6	2+ 28	1	1	5	65	0.24
<i>Carduelis spinus</i>	2	1	3	2	4		5	7	5	3	1+	1	45	0.16
<i>Sturnus vulgaris</i>	1-	0	1-	6	1-	6	1-	4	5	1	3	2+	63	0.23
<i>Apodemus sylvaticus</i>	1-	0	1-	1	2-	2	3-	0	1-	5	1-	3+	108	0.39
<i>Strix aluco</i> juv.				1	2		3	4	4	2	3	5	29	0.11
<i>Mustela nivalis</i>	1	2	2	1	2	1	5	4	5	1	2	1	27	0.10
<i>Emberiza citrinella</i>								3	4	3	3	4	17	0.06
<i>Sylvia atricapilla</i>			2	2			7		4			1	16	0.06
<i>Sitta europaea</i>	1			2	2		6	1	1	2	1	1	15	0.05
<i>Lacerta vivipara</i>			2	2	1	3					3	3	14	0.05
<i>Phylloscopus trochilus</i>			1		2	3	5		1			1	13	0.05
<i>Pica pica</i>					2		3		1	2		4	12	0.04
<i>Rattus norvegicus</i>					2			4	4		1		11	0.04
<i>Passer domesticus</i>				1		1		3	2		1	2	10	0.04
<i>Garrulus glandarius</i>					3			1		1	2		9	0.03
<i>Sciurus vulgaris</i>						1	2	1	4			1	9	0.03
<i>Anthus pratensis</i>		3	1		1		2	2					9	0.03
<i>Carduelis flammea</i>				4			2	1	1			1	9	0.03
<i>PeriParus ater</i>	1			2		1	2	1	1	1			9	0.03
<i>Poecile montanus</i>				1	3				3			1	8	0.03
<i>Turdus viscivorus</i>		2			1			1	1	3			8	0.03
<i>Saxicola rubetra</i>				3		2	1		2				8	0.03
<i>Apodemus flavicollis</i>					1		5				1		7	0.03
<i>Lepus timidus</i> juv.	2		2					1	1			1	7	0.03
<i>Pyrrhula pyrrhula</i>			1	1			2		2			1	7	0.03
<i>Sylvia communis</i>	1		1			3	1					1	7	0.03

Tab. 16. continuation / pokračovanie

species / region druh / oblasť	Selbu	Meldal	M. Gauldal	Orkdal	Malvik	Snillfjord	Hemne	Byneset	Gauldal	Nidelva	Jonsvatnet	Rissa	Σ	%
<i>Phylloscopus sibilatrix</i>				1		3	2		1				7	0.03
<i>Aegithalos caudatus</i>				1			4	1					6	0.02
<i>Fringilla montifringilla</i>			2	2							1		5	0.02
<i>Muscicapa striata</i>							2		1			2	5	0.02
<i>Coccothraustes coccothraustes</i>								1	3		1		5	0.02
Mammalia	808	1574	2002	2355	1530	2120	3715	1427	1- 1885	1241	1586	2056	22299	81.40
Aves	1- 80	1- 178	1- 154	414	222	2- 98	1- 494	1+ 439	1+ 825	1+ 338	270	458	3970	14.49
Amphibia, Reptilia	2- 4	2- 12	2- 21	1- 56	83	1+ 129	173	1+ 133	117	1+ 90	1+ 151	92	1061	3.87
Vertebrata	0	1- 0	1- 0	8	8	3	1- 5	6	2+ 29	1	1	5	66	0.24
Σ	892	1764	2177	2833	1843	2350	4387	2005	2856	1670	2008	2611	27396	100.00
Diversity H'	1.56	1.29	1.54	1.64	1.61	1.81	1.99	2.02	2.17	1.76	1.77	2.00	1.93	

all samples from the same location and same sampling date together, we selected only those body parts specified in our methods. The results of species identification of birds or mammals were recorded only after sorting out all bones from the sampling occasion.

For the identification of mammals we used jaw bones, in moles also humerus and in hares the heel bone (calcaneus). The identification of the Arvicolidae family also involved careful sorting of detached first lower molars M_1 , which allow the identification of individual species. In other mammal species (families Soricidae, Muridae, order Chiroptera) we searched for differential characteristics which allow the identification of species even after the teeth have been removed. The presence of reliable comparative skeleton material is crucial for the identification of bone fragments.

According to the handbook by März (1969), we sorted out four types of avian bones and the occurrence of a particular species in the sample was determined from the most numerous of these bones. The analyzed material is deposited at the Botanical Gardens of Comenius University in Bratislava for later revision, or closer identification of specimens that were classified to higher taxonomic levels. The material can later be used for taxonomic studies. Several authors use only beaks for the identification of birds. Bocheński et al. (1993) studied which bird bones are most numerous in the pellets of *S. aluco* and *B. bubo* and how fragmented they were. According to our notes on the analysis of *S. aluco* pellets in this study, we can conclude that by using beaks only, the number of birds in the pellets would be underestimated to 25% of the real number. The accuracy of the identification to species level would also be limited. In our case the use of four bone types provides complementary material that is used to clear up any doubtful results caused by bone fragmentation. The checks of food reserves in the nests of the *B. bubo* revealed that in cases of large prey (e. g. hedgehogs or ducks) the adults feed their young only with fleshy body parts, and heads are disposed of in the pellets of the adults outside the nest.

In our smallest owl species *G. passerinum*, heads are absent in the pellets not only for prey of the passerine birds (Passeriformes), but also rodents (Rodentia). Uttendörfer (1939,1952) and other German authors included in prey numbers from the pellets also the results from the identification of feathers found around the pellet sampling spot. In Slovakia, the method of results accumulation from the food reserves in the nest, skeleton remains, feathers and pellet samples is used in the research of the diet of the birds of prey, since most bones in their pellets are digested (e. g. Dravecký et al. 2008).

The method of marked differences from the mean (MDFM) assumes binomial distribution of discrete numbers in a contingency table and is based on χ^2 values. It does not test overall similarity of samples within a dataset but works out which items (species) in the dataset show significantly different abundances from the mean (summary) values. The measure of deviation difference is derived from the geometric relationship between the parameters of the basic boundary line: 1, 2 (coefficient) and 4 (constant). We analyzed the same data first by calculating a similarity dendrite using the MDFM method and then by cluster analysis producing a dendrogram, and both methods yielded similar results (Miklisová et al. 2001). However, the MDFM method has identified diagnostic species which define similarities or differences between samples independently of their dominance. The marked differences from the mean method (MDFM, Obuch 2001) have so far only been used by a few Slovak researchers. Some do not consider this a correct method (Mlíkovský 1998), while others use free standard computer programs for the statistical analysis of their data. The Zber database program (Šipőcz 2004) is used only by the Botanical Gardens of Comenius University in Blatnica and the headquarters of the Raptor Protection of Slovakia civic association located in Bratislava. This computer program allows the synthesis of a great amount of data. This method has also been applied to some literary data.

Poland. Many research studies about the owl diet including *S. aluco* have been published. For comparison we selected several studies from the urban environment and larger forest complexes.

The diet of *S. aluco* in the cities and adjacent areas (Appendix 36). The food samples of *S. aluco* from large cities in Poland were distinguished by high proportion of birds (Aves, 47.3%):

In Poznan, Cracow and the centre of Warsaw, the dominant prey species included the sparrow species *P. domesticus* and *P. montanus*, in Torun also larger species: *S. decaocto* and *Sturnus vulgaris*. At the Salvator Hill at Cracow two frequent species of thrushes (*T. merula* and *T. pilaris*). Great part of the birds (10%) were only determined as Passeriformes or Aves. Goszczynski et al. (1993) referred about increasing proportion of birds in the food samples of *S. aluco* in the suburbs of Warsaw (Puszcza Kampinsoka) and parks at newer residential areas and in the centre of the city. Their data was combined into three groups. In the woodlands in the city suburbs, the forest rodent species were more frequent (*A. flavicollis* and *C. glareolus*), in the centre of Warsaw rather the synanthropic species (*R. norvegicus* and *M. musculus*), while

the striped field mouse (*A. agrarius*) was dominant in the parks on the city suburbs. We added the data of Wiacek & Niedzwiedz (2008) from three sites located from the suburbs to the centre of Lublin. The distribution of diagnostic species in the sum of these samples most closely resembles the results from the suburbs of Warsaw.

The diet of *S. aluco* in forested areas (Appendix 37). In contrast to the Slovak landscape, Poland has a much greater territory and most of it is covered with plains or low hills. Three of the six food samples of *S. aluco* in our comparison came from the north-eastern part of Poland, one from a moderately high mountain range (Beskid Niski Mts.) on the border with Slovakia. In the sample from Luknajo lake, only mammals were identified. Birds (4.3%) generally make up a less important food component of *S. aluco* and it is hard to estimate their species composition, because house sparrows (*P. domesticus*) were identified only in the samples from the Beskid Niski Mts, and thrushes (*T. philomelos*) from the Romincka forest. Data on other species are scarce. Frogs are quite frequent in two samples from north-eastern Poland, especially *R. temporaria* and *R. arvalis* at the Romincka site. Mammals (Mammalia, 80.2%) are present most markedly at Luknajo lake as block nine of mostly marshland species. Not all species were determined; otherwise the resulting proportion would be lower. The proportion of bats in the diet of *S. aluco* from the Szachownica cave at Cracow was quite significant (Chiroptera, seven species, 21.6%).

Germany. Germany was the cradle of owl pellet research. Uttendörfer (1939, 1952) concentrated in his works on contemporary data on the diet of birds of prey and owls not only from Germany but also from other European countries, and he also mentioned studies from other continents. His works lack more detailed geographical descriptions of the sampling sites. Thus the data from Schaefer from Slovakia were also included. Silesia was then a part of Germany and presently it has become difficult to identify the German names of the sites in Polish territory. This researcher also did not include information on who collected and analyzed the samples. In the introduction to his study from 1939 he acknowledged only his closest colleagues, not mentioning dozens of those who collected samples. Some of his students (e. g. Schaefer 1962, März 1954) later re-published material already presented by Uttendörfer.

Surroundings of Herrnhut, south-eastern Germany (Uttendörfer 1939, 1952) (Appendix 38). The samples were collected over a period of several years at several sites, which are marked beside the local description with the letter H (abbreviation of the town Herrnhut, where

Tab. 17. Diet of *Strix aluco* in the Near East region
 Tab. 17. Potrava *Strix aluco* na Blízkom Východe

species / sites druh / lokalita	2	1	4	3	6	5	7	8	9	10	Σ	%
<i>Acomys cahirinus</i>	2+	9	3								12	0.52
<i>Meriones tristrami</i>	1+	7		1-	7	4	2	4	1-	2	32	1.38
<i>Rousettus aegyptiacus</i>		2+	26								27	1.16
<i>Solifuga</i> sp.		2+	14		1				2-	0	16	0.69
<i>Orthoptera</i> sp.		2+	24				5		1-	0	32	1.38
<i>Nannospalax ehrenbergi</i>		1+	5					1	2-	0	7	0.30
<i>Coleoptera</i> sp.	1	2+	63	1	2-	14	2+	42	1-	16	156	6.72
<i>Lacertidae</i> sp.		1+	10		1+	7	5		1-	0	23	0.99
<i>Fringilla coelebs</i>	3	1+	7		1			1+	7	0	19	0.82
<i>Petronia petronia</i>		1	1+	6				4		15	35	1.51
<i>Microtus guentheri</i>	4	2-	0	2+	18		12	2-	1	14	131	5.65
<i>Microtus cf. socialis</i>				1	2+	14			1-	0	15	0.65
<i>Pipistrellus pipistrellus</i>			1	2+	15					2	19	0.82
<i>Limacidae</i> sp.	2-	0		3+	85	1-	1	1-	7	1-	102	4.40
<i>Scincidae</i> sp.				1+	10				4	0	10	0.43
<i>Passer domesticus</i>		1	2	1+	19	2	3	1+	15	1-	44	1.90
<i>Mus cf. macedonicus</i>	6	8		1+	26	8	1+	20	1+	23	116	5.00
<i>Apodemus witherbyi</i>		1-	0	1	13	1-		1-	0		54	2.33
<i>Chionomys nivalis</i>			1	1+	10			1+	8	1	20	0.86
<i>Apodemus flavicollis</i>	2	4		1+	12	15	6	1-	0	2-	39	1.68
<i>Apodemus mystacinus</i>	1-	3	1-	18	1-	0	32	1+	51	0	290	12.50
<i>Hyla savignyi</i>		1-	0		0	2+	24			1-	37	1.59
<i>Hymenoptera</i> sp.		2				2	5			6	9	0.39
<i>Dryomys nitedula</i>				7	1+	8			1-	0	23	0.99
<i>Hirundo rustica</i>	1			1							12	0.52
<i>Pipistrellus kuhlii</i>					3						11	0.47
<i>Agamidae</i> sp.		3				1	1+	8	1-	0	13	0.56
<i>Rattus rattus</i>	1	5		5	3	7	2+	35	1-	0	56	2.41
<i>Cricetulus migratorius</i>	1-	1-	0	1-	1	0	2+	8		13	50	2.16
<i>Emberiza calandra</i>							1+				5	0.22
<i>Eptesicus bottae</i>									1+	11	11	0.47
<i>Nyctalus noctula</i>				2					1+	9	11	0.47
<i>Columba livia</i>				1					1+	8	9	0.39
<i>Delichon urbicum</i>		1		1-	0			2	1+	32	35	1.51
<i>Bufo viridis</i>	1-	0	3-	3-	0	3-	0	3-	2+	193	194	8.36
<i>Rana ridibunda</i>	1-	0	2-	3-	0	2-	0	1-	5	3-	180	7.76

Tab. 17. continuation / pokračovanie

species / sites druhy / lokality	2	1	4	3	6	5	7	8	9	10	Σ	%										
Cypriniformes sp.		1-		1-	0	1-	0	1-	0	2+	51	2.20										
Apodemus cf. uralensis										2+	17	20										
Clethrionomys glareolus										1+	6	6										
Microtus rossiaemeridionalis										1+	7	7										
Crocodyrus suaveolens		4		5	7	6	6	5	1-	4	37	1.59										
Crocodyrus leucodon						4	1	2	5	2	14	0.60										
Turdus merula		2		1			4	2	2	1	12	0.52										
Luscinia sp.		4						4	3		11	0.47										
Sylvia atricapilla					2			3	5		10	0.43										
Erithacus rubecula		1			3	1	1		4		10	0.43										
Turdus philomelos		3					3		4		10	0.43										
Mammalia	1+	39	1-	87	23	170	1+	142	1+	100	128	1+	172	1-	169	1+	44	1074	46.29			
Aves	1+	21	52	1+	19	46	1-	14	1-	8	1+	58	1+	55	118	6	397	17.11				
Amphibia, Reptilia, Pisces	2-	2	2-	14	2-	0	3-	11	1-	31	2-	4	1-	24	4-	1	2+	426	1-	2	515	22.20
Vertebrata	1-	1	2+	106	2	1+	94	24	1+	46	1-	18	1-	17	2-	22	4	334	14.40			
Σ	63	259	44	321	211	158	228	245	735	56	2320	100.00										
Diversity H'	2.96	3.03	2.17	2.71	2.58	2.27	3.09	2.91	2.66	2.29	3.72											
2005, 5. 10. 2005, 8 – Belem, Turkey, 9. 6. 1992 (Obuch 1994b), 9 – Nemrut Dag, Turkey, 7. 6. 1992 (Obuch 1994b), 10 – Abant Golu, Turkey, 16. 5. 1996																						
Other species (site – number) / Ostatné druhy (lokality – počet):																						
<i>Erinaceus concolor</i> (7–2; 8–1; 9–1), <i>Neomys teres</i> (10–1), <i>Suncus etruscus</i> (6–1; 5–1; 7–1; 8–1; 9–1), <i>Rhinolophus ferrumequinum</i> (1–1; 9–7), <i>Rhinolophus euryale</i> (9–2), <i>Myotis mystacinus</i> (9–1), <i>Myotis emarginatus</i> (6–1; 9–3), <i>Myotis myotis</i> (9–1), <i>Myotis blythii</i> (2–1; 1–1; 5–1; 8–1; 9–5), <i>Vespertilio murinus</i> (9–1), <i>Eptesicus serotinus</i> (9–2), <i>Hypsugo savii</i> (8–1; 9–1), <i>Barbastella barbastellus</i> (9–1), <i>Miniopterus schreibersii</i> (9–1), <i>Tadarida teniotis</i> (2–1; 8–1), <i>Taphozous nudiventris</i> (2–2), <i>Glis glis</i> (10–1), <i>Muscardinus avellanarius</i> (10–2), <i>Nannospalax nehringi</i> (9–4), <i>Rattus norvegicus</i> (1–1; 6–1; 8–2), <i>Gerbillus dasyurus</i> (2–3; 1–5), <i>Microtus subterraneus</i> (10–1), <i>Ixobrychus minutus</i> (1–1), <i>Alectoris chukar</i> (5–1; 8–1; 9–4), <i>Ammoperdix heyi</i> (1–1), <i>Coturnix coturnix</i> (7–1), <i>Porzana porzana</i> (7–1; 9–1), <i>Porzana parva</i> (3–1), <i>Crex crex</i> (7–1; 9–1), <i>Gallinula chloropus</i> (8–1), <i>Fulica atra</i> (8–1), <i>Scolopax rusticola</i> (8–2), <i>Streptopelia turtur</i> (2–3; 9–1), <i>Streptopelia senegalensis</i> (2–1; 1–1; 8–1), <i>Tyto alba</i> (7–1), <i>Otus scops</i> (9–3), <i>Athene noctua</i> (9–1), <i>Strix aluco</i> (7–1), <i>Caprimulgus europaeus</i> (9–1), <i>Apus apus</i> (7–2), <i>Tachymartia melba</i> (8–1; 9–5), <i>Apus affinis</i> (9–1), <i>Upupa epops</i> (1–1), <i>Dendrocopos syriacus</i> (2–1), <i>Jynx torquilla</i> (6–1), <i>Lullula arborea</i> (8–1), <i>Hirundo daurica</i> (1–3), <i>Riparia riparia</i> (1–2), <i>Anthus sp.</i> (9–1), <i>Lanius senator</i> (8–1), <i>Lanius collurio</i> (7–3; 8–3; 9–2), <i>Lanius sp.</i> (7–2), <i>Sylvia communis</i> (4–1; 5–1; 7–1), <i>Sylvia curruca</i> (8–1), <i>Sylvia sp.</i> (1–4), <i>Phylloscopus trochilus</i> (2–1; 7–1), <i>Phylloscopus collybita</i> (4–2), <i>Phylloscopus sibilatrix</i> (4–2; 7–2), <i>Regulus sp.</i> (10–1), <i>Sylvia sp.</i> (2–2; 1–2; 4–2; 3–5; 6–1; 7–3; 8–5; 10–2), <i>Muscicapa striata</i> (1–2), <i>Saxicola torquata</i> (9–2), <i>Oenanthe isabellina</i> (9–1), <i>Phoenicurus phoenicurus</i> (1–2), <i>Phoenicurus sp.</i> (4–2), <i>Turdus pilaris</i> (9–1), <i>Turdus viscivorus</i> (8–1), <i>Turdus sp.</i> (2–2; 5–1; 9–1), <i>Parus major</i> (2–2; 1–2; 3–2; 6–1), <i>Periparus ater</i> (1–1), <i>Sitta neumayer</i> (3–2), <i>Sitta sp.</i> (8–1; 9–5), <i>Certhia brachydactyla</i> (3–1), <i>Troglodytes troglodytes</i> (2–1; 1–1; 3–2), <i>Emberiza sp.</i> (6–1), <i>Carduelis chloris</i> (1–3; 7–2), <i>Serinus serinus</i> (3–1), <i>Loxia curvirostra</i> (10–1), <i>Fringillidae sp.</i> (3–1), <i>Passer hispaniolensis</i> (6–1), <i>Passer montanus</i> (9–1), <i>Sturnus vulgaris</i> (2–1; 8–1), <i>Garrulus glandarius</i> (1–2; 8–2), <i>Pica pica</i> (9–2), <i>Coloeus monedula</i> (9–1), <i>Passeriformes sp.</i> (2–3; 1–1; 4–2; 6–1; 7–4; 8–5; 9–8; 10–1), <i>Aves sp. juv.</i> (1–3), <i>Sauria sp.</i> (2–2; 8–1; 9–4), <i>Diptera sp.</i> (5–1), <i>Gryllotalpa sp.</i> (1–1; 6–1; 5–1; 7–2), <i>Dermaptera sp.</i> (3–4), <i>Decapoda sp.</i> (9–6), <i>Scorpionida sp.</i> (1–2; 5–1)																						

Uttendörfer worked). The most frequent prey species was *M. arvalis* (53.3%), indicating that the samples were collected in agricultural land. Birds (Aves, 9.0%) were represented by a block of nine quite frequent species at the Petersbach site. Amphibians (Amphibia, 6.5%) were quite frequent at three sites. Uttendörfer did not distinguish between species of the rodent family Muridae (11.9%). Since these mice were more frequent along with the vole species *C. glareolus* (4.7%), we can suppose that they were mainly represented by the forest species *A. flavicollis*. Although his work shows some inaccuracies of identification, from the current point of view he analyzed subrecent material, more than 60 years old. Current pellet samples of *S. aluco* allow gathering evidence of long-term changes in prey species composition, depending on the type of land use.

Berlin, Grünewald (Wendland 1975) (Appendix 39). Wendland collected owl pellets in the forested part of West Berlin over extended periods of time and from 1952 to 1973 recorded regular 3-year population cycles of *A. flavicollis*. In 1952–1961 he marked population peaks when the dominance of *Apodemus* sp. > 10% in the pellets of *A. otus* and between 1959–1972 when the dominance of *A. cf. flavicollis* > 35% in the pellets of *S. aluco*. The drawback of his studies lies in the fact that he failed to identify properly mouse species of the genus *Apodemus* and that this genus was present in significant proportions in the diet of both *A. otus* (12.9%) and *S. aluco* (28.5%). The diet of *A. otus* showed high dominance of Aves (52.4%) and *M. arvalis* (23.2%). The MDFM method has confirmed an above-average proportion of *Apodemus* sp. in the years 1955, 1957, 1958 and 1961 and *M. arvalis* in years 1952 and 1956. During a period of 15 years the diet of *S. aluco* showed four 3-year periods with increased abundance of *A. cf. flavicollis* in the years 1961–1970, but its proportion in 1973 was significantly below average. In the first years 1959–1960 there was a significantly increased dominance of several other species of mammals, in 1960–1963 the dominance of frogs, and after 1966 the food of *S. aluco* showed an increasing proportion of birds (Aves, 37.5%), which peaked in the last years of the research between 1971–1973. In Slovakia the periods of *A. flavicollis* increase were accompanied by increased proportions of the subdominant forest rodent species *C. glareolus*. The material of Wendland from Grünewald showed only a low proportion of this species (4.2%), and only in 1964 the abundance of these two species increased simultaneously.

Belgium (Delmee et al. 1979) (Appendix 40). Relatively extensive material of 15,450 food items of *S. aluco*

from 16 sites with ten first sites located in the forested region of Oignies was collected over a period of 15 years. Only mammals (Mammalia, 80.0%) were identified in greater detail. Aves (13.2%) were more numerous at four locations outside Oignies, along with the forest species *C. glareolus* and *M. subterraneus* and the mouse species of the genus *Apodemus*, whereas the forest species *A. flavicollis* was not distinguished from the non-forest *A. sylvaticus*. At the Beloeil site the diversity of mammals was the highest, with increased proportions of the following species: *T. europaea*, *R. norvegicus*, *E. quercinus*, *Crocidura russula* and *N. fodiens*. At the Le Mesnil site, by far the most dominant species include the vole species *M. arvalis* and *M. agrestis*. The sites in the Oignies region differ from the rest of the material in the higher proportions of shrews (*S. araneus* and *S. minutus*), vole species *M. agrestis* and amphibians (Amphibia). This indicates rather humid conditions. There were only three sites with increased proportion of *Apodemus* sp. and two sites with *C. glareolus*.

The presented examples of the analysis of published data from researchers in Poland, Germany and Belgium indicate some differences in the proportions of prey species in the diet of *S. aluco* in comparison to Slovakia. There were differences even when we compared them with the type G from strongly human-influenced environments. These differences may be caused by the more oceanic climate and less rugged landscape of these countries, as well as differences in land use and distribution of some mammal species. The preserved original fauna and flora can be compared to Romania and the Balkans. Even in the neighbouring countries of Poland and Moravia, we can see the influence of different land use. The intensity of agriculture in Germany and Belgium is markedly different.

Most studies of owl diets present results from several samples of different spatial and temporal characteristics. These data are then presented in contingency tables with identified food items (prey species) in rows and food samples in the columns. The proportional occurrence of individual species in the samples is represented by the absolute or relative measure of abundance. Species are sorted either according to the zoological classification system, or according to the descending summarized dominance. Several studies take into account the biomass of the owl's prey.

The collected data are used in mammalogical faunistic reports such as Erfurt & Stubbe (1986) in Germany, Pucek & Raczynski (1983) in Poland, or currently analyzed data for the Atlas of the Mammals of Slovakia. The studies

of dietary ecology use different statistical methods of correlation or cluster analysis (e. g. Libois 1984).

A great amount of faunistic data, mainly acquired from the analysis of owl food remains, is used by the authorities of the National Nature Protection Office. Most research studies were conducted in the national parks (NP) and protected landscape areas (PLA) of Slovakia, but also of the Czech Republic. Several studies were initiated by the Directorate of the Muránska planina, Veľká Fatra, Slovenský kras and Slovenský raj National Parks. The Directorate of the Cerová vrchovina Natural Protected Area commissioned a survey of owl activity in abandoned quarries. The survey in the Choč Mt. area created the foundations for establishing a National Nature Reserve. The survey in the Drienčanský kras karst and surrounding parts of Revúcka vrchovina Mts. was supposed to serve as a basis for the foundation of a new Natural Protected Area. The cooperation with the Jordanian Royal Society for Nature Protection was also aimed at gathering faunistic data from both established and planned nature reserves using studies of owl food remains. Mammals make up the most important component of the owl diet. The Atlas of Mammals of Slovakia (in preparation) also includes geographical data on the distribution of mammal species acquired from the studies of owl food remains. The text of the atlas also includes data on the proportions of individual mammal species in the diets of selected owl species over the whole territory of Slovakia and selected orographic units. The analysis of nest beddings of *S. aluco* in Central Norway also provides data for the upcoming Atlas of Mammals of Norway.

Although the presented material about the diet of *S. aluco* is quite extensive, it only covers a small part of the Slovakian territory. The samples from foreign countries are rather random fragments of the whole population, considering the size of the whole area and great variability of dietary ranges. Further study of the owl's diet in space and time will broaden not only our knowledge of the faunistic aspects of prey item distribution, but also our understanding of the dynamics of changes in the forest ecosystems with various degrees of human impact.

The map of Slovakia (Fig. 3) clearly shows that data is missing from the north-eastern and south-western part of the territory. In relation to these areas it would be interesting to conduct a more detailed study of the eastern and southern part of the Carpathian arch. The dietary type B in the volcanic mountain ranges of Central Slovakia could be further subdivided. There are also further possibilities in new approaches to the study of owl food ecology using other methods of data analysis.

Conclusions

The comparison of 225,441 food items of eight owl species from the territory of Slovakia reveals that the most diverse diet is present in *Strix aluco* (diversity index $H' = 3.05$). 89 out of 250 identified animal taxa show significantly higher frequency of occurrence (+MDFM, Table 1). The high proportion of Limacidae (11%) is quite unique.

Food samples of *S. aluco* in Slovakia (material of 68,070 food items) could be classified into seven main dietary types. Four of these types are associated with altitude zoning: lowland floodplain forests (type F), lower mountains (type A), middle montane zone (type B) and cold and humid mountains (type C). The dietary type D is characterized by the specialization of some individuals of this owl species for hunting bats (Chiroptera, 9–90%) at cave entrances or rock fissures. This dietary type was identified in karst regions at different altitudes. The dietary type E is distinct for its high proportion of slugs (Limacidae, 31%) and occurs in the 4th vegetation zone of beech forests on limestone ground (forest communities *Fagetum dealpinum*). Slugs make up a substitutional food source during population lows of forest rodents such as *Apodemus flavicollis* and *Clethrionomys glareolus*. The dietary type G is associated with strongly human-influenced environments such as intensively-exploited agricultural land (subtype G1 with the dominance of the vole species *Microtus arvalis* > 30%), or from the built-up areas of towns and villages (subtype G2 with high prey diversity and presence of synanthropic species of prey). Spatial diversity was estimated from the analysis of samples from individual geomorphological units.

In some mountain ranges the samples of *S. aluco* diet could be classified into several dietary types (e. g. five dietary types in the Muránska planina Mts.). The samples from several mountain ranges belong only to a single dietary type (e. g. Cerová vrchovina Mts. to type A, Vtáčnik Mts. to type B, Choč Mts. to type C). Samples of type G could be found in the plains, mountain valleys or villages at higher altitudes (Kysuce region).

The population peaks of the dominant rodent species were evaluated at sampling sites with a sampling history covering the last 31 years. For this time period we analyzed changes associated with the succession of vegetation, especially the gradual overgrowth of former pastures with shrubs and woods. In two parts of the Veľká Fatra Mts. we compared subfossil and subrecent samples of *S. aluco* diet with the recent pellet samples. At Havranovo near Blatnica village we have identified three periods with increased proportions of non-forest mammal species from

the Epiatlantic to Subrecent periods. During the Holocene, the dominance of forest species of vertebrates with high proportion of bats in some samples was only rarely interrupted in the surroundings of Dolný Harmanec village.

Analysis of the extensive material of *S. aluco* diet from the Czech Republic (17,433 food items) enables us to characterize differences between eight regions, depending on different environmental conditions. Material from the nest boxes in the Sør Trondelag region in Central Norway could be classified into three dietary types: A with dominant *Microtus agrestis*, B with dominant *Sorex araneus* and *Clethrionomys glareolus*, and C with dominant birds of the *Turdus* genus. Smaller samples of *S. aluco* food from Mediterranean Europe, Romania, Crimea and Caucasus provide evidence of the high diversity of prey species and occurrence of endemic mammal species in the Western Alps, Dinaric Mountains and Caucasus. Forest enclaves in the Asian part of the *S. aluco* range are under strong human impact, so the food of this originally forest owl contains high proportion of non-forest mammal species. In the vicinity of streams, aquatic animals including frogs, fish and crabs are frequent prey. Due to differences in pellet processing methods in different studies on food remains, the comparison between different literary sources is difficult. Some published studies from Poland, Germany and Belgium have also been evaluated using the MDFM method (Obuch 2001). The results on the classification of samples into different dietary types in Slovakia can not be directly applied to the conditions of the neighbouring countries.

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Appendix 1. Distribution of diagnostic species in the diet of eight owl species in Slovakia**Appendix 1.** Zastúpenie diagnostických druhov v potrave ôsmich druhov sov na Slovensku

owl species / druh sovy prey taxa / druhy koristi column / stĺpec	<i>Bubo</i> <i>bubo</i>		<i>Tyto</i> <i>alba</i>		<i>Asio</i> <i>otus</i>		<i>Athene</i> <i>noctua</i>		<i>Glaucidium</i> <i>passerinum</i>	<i>Aegolius</i> <i>funereus</i>	<i>Strix</i> <i>uralensis</i>	<i>Strix</i> <i>aluco</i>	Σ	%
	1	2	3	4	5	6	7	8						
<i>Erinaceus concolor</i>	2+ 537	5- 1 5-	0 1-	0		1-	0		1-	0	1 5-	2	541	0.24
<i>Lepus europaeus</i>	2+ 341	5- 0 4-	2 1-	0		1-	0		1-	0	3-	17	360	0.16
<i>Sciurus vulgaris</i>	2+ 142	4- 0 4-	0								2-	8	150	0.07
<i>Spermophilus citellus</i>	2+ 56	2- 0 2-	0								1-	6	62	0.03
<i>Cricetus cricetus</i>	2+ 170	2- 9 4-	0								3-	3	182	0.08
<i>Rattus norvegicus</i>	2+ 1615	1- 367 4-	24 2-	4		3-	0 2-	1 2-	132	2143	0.95			
<i>Arvicola amphibius</i>	2+ 4795	4- 96 7-	10 3-	0 1-	0 4-	2 1-	15 2-	513	5431	2.41				
<i>Vulpes vulpes</i>	2+ 52	2- 0 2-	0						2-	0	52	0.02		
<i>Mustela erminea</i>	2+ 62	2- 1 2-	0						2-	4	67	0.03		
<i>Mustela nivalis</i>	2+ 197	3- 2 4-	0						2-	19	218	0.10		
<i>Anas platyrhynchos</i>	2+ 64	2- 1 2-	0						3-	0	65	0.03		
<i>Buteo buteo</i>	2+ 45	2- 0 2-	0						2-	0	45	0.02		
<i>Falco tinnunculus</i>	2+ 101	2- 3 3-	0						2-	7	111	0.05		
<i>Perdix perdix</i>	2+ 553	5- 2 5-	0 2-	0		1-	0		6-	0	555	0.25		
<i>Coturnix coturnix</i>	2+ 176	3- 4 3-	1						3-	3	184	0.08		
<i>Phasianus colchicus</i>	2+ 70	2- 2 3-	0						3-	0	72	0.03		
<i>Porzana porzana</i>	2+ 20	1- 0 1-	0						1-	2	22	0.010		
<i>Crex crex</i>	2+ 39	2- 0 2-	0						1-	2	41	0.02		
<i>Gallinula chloropus</i>	2+ 32	1- 0 1-	0						2-	0	32	0.01		
<i>Vanellus vanellus</i>	2+ 79	3- 0 3-	0						3-	0	79	0.04		
<i>Scolopax rusticola</i>	2+ 103	3- 0 3-	0						1 2-	4	108	0.05		
<i>Columba livia dom.</i>	2+ 202	3- 8 4-	0						4 2-	24	238	0.11		
<i>Columba oenas</i>	2+ 27	2- 0 2-	0							9	36	0.02		
<i>Columba palumbus</i>	2+ 58	2- 0 2-	0						1 1-	6	65	0.03		
<i>Streptopelia turtur</i>	2+ 36	2- 0 2-	0							15	51	0.02		
<i>Bubo bubo</i> juv.	2+ 18	1- 0 1-	0						1-	0	18	0.008		
<i>Asio otus</i>	2+ 308	5- 0 5-	0 1-	0					1 4-	2	311	0.14		
<i>Strix aluco</i>	2+ 136	4- 0 4-	0						2-	9	145	0.06		
<i>Alauda arvensis</i>	2+ 163	1- 30 2-	8	1					3-	7	209	0.09		
<i>Pica pica</i>	2+ 77	3- 0 3-	0						3-	0	77	0.03		
<i>Corvus corone</i> + <i>frugilegus</i>	2+ 562	5- 1 5-	0 2-	0		1-	0		6-	0	563	0.25		
<i>Corvus monedula</i>	2+ 99	3- 1 3-	0						2-	5	105	0.05		
<i>Rana temporaria</i>	2+ 11759	9- 8 9-	0 6-	0 3-	0 6-	0 2-	22	4407	16196	7.18				
<i>Lacerta agilis</i>	2+ 35	1- 4 2-	0						9	48	0.02			
Cypriniformes sp.	2+ 111	3- 0 3-	0						2-	9	120	0.05		
<i>Ondatra zibethicus</i>	1+ 11								2	13	0.006			
<i>Putorius putorius</i>	1+ 6									6	0.003			
<i>Tachybaptus ruficollis</i>	1+ 12									1	13	0.006		
<i>Anas crecca</i>	1+ 10										10	0.004		
<i>Anas querquedula</i>	1+ 16								1-	0	16	0.007		
<i>Accipiter gentilis</i>	1+ 15								1-	0	15	0.007		
<i>Accipiter nisus</i>	1+ 13									4	17	0.008		
<i>Tetrastes bonasia</i>	1+ 18	1- 0 1-	0							14	32	0.01		
<i>Rallus aquaticus</i>	1+ 11									1	12	0.005		

Appendix 1. continuation / pokračovanie

owl species / druh sovy prey taxa / druhy koristi column / stĺpec	<i>Bubo</i> <i>bubo</i>		<i>Tyto</i> <i>alba</i>		<i>Asio</i> <i>otus</i>		<i>Athene</i> <i>noctua</i>		<i>Glaucidium</i> <i>passerinum</i>		<i>Aegolius</i> <i>funereus</i>		<i>Strix</i> <i>uralensis</i>		<i>Strix</i> <i>aluco</i>		Σ	%
	1	2	3	4	5	6	7	8										
<i>Fulica atra</i>	1+	11															11	0.005
<i>Charadrius dubius</i>	1+	9															9	0.004
<i>Actitis hypoleucos</i>	1+	15													1		16	0.007
<i>Gallinago</i> sp.	1+	9															9	0.004
<i>Cuculus canorus</i>	1+	20	1-	0	1-	0									7		27	0.01
<i>Athene noctua</i>	1+	13		2									1-	0			15	0.007
<i>Caprimulgus europaeus</i>	1+	9														1	10	0.004
<i>Lullula arborea</i>	1+	9		3		2							1-	0			14	0.006
<i>Nucifraga caryocatactes</i>	1+	12														2	14	0.006
<i>Corvus corax</i>	1+	6															6	0.003
<i>Lacerta viridis</i>	1+	20		3	1-	0										5	28	0.01
<i>Colubridae</i> sp.	1+	11		2												2	15	0.007
<i>Lucanus cervus</i>	1+	11														3	14	0.006
<i>Garrulus glandarius</i>	1+	94	3-	1	4-	0								1+	76		171	0.08
<i>Eliomys quercinus</i>	1+	38	3-	0	3-	0								1+	40		78	0.03
<i>Lanius collurio</i>	1+	12	1-	1	1-	0								1+	18		31	0.01
<i>Turdus pilaris</i>	1+	78	4-	1	3-	6	1						2	1+	163		251	0.11
<i>Turdus viscivorus</i>	1+	46	3-	1	3-	0							4	1+	70		121	0.05
<i>Salmo trutta</i>	1+	92	4-	0	4-	0								1+	116		208	0.09
<i>Streptopelia decaocto</i>	1+	39	1-	8	2-	3							3+	23	1-	19	92	0.04
<i>Aegolius funereus</i>	1+	13	1-	0	1-	0				1+	5		1		9		28	0.01
<i>Apodemus sylvaticus</i>	1+	1086	1+	1200	1+	1104	70		2	2-	9	1-	10	2-	315		3796	1.68
<i>Apodemus microps</i>	2-	110	1+	806	1+	879	29			3-	0	2-	0	3-	110		1934	0.86
<i>Microtus arvalis</i>	1-	16822	1+	31957	1+	45352	1-	944	1-	50	5-	30	1-	250	3-	6224	101629	45.08
<i>Micromys minutus</i>	4-	34	1+	1028	1+	584	2+	111		1	3-	1	2-	0	1-	360	2119	0.94
<i>Mus cf. musculus</i>	1-	429	2+	2935	2-	229	2+	186	1-	0	4-	0	2-	3	2-	502	4284	1.90
<i>Crocodyria suaveolens</i>	4-	18	2+	1469	4-	21	1+	72			3-	0	2-	0	1-	314	1894	0.84
<i>Crocodyria leucodon</i>	5-	14	2+	2563	6-	11	1-	19		4-	0	2-	1	2-	356	2964	1.31	
<i>Neomys anomalus</i>	3-	11	2+	439	4-	5	1-	1		1-	1			1-	113	570	0.25	
<i>Apus apus</i>	2-	0	2+	50	2-	0									14	64	0.03	
<i>Hirundo rustica</i>	3-	2	2+	131	3-	2	3						1		47	186	0.08	
<i>Phoenicurus ochruros</i>	2-	4	2+	103	3-	0	4							1-	25	136	0.06	
<i>Passer domesticus</i>	5-	13	2+	1422	1-	353	29		2	3-	0	2-	0	1-	397	2216	0.98	
<i>Bufo bufo</i>	1-	7	2+	71	2-	1								2-	6	85	0.04	
<i>Melolontha melolontha</i>			1+	9												9	0.004	
<i>Tyto alba</i>		5	1+	9										1-	0	14	0.006	
<i>Plecotus austriacus</i>			1+	11											3	14	0.006	
<i>Sorex araneus</i>	5-	50	1+	2484	6-	26	3-	12	5	3+	508		28	1+	2586	5699	2.53	
<i>Sorex minutus</i>	5-	10	1+	932	4-	29	2-	4	4	2+	69	1-	1	1+	651	1700	0.75	
<i>Neomys fodiens</i>	1-	31	1+	132	4-	4	2			1-	0		2	1+	165	336	0.15	
<i>Myotis myotis</i>	3-	29	2+	712	6-	1	3-	0		2-	0		1	1+	437	1180	0.52	
<i>Myotis blythii</i>	2-	1	1+	33	2-	0								1+	34	68	0.03	
<i>Apodemus agrarius</i>	2-	118	1-	370	1+	827	38		2-	3	2+	52			558	1966	0.87	
<i>Dermaptera</i> sp.	2-	0	3-	0	2-	0	4+	69						3-	1	70	0.03	

Appendix 1. continuation / pokračovanie

owl species / druh sovy prey taxa / druhy koristi	<i>Bubo</i>		<i>Tyto</i>		<i>Asio</i>		<i>Athene</i>		<i>Glaucidium</i>	<i>Aegolius</i>		<i>Strix</i>		<i>Strix</i>	Σ	%		
column / stĺpec	1		2		3		4		5	6		7		8				
<i>Gryllotalpa gryllotalpa</i>	2-	0	11	2-	0	2+	14							17	42	0.02		
Orthoptera sp.	4-	0	3-	1	4-	0	2+	25						2+	132	158	0.07	
Hymenoptera sp.	2-	0	2-	0	2-	0	3+	29	1					1+	32	62	0.03	
Coleoptera sp.	6-	14	3-	125	8-	1	5+	1571	1-	0	1-	28	2-	2	1+	2382	4123	1.83
<i>Phylloscopus collybita</i>	1-	0	1-	0	1-	0			1+	5		3			1+	16	24	0.01
<i>Cyanistes caeruleus</i>	3-	1	4-	0		34			1+	7		3		2	1+	133	180	0.08
<i>Certhia</i> sp.	1-	0	1-	0	1-	1			1+	8					1+	15	24	0.01
<i>Erithacus rubecula</i>	2-	13	2-	15	2-	23	1-	0	1+	8		7		2	2+	270	338	0.15
<i>Regulus</i> sp.	2-	1	2-	1	1-	6			2+	13	2+	11		1	1+	56	89	0.04
<i>Periparus ater</i>	2-	1	3-	0		21			2+	9	2+	12			1+	49	92	0.04
<i>Clethrionomys glareolus</i>	2-	398	4-	165	3-	205	5-	1	2+	50	2+	511	2+	165	2+	6757	8252	3.66
<i>Microtus subterraneus</i>	2-	128	3-	71	3-	70	2-	4	1+	8	4+	291	2+	51	1+	1165	1788	0.79
<i>Microtus agrestis</i>	1-	91	4-	7	5-	3	2-	0		3	2+	30	3+	33	1+	441	608	0.27
<i>Apodemus flavicollis</i>	2-	1117	2-	1528	3-	480	5-	7	2-	3	2+	706	2+	263	2+	16217	20321	9.01
<i>Turdus philomelos</i>		200	5-	2	4-	8	5-	0			1+	17	1+	9	1+	554	790	0.35
<i>Sorex alpinus</i>	3-	0	3-	0	3-	0					2+	22		3	2+	100	125	0.06
<i>Dryomys nitedula</i>		39	4-	0	4-	0					2+	27			1+	125	191	0.08
<i>Muscardinus avellanarius</i>	4-	74	4-	63	7-	8	4-	1	1-	0	3+	312		23	2+	3975	4456	1.98
<i>Sicista betulina</i>	2-	20	5-	0	5-	0	1-	0			5+	156		6	1+	189	371	0.16
<i>Talpa europaea</i>		230	3-	21	4-	8	2-	0		2-	0	3+	49	1+	617	925	0.41	
<i>Parus major</i>	4-	4	2-	26		116	1-	2		3		2	1+	9	1+	293	455	0.20
<i>Fringilla coelebs</i>	3-	21	3-	18	3-	21	2-	0	2+	16		12	2+	17	2+	460	565	0.25
<i>Coccothraustes coccothraustes</i>	2-	13	3-	3	3-	5				1		1	2+	20	2+	203	246	0.11
<i>Turdus merula</i>		130	4-	6	2-	32	2-	0				3	1+	15	1+	403	589	0.26
<i>Rhinolophus euryale</i>	1-	0	1-	1	1-	0									2+	32	33	0.01
<i>Myotis mystacinus</i>	1-	7	2-	2	3-	0		2				2			2+	88	101	0.04
<i>Myotis bechsteinii</i>	1-	4	2-	0	2-	0									2+	45	49	0.02
<i>Vespertilio murinus</i>	2-	11	4-	3	4-	0	1-	0							2+	267	281	0.12
<i>Nyctalus noctula</i>	3-	15	3-	12	1-	51	1-	0		1-	0				2+	345	423	0.19
<i>Pipistrellus pipistrellus</i>	5-	7	5-	4	6-	0	2-	0		2-	0	1-	0		2+	993	1004	0.45
<i>Barbastella barbastellus</i>	2-	8	3-	1	4-	0									2+	160	169	0.07
<i>Glis glis</i>	2-	78	6-	3	6-	1	3-	0		3-	0		8	2+	1383	1473	0.65	
<i>Dendrocopos major</i>	1-	2	2-	0	2-	0							2	2+	52	56	0.02	
<i>Delichon urbicum</i>	2-	10	1-	29	4-	1		3							2+	163	206	0.09
<i>Sylvia atricapilla</i>	2-	4	2-	3	3-	1				4		1		1	2+	86	100	0.04
<i>Sitta europaea</i>	3-	1	2-	5	1-	11		1		3		1		2	2+	95	119	0.05
<i>Pelobates fuscus</i>	2-	28	1-	69	6-	0	1-	2		1-	0				2+	524	623	0.28
<i>Hyla arborea</i>	4-	0	4-	0	4-	0									2+	157	157	0.07
<i>Rana arvalis</i>	4-	1	3-	8	5-	0	1-	0							2+	280	289	0.13
<i>Rana cf.esculenta</i>	1-	71	2-	33	6-	0	2-	0		1-	0		1	2+	527	632	0.28	

Appendix 1. continuation / pokračovanie

owl species / druh sovy prey taxa / druhy koristi column / stĺpec	<i>Bubo bubo</i>		<i>Tyto alba</i>		<i>Asio otus</i>		<i>Athene noctua</i>		<i>Glaucidium passerinum</i>		<i>Aegolius funereus</i>		<i>Strix uralensis</i>		<i>Strix aluco</i>		Σ	%	
	1		2		3		4		5		6		7		8				
<i>Rana ridibunda</i>	3-	2	3-	1	4-	0									2+	160	163	0.07	
<i>Limacidae</i> sp.	8-	6	6-	21	9-	0	5-	0	2-		0	5-	1	4-	0	2+	7412	7440	3.30
<i>Rhinolophus ferrumequinum</i>																1+	14	14	0.006
<i>Rhinolophus hipposideros</i>	2-	2		21	2-	1										1+	48	72	0.03
<i>Myotis brandtii</i>	1-	1	1-	2	2-	0										1+	36	39	0.02
<i>Myotis emarginatus</i>	1-	0	1-	3	1-	0										1+	31	34	0.02
<i>Myotis nattereri</i>		2		1	1-	0										1+	16	19	0.008
<i>Myotis daubentoni</i>				1												1+	12	13	0.006
<i>Myotis dasycneme</i>																1+	8	8	0.004
<i>Eptesicus serotinus</i>		26	2-	8	3-	0										1+	99	133	0.06
<i>Eptesicus nilssonii</i>		1														1+	13	14	0.006
<i>Plecotus auritus</i>	1-	5	1-	4	2-	0		1								1+	44	54	0.02
<i>Miniopterus schreibersii</i>																1+	15	15	0.007
<i>Microtus tatricus</i>		7	1-	0	1-	0										1+	24	31	0.01
<i>Picus canus</i>	1-	0		2	1-	0						1				1+	18	21	0.009
<i>Dendrocopos syriacus</i>													1			1+	9	10	0.004
<i>Dendrocopos medius</i>																1+	10	10	0.004
<i>Riparia riparia</i>		2		5	1-	0										1+	17	24	0.01
<i>Anthus trivialis</i>		10		4	1-	2								1		1+	18	35	0.02
<i>Motacilla cinerea</i>		1	1-	0		1						2				1+	18	22	0.010
<i>Prunella modularis</i>	1-	0	1-	0	1-	0		1		4		3				1+	16	24	0.01
<i>Sylvia communis</i>						1						1				1+	15	17	0.008
<i>Phylloscopus trochilus</i>						2				4						1+	11	17	0.008
<i>Muscicapa striata</i>	1-	0		2		1				2		2				1+	14	21	0.009
<i>Ficedula</i> sp.								1								1+	11	12	0.005
<i>Turdus torquatus</i>		18	3-	0	3-	0						3				1+	59	80	0.04
<i>Poecile palustris</i>	1-	0	1-	0		4				4		1				1+	21	30	0.01
<i>Troglodytes troglodytes</i>	1-	1		3	1-	2				2		1				1+	23	32	0.01
<i>Emberiza citrinella</i>		20	1-	11		26				1						1+	58	116	0.05
<i>Carduelis carduelis</i>	2-	6	2-	4		38				1						1+	77	126	0.06
<i>Carduelis spinus</i>	2-	0	2-	0		14				4		2				1+	29	49	0.02
<i>Carduelis cannabina</i>	1-	2	1-	3		13							2			1+	39	59	0.03
<i>Carduelis chloris</i>	2-	4	1-	11		23							2			1+	65	105	0.05
<i>Pyrrhula pyrrhula</i>	2-	1	2-	0		9				2		4		1		1+	38	55	0.02
<i>Serinus serinus</i>	1-	1	2-	0	1-	3										1+	32	36	0.02
<i>Passer montanus</i>	4-	2		83		77		9				4				1+	119	294	0.13
<i>Sturnus vulgaris</i>		27	1-	11	3-	1										1+	58	97	0.04
<i>Oriolus oriolus</i>																1+	8	8	0.004
<i>Lacerta vivipara</i>		3														1+	11	14	0.006
<i>Motacilla alba</i>		7		9		5		1									17	39	0.02

Appendix 1. continuation / pokračovanie

owl species / druh sovy prey taxa / druhy koristi	<i>Bubo</i> <i>bubo</i>	<i>Tyto</i> <i>alba</i>	<i>Asio</i> <i>otus</i>	<i>Athene</i> <i>noctua</i>	<i>Glaucidium</i> <i>passerinum</i>	<i>Aegolius</i> <i>funereus</i>	<i>Strix</i> <i>uralensis</i>	<i>Strix</i> <i>aluco</i>	Σ	%
column / stípec	1	2	3	4	5	6	7	8		
Mammalia, 69 spp.	1- 30594	49479	1+ 49938	1- 1508	1- 126	2680	966	46743	182034	80.75
Aves, min. 147 spp.	1+ 4292	1- 2079	2- 927	2- 62	3+ 119	1- 110	1+ 127	1+ 5089	12805	5.68
Amph., Reptilia, Pisces	2+ 12189	5- 207	9- 1	6- 2	3- 0	6- 0	2- 23	6246	18668	8.28
Evertebrata	6- 31	4- 169	9- 1	4+ 1709	2- 1	2- 29	4- 2	2+ 9992	11934	5.29
Σ	47106	51934	50867	3281	246	2819	1118	68070	225441	100.00
Diversity H'	2.39	1.76	0.62	1.66	2.92	2.20	2.53	3.05	2.59	

Other species (column – number) / Ostatné druhy (stípec – počet):

Nyctalus leisleri (2–2), *Pipistrellus nathusii* (2–1; 8–2), *Chiroptera* sp. (2–1), *Leporidae* sp. (8–1), *Sicista subtilis* (2–3), *Apodemus* sp. (1–1520), *Rattus rattus* (1–2), *Microtus oeconomus* (2–2; 3–3; 8–3), *Chionomys nivalis* (1–5; 8–3), *Martes* sp. (1–3), *Putorius eversmanni* (1–1), *Felis catus dom.* (1–5; 8–1), *Felis silvestris* (2–1), *Sus scrofa* (2–1), *Cervus elaphus* (1–2), *Podiceps grisegena* (1–1), *Aythya fuligula* (1–1), *Bucephala clangula* (1–1), *Anatidae* sp. (1–23), *Pernis apivorus* (1–2), *Aquila* sp. (1–1), *Circus* sp. (1–2), *Accipitridae* sp. (1–1), *Falco peregrinus* (1–4), *Falco subbuteo* (1–2; 8–1), *Falco* sp. (1–3), *Lyrurus tetrix* (1–4; 8–1), *Tetrao urogallus* (1–5; 8–1), *Gallus gallus dom.* (1–5; 2–1), *Galliformes* sp. (1–3), *Rallidae* sp. (1–3), *Tringa glareola* (1–2), *Tringa ochropus* (1–1; 3–1), *Tringa* sp. (1–5), *Philomachus pugnax* (1–2), *Limicolae* sp. (1–4), *Chroicocephalus ridibundus* (1–1), *Sterna hirundo* (1–2), *Chlidonias niger* (1–3), *Columba* sp. (1–101; 8–8), *Otus scops* (1–1), *Glaucidium passerinum* (8–3), *Strix uralensis* (1–2), *Merops apiaster* (8–4), *Coracias garrulus* (1–1), *Melopsittacus undulatus* (2–1), *Upupa epops* (2–2; 8–1), *Dryocopus martius* (1–5; 8–1), *Picus viridis* (1–2; 8–7), *Dendrocopos leucotos* (8–6), *Dendrocopos minor* (5–1; 8–2), *Dendrocopos* sp. (8–6), *Picoides tridactylus* (8–1), *Jynx torquilla* (1–3; 8–6), *Galerida cristata* (1–7; 3–1; 4–1; 8–5), *Alaudidae* sp. (2–1), *Anthus pratensis* (5–1; 8–3), *Bombycilla garrulus* (1–1; 3–1; 8–4), *Lanius excubitor* (3–1; 8–1), *Lanius minor* (1–2; 8–3), *Acrocephalus palustris* (1–1; 2–3; 8–6), *Acrocephalus* sp. (1–1; 8–1), *Hippolais icterina* (2–2), *Sylvia curruca* (8–5), *Sylvia borin* (5–1; 7–1; 8–7), *Sylvia nisoria* (8–1), *Sylvia* sp. (1–1), *Phylloscopus sibilatrix* (5–2; 8–6), *Sylviidae* sp. (1–5; 2–1; 3–2; 4–1; 6–1; 8–63), *Saxicola torquata* (2–1; 8–3), *Saxicola rubetra* (1–1; 2–3; 3–3; 8–5), *Monticola saxatilis* (8–2), *Oenanthe oenanthe* (8–1), *Luscinia megarhynchos* (2–1; 8–2), *Luscinia* sp. (8–5), *Turdus* sp. (2–1; 8–20), *Aegithalos caudatus* (3–1; 5–1; 6–2; 8–5), *Lophophanes cristatus* (8–6), *Poecile montanus* (2–1; 5–1; 8–6), *Paridae* sp. (3–3; 6–1; 8–37), *Cinclus cinclus* (1–1; 8–1), *Emberiza calandra* (1–1; 8–1), *Emberiza schoeniclus* (1–3; 3–1; 8–2), *Fringilla montifringilla* (3–4; 8–7), *Loxia curvirostra* (1–3; 5–4; 8–3), *Fringillidae* sp. (1–1; 8–1), *Corvus frugilegus* (8–2), *Corvus cornix* (8–1), *Corvidae* sp.juv. (8–1), *Passeriformes* sp. (1–63; 2–18; 3–34; 4–2; 5–5; 6–4; 7–1; 8–191), *Aves* sp. (1–12; 8–12), *Aves* sp.juv. (1–8; 2–3; 8–10), *Bombina* sp. (1–1; 2–7; 8–5), *Bufo viridis* (1–1), *Rana dalmatina* (1–3; 8–4), *Anguis fragilis* (1–1; 8–2), *Lacerta muralis* (1–6; 8–9), *Lacerta* sp. (1–8; 8–6), *Ablepharus kitaibeli* (2–1), *Salmonidae* sp. (1–3), *Esox lucius* (8–1), *Pisces* sp. (1–26; 8–6), *Diptera* sp. (2–2; 4–1; 8–6), *Heteroptera* sp. (8–1), *Odonata* sp. (8–2), *Insecta* sp. (8–3), *Gastropoda* sp. (8–1)

Appendix 2. The diet of *Strix aluco* in Slovakia, Silická ľadnica cave
Appendix 2. Potrava *Strix aluco* na Slovensku, Silická ľadnica

month, year / mesiac, rok	9/76	10/82	6/87	5/97	1/98	1/01	2/02	1/05	3/06	2/09	2/10	Σ	%
sample / zber	1	2	3	4	5	6	7	8	9	10	11		
<i>Myotis mystacinus</i>	1+	14 2-	0		4	6		4	1			29	1.36
<i>Myotis myotis</i>	1+	7	3	1				1				12	0.56
<i>Muscardinus</i>	1+	25	32	3	18	10 1-	1 1-	5	4	2	1	103	4.82
<i>avellanarius</i>													
<i>Microtus arvalis</i>	1+	48 1+	152 1+	25	28 1-	9 2-	4 1-	13	19 1-	5	5	320	14.97
<i>Rana temporaria</i>	3 1+	29		12	3	1	2	1				39	1.82
<i>Rana cf. esculenta</i>	1 1+	21	1		4	1		1		1		30	1.40
<i>Microtus subterraneus</i>	1 1+	14	2		1			1		1		20	0.94
<i>Clethrionomys</i>	11 1+	51	10	2 1-	7	16 1-	4 1-	3	8	9 1+	9	130	6.08
<i>glareolus</i>													
<i>Sorex araneus</i>	9	24	1		1+	14 1+	4 1-	1	2		1	68	3.18
<i>Apodemus agrarius</i>	2	3	3		1 1+	11						20	0.94
<i>Apodemus flavicollis</i>	1-	65 1-	128	28	102	93 1+	112 1+	145	74 1+	62 1+	33	870	40.71
<i>Limacidae sp.</i>		1-	1		6	3		8	2 1+	6 1+	6	32	1.50
<i>Glis glis</i>	6	20	3		14	3			6	7		72	3.37
<i>Sorex minutus</i>	3	11		1	4	3	2	1	1			26	1.22
<i>Turdus philomelos</i>	1	10			2	4	1	4	2			24	1.12
<i>Crocridura leucodon</i>		10		1	4	1		2	1	1		20	0.94
<i>Fringilla coelebs</i>		10		1				2	4	3		20	0.94
<i>Coleoptera sp.</i>		10	3	1	4							18	0.84
<i>Eptesicus serotinus</i>		3			5	1		5	1	2		17	0.80
<i>Crocridura suaveolens</i>	3	3		1	5		1		1			14	0.66
<i>Talpa europaea</i>	1	7	2					1	2			13	0.61
<i>Turdus merula</i>	1	4	1	1	1	1	1	1	1	1		13	0.61
<i>Apodemus sylvaticus</i>	3	7			1				1			12	0.56
<i>Coccothraustes</i>		5		1	2		1	2		1		12	0.56
<i>coccothraustes</i>													
<i>Myotis brandtii</i>		3		1	1				3			8	0.37
<i>Eliomys quercinus</i>	4	3							1			8	0.37
<i>Passer domesticus</i>		5				1	1			1		8	0.37
<i>Erithacus rubecula</i>		1		1	2	1	1		1	1		8	0.37
<i>Garrulus glandarius</i>		1			2	1	1	1	1	1		8	0.37
<i>Myotis bechsteinii</i>	2	3							2			7	0.33
<i>Parus major</i>		5				1		1				7	0.33
<i>Emberiza citrinella</i>		4			1	1			1			7	0.33

Appendix 2. continuation / pokračovanie

month, year / mesiac, rok	9/76	10/82	6/87	5/97	1/98	1/01	2/02	1/05	3/06	2/09	2/10	Σ	%
sample / zber	1	2	3	4	5	6	7	8	9	10	11		
<i>Myotis emarginatus</i>					3	1	1		1			6	0.28
<i>Dryomys nitedula</i>	1	4							1			6	0.28
<i>Mus cf. musculus</i>	2	2						1	1			6	0.28
<i>Neomys fodiens</i>		3		1								5	0.23
<i>Myotis blythii</i>	4							1	1			5	0.23
<i>Myotis daubentonii</i>						4	1					5	0.23
<i>Barbastella</i>	3											5	0.23
<i>barbastellus</i>													
<i>Micromys minutus</i>		2			1				1			5	0.23
<i>Sitta europaea</i>		1	1		1	2						5	0.23
Mammalia	222	501	76	53	214	176	137	199	133	89	49	1849	86.52
Aves	1-	8 1+	63	3	19	15	9	18	13	9	1-	0 163	7.63
Amphibia	9 1+	50	1	0	7 1-	2	2 1-	2 1-	1	1	0	75	3.51
Vertebrata	1-	0 11	3	1	10	3	0	8	2	6 1+	6	50	2.34
Σ	239	625	83	60	250	196	148	227	149	105	55	2137	100.00
Diversity H'	2.61	2.80	1.88	1.96	2.43	2.21	1.25	1.77	2.16	1.66	1.21	2.58	
Other species (sample – number) / Ostatné druhy (zber – počet):													
<i>Neomys anomalus</i> (2–4), <i>Rhinolophus hipposideros</i> (1–1), <i>Myotis nattereri</i> (1–1; 2–1; 6–2), <i>Myotis dasycneme</i> (1–1; 6–2), <i>Vespertilio murinus</i> (2–1), <i>Eptesicus nilssonii</i> (6–1; 8–2), <i>Nyctalus noctula</i> (4–1), <i>Pipistrellus pipistrellus</i> (9–1), <i>Plecotus auritus</i> (1–1; 8–1), <i>Lepus europaeus</i> (1–1; 2–1; 7–1; 9–1), <i>Spermophilus citellus</i> (4–1), <i>Apodemus microps</i> (2–2; 5–1), <i>Rattus norvegicus</i> (2–1), <i>Cricetus cricetus</i> (1–1; 2–1), <i>Arvicola amphibius</i> (1–2; 2–1; 8–1), <i>Mustela nivalis</i> (2–1; 6–1), <i>Falco tinnunculus</i> (1–1; 2–1), <i>Falco subbuteo</i> (6–1), <i>Columba oenas</i> (6–1), <i>Streptopelia turtur</i> (1–1), <i>Aegolius funereus</i> (5–1), <i>Picus canus</i> (8–1), <i>Dendrocopos syriacus</i> (5–1), <i>Dendrocopos</i> sp. (2–2), <i>Riparia riparia</i> (5–1), <i>Anthus trivialis</i> (1–1; 5–1), <i>Anthus pratensis</i> (8–1), <i>Bombicilla garrulus</i> (9–1), <i>Lanius collurio</i> (2–1; 3–1), <i>Sylvia atricapilla</i> (8–1), <i>Phylloscopus sibilatrix</i> (8–1), <i>Regulus</i> sp. (7–1), <i>Sylvidae</i> sp. (1–2), <i>Muscicapa striata</i> (9–1), <i>Phoenicurus ochruros</i> (8–1), <i>Turdus pilaris</i> (9–1), <i>Turdus viscivorus</i> (2–1; 10–1), <i>Aegithalos caudatus</i> (4–1), <i>Cyanistes caeruleus</i> (4–1; 7–2), <i>Poecilus palustris</i> (5–2), <i>Parusidae</i> sp. (2–3), <i>Certhia</i> sp. (8–1), <i>Troglodytes troglodytes</i> (2–1), <i>Carduelis spinus</i> (8–1), <i>Serinus serinus</i> (5–1), <i>Passer montanus</i> (5–1; 6–1), <i>Sturnus vulgaris</i> (1–1), <i>Passeriformes</i> sp. (2–8), <i>Pelobates fuscus</i> (1–3; 9–1), <i>Rana arvalis</i> (1–2)													

Appendix 3. The diet of *Strix aluco* in Slovakia, Líščia diera cave**Appendix 3.** Potrava *Strix aluco* na Slovensku, jaskyňa Líščia diera

month / year mesiac / rok	8/95	1/96	1/97	1/98	2/03	5/04	3/06	2/07	2/09	2/10	Σ	%
sample / zber	1	2	3	4	5	6	7	8	9	10		
<i>Microtus arvalis</i>	1+ 23	7	9	24	58	1+ 49	2- 4	1- 8	1+ 33	32	247	35.69
<i>Apodemus flavicollis</i>	4	11	1+ 17	1- 9	44	1- 10	1+ 25	16	1- 3	13	152	21.97
<i>Hyla arborea</i>				1+ 6							6	0.87
<i>Rana cf. esculenta</i>				1+ 13	1-	0	1+ 8			2	23	3.32
Coleoptera sp.		1			1		2+ 12				14	2.02
Limacidae sp.				4	16	9	1- 0	1+ 14		7	50	7.23
<i>Glis glis</i>		1	3	3	2	2		1	5	4	21	3.03
<i>Rhinolophus euryale</i>	1		2	1	3	3		2	4	3	19	2.75
<i>Clethrionomys glareolus</i>		4	2	1	7	2			1	1	18	2.60
<i>Crocodyria leucodon</i>	1		5		4	4		1			15	2.17
<i>Apodemus agrarius</i>			1	2	2	4		2		1	12	1.73
<i>Coccothraustes</i>			1	2	2	1	4			2	12	1.73
<i>Muscicivora avellan.</i>				2	2	2	2		1	2	11	1.59
<i>Crocodyria suaveolens</i>		1	1		2	2			1	2	9	1.30
<i>Rhinolophus ferrumequinum</i>					3	2		1		1	7	1.01
<i>Erithacus rubecula</i>					1	1	2	1		1	6	0.87
<i>Parus major</i>	1	1			2	1				1	6	0.87
<i>Cyanistes caeruleus</i>		1			2			2			5	0.72
<i>Turdus merula</i>				3		1				1	5	0.72
<i>Fringilla coelebs</i>	2		2			1					5	0.72
<i>Pelobates fuscus</i>				2	1	2					5	0.72
Mammalia	31	29	38	1- 43	132	84	1- 31	34	49	62	533	77.02
Aves	5	3	3	5	15	10	8	4	1	5	59	8.53
Amphibia	0	0	0	2+ 21	1- 3	2	1+ 8	0	0	2	36	5.20
Evertebrata	1	0	0	4	17	9	1+ 12	1+ 14	1- 0	7	64	9.25
Σ	37	32	41	73	167	105	59	52	50	76	692	100.00
Diversity H'	1.47	1.94	1.76	2.13	2.19	2.20	1.69	1.96	1.27	2.06	2.42	

Other species (sample – number) / Ostatné druhy (zber – počet):

Sorex minutus (2–1; 3–1), *Rhinolophus hipposideros* (5–1; 8–1), *Myotis myotis* (5–1), *Myotis blythii* (6–1), *Plecotus austriacus* (1–1), *Miniopterus schreibersii* (5–2), *Lepus europaeus* (4–1), *Dryomys nitedula* (5–1; 8–2), *Mus cf. musculus* (2–1), *Micromys minutus* (6–2; 9–1; 10–1), *Apodemus sylvaticus* (10–1), *Rattus norvegicus* (2–1; 6–1), *Arvicola amphibius* (10–1), *Delichon urbicum* (6–1), *Lanius collurio* (1–1), *Turdus pilaris* (9–1), *Turdus philomelos* (6–1), *Sitta europaea* (5–2), *Emberiza citrinella* (5–2), *Carduelis cannabina* (6–1), *Pyrrhula pyrrhula* (2–1; 5–1), *Passer domesticus* (5–1), *Passer montanus* (1–1; 5–2; 8–1), *Garrulus glandarius* (6–1; 7–1), *Passeriformes* sp. (6–1; 7–1), *Rana temporaria* (5–2)

Appendix 4. The diet of *Strix aluco* in Slovakia, Maštaľná cave**Appendix 4.** Potrava *Strix aluco* na Slovensku, jaskyňa Maštaľná

month / year mesiac / rok	10/82		10/82		10/82		5/94		10/82		7/91		2/97		1/01		2/02		3/06		Σ	%	
sample / zber	1		2		3		4		5		6		7		8		9		10				
Mus cf. musculus	2+	17					2		1												20	0.44	
Apodemus microps	1+	10					2		1		1										14	0.31	
Coleoptera sp.	1+	200	1+	96	4-	3	76	1-	63	1+	164	1-	6	3-	4	2-	2	1-	8	622	13.69		
Turdus philomelos		3	1+	9		7	6		8		4		1		1		1				40	0.88	
Parus major		2	1+	7		3	1		6		1		2		2		2				26	0.57	
Erithacus rubecula	1-	0	1+	10		5	4		1		7	1+	7		2		1				37	0.81	
Fringilla coelebs	1-	3	1+	10	1-	4	3		11		4	1+	7		2		3				47	1.03	
Limacidae sp.		48	2+	78	4-	1	38		37	1-	25	1-	4	1+	43	2-	0	1+	30		304	6.69	
Rana temporaria		5		2	1+	15		10		8	1-	1		1		1					43	0.95	
Sorex araneus		25		9	1+	37		23		19		14		2	1-	1		1		3	134	2.95	
Muscardinus avell.		46	1-	10	1+	101		50	1-	24	1-	24		5	1-	8	1-	2		10	280	6.16	
Dryomys nitedula		4			1+	14		3		2		1		2				1		3	30	0.66	
Crocidura leucodon		27		7	1+	43	1+	28	2-	2	2-	1		5		3		2		1	119	2.62	
Microtus arvalis		79	1-	29	1+	172	1+	104	1-	42	1-	55	1-	6		26	1-	10	1-	13	536	11.80	
Clethrionomys glareolus	1-	32		23	1+	78		43		42		1+	59		6		20		7	1-	2	312	6.87
Sorex minutus		9		4		16		6	1+	19	1-	3				1		1		2	61	1.34	
Apodemus sylvaticus	1-	0				6			2+	16				2				1			25	0.55	
Apodemus agrarius	1-	0			1-	2	1-	1	1+	15		2		4		6		4	1+	7	41	0.90	
Apodemus flavicollis	1-	139	2-	21		248		147		175		178	1+	55	1+	120	1+	77	1+	65	1225	26.96	
Glis glis	1-	22	1-	9		41		33		28		29		5		11	1+	13	1+	15	206	4.53	
Turdus merula		7		6		4		2		6		3		2		1				4	35	0.77	
Microtus subterraneus		6		1		7		5		3		3		1		3		2		1	32	0.70	
Coccothraustes coccothraustes		6		5		5		1		2		3		1		1		1		2	27	0.59	
Rana cf. esculenta		6				8		8		4											26	0.57	
Crocidura suaveolens		5		1		3		3				3		1		3		2			21	0.46	
Talpa europaea		3		1		2		3		3		4									16	0.35	
Arvicola amphibius		1		1		1		3		2		3			2		1		2		16	0.35	
Passer domesticus		7		1		4		2		2											16	0.35	
Cyanistes caeruleus				1		2		2		1		1			1		3				11	0.24	
Garrulus glandarius		2		2		2		1		2		1									10	0.22	
Turdus viscivorus		5		1				1		1					1						9	0.20	
Emberiza citrinella		1				1		3				1							2		8	0.18	
Passer montanus				1		1		3		1		1									7	0.15	
Dendrocopos major		1		1		1		1		2		1									7	0.15	
Neomys anomalus				1		1		3				1		1							7	0.15	
Neomys fodiens				2		2		2													6	0.13	
Myotis myotis				1		4		1													6	0.13	
Pipistrellus pipistrellus		1		1		3						1									6	0.13	
Sylvia atricapilla						1		2						2			1				6	0.13	
Turdus pilaris				3		2				1											6	0.13	

Appendix 4. continuation / pokračovanie

month / year mesiac / rok	10/82	10/82	10/82	5/94	10/82	7/91	2/97	1/01	2/02	3/06	Σ	%						
sample / zber	1	2	3	4	5	6	7	8	9	10								
<i>Sitta europaea</i>			2	1	1			1		1	6	0.13						
<i>Micromys minutus</i>			1	1	2	1					5	0.11						
<i>Rattus norvegicus</i>			1	2		1				1	5	0.11						
<i>Delichon urbicum</i>	2	1		1	1						5	0.11						
Mammalia	430	1-	122	1+	796	468	398	383	95	204	1+	126	126	3148	69.28			
Aves	52	1+	66	1-	51	44	1+	71	1-	31	1+	27	1-	14	17	13	386	8.49
Amphibia, Reptilia, Pisces	12	1-	2	1+	27	1+	23	14	1-	2		1		2	0	1	84	1.85
Evertebrata	1+	248	1+	174	5-	4	114	100	1+	189	1-	10	47	3-	2	38	926	20.38
Σ	742	364	878	649	583	605	133	267	145	178	4544	100.00						
Diversity H'	2.56	2.60	2.50	2.71	2.73	2.16	2.46	2.01	2.04	2.26	2.73							

Samples / vzorky 1–4 – subrecent period, 0–5 cm soil layer / subrecentné, vrstva 0–5 cm; 1 – back side / vzadu, 2 – left part / ľavá časť, 3 – right part / pravá časť; 5–10 – fresh pellets / čerstvé vývržky

Other species (sample – number) / Ostatné druhy (zber – počet):

Rhinolophus hipposideros (3–1), *Myotis emarginatus* (4–1), *Vespertilio murinus* (1–2; 3–2), *Eptesicus serotinus* (1–1; 3–1; 9–2), *Nyctalus noctula* (1–1), *Barbastella barbastellus* (3–1), *Plecotus auritus* (3–1; 5–1), *Lepus europaeus* (3–1; 4–1), *Spermophilus citellus* (2–1; 3–2), *Eliomys quercinus* (4–1), *Microtus agrestis* (5–2), *Mustela nivalis* (4–2; 10–1), *Falco tinnunculus* (3–1), *Tetrastes bonasia* (4–1; 7–1; 10–1), *Scolopax rusticola* (1–1), *Streptopelia turtur* (4–1), *Cuculus canorus* (2–1; 3–1; 4–1), *Picus canus* (1–1; 3–1; 5–1; 9–1), *Dendrocopos medius* (2–1; 10–1), *Alauda arvensis* (4–1), *Riparia riparia* (3–1), *Anthus trivialis* (1–1), *Bombycilla garrulus* (3–1), *Lanius collurio* (5–1), *Prunella modularis* (7–1), *Acrocephalus palustris* (2–1; 4–1), *Sylvia communis* (2–1), *Regulus* sp. (5–1; 6–1; 7–1), *Sylviidae* sp. (5–4), *Ficedula* sp. (8–1), *Luscinia megarhynchos* (2–1), *Luscinia* sp. (9–1), *Aegithalos caudatus* (9–1), *Periparus ater* (10–1), *Poecile palustris* (2–1; 8–1), *Poecile montanus* (9–1), *Paridae* sp. (1–3; 5–10), *Troglodytes troglodytes* (4–1; 5–1), *Carduelis cannabina* (2–2; 7–1), *Carduelis chloris* (7–1), *Pyrrhula pyrrhula* (1–1; 5–1), *Sturnus vulgaris* (1–1), *Passeriformes* sp. (1–5; 3–2; 5–6; 6–3; 9–1; 10–1), *Aves* sp. (4–4), *Hyla arborea* (1–1; 3–3), *Rana ridibunda* (6–1), *Lacerta muralis* (5–1; 8–1), *Lacerta* sp. (10–1), *Serpentes* sp. (4–1), *Salmo trutta* (4–3), *Cypriniformes* sp. (3–1; 4–1), *Pisces* sp. (5–1)

Appendix 5. The diet of *Strix aluco* in Slovakia, Nandraž mine

Appendix 5. Potrava *Strix aluco* na Slovensku, Nandraž, štôľňa

month / year mesiac / rok	7/97	2/02	6/02	8/03	1/05	4/06	2/07	2/08	2/09	2/10	Σ	%	
sample / vzorka	1	2	3	4	5	6	7	8	9	10			
<i>Microtus arvalis</i>		1+ 38	3 2-	0 1-	2	9	2	7	7	3	71	3.47	
<i>Glis glis</i>	1	1+ 22	2	3	8	1	5		4	1	47	2.30	
<i>Muscardinus avellanarius</i>	6	1+ 49	7	11	13	12	3	5	7	6	119	5.82	
Coleoptera sp.	3	1+ 73	1-	1 1-	13 3-	2 2+ 61	1-	0	8	12 1-	3	176	8.61
Orthoptera sp.		2- 0			1- 0	2+ 18		4	5			27	1.32
<i>Sorex araneus</i>	2	21	1	1+ 22	1- 3	8	3	2	3	1	66	3.23	
<i>Apodemus flavicollis</i>	47	282	40	145	1+ 220	1- 38	1- 14	80 2-	16 1+	97	979	47.90	
<i>Clethrionomys glareolus</i>	5	1- 38	9	20	35 1-	4	2	1+ 120		13 1+	28	174	8.51
<i>Rana temporaria</i>	10	29	2	17 2-	3 1+	24		4	2+ 25	1- 4	122	5.97	
<i>Talpa europaea</i>		1- 0	1	5	3			1	2	1	13	0.64	
<i>Sorex minutus</i>		7	2	3		3		1	1	1	18	0.88	
<i>Apodemus agrarius</i>		2	3	6	2	1				1	15	0.73	
<i>Turdus philomelos</i>		6	1	1	3	1	1				13	0.64	

Appendix 5. continuation / pokračovanie

month / year mesiac / rok	7/97	2/02	6/02	8/03	1/05	4/06	2/07	2/08	2/09	2/10	Σ	%	
sample / vzorka	1	2	3	4	5	6	7	8	9	10			
<i>Fringilla coelebs</i>		4	1	1		1	4		1	1	13	0.64	
<i>Erithacus rubecula</i>	2	5		3	1	1					12	0.59	
<i>Sitta europaea</i>	1	3		1	2	2	1	1		1	12	0.59	
<i>Parus major</i>	1	6							4		11	0.54	
<i>Micromys minutus</i>	1	5	1		1			1	1	1	11	0.54	
<i>Miniopterus schreibersii</i>		4		3	1			1	1		10	0.49	
<i>Rhinolophus euryale</i>		4				2		1	1	1	9	0.44	
<i>Cyanistes caeruleus</i>		2			1	2			3	1	9	0.44	
<i>Turdus merula</i>		2		1			3		1	1	8	0.39	
<i>Crociodura leucodon</i>		2		1		2				2	7	0.34	
<i>Apodemus sylvaticus</i>		1		3	2					1	7	0.34	
<i>Myotis myotis</i>	1	2		1			1		1		6	0.29	
<i>Arvicola amphibius</i>		2		3	1						6	0.29	
Limacidae sp.								3	2	1	6	0.29	
<i>Neomys fodiens</i>		2			1			2			5	0.24	
<i>Microtus subterraneus</i>		3	1			1					5	0.24	
<i>Delichon urbicum</i>		1			1		1		1	1	5	0.24	
Mammalia	65	498	71	227	293	1- 81	1- 30	121	1- 60	144	1590	77.79	
Aves	7	41	6	11	13	8	1+ 14	1-	1	11	5	117	5.72
Amphibia, Reptilia, Pisces	10	32	2	17	2- 3	1+ 25	4	4	2+ 25	1- 4	126	6.16	
Evertebrata	1- 3	73	1- 3	1- 13	3- 2	2+ 79	4	16	14	1- 4	211	10.32	
Σ	85	644	82	268	311	193	52	142	110	157	2044	100.00	
Diversity H'	1.73	2.27	2.05	1.87	1.30	2.16	2.52	1.66	2.56	1.48	2.21		

Other species (sample – number) / Ostatné druhy (zber – počet):

Neomys anomalus (2–1; 9–1), *Crociodura suaveolens* (1–1; 2–2), *Myotis mystacinus* (2–2; 3–1), *Myotis emarginatus* (2–1; 5–1), *Myotis bechsteinii* (2–1; 9–1), *Barbastella barbastellus* (9–1), *Plecotus auritus* (1–1), *Rattus norvegicus* (2–4), *Microtus agrestis* (2–3; 4–1), *Dendrocopos leucotos* (9–1), *Hirundo rustica* (4–1), *Riparia riparia* (2–1), *Anthus trivialis* (2–1), *Motacilla cinerea* (2–1), *Sylvia atricapilla* (4–1; 5–1), *Phylloscopus collybita* (4–1), *Ficedula parva* (5–1), *Saxicola torquata* (5–1), *Turdus viscivorus* (2–1), *Aegithalos caudatus* (2–1), *Periparus ater* (3–1), *Poecile palustris* (4–1; 7–1), *Troglodytes troglodytes* (6–1), *Emberiza citrinella* (2–1), *Fringilla montifringilla* (3–2), *Carduelis carduelis* (2–1), *Carduelis spinus* (2–1; 7–1), *Coccothraustes coccothraustes* (1–2; 2–2; 7–1), *Passer domesticus* (2–1; 5–1; 7–1), *Garrulus glandarius* (1–1; 2–1), *Passeriformes* sp. (5–1), *Aves* sp.juv. (3–1), *Hyla arborea* (6–1), *Rana cf. esculenta* (2–3), *Diptera* sp. (3–1), *Lucanus cervus* (3–1)

Appendix 6. The diet of *Strix aluco* in Slovakia, Pokoradzské jazierka lakes**Appendix 6.** Potrava *Strix aluco* na Slovensku, Pokoradzské jazierka

month / year mesiac / rok	2/97		4/06		3/07		2/08		2/09		2/10		Σ	%
sample / zber	1		2		3		4		5		6			
<i>Rana cf. esculenta</i>	1+	56	1-	29		19		9	1+	23		2	138	13.76
<i>Micromys minutus</i>	1-	0	1+	17		2							19	1.89
<i>Apodemus agrarius</i>	1-	6	1+	36		11		2				2	57	5.68
<i>Microtus arvalis</i>		32	1+	85		14	1-	6		3		1	141	14.06
Coleoptera sp.		1	1+	14		1		2			1		19	1.89
<i>Muscardinus avellanarius</i>		5		13	1+	10					2		30	2.99
<i>Rana temporaria</i>		1		7	1+	8		3					19	1.89
<i>Clethrionomys glareolus</i>		9	1-	8		5	2+	22			2	1	47	4.69
<i>Apodemus flavicollis</i>		98		125		37		34	1-		5	12	311	31.01
<i>Pelobates fuscus</i>		11		15		8		2			4	1	41	4.09
Limacidae sp.		3		11		3		3				2	22	2.19
<i>Glis glis</i>		6		4		1		1			2		14	1.40
<i>Turdus merula</i>		2		4		2		1			1		10	1.00
<i>Parus major</i>		2		5		1		1					9	0.90
<i>Fringilla coelebs</i>		2		2		2		2			1		9	0.90
<i>Apodemus sylvaticus</i>		2		7									9	0.90
<i>Crocidura suaveolens</i>				4		1		2					7	0.70
<i>Crocidura leucodon</i>		4		2									6	0.60
Hymenoptera sp.				5									5	0.50
Mammalia		164		316		84		71	1-	18		16	669	66.70
Aves		17		29		15		7		5		1	74	7.38
Amphibia, Reptilia, Pisces	1+	68	1-	57		39		15	1+	28		3	210	20.94
Evertebrata	1-	4	1+	32		4		5		3		2	50	4.99
Σ		253		434		142		98		54		22	1003	100.00
Diversity H'		2.06		2.63		2.64		2.22		2.24		1.55	2.64	

Other species (sample – number) Ostatné druhy (zber – počet):

Talpa europaea (2–2; 4–1; 5–1), *Sorex araneus* (2–2), *Sorex minutus* (1–1; 2–2; 3–1), *Neomys anomalus* (4–1), *Rhinolophus hipposideros* (1–1), *Rhinolophus euryale* (3–1; 5–1), *Myotis blythii* (2–1), *Nyctalus noctula* (5–1), *Plecotus austriacus* (2–1), *Mus cf. musculus* (2–4), *Apodemus microps* (2–2; 4–1), *Rattus norvegicus* (3–1; 4–1), *Microtus subterraneus* (2–1; 5–1), *Strix aluco* (5–1), *Dendrocopos syriacus* (1–1; 4–1), *Jynx torquilla* (1–1), *Anthus trivialis* (2–2), *Motacilla alba* (4–1), *Lanius collurio* (5–1), *Sylvia atricapilla* (3–2), *Phylloscopus trochilus* (2–1), *Ficedula sp.* (3–1), *Oenanthe oenanthe* (2–1), *Erithacus rubecula* (1–1; 2–1; 3–1), *Turdus pilaris* (3–1), *Turdus philomelos* (1–2; 3–1; 4–1), *Cyanistes caeruleus* (1–1), *Sitta europaea* (2–2), *Troglodytes troglodytes* (3–1), *Emberiza citrinella* (1–2), *Emberiza schoeniclus* (2–1), *Carduelis carduelis* (1–2; 2–1; 3–1), *Carduelis spinus* (2–1), *Carduelis cannabina* (2–1), *Pyrrhula pyrrhula* (2–1), *Coccothraustes coccothraustes* (2–1; 3–1), *Passer montanus* (3–1), *Sturnus vulgaris* (2–3; 5–1), *Garrulus glandarius* (1–1; 2–1), *Passeriformes sp.* (6–1), *Aves sp. juv.* (2–1), *Bombina sp.* (2–1), *Hyla arborea* (2–1; 3–1; 5–1), *Rana ridibunda* (2–3; 4–1), *Rana dalmatina* (3–3), *Lacerta agilis* (2–1), *Lucanus cervus* (5–2), *Orthoptera sp.* (2–2)

Appendix 7. The diet of *Strix aluco* in Slovakia, Cerová vrchovina Mts. and Bodvianska pahorkatina Mts.**Appendix 7.** Potrava *Strix aluco* na Slovensku, Cerová vrchovina a Bodvianska pahorkatina

species / sites druhy / lokality	1		2		3		5		4		Σ	%
<i>Rana cf. esculenta</i>	1+	16	2		1-	0	3		3		24	2.73
Orthoptera sp.			1+	7					5		12	1.36
<i>Glis glis</i>	1-	6	1+	17	20		1-	0	17		60	6.82
<i>Apodemus flavicollis</i>	81		1-	46	1+	215	1-	26	130		498	56.59
<i>Muscardinus avellanarius</i>	5		3		1-	1	1+	7	11		27	3.07
<i>Clethrionomys glareolus</i>	10		3		10		6		12		41	4.66
<i>Microtus arvalis</i>	11		10		9		3		6		39	4.43
<i>Sorex araneus</i>	2		1		7		2		3		15	1.70
<i>Fringilla coelebs</i>	2				2		5		2		11	1.25
Coleoptera sp.			5		3		1		2		11	1.25
<i>Talpa europaea</i>	1		2		2		1		3		9	1.02
<i>Crocidura suaveolens</i>	3		3		2						8	0.91
<i>Coccothraustes coccothraustes</i>	1		1		1		2		3		8	0.91
<i>Microtus subterraneus</i>	1		1		1		2		2		7	0.80
<i>Turdus merula</i>	1		1				3		1		6	0.68
<i>Sorex minutus</i>			1		2		2		1		6	0.68
<i>Crocidura leucodon</i>			3		1		1		1		6	0.68
<i>Apodemus sylvaticus</i>	5		1								6	0.68
<i>Apodemus agrarius</i>	2		1		2				1		6	0.68
<i>Arvicola amphibius</i>	3				1		1				5	0.57
<i>Pelobates fuscus</i>	4								1		5	0.57
Mammalia	134		92		275		53		192		746	84.77
Aves	10		9		1-	8	1+	21	27		75	8.52
Amphibia, Reptilia	1+	20	5		2-	0	3		4		32	3.64
Evertebrata	1		1+	12	1-	4	2		8		27	3.07
Σ	165		118		287		79		231		880	100.00
Diversity H'	2.12		2.33		1.19		2.62		2.06		2.10	

1 – Steblova skala, 26. 6. 1995 + 21. 4. 1998 + 20. 9. 2006, 2 – Hajnáčka, Ragáč, 26. 6. 1995 + 21. 4. 1998 + 20. 9. 2006, 3 – Šurice quarry / lom, 22. 4. 1998 + 21. 9. 2006, 5 – Tornaľa, Činča valley, 8. 4. 1998, 4 – Pohanský & Soví vrch Mts, 22. 4. 1998 + 21. 9. 2006

Other species (site – number) / Ostatné druhy (lokalita – počet):

Neomys anomalus (3–1), *Myotis bechsteinii* (4–1), *Myotis myotis* (3–1; 4–2), *Dryomys nitedula* (1–1; 5–2), *Mus cf. musculus* (1–1; 4–1), *Micromys minutus* (1–1; 4–1), *Mustela erminea* (1–1), *Columba oenas* (2–1), *Dendrocopos major* (3–1; 5–2; 4–1), *Hirundo rustica* (1–1; 4–1), *Motacilla alba* (5–1), *Sylvia communis* (4–1), *Sylvia atricapilla* (4–1), *Regulus sp.* (4–1), *Monticola saxatilis* (4–2), *Erithacus rubecula* (1–1; 3–1; 5–2), *Turdus pilaris* (5–1; 4–1), *Turdus philomelos* (1–1; 2–1; 5–1), *Turdus sp.* (3–2), *Parus major* (1–1; 2–1; 4–1), *Cyanistes caeruleus* (1–1; 2–2; 4–1), *Poecile palustris* (4–1), *Sitta europaea* (2–1; 5–1; 4–1), *Troglodytes troglodytes* (5–1), *Emberiza citrinella* (2–1), *Carduelis carduelis* (4–1), *Carduelis cannabina* (5–2), *Pyrrhula pyrrhula* (4–1), *Serinus serinus* (4–1), *Passer domesticus* (1–1; 4–2), *Garrulus glandarius* (4–3), *Passeriformes sp.* (3–1; 4–1), *Rana arvalis* (2–2), *Lacerta muralis* (2–1), *Limacidae sp.* (1–1; 3–1; 5–1; 4–1)

Appendix 8. The diet of *Strix aluco* in Slovakia, Havranovo, Recent period
Appendix 8. Potrava *Strix aluco* na Slovensku, Havranovo, recent

month, year mesiac, rok	11/81	12/82	11/83	12/85	11/86	2/89	2/90	9/91	1/92	8/93	9/94	8/95	12/98	1/01	1/10	Σ	%									
samples / zbery	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15											
<i>Rana temporaria</i>	1+ 55	1+ 87	16	2-	2	7	12	7	16	10	2-	7	9	8	1-	2	3-	0	245	17.58						
Coleoptera sp.	1- 10	2+ 117	1-	3	1-	1	2	2	10	4	2-	4	1	3	1-	0	2-	1	160	11.48						
Limacidae sp.	1-	3	15	7	1-	2+ 18	3	2	7	5	1-	4	3	2	7	6	1+ 17	100	7.17							
<i>Microtus arvalis</i>	12	1-	3	1+ 14	3	1	6	2	1-	0	2	1+ 17	5	3	2	2	5	75	5.38							
<i>Clethrionomys glareolus</i>	15	1-	9	11	8	3	2	7	12	6	1+ 27	2	2	4	3	1+ 24	133	9.54								
<i>Apodemus flavicollis</i>	22	2-	9	21	1+ 28	1-	4	1+ 18	1-	7	1-	6	1+ 66	3	1-	5	1+ 15	1+ 54	266	19.08						
<i>Muscardinus avellanarius</i>	7	12	5	1+ 14	3	5	5	3	7	6	5	1+ 12	1	3	1-	3	91	6.53								
<i>Sorex araneus</i>	10	2-	3	6	3	4	1+ 13	5	1+ 26	1+ 11	13	3	1+ 18	3	6	2-	1	125	8.97							
<i>Salmo trutta</i>						3	1	1+ 6									10	0.72								
<i>Glis glis</i>	2	7	1	2	2	6	1	1	4	6	1	1	1+ 11	1	1+ 10	53	3.80									
<i>Talpa europaea</i>	4	2	4		1	2	2	1	1	2	3	1	1	5	2	29	2.08									
<i>Sorex minutus</i>	2	2		1		1	1	1	3	4		2	2	1	1	18	1.29									
<i>Turdus philomelos</i>	2	2	1	2				4		2	1	3				17	1.22									
<i>Microtus subterraneus</i>	1	2	3	4	2	1	1			1	1					15	1.08									
<i>Sorex alpinus</i>						1		3			1		2			7	0.50									
Mammalia	77	2-	51	66	1+ 65	1-	18	42	38	58	43	1+ 145	20	45	32	33	1+ 98	831	59.61							
Aves	3	5		2	4	1	3	4	1+	9	2	5	1	5	2	1	0	47	3.37							
Amphibia, Reptilia, Pisces	1+	55	1+	87	16	2-	2	10	13	7	22	10	2-	7	9	7	8	1-	2	3-	0	255	18.29			
Evertebrata	1-	13	2+	132	1-	10	1-	3	1+	19	1-	5	1-	4	17	9	2-	8	4	1-	5	7	6	19	261	18.72
Σ	148	275	94	74	48	63	53	106	64	165	34	62	49	42	117	1394	100.00									
Diversity H'	2.08	1.68	2.24	2.08	2.08	2.47	2.09	2.46	2.42	2.05	2.18	2.23	2.17	2.00	1.56	2.50										
1–14 – Havranovo; 15 – Biela jaskyňa cave and Jelenia jaskyňa cave, samples / vzorky 2006, 2008, 2010																										

Other species (sample – number) / Ostatné druhy (zber – počet):
Neomys fodiens (5–1), *Myotis myotis* (8–2; 9–2), *Vespertilio murinus* (1–1; 3–1; 6–1; 12–1), *Eptesicus serotinus* (8–1), *Mus cf. musculus* (4–1), *Apodemus sylvaticus* (4–1), *Rattus norvegicus* (1–1), *Arvicola amphibius* (2–1; 10–1), *Microtus tataricus* (8–1), *Microtus agrestis* (2–1; 10–1; 13–1), *Tachybaptus ruficollis* (2–1), *Falco tinnunculus* (4–1), *Columba palumbus* (6–1), *Apus apus* (8–1), *Sylvia curruca* (8–1), *Sylvidae* sp. (6–1; 7–1), *Erithacus rubecula* (4–1; 13–2), *Turdus merula* (7–1), *Turdus torquatus* (10–1), *Turdus pilaris* (2–1; 12–1), *Parus major* (7–1), *Periparus ater* (8–1), *Cyanistes caeruleus* (2–1), *Paridae* sp. (7–1), *Sitta europaea* (8–1; 10–2), *Certhia* sp. (9–1), *Fringilla coelebs* (12–1), *Pyrrhula pyrrhula* (14–1), *Garrulus glandarius* (6–1; 8–1), *Passeriformes* sp. (1–1; 3–1; 5–1; 9–1), *Hymenoptera* sp. (15–1)

Appendix 9. The diet of *Strix aluco* in Slovakia, Malá Fatra Mts.**Appendix 9.** Potrava *Strix aluco* na Slovensku, Malá Fatra

dietary type / typ potravý	B		E		B		B		D		Σ	%
species / druhy // sites / lokalita	1		2		3		4		5			
<i>Muscardinus avellanarius</i>	1+	19		8		3		5	2-	2	37	3.62
<i>Apodemus flavicollis</i>	1+	33		8		7		2	1-	15	65	6.36
<i>Clethrionomys glareolus</i>	1+	18		11		7			1-	21	57	5.58
<i>Rana temporaria</i>	1+	25	1+	26		2		1	1-	32	86	8.41
Coleoptera sp.		8	1+	9				2	2-	0	19	1.86
Limacidae sp.		24	2+	63		3		7	4-	0	97	9.49
<i>Microtus subterraneus</i>		8	1+	8		3			2-	0	19	1.86
<i>Talpa europaea</i>		7	1+	14	1+	6		2	2-	2	31	3.03
<i>Sorex araneus</i>		11	1+	15	1+	7		5	2-	4	42	4.11
<i>Sorex minutus</i>		5		1		2	1+	5	1-	1	14	1.37
<i>Myotis brandtii</i>									1+	17	17	1.66
<i>Vespertilio murinus</i>	2-	2	3-	0	1-	0			1+	114	116	11.35
<i>Eptesicus serotinus</i>		3	1-	0					1+	21	24	2.35
<i>Pipistrellus pipistrellus</i>	3-	0	3-	0	1-	0	1-	0	1+	159	159	15.56
<i>Barbastella barbastellus</i>	2-	2	3-	0	1-	0			1+	102	104	10.18
<i>Microtus arvalis</i>		11		6		2				13	32	3.13
<i>Fringilla coelebs</i>		3								8	11	1.08
<i>Motacilla cinerea</i>		1								5	6	0.59
<i>Salmo trutta</i>		3								3	6	0.59
<i>Glis glis</i>		1		1				1		2	5	0.49
<i>Myotis myotis</i>		2		1						2	5	0.49
<i>Plecotus auritus</i>										5	5	0.49
Mammalia		127	1-	77		38		21		495	758	74.17
Aves		14	1-	4		2		2		32	54	5.28
Amphibia, Pisces	1+	28	1+	26		2		1	1-	37	94	9.20
Evertebrata	1+	32	2+	72		3	1+	9	5-	0	116	11.35
Σ		201		179		45		33		564	1022	100.00
Diversity H'		2.78		2.22		2.32		2.23		2.35	2.94	

1 – Nitriansky Kľak, north / sever, 26. 5. 1979 + Vrúcko, Vrania skala Mt., 2. 7. 1979 + Kľačno, Drevená dolina valley, 30. 9. 1979 + Kľačno, Mokrá valley, 30. 9. 1979 (Obuch 1980), 2 – Turie, Ostrá, 3. 8. 1980, 3 – Kukurišova valley, 10. 7. 1983 + Hoskora valley, 9. 7. 1981, 4 – Zázrivá, Havrania skala, 22. 8. 1995, 5 – Stráňavy, Hýrov, 19. 3. 1978

Other species (site – number) / Ostatné druhy (lokalita – počet):

Sorex alpinus (1–1; 2–1), *Neomys anomalus* (1–1; 5–1), *Myotis mystacinus* (5–3), *Myotis nattereri* (5–1), *Myotis bechsteinii* (5–4), *Eptesicus nilssonii* (2–1; 5–1), *Nyctalus noctula* (5–4), *Eliomys quercinus* (2–1; 5–1), *Sicista betulina* (3–1), *Micromys minutus* (1–1), *Apodemus sylvaticus* (4–1), *Arvicola amphibius* (1–2; 2–1), *Tringa hypoleucos* (5–1), *Anthus trivialis* (5–1), *Regulus* sp. (1–1; 5–2), *Sylviidae* sp. (5–2), *Phoenicurus ochruros* (5–1), *Turdus merula* (1–1; 2–1; 4–1), *Turdus torquatus* (2–1), *Turdus philomelos* (1–2), *Turdus viscivorus* (5–1), *Parus major* (1–1; 5–3), *Periparus ater* (5–1), *Cyanistes caeruleus* (5–1), *Poecile palustris* (5–1), *Troglodytes troglodytes* (5–1), *Emberiza citrinella* (1–1), *Carduelis spinus* (5–1), *Carduelis chloris* (5–1), *Pyrrhula pyrrhula* (1–1; 4–1), *Coccothraustes coccothraustes* (5–2), *Passeriformes* sp. (1–3; 2–2; 3–2), *Bufo bufo* (5–2)

Appendix 10. The diet of *Strix aluco* in Slovakia, Žiar Mts.
Appendix 10. Potrava *Strix aluco* na Slovensku, Žiar

month / year mesiac / rok	11/76	11/77	12/79	6/81	9/84	7/95	10/97	4/07	8/94	7/97	4/80	Σ	%							
samples / zbery	1	2	3	4	5	6	7	8	9	10	11									
<i>Clethrionomys glareolus</i>	1+	13	11	9	1	3	1	7	4	1-	3	55	7.38							
<i>Apodemus flavicollis</i>	5	1+	22	13	1-	5	4	1-	9	4	19	7	90	12.08						
<i>Muscardinus avellanarius</i>	3	1+	14	8	2	1+	10	2	4	2	1-	2	52	6.98						
<i>Microtus arvalis</i>	12	1+	34	28	2+	36	1-	2	1	2-	1	17	1-	2	37	4	174	23.36		
<i>Hirundo rustica</i>			1+	7													7	0.94		
<i>Limacidae</i> sp.	1-	0	1-	3	2-	0	1-	0	2	2+	53	4	1+	20	2-	3	2	87	11.68	
<i>Rana temporaria</i>	7	2-	0	12	1-	1	1-	1-	1	2	1-	3	1-	1	2+	77	3	109	14.63	
<i>Sorex araneus</i>	6	2	1	1	1	1	5	2	1	6	8	1	2	6			1	33	4.43	
<i>Glis glis</i>	2	2	4	4	4	3	2	3	2	6		23	3	0.9				23	3.09	
<i>Talpa europaea</i>	2		1	1	2	2	2	3	2			13	1	74				13	1.74	
<i>Sorex minutus</i>	1	1			1	2				1	2	8		1	0			8	1.07	
<i>Arvicola amphibius</i>			2	2	2		1	1	1	1		8		1	0			8	1.07	
<i>Turdus philomelos</i>			2	2	2	1	1	1		1	1	8		1	0			8	1.07	
<i>Pitymys subterraneus</i>		4	2	2				1				7		0	94			7	0.94	
<i>Apodemus sylvaticus</i>					2					4		6		0	81			6	0.81	
<i>Turdus merula</i>			3			1		1			1	6		0	81			6	0.81	
<i>Mus cf. musculus</i>	1		2							2		5		0	67			5	0.67	
Mammalia	45	1+	92	71	1+	43	32	17	2-	12	43	22	1-	87	21	485	65.10			
Aves	1	1-	1	1+	19	0	6	4	2	2	3	2	1-	6	1+	7	51	6.85		
Amphibia, Reptilia, Pisces	8	2-	0	16	1-	1	1-	2	2	1-	3	1-	1	2+	79	5	118	15.84		
Vertebrata	1-	0	1-	3	2-	0	1-	0	5	0	2+	53	4	1+	20	2-	4	2	91	12.21
Σ	54	96	106	106	44	44	44	23	69	53	176	45	45	176	35	745	100.00			
Diversity H'	2.11	1.81	2.50	0.82	2.61	2.22	1.04	2.11	1.90	1.94	2.66	2.58								
1–7 – Moškovské skaly, 8 – Ondrašovské skaly, 9 – Zniev, 10 – Sokol, Slovenské Pravno, 11 – Vyšehradné																				

Other species (sample – number) / Ostatné druhy (zber – počet):
Neomys anomalus (10–2; 11–1), *Neomys fodiens* (9–1), *Myotis myotis* (2–2; 4–1), *Eptesicus serotinus* (10–1), *Micromys minutus* (10–1; 11–1), *Rattus norvegicus* (3–1), *Delichon urbicum* (3–2; 5–1), *Riparia riparia* (3–3), *Regulus* sp. (11–1), *Sylvia* sp. (8–1), *Erethacus rubecula* (5–1; 6–1), *Turdus pilaris* (5–1; 8–1), *Turdus viscivorus* (3–1; 7–1; 10–1), *Periparus ater* (10–1), *Certhia* sp. (10–1), *Emberiza citrinella* (11–1), *Fringilla coelebs* (5–1; 9–1; 10–1; 11–1), *Pyrrhula pyrrhula* (11–1), *Stumus vulgaris* (10–1), *Garrulus glandarius* (6–1), *Passeriformes* sp. (1–1; 2–1; 3–1; 9–1; 11–1), *Pelobates fuscus* (10–2), *Hyla arborea* (3–3), *Salmo trutta* (1–1; 3–1; 11–2), *Coleoptera* sp. (5–3; 10–1)

Appendix 11. The diet of *Strix aluco* in Slovakia, Strážovské vrchy Mts. and Súľovské vrchy Mts.**Appendix 11.** Potrava *Strix aluco* na Slovensku, Strážovské a Súľovské vrchy

dietary type / typ potravý	A	B	B	B	B	B	E	E		
species / sites //										
druhy / lokality	1	3	7	4	2	6	5	8	Σ	%
Coccothraustes coccothraustes	1+ 28								28	1.69
Microtus arvalis	1+ 247	2	2	7	1- 10	4	2- 13	1- 2	287	17.31
Glis glis	1- 5	2		1+ 6	1+ 7	2	7		29	1.75
Clethrionomys glareolus	123	2	8	10	1+ 28	2	1+ 40	1- 3	216	13.03
Sorex araneus	36		2	1	8	1+ 7	1+ 16		70	4.22
Limacidae sp.	4- 0	1			5		2+ 45	3+ 31	82	4.95
Erithacus rubecula	1- 2	4				4			10	0.60
Apodemus flavicollis	407	18	13	1- 7	30	14	62	1- 6	557	33.59
Muscardinus avellanarius	50		1		5	5	15	6	82	4.95
Turdus merula	17			1	1	2	3	2	26	1.57
Neomys anomalus	19						1		20	1.21
Passer domesticus	18						1		19	1.15
Sorex minutus	10				2	1	3	3	19	1.15
Coleoptera sp.	10				5		1	2	18	1.09
Talpa europaea	10			1	5		2		18	1.09
Crociodura leucodon	17				1				18	1.09
Turdus philomelos	5	4	1			1	2	2	15	0.90
Parus major	13						2		15	0.90
Garrulus glandarius	9				1				10	0.60
Sitta europaea	6			2					8	0.48
Fringilla coelebs	6	1							7	0.42
Dendrocopos major	7								7	0.42
Rana temporaria	1						5	1	7	0.42
Crociodura suaveolens	7								7	0.42
Microtus subterraneus				1	1	1	2		5	0.30
Regulus sp.	3							2	5	0.30
Mammalia	933	24	26	36	99	37	165	1- 20	1340	80.82
Aves	154	1+ 10	3	5	1- 7	10	1- 11	6	206	12.42
Amphibia, Reptilia, Pisces	1- 3	0	0	0	2	1	5	1	12	0.72
Evertebrata	3- 10	1	0	0	10	0	2+ 46	2+ 33	100	6.03
Σ	1100	35	29	41	118	48	227	60	1658	100.00
Diversity H'	2.24	1.63	1.55	2.11	2.38	2.33	2.22	1.74	2.47	

1 – Drieňov (Kropil 1987), 3 – Čierna Lehota, Sokolia skala, 14. 4. 2005, 7 – Malinová, 22. 11. 2004, nest box / búdka, leg. K.Šotnár, 4 – Slatinka nad Bebravou, Sovia skryš cave, 14. 4. 2005, 2 – Uhrovecke Podhradie, 16. 10. 1980, 6 – Hlboké, waterfall / vodopád, 4. 10. 1978, 5 – Malý Manín, 4. 11. 1979 + 12. 7. 1983 + Veľký Manín, 15. 7. 1983, 8 – Rokoš, 16. 10. 1980

Other species (site – number) / Ostatné druhy (lokalita – počet):

Sorex alpinus (5–1), *Myotis nattereri* (5–1), *Myotis myotis* (6–1), *Eptesicus serotinus* (4–3), *Nyctalus noctula* (2–1), *Sciurus vulgaris* (2–1), *Eliomys quercinus* (5–1), *Rattus norvegicus* (1–2; 5–1), *Accipiter nisus* (1–1), *Falco tinnunculus* (5–1), *Scolopax rusticola* (1–1), *Streptopelia decaocto* (6–1), *Cuculus canorus* (1–2), *Asio otus* (1–1), *Caprimulgus europaeus* (4–1), *Upupa epops* (1–1), *Jynx torquilla* (1–1), *Delichon urbicum* (1–2), *Anthus trivialis* (2–1), *Lanius collurio* (1–1), *Sylvia communis* (1–1), *Sylvia curruca* (1–1), *Sylvia atricapilla* (2–1), *Sylviidae* sp. (1–1), *Turdus pilaris* (6–1), *Turdus viscivorus* (7–1; 5–1), *Cyanistes caeruleus* (1–4), *Poecile palustris* (1–1), *Troglodytes troglodytes* (2–1; 6–1), *Emberiza citrinella* (1–1; 7–1), *Carduelis carduelis* (1–4), *Carduelis cannabina* (1–2), *Carduelis chloris* (1–3), *Pyrrhula pyrrhula* (3–1), *Passer montanus* (1–4), *Sturnus vulgaris* (1–3; 2–1), *Oriolus oriolus* (1–1), *Corvus cornix* (1–1), *Passeriformes* sp. (1–1; 4–1; 2–1; 5–1), *Aves* sp. (1–2), *Rana dalmatina* (1–1), *Rana cf. esculenta* (2–1), *Lacerta vivipara* (2–1), *Salmo trutta* (1–1), *Pisces* sp. (6–1)

Appendix 12. The diet of *Strix aluco* in Slovakia, Vtáčnik Mts.

Appendix 12. Potrava *Strix aluco* na Slovensku, Vtáčnik

species / sites druhy / lokalita	1	3	2	5	6	4	Σ	%
<i>Talpa europaea</i>	1+ 6	1	7	7	1 1-	1	23	1.48
<i>Microtus arvalis</i>	1+ 7	1	2+ 35	1- 8	1- 0	11	62	4.00
<i>Sorex araneus</i>	5	1+ 15	1+ 29	37	1- 3	1- 18	107	6.90
<i>Glis glis</i>	1		1+ 12	1- 0			13	0.84
Limacidae sp.			1+ 11				11	0.71
<i>Rana temporaria</i>	2	1	1+ 17	1+ 25	1 2-	0	46	2.97
Coleoptera sp.			9	1+ 18	1 1-	2	30	1.94
<i>Muscardinus avellanarius</i>	2	1	5	1+ 26	6	12	52	3.35
<i>Turdus philomelos</i>			1	1+ 13	1	4	19	1.23
<i>Apodemus flavicollis</i>	20	76	1- 68	252	1+ 113	1+ 251	780	50.32
<i>Clethrionomys glareolus</i>	1- 2	23	52	104	32	53	266	17.16
<i>Microtus subterraneus</i>	5	8	1- 2	9	5	11	40	2.58
<i>Sorex minutus</i>	1		3	4		6	14	0.90
<i>Fringilla coelebs</i>	1	1		7	1	4	14	0.90
<i>Turdus merula</i>	1	1	2	5	1	1	11	0.71
<i>Erithacus rubecula</i>		1		4	1		6	0.39
<i>Neomys anomalus</i>			2	4			6	0.39
<i>Apodemus sylvaticus</i>				1		4	5	0.32
Mammalia	49	125	223	455	160	369	1381	89.10
Aves	2	4	11	1+ 40	5	18	80	5.16
Amphibia	2	1	1+ 17	1+ 25	1 2-	0	46	2.97
Evertebrata	0	0	1+ 20	19	2 1-	2	43	2.77
Σ	53	130	271	539	168	389	1550	100.00
Diversity H'	2.00	1.34	2.38	1.93	1.15	1.43	1.92	

1 – Žarnov, 4. 5. 1979 (Obuch 1980), 3 – Čígeľ, Veľký Grič, 22. 11. 2004, nest box / búdka, leg. K. Šotnár, 2 – Jasenová skala, 14. 7. 1979 (Obuch 1980) + Veľká skala, 15. 7. 1979 (Obuch 1980) + Veľká skala, 15. 3. 1990, leg. J. Chavko + Veľká skala, 15. 4. 2004, leg. J. Chavko, 5 – Hradec, 12. 10. 2003, 3 nest boxes / 3 búdky, leg. K. Šotnár, 6 – Hradec, 2. 9. 2004, 2 nest boxes / 2 búdky, leg. K. Šotnár, 4 – Sebedražie, 12. 10. 2003, 3 nest boxes / 3 búdky, leg. K. Šotnár.

Other species (site – number) / Ostatné druhy (lokalita – počet):

Crocridura leucodon (2–1), *Crocridura suaveolens* (5–1), *Myotis bechsteinii* (2–1), *Myotis myotis* (5–1), *Nyctalus noctula* (2–3), *Lepus europaeus* (4–2), *Sciurus vulgaris* (2–1), *Micromys minutus* (2–1), *Arvicola amphibius* (2–1; 5–1), *Columba livia dom.* (2–1), *Asio otus* (4–1), *Strix aluco* (4–1), *Picus canus* (2–1), *Dendrocopos major* (5–1; 4–1), *Motacilla cinerea* (5–1), *Lanius collurio* (5–1; 4–1), *Sylvia atricapilla* (5–2; 4–1), *Sylviidae* sp. (2–1), *Turdus torquatus* (2–1), *Turdus viscivorus* (5–1; 6–1), *Parus major* (5–1), *Poecile palustris* (5–1), *Fringilla montifringilla* (2–1), *Coccothraustes coccothraustes* (2–1; 5–1; 4–1), *Serinus serinus* (5–1), *Passer montanus* (5–1), *Passeriformes* sp. (3–1; 2–2; 4–1), *Aves* sp.juv. (4–2), *Hymenoptera* sp. (5–1; 6–1)

Appendix 13. The diet of *Strix aluco* in Slovakia, Central Slovakian volcanic mountain ranges**Appendix 13.** Potrava *Strix aluco* na Slovensku, stredoslovenské vulkanické pohoria

species / sites druhy / lokality	2	8	1	3	6	7	5	4	Σ	%
<i>Sorex araneus</i>	1+ 9	1	18		2	1-	0		30	4.67
<i>Muscardinus avellanarius</i>	1+ 15	3	22	1	2		6		49	7.63
Coleoptera sp.	3	1+ 6	1+ 31	1		1-	0		41	6.39
<i>Turdus philomelos</i>	1		1+ 13						14	2.18
<i>Apodemus flavicollis</i>	1- 18	1- 4	156	1+ 24	22		42	14 12	292	45.48
<i>Microtus subterraneus</i>	3	1	5		1+ 7		1		17	2.65
<i>Clethrionomys glareolus</i>	7	4	1- 13	5	5	1+ 125		3	62	9.66
<i>Microtus arvalis</i>	2		11		3		9	1	26	4.05
<i>Glis glis</i>			8		1		3	2	14	2.18
<i>Rana temporaria</i>	1	2	6		1		4		14	2.18
<i>Sorex minutus</i>		1	8		1				10	1.56
<i>Talpa europaea</i>	2	1	3				2	1	9	1.40
<i>Turdus merula</i>	1		6						7	1.09
<i>Fringilla coelebs</i>	1		4				1	1	7	1.09
Orthoptera sp.			7						7	1.09
<i>Neomys fodiens</i>	1		4					1	6	0.93
Mammalia	59	16	249	30	43	94	20	14	525	81.78
Aves	4	0	1+ 38	1	3	6	0	2	54	8.41
Amphibia, Reptilia, Pisces	1	2	6	1	1	4	0	0	15	2.34
Evertebrata	3	6	1+ 38	1	0	1-	0	0	48	7.48
Σ	67	24	331	33	47	104	20	16	642	100.00
Diversity H'	2.18	2.07	2.16	0.94	1.81	1.91	0.91	0.91	2.23	

2 – Turček, 3. 7. 1992 + 9. 10. 2005, leg. M. Poláček, Kremnické vrchy Mts., 8 – Klenovec, 14. 7. 1981, Veporské vrchy Mts. (Obuch 1985a), 1 – Horná Ves, 2007 + 2008, Kremnické vrchy Mts. (Poláček 2009), 3 – Jastrabia skala, 29. 6. 2002, Kremnické vrchy Mts., leg. J. Kicko, 6 – Sitno, 13. 2. 1990, leg. J. Šteffek, June and December 1987 + Sklené Teplice, gallery / štôľňa, 13. 2. 1990, Štiavnické vrchy Mts., 7 – Jánošíkova skala + Melichova skala + Kalamárka, Poľana Mts. (Obuch 1979), 5 – Rabenstein, mine / baňa, January 2005, Štiavnické vrchy Mts., leg. E. Hapl, P. Bryndza, 4 – Poštárka, 19. 3. 2004, Javorie Mts

Other species (site – number) / Ostatné druhy (lokalita – počet):

Dryomys nitedula (7–1), *Sicista betulina* (8–1), *Arvicola amphibius* (2–1; 1–1; 7–2), *Microtus agrestis* (2–1; 7–3), *Columba* sp. (7–1), *Dendrocopos major* (1–1), *Anthus trivialis* (7–2), *Motacilla cinerea* (1–1), *Lanius minor* (6–1), *Prunella modularis* (6–1), *Sylvia nisoria* (1–1), *Erithacus rubecula* (1–2), *Parus major* (1–1; 6–1), *Poecile palustris* (1–1), *Sitta europaea* (1–1), *Certhia* sp. (1–1), *Emberiza citrinella* (7–1), *Pyrrhula pyrrhula* (2–1), *Coccothraustes coccothraustes* (1–3; 4–1), *Passer domesticus* (3–1), *Sturnus vulgaris* (1–2), *Oriolus oriolus* (1–1), *Passeriformes* sp. (7–1), *Rana cf. esculenta* (3–1)

Appendix 14. The diet of *Strix aluco* in Slovakia, Horná Orava region**Appendix 14.** Potrava *Strix aluco* na Slovensku, Horná Orava

species / sites druhy / lokality	1		2		3		4		5		Σ	%
<i>Apodemus flavicollis</i>	1+	31	2-	1		7		4		4	47	7.82
<i>Sicista betulina</i>		2	1+	14		2		4		2	24	3.99
<i>Rana temporaria</i>	1-	19	1+	46	1-	10		21		16	112	18.64
<i>Clethrionomys glareolus</i>	1-	10	1-	10	1+	34		9		3	66	10.98
<i>Microtus agrestis</i>		38		25	1+	36	1-	9	1-	2	110	18.30
<i>Talpa europaea</i>		1				1	1+	6			8	1.33
<i>Sorex araneus</i>		11		10		3		3	1+	9	36	5.99
<i>Arvicola amphibius</i>		3		4		2			1+	11	20	3.33
<i>Microtus subterraneus</i>		9		15		12		8		0	44	7.32
<i>Muscardinus avellanarius</i>		8		9		4		3		4	28	4.66
<i>Microtus arvalis</i>		4		12		2		4		3	25	4.16
<i>Turdus philomelos</i>		3		4		2		3		1	13	2.16
<i>Neomys fodiens</i>		2		6				1		1	10	1.66
<i>Sorex minutus</i>		6				1		2			9	1.50
<i>Mus cf. musculus</i>				3				1		3	7	1.16
<i>Coleoptera</i> sp.				4				1			5	0.83
Mammalia		127		111		104		57		43	442	73.54
Aves		10		9		7		10		2	38	6.32
Amphibia, Reptilia, Pisces	1-	19	1+	47	1-	10		21		16	113	18.80
Evertebrata		0		6		0		1		1	8	1.33
Σ		156		173		121		89		62	601	100.00
Diversity H'		2.40		2.48		2.05		2.70		2.28	2.67	

1 – Oravská Polhora, Pekárka, 20. 8. 2004, leg. M. Demko & D. Karaska, 2 – Oravice, Peciská, 9. 6. 2005, nest box / búdka, leg. D. Karaska, 3 – Oravice, Tichá valley, 9. 6. 2005, nest box / búdka, leg. D. Karaska, 4 – Oravice, pellets / vývržky up to 2002, 5 – Habovka, Blatná valley, Zamaňová, 15. 5. 2007, nest box / búdka, leg. D. Karaska

Other species (site – number) / Ostatné druhy (lokalita – počet):

Sorex alpinus (2–1; 5–1), *Neomys anomalus* (4–1), *Dryomys nitedula* (1–1; 2–1), *Chionomys nivalis* (4–1), *Mustela nivalis* (1–1; 4–1), *Tetrao urogallus* (4–1), *Coturnix coturnix* (4–1), *Columba palumbus* (4–1), *Dendrocopos* sp. (4–1), *Regulus* sp. (1–1), *Erithacus rubecula* (5–1), *Turdus merula* (1–1; 4–1), *Turdus torquatus* (3–1; 4–1), *Turdus pilaris* (4–1), *Turdus viscivorus* (3–2), *Turdus* sp. (3–2), *Periparus ater* (1–2), *Certhia* sp. (1–1), *Fringilla coelebs* (1–1; 2–2), *Carduelis spinus* (1–1), *Garrulus glandarius* (2–1), *Passeriformes* sp. (2–1), *Aves* sp.juv. (2–1), *Salmo trutta* (2–1), *Hymenoptera* sp. (2–2; 5–1)

Appendix 15. The diet of *Strix aluco* in Slovakia, Kysuce region**Appendix 15.** Potrava *Strix aluco* na Slovensku, Kysuce

dietary type / typ potravý	C		C		C		C		G		Σ	%
species / sites druhy / lokality	2		3		4		1		5			
<i>Dryomys nitedula</i>	1+	12	6		3		1				22	1.58
<i>Sicista betulina</i>	1+	13			8		4		1		26	1.87
<i>Coleoptera</i> sp.	1+	21	6	1-	4		7		4		42	3.01
<i>Rana temporaria</i>	1+	84	2-	7	1-	40	1-	14	1+	66	211	15.14
<i>Turdus torquatus</i>	1+	8			1				1		10	0.72
<i>Turdus philomelos</i>	1+	23	1+	14	9		4		1-	2	52	3.73
<i>Muscardinus avellanarius</i>		13	1+	16	10		9		2-	0	48	3.44
<i>Apodemus flavicollis</i>		27	1+	27	1+	38	1-	10	1-	5	107	7.68
<i>Clethrionomys glareolus</i>	1-	17	12		1+	71	1-	12	2-	2	114	8.18
<i>Pitymys subterraneus</i>		14	11		1+	26	7		1-	1	59	4.23
<i>Sorex araneus</i>		36	1-	7	1+	56	1+	37	3-	1	137	9.83
<i>Neomys fodiens</i>		7	2		1-	0	1+	9	3		21	1.51
<i>Turdus merula</i>		8	6		12		1+	13	3		42	3.01
<i>Turdus pilaris</i>		8	4		1-	3	1+	13	5		33	2.37
<i>Microtus arvalis</i>		16	5		1-	12	1+	21	1+	25	79	5.67
<i>Mus</i> cf. <i>musculus</i>	1-	6	1-	0	12		4		1+	18	40	2.87
<i>Rattus norvegicus</i>		1					1		1+	6	8	0.57
<i>Passer domesticus</i>	1-	0			1-	0	4		2+	19	23	1.65
<i>Parus major</i>		1	1				1		1+	6	9	0.65
<i>Arvicola amphibius</i>		28	1-	3	2-	2	18		1+	23	74	5.31
<i>Microtus agrestis</i>		19	11		14		7		1-	1	52	3.73
<i>Fringilla coelebs</i>		7	6		9		5		4		31	2.22
<i>Apodemus sylvaticus</i>		4			2		6		8		20	1.43
<i>Apodemus agrarius</i>		1	2		7		2		3		15	1.08
<i>Neomys anomalus</i>		5	1		3		2		2		13	0.93
<i>Sorex minutus</i>		3	1		3		1				8	0.57
<i>Talpa europaea</i>			1		2				4		7	0.50
<i>Delichon urbicum</i>		2			2				2		6	0.43
<i>Erithacus rubecula</i>			3				3				6	0.43
<i>Sturnus vulgaris</i>					1				5		6	0.43
Mammalia		223		106	1+	272		152	1-	104	857	61.48
Aves		73	1+	44	1-	47		52	1+	64	280	20.09
Amphibia, Reptilia, Pisces	1+	84	2-	7	1-	40	1-	17	1+	66	214	15.35
Evertebrata	1+	21		7	1-	4		7		4	43	3.08
Σ		401		164		363		228		238	1394	100.00
Diversity H'		2.97		2.98		2.73		3.06		2.79	3.19	

2 – Makov, Čierne and Potok, 22. 10. 1991 + 13. 10. 1992, 3 – Čadca, Bzdívonka and Jurošovský vrch, 10. 6. 2004, 4 – Oščadnica, Magura and Tertež, 10. 11. 1993 + Tertež, 11. 6. 2004, 1 – Vysoká nad Kysucou, Nižný Kelčov, 22. 10. 1991 + 13. 10. 1992 + 10. 11. 1993, 5 – Skalité, church / kostol, 24. 8. 1995 + Klokočov, school / škola, 22. 10. 1991

Other species (site – number) / Ostatné druhy (lokalita – počet):

Sorex alpinus (2–1; 3–1; 4–2; 1–1), *Plecotus auritus* (5–1), *Glis glis* (4–1), *Columba livia dom.* (5–1), *Streptopelia decaocto* (2–1), *Streptopelia turtur* (2–1; 3–1; 5–1), *Strix aluco* (2–2; 3–1; 4–2), *Apus apus* (2–1; 5–1), *Dendrocopos major* (2–1; 3–1), *Jynx torquilla* (5–1), *Lanius collurio* (4–1), *Prunella modularis* (2–3), *Acrocephalus palustris* (2–1), *Sylvia borin* (3–2), *Sylvia atricapilla* (1–1), *Regulus* sp. (3–1; 5–1), *Muscicapa striata* (5–1), *Phoenicurus ochruros* (5–1), *Turdus viscivorus* (2–1; 4–1; 1–2), *Turdus* sp. (2–1; 1–1; 5–1), *Periparus ater* (2–1; 3–1), *Cyanistes caeruleus* (1–1), *Paridae* sp. (1–1), *Emberiza citrinella* (1–2; 5–1), *Carduelis carduelis* (4–1; 5–4), *Carduelis spinus* (4–2), *Carduelis cannabina* (3–1), *Carduelis chloris* (2–1; 4–2; 1–1; 5–1), *Serinus serinus* (5–2), *Garrulus glandarius* (3–1; 5–1), *Corvidae* sp.juv. (4–1), *Passeriformes* sp. (2–2; 3–1), *Salmo trutta* (1–3), *Hymenoptera* sp. (3–1)

Appendix 16. The diet of *Strix aluco* in Slovakia, Chočské vrchy Mts.
Appendix 16. Potrava *Strix aluco* na Slovensku, Chočské vrchy

species / sites druhy / lokality	2	1	3	4	5	8	9	10	6	7	Σ	%					
<i>Talpa europaea</i>	2	1+	39	1-	8	6	4				59	3.49					
<i>Sorex araneus</i>	7	1+	47	15	7	1	1	1-	0	7	134	7.92					
<i>Microtus agrestis</i>	1	6	1+	23	1-	0	5			4	39	2.31					
<i>Rana temporaria</i>	1-	6	70	1+	220	1-	21	2-	0	1-	6	339	20.05				
<i>Muscardinus avellanarius</i>	13	66	1-	58	1+	40	1-	0	1-	1	2	241	14.25				
Limacidae sp.		1-	1	2-	0	12	4	1+	8		25	1.48					
<i>Apodemus flavicollis</i>	7	1-	21	1-	38	1+	61	1+	36	1+	7	230	13.60				
<i>Arvicola amphibius</i>	3	11	9	4	1+	9					41	2.42					
<i>Microtus arvalis</i>	2	25	42	1-	8	1-	4	1+	15	4	1-	107	6.33				
<i>Microtus subterraneus</i>	6	39	41	19	2-	0	2	1+	11	1+	13	134	7.92				
<i>Clethrionomys glareolus</i>	1	20	34	12	10	1					1	103	6.09				
<i>Turdus philomelos</i>		10	1-	3	4	4	2			2	1	26	1.54				
<i>Sorex minutus</i>	2	3	14	8		2				1	30	1.77					
<i>Turdus merula</i>	3	8	4	3		1					19	1.12					
<i>Glis glis</i>		2	1	6	2					2	13	0.77					
<i>Turdus torquatus</i>		3	1	2	2					2	10	0.59					
<i>Fringilla coelebs</i>	4	1	2	2	1						10	0.59					
<i>Neomys fodiens</i>	1	1	7							1	10	0.59					
<i>Coleoptera</i> sp.	3			3	4						10	0.59					
<i>Sorex alpinus</i>			5		2						7	0.41					
<i>Micromys minutus</i>				3	4						7	0.41					
<i>Pyrhula pyrrhula</i>		1			1	2				2	6	0.35					
Mammalia	47	282	343	200	126	33	1+	25	1+	71	33	23	1183	69.96			
Aves	10	1+	48	1-	23	20	13	0	1-	0	1+	10	2	132	7.81		
Amphibia, Reptilia, Pisces	1-	6	70	1+	220	1-	22	2-	8	2-	0	1-	0	6	9	341	20.17
Evertebrata	3	1-	1	2-	0	1+	15	1+	8	1+	0	0	0	0	0	35	2.07
Σ	66	401	586	257	155	47	25	71	49	34	1691	100.00					
Diversity H'	2.63	2.63	2.33	2.48	2.50	1.88	1.02	1.09	2.61	2.28	2.74						
1–5 – Biele Brehy, 2 – 8. 11. 1978, pellets / vývržky, 1 – 12. 10. 1977, leg J. Darola, 3 – 8. 11. 1978, detrit, 4 – 31. 12. 1989, 5 – 31. 8. 2005, 8 – Vyšný Kubín, Choč, 17. 5. 1994, 9 – Lúčky, Prašivá, 7. 8. 1996, 10 – Východný Šíp, dwarf pine / kosodrevina, 7. 8. 1996, 6 – Turická dolina valley, Bačova skala Mt., leg. B. Murín, March 1996, 7 – Slnica castle, 7. 10. 1991																	
Other species (site – number) / Ostatné druhy (lokalita – počet):																	
<i>Neomys anomalus</i> (1–1; 3–3), <i>Eptesicus nilssonii</i> (2–2), <i>Barbastella barbastellus</i> (3–3), <i>Plecotus auritus</i> (5–1), <i>Lepus europaeus</i> (3–1), <i>Elomys quercinus</i> (3–3), <i>Dryomys nitedula</i> (3–3; 7–1), <i>Sicista betulina</i> (5–2; 7–1), <i>Mus cf. musculus</i> (3–2; 6–1), <i>Apodemus microps</i> (6–1), <i>Apodemus agrarius</i> (6–1), <i>Rattus norvegicus</i> (1–1), <i>Mustela nivalis</i> (3–1), <i>Tetrastes bonasia</i> (1–1; 3–1), <i>Columba sp.</i> (3–2), <i>Streptopelia turtur</i> (1–1), <i>Picus viridis</i> (3–1), <i>Dendrocopos leucotos</i> (3–1), <i>Alauda arvensis</i> (1–1), <i>Galerida cristata</i> (1–5), <i>Delichon urbicum</i> (7–1), <i>Prunella modularis</i> (4–1), <i>Sylvia atricapilla</i> (2–1), <i>Regulus sp.</i> (2–1), <i>Sylvidae sp.</i> (1–3; 3–1), <i>Phoenicurus ochruros</i> (1–3), <i>Erithacus rubecula</i> (1–1; 4–1; 8–1), <i>Turdus pilaris</i> (1–2; 6–1), <i>Turdus viscivorus</i> (4–1; 5–1), <i>Cyanistes caeruleus</i> (4–2; 5–2), <i>Paridae sp.</i> (1–3; 4–1), <i>Sitta europaea</i> (5–1), <i>Certhia sp.</i> (6–1), <i>Carduelis cannabina</i> (3–2), <i>Coccothraustes coccothraustes</i> (1–1), <i>Passer montanus</i> (1–2; 3–1), <i>Sturnus vulgaris</i> (1–1; 3–3), <i>Garrulus glandarius</i> (1–1; 6–2), <i>Corvus frugilegus</i> (3–1), <i>Passeriformes sp.</i> (2–1; 4–2; 5–1), <i>Aves sp.juv.</i> (4–1), <i>Lacerta vivipara</i> (5–1), <i>Pisces sp.</i> (4–1)																	

Appendix 17. The diet of *Strix aluco* in Slovakia, Nízke Tatry Mts., recent and subrecent food of *S. aluco***Appendix 17.** Potrava *Strix aluco* na Slovensku, Nízke Tatry, recentná a subfosílna potrava *S. aluco*

species / sites druhy / lokality	3		2		1		Σ	%
<i>Rana temporaria</i>	1+	110		64	2-	6	180	36.14
<i>Microtus arvalis</i>	1+	11		2			13	2.61
<i>Glis glis</i>	1+	9		1			10	2.01
<i>Delichon urbicum</i>	3-	0	1+	49	1-	2	51	10.24
<i>Clethrionomys glareolus</i>	1-	3		9	1+	19	31	6.22
<i>Barbastella barbastellus</i>					1+	8	8	1.61
<i>Vespertilio murinus</i>	1-	0		12		4	16	3.21
<i>Apodemus flavicollis</i>		7		9		5	21	4.22
<i>Limacidae</i> sp.		3		12		1	16	3.21
<i>Muscardinus avellanarius</i>		3		8		4	15	3.01
<i>Sorex araneus</i>		3		2		4	9	1.81
<i>Sorex minutus</i>		2		4		3	9	1.81
<i>Microtus agrestis</i>		1		2		5	8	1.61
<i>Turdus philomelos</i>		1		5		1	7	1.41
<i>Myotis myotis</i>		1		6			7	1.41
<i>Talpa europaea</i>		4		2			6	1.20
<i>Microtus subterraneus</i>		1		2		3	6	1.20
<i>Hirundo rustica</i>				1		5	6	1.20
Mammalia, 28 spp.	1-	53		67	1+	69	189	37.95
Aves, 22 spp.	2-	8	1+	75		20	103	20.68
Amphibia, Reptilia, Pisces	1+	114	1-	65	2-	7	186	37.35
Evertebrata		4	1+	15		1	20	4.02
Σ		179		222		97	498	100.00
Diversity H'		1.79		2.58		3.09	2.82	

3 – Brankovský vodopád waterfall, 21. 8. 1990 + 15. 10. 2001, 2 – Demänovská dolina valley, Okno, 4. 5. 1990 + 5. 5. 1999, 1 – Demänovská Zbojnická jaskyňa cave, 12. 9. 1982, Subfossil, 100 m from entrance / od vchodu, 20–30 cm

Other species (site – number) / Ostatné druhy (lokalita – počet):

Sorex alpinus (3–3), *Neomys fodiens* (2–3; 1–1), *Rhinolophus hipposideros* (1–1), *Myotis brandtii* (1–1), *Myotis bechsteinii* (1–1), *Eptesicus serotinus* (2–1), *Nyctalus noctula* (1–2), *Pipistrellus pipistrellus* (1–1), *Sciurus vulgaris* (2–1), *Dryomys nitedula* (1–3), *Sicista betulina* (3–1; 2–2; 1–1), *Apodemus sylvaticus* (3–1), *Arvicola amphibius* (3–3; 2–1), *Microtus tatricus* (1–1), *Chionomys nivalis* (1–2), *Columba livia dom.* (2–2), *Columba palumbus* (3–1), *Picus viridis* (1–1), *Riparia riparia* (2–1), *Anthus spinoletta* (1–2), *Motacilla cinerea* (2–1; 1–3), *Erithacus rubecula* (2–1), *Turdus torquatus* (3–2; 2–2), *Turdus pilaris* (2–1), *Turdus viscivorus* (3–1; 1–1), *Turdus* sp. (3–1), *Parus major* (2–1; 1–1), *Cyanistes caeruleus* (1–1), *Sitta europaea* (2–1), *Fringilla coelebs* (2–2; 1–2), *Carduelis carduelis* (2–1), *Coccothraustes coccothraustes* (3–1), *Passer montanus* (2–1), *Garrulus glandarius* (3–1), *Nucifraga caryocatactes* (1–1), *Passeriformes* sp. (2–6), *Bufo bufo* (3–2), *Coronella austriaca* (1–1), *Salmo trutta* (3–2), *Pisces* sp. (2–1), *Coleoptera* sp. (3–1; 2–3)

Appendix 18. The diet of *Strix aluco* in Slovakia, Slovenský raj Mts.**Appendix 18.** Potrava *Strix aluco* na Slovensku, Slovenský raj

dietary type / typ potravy	C		C		C		C		C		D		D		Σ	%
samples / zbery	1	2	3	4	5	6	7									
Coleoptera sp.	2+	18	174	1-	6	1-	13	2	1+	20	2-	0	233	4.87		
Rana temporaria	1-	14	1+ 1436	1-	87	1-	140	2-	13	2-	25	4-	0	1715	35.83	
Microtus arvalis			1+ 194	2-	3		20	1-	1	1-	4	1-	1	223	4.66	
Microtus agrestis			31	1+ 11		10				1				53	1.11	
Microtus subterraneus		2	138	1+ 23	1-	16	1+	15	1+	22	1-	2	218	4.55		
Arvicola amphibius			42	1+ 11	1+	21		2		2			78	1.63		
Apodemus flavicollis	1-	0	1- 209	2+ 73	1+	76		14	1-	6	1-	3	381	7.96		
Sorex araneus		2	1- 44	1+ 14	1+	17				8		3	88	1.84		
Glis glis		1	1- 51		9	1+ 33		2		2			98	2.05		
Turdus philomelos			1- 10		2	1+ 10		1		1			24	0.50		
Salmo trutta		1	1- 13			2+ 17				1			32	0.67		
Clethrionomys glareolus		7	283		25	51	2+	41		25	2-	3	435	9.09		
Limacidae sp.		5	152		14	3-	0	4		2+	54	2-	0	229	4.78	
Myotis mystacinus			2- 0							2+	13		13	0.27		
Myotis myotis			3- 12	2-	0	2-	3	1		2+	42	4+	146	204	4.26	
Sorex alpinus		1	1- 5		3		4			2			15	0.31		
Muscardinus avellanarius		6	309		25		63		8	25	2-	1	437	9.13		
Sicista betulina		2	27		3		6			2			40	0.84		
Talpa europaea			26		2		5		1	2		2	38	0.79		
Sorex minutus			21		3		6		2	2		1	35	0.73		
Neomys fodiens			9		4		3		2	1			19	0.40		
Erithacus rubecula			14				1		2	1			18	0.38		
Delichon urbicum			9				1						10	0.21		
Neomys anomalus			4		4		1						9	0.19		
Turdus merula			6		1				1				8	0.17		
Periparus ater			5		1					2			8	0.17		
Dryomys nitedula			5				1			1			7	0.15		
Micromys minutus			1		1		3		1				6	0.13		
Fringilla coelebs			5				1						6	0.13		
Mammalia	1-	21	1429	1+	215	1+	340	1+	90	165	1+	171	2431	50.78		
Aves		0	92		8	1+	29		5	7		2	143	2.99		
Amphibia, Reptilia, Pisces		15	1+ 1451	1-	87	1-	157	2-	13	2-	26	4-	1	1750	36.56	
Evertebrata	2+	23	326	1-	20	2-	14		6	2+	74	3-	0	463	9.67	
Σ		59	3298		330		540		114	272		174	4787	100.00		
Diversity H'		1.95	2.21		2.40		2.60		2.16	2.59		0.88	2.48			

1 – Klauzy, 9/80, 2–5 – Peklisko, Výria jaskyňa cave: 2 – 7/90, 3 – 10/94, 4 – 8/01, 5 – 8/05, 6 – Duča cave, 7/90, 7 – Stratenská jaskyňa cave, 7/90

Other species (sample – number) Ostatné druhy (zber – počet):

Crocodyra leucodon (2–1), *Rhinolophus hipposideros* (2–3), *Myotis brandtii* (2–1; 7–2), *Myotis nattereri* (6–2), *Myotis bechsteinii* (6–1; 7–1), *Myotis blythii* (2–1; 7–1), *Myotis daubentonii* (7–1), *Eptesicus serotinus* (2–2), *Eptesicus nilssonii* (2–1), *Nyctalus noctula* (2–2), *Barbastella barbastellus* (6–2; 7–2), *Plecotus auritus* (2–2; 7–2), *Eliomys quercinus* (2–4), *Apodemus sylvaticus* (4–1), *Rattus norvegicus* (3–1), *Mustela nivalis* (2–1), *Accipiter nisus* (7–1), *Tetrastes bonasia* (6–1), *Columba* sp. (6–1), *Picus canus* (2–2; 4–1), *Dendrocopos major* (2–4; 4–1), *Dendrocopos medius* (3–2), *Hirundo rustica* (2–3), *Riparia riparia* (2–4), *Motacilla cinerea* (2–1), *Prunella modularis* (2–1), *Sylvia communis* (2–5), *Sylvia atricapilla* (4–1), *Regulus* sp. (2–2; 6–1), *Muscicapa striata* (2–1), *Saxicola rubetra* (3–1), *Turdus pilaris* (4–1), *Turdus viscivorus* (2–2; 4–1), *Parus major* (4–1), *Cyanistes caeruleus* (2–1; 4–1), *Lophophanes cristatus* (2–1), *Poecile palustris* (2–2; 4–2), *Sitta europaea* (2–1), *Troglodytes troglodytes* (2–2), *Cinclus cinclus* (2–1), *Emberiza citrinella* (4–1), *Carduelis carduelis* (2–1), *Carduelis spinus* (2–1), *Pyrrhula pyrrhula* (2–1), *Coccothraustes coccothraustes* (2–1; 4–1), *Loxia curvirostra* (5–1), *Garrulus glandarius* (2–1; 4–1), *Nucifraga caryocatactes* (2–1), *Passeriformes* sp. (2–4; 3–1; 4–4; 7–1), *Bombina* sp. (2–1), *Lacerta agilis* (2–1), *Lacerta* sp. (7–1), *Orthoptera* sp. (4–1)

Appendix 19. The diet of *Strix aluco* in Slovakia, Zbojnická jaskyňa cave
Appendix 19. Potrava *Strix aluco* na Slovensku, Zbojnická jaskyňa

month, year mesiac, rok	D10/81	D9/81	10/81	9/81	2/93	2/94	2/95	1/96	1/97	2/00	1/01	2/02	1/05	3/06	2/07	2/08	2/09	2/10	% Σ
species / samples druhy / zbery	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
<i>Pipistrellus pipistrellus</i>	2+ 62	2-	1	2	1-	0			1-	1			1-	0			1		67 3.75
<i>Apodemus sylvaticus</i>	1+ 13	2				1					1								16 0.89
<i>Microtus subterraneus</i>	1+ 14	9	2	1	2	1	1							2					33 1.84
<i>Sorex minutus</i>	1+ 8	2	1	1									2	2					16 0.89
<i>Microtus arvalis</i>	1+ 68	1- 28	6	15	8	1-	6	1-	2	1-	10	1	1-	1		9	1	3	2 220 12.30
<i>Sorex araneus</i>	10	1+ 22	3	2		1				1				1			1		41 2.29
<i>Glis glis</i>	1- 10	1+ 27	1	14	3	3	7	4	7	5	5	6	1	3	2		4	2	104 5.81
<i>Rana temporaria</i>		1+ 11				1		1			1	1							16 0.89
<i>Coleoptera sp.</i>		1+ 10	1	2	1	1	1		1					1			1		19 1.06
<i>Musccardinus avellanarius</i>	1- 6	1+ 22				1	6	1	1	9	1	3	1	1	1				64 3.58
<i>Limacidae sp.</i>	2- 4	2-	1			3	4	1-	0			1		4	1+ 7	1+	9	3	100 5.59
<i>Nyctalus noctula</i>	2- 4	1-	9	1-	4	1+ 12	2+ 28	4	1+ 9	1	6	4		6	1+ 9	6	5	3	115 6.43
<i>Apodemus flavicollis</i>	1- 101	105	18	57	1-	10	37	1+ 45	10	1+ 115	20	1+ 24	13	1- 28	1-	4	12	1-	640 35.77
<i>Apodemus agrarius</i>	3							1		1				1+ 8	1				14 0.78
<i>Clethrionomys glareolus</i>	28	27	5	16	7	7	12		14	7	6	2	3	7	2	1+ 11	1+ 10	4	168 9.39
<i>Myotis myotis</i>	5	2	1	2										2					12 0.67
<i>Turdus merula</i>	2	5	1	1					1					1			1		12 0.67
<i>Rana cf. esculenta</i>	5	3							1					1					10 0.56
<i>Myotis mystacinus</i>		6									1			1					10 0.56
<i>Erithacus rubecula</i>		2	2	1		1			1										7 0.39
<i>Parus major</i>	1		2			1			1				1		1				7 0.39
<i>Talpa europaea</i>	3	1							1										7 0.39
<i>Crocidura suaveolens</i>	1		1			1		1				1		1				1	7 0.39
<i>Crocidura leucodon</i>	1								4					1					6 0.34
<i>Rhinolophus ferrumequinum</i>				1	1												4		6 0.34
<i>Rhinolophus hipposideros</i>	1									2				2			1		6 0.34
<i>Micromys minutus</i>	1	2							1				1	1					6 0.34
<i>Arvicola amphibius</i>	2	1								1					1				5 0.28

Appendix 19. continuation / pokračovanie

month, year mesiac, rok	D10/81	D9/91	10/81	9/91	2/93	2/94	2/95	1/96	1/97	2/00	1/01	2/02	1/05	3/06	2/07	2/08	2/09	2/10	Σ	%
species / samples druhy / zbery	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
Mammalia	350	269	42	128	44	92	73	27	170	39	1- 47	40	24	121	31	31	37	1- 21	1586	88.65
Aves	6	12	1+	7	4	2	4	2	0	6	2	1	0	1	1	1	2	1	53	2.96
Amphibia, Reptilia, Pisces	8	1+ 14	0	1	0	1	0	1	1	0	1	1	0	1	1	0	0	0	30	1.68
Vertebrata	2- 4	1- 11	1	1+ 18	4	5	1	0	1- 3	0	2+ 28	1	0	6	7	1+ 9	4	2+ 18	120	6.71
Σ	368	306	50	151	50	102	76	28	180	41	77	42	25	129	40	41	43	40	1789	100.00
Diversity H'	2.42	2.41	2.32	2.14	2.09	1.97	1.43	1.56	1.56	1.69	1.71	1.47	1.64	2.00	2.15	1.60	2.24	1.60		2.48
D – detritus from old disintegrated pellets / detrit z starších rozpadnutých vývržkov																				
Other species (sample – number) / Ostatné druhy (zber – počet):																				
Neomys anomalus (1–1; 10–1), Neomys fodiens (1–1; 9–1), Myotis emarginatus (15–1), Myotis nattereri (2–1), Myotis bechsteinii (1–1; 6–1), Myotis blythii (13–1), Vespertilio murinus (1–1), Eptesicus serotinus (16–1), Eptesicus nilssonii (2–1), Barbastella barbastellus (4–1; 7–1), Plecotus auritus (1–1; 4–1), Eliomys quercinus (1–2; 6–1), Dryomys nitedula (1–1; 13–1), Mus cf. musculus (1–1; 2–1), Picus canus (9–1), Dendrocopos major (4–1), Hirundo rustica (3–1), Delichon urbicum (1–1), Sylvia sp. (2–1), Turdus pilaris (7–1), Turdus philomelos (2–1; 7–1; 10–1; 11–1), Turdus viscivorus (5–1; 16–1), Cyanistes caeruleus (9–1; 10–1; 18–1), Sitta europaea (1–1; 2–1; 5–1; 9–1), Emberiza citrinella (2–1), Fringilla coelebs (2–1), Pyrrhula pyrrhula (4–1; 6–1), Coccothraustes coccothraustes (1–1; 3–1; 17–1), Passeriformes sp. (6–1), Pelobates fuscus (1–2), Lacerta agilis (15–1), Salmo trutta (1–1), Orthoptera sp. (14–1)																				

Appendix 20. The diet of *Strix aluco* in Slovakia, Dolný Harmanec, Bystrická dolina valley, recent period
Appendix 20. Potrava *Strix aluco* na Slovensku, Dolný Harmanec, Bystrická dolina, recent

month / year mesiac / rok	7/78	12/80	1/82	12/82	10/83	11/86	1/90	4/91	12/93	10/97	8/99	11/00	4/04	8/05	6/06	7/07	2/08	4/09	
species / samples	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Σ
drúhy / zbery	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	%
<i>Microtus subterraneus</i>	2+ 12	1	1	1	1	1	2	2	2	4	1	1	1	1	1	3	1	1	34 1.27
<i>Sorex minutus</i>	1	4	1+	5	2				1	1	3	1		2				1	21 0.79
<i>Sorex araneus</i>	1	9	1+	8	1+ 9	1	1+ 15	9	1+ 12	2	4	6	2	5	4	4	1- 1	0	1- 93 3.48
<i>Coleoptera</i>	2	1	1	1	2	3					2		2	2	6	4	1	1	2 35 1.31
<i>sp.</i>																			
<i>Muscardinus avellanarius</i>	5	13	6	1+ 15	8	8	7	1+ 14	9	11	1- 3	1+ 20	16	2- 1	1- 3	11	11	1- 11	172 6.43
<i>Clethrionomys glareolus</i>	11	30	9	23	1+ 56	30	1+ 52	28	36	56	1- 10	39	1- 38	63	1- 16	37	47	59	640 23.94
<i>Salmo trutta</i>						1+ 5			1										6 0.22
<i>Rana temporaria</i>	1	4	4	4	8	4	1- 0	1+ 15	4	1- 5	5	2	1+ 26	11	8	4	1- 2	8	115 4.30
<i>Apodemus flavicollis</i>	15	26	15	2- 2	28	26	28	1- 13	1+ 47	1- 26	1- 13	1+ 46	53	1+ 107	1- 17	1+ 67	1+ 69	72	670 25.07
<i>Limacidae</i> sp. 1-	1	20	2-	1	25	2- 5	18	1- 7	2- 6	1- 7	1+ 100	1+ 56	1- 10	47	1- 33	1+ 54	1- 14	2- 6	513 19.19
<i>Glis glis</i>	1	1	1	2	3	7	4	5	6	8	4	1	6	3	2	1+ 15	5	7	80 2.99
<i>Pipistrellus pipistrellus</i>							3	2	2	2	6		3	3	2+ 16	1	1+ 11	5	52 1.95
<i>Talpa europaea</i>	2	2	2	5		1	3	4	2	7	3		3	2	1	3		1	41 1.53
<i>Myotis myotis</i>			1					1		3	1	1				1	5	5	18 0.67
<i>Vespertilio murinus</i>	1							1	1	2	4		1	1		1	3		14 0.52
<i>Microtus arvalis</i>	1						2	1		2			3			1			10 0.37
<i>Microtus agrestis</i>					1	3				1		1	2	1				1	10 0.37
<i>Sorex alpinus</i>	1	1	1				1	4	1					1					10 0.37
<i>Erithacus rubecula</i>								1	1	1	1		1	1		1	1	1	9 0.34
<i>Turdus philomelos</i>													1	1	2	2	1	1	9 0.34
<i>Neomys fodiens</i>								1		1		1				1		1	8 0.30
<i>Barbastella barbastellus</i>																	3	1	2 0.26

Appendix 20. continuation / pokračovanie

month / year mesiac / rok	7/78	12/80	1/82	12/82	10/83	11/86	1/90	4/91	12/93	10/97	8/99	11/00	4/04	8/05	6/06	7/07	2/08	4/09	
species / samples	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Σ
druhy / zbery																			%
<i>Turdus</i>			1	2				2	1	1									7
<i>torquatus</i>																			0.26
<i>Turdus</i>																			
<i>merula</i>			1													2	1	1	5
<i>Nyctalus</i>																			0.19
<i>noctula</i>										1			1					3	5
																			0.19
Mammalia	36	99	50	59	101	91	1+ 113	90	105	1- 132	1- 56	1+ 114	137	187	1- 62	148	1+ 156	175	1911
Aves	1	3	4	5	1	4	1	7	4	6	6	2	5	9	3	9	4	8	82
Amphibia,																			3.07
Reptilia,	1	4	4	4	8	9	1- 0	1+ 15	5	1- 6	5	2	1+ 26	14	9	4	1- 2	1- 8	126
Pisces																			4.71
Evertebrata	1- 1	22	1- 2	1+ 34	1- 7	21	2- 7	2- 6	2- 7	1+ 100	1+ 58	1- 10	52	1- 39	1+ 59	1- 17	2- 7	1+ 105	554
Σ	39	128	60	102	117	125	121	118	121	244	125	128	220	249	133	178	169	296	2673
Diversity H'	1.70	2.17	2.38	2.17	1.63	2.19	1.81	2.50	1.80	2.00	2.13	1.69	2.24	1.78	1.98	2.15	1.83	1.94	2.31
Other species (sample – number) Ostatné druhy (zber – počet):																			
<i>Crocodylus leuconotus</i> (7–1), <i>Rhinolophus hipposideros</i> (16–1; 18–3), <i>Myotis mystacinus</i> (4–1; 11–1; 13–1; 17–1), <i>Myotis blythii</i> (18–1), <i>Eptesicus serotinus</i> (10–1; 12–1; 16–1; 18–1), <i>Eptesicus nilssonii</i> (16–1), <i>Plecotus auritus</i> (7–1; 11–1), <i>Elanomys quercinus</i> (10–1; 13–1), <i>Microtus minutus</i> (17–1), <i>Apodemus sylvaticus</i> (9–1), <i>Arvicola amphibius</i> (8–1; 13–2), <i>Lyrurus tetrax</i> (10–1), <i>Columba livia</i> dom. (11–3), <i>Columba palumbus</i> (10–1; 18–1), <i>Columba sp.</i> (14–1), <i>Dendrocopos leucotos</i> (4–1; 8–1), <i>Motacilla cinerea</i> (16–1), <i>Prunella modularis</i> (6–1; 10–1), <i>Sylvia atricapilla</i> (13–1; 14–2), <i>Phylloscopus collybita</i> (14–1), <i>Phylloscopus sibilatrix</i> (18–1), <i>Regulus sp.</i> (9–1; 16–1), <i>Muscicapa striata</i> (8–1), <i>Turdus viscivorus</i> (13–1; 18–2), <i>Parus major</i> (6–1; 16–2), <i>Periparus ater</i> (4–1; 8–1; 9–1; 13–1), <i>Paridae sp.</i> (1–1; 3–1; 4–1; 5–1; 6–1), <i>Emberiza citrinella</i> (10–1), <i>Fringilla coelebs</i> (2–1; 11–1; 14–1; 18–1), <i>Carduelis carduelis</i> (11–1), <i>Carduelis cannabina</i> (14–1), <i>Pyrrhula pyrrhula</i> (6–1; 12–1), <i>Coccothraustes coccothraustes</i> (2–1), <i>Garrulus glandarius</i> (8–1), <i>Passeriformes sp.</i> (7–1; 12–1; 14–1; 15–1; 17–1), <i>Aves sp.</i> (3–1), <i>Lacerta agilis</i> (14–1), <i>Lacerta muralis</i> (10–1), <i>Lacerta vivipara</i> (14–2; 15–1), <i>Diptera sp.</i> (16–1), <i>Hymenoptera sp.</i> (13–1; 15–1), <i>Orthoptera sp.</i> (13–2; 16–1)																			

Appendix 21. The diet of *Strix aluco* in Slovakia, Muránska planina Mts., type C**Appendix 21.** Potrava *Strix aluco* na Slovensku, Muránska planina, typ C

species / sites druhy / lokality	1		3		6		2		4		5		Σ	%
<i>Glis glis</i>	1+	11								1			12	0.69
Limacidae sp.	1+	183	1+	47		23	3-	1		39	3-	1	294	16.94
<i>Muscardinus avellanarius</i>		107	1+	38	1+	58		29		35	1-	15	282	16.24
Coleoptera sp.	2-	21	1-	4	2-	1	2+	105	2-	5	1-	6	142	8.18
<i>Sicista betulina</i>	1-	16		4		10	1+	28		5	1-	0	63	3.63
<i>Myotis mystacinus</i>							1+	5					5	0.29
<i>Neomys fodiens</i>		4		1					1+	8			13	0.75
<i>Rana temporaria</i>		47		11	2-	0		11	1+	52	1-	3	124	7.14
<i>Sorex araneus</i>		55		7		19	2-	3		16	1+	22	122	7.03
<i>Apodemus flavicollis</i>		60		9		20	1-	5		18	1+	20	132	7.60
<i>Clethrionomys glareolus</i>		44	1-	6		19	1-	9		13	1+	31	122	7.03
<i>Microtus agrestis</i>		22		3		2	1-	0		12	1+	12	51	2.94
<i>Talpa europaea</i>		16		1		2	1-	1		5	2+	24	49	2.82
<i>Microtus subterraneus</i>		25		3		7	1-	3		13		11	62	3.57
<i>Arvicola amphibius</i>		29		8	1-	0		10		5		3	55	3.17
<i>Microtus arvalis</i>		12						1				5	18	1.04
<i>Turdus philomelos</i>		5		1		4				3		2	15	0.86
<i>Fringilla coelebs</i>		2		1		5				3		2	13	0.75
<i>Sorex minutus</i>		3		1		3		1		2		3	13	0.75
<i>Dryomys nitedula</i>		6		4				1				2	13	0.75
<i>Vespertilio murinus</i>		6						2		1			9	0.52
<i>Parus major</i>										5		3	8	0.46
Hymenoptera sp.		5						3					8	0.46
<i>Salmo trutta</i>		1		1						5			7	0.40
<i>Turdus torquatus</i>		5						1				1	7	0.40
<i>Turdus merula</i>		2				3		1					6	0.35
Mammalia		430		85	1+	144	1-	103		138	1+	148	1048	60.37
Aves	1-	28		7	1+	17		9	1+	23		15	99	5.70
Amphibia, Reptilia, Pisces		49		14	2-	0	1-	11	2+	59	1-	3	136	7.83
Evertebrata		213	1+	55	1-	24	1+	110	1-	44	2-	7	453	26.09
Σ		720		161		185		233		264		173	1736	100.00
Diversity H'		2.70		2.37		2.31		2.11		2.74		2.58	2.89	

1 – Malá Stožka, 3 – Trsteník, hunter cottage / poľovnícka chatka, 6 – Pod Klakom cave, 2 – Pätina, game-keeper's cottage / horáreň, 4 – Župkova Magura, 5 – Zbojská

Other species (site – number) / Ostatné druhy (lokality – počet):

Sorex alpinus (1–1; 2–1), *Neomys anomalus* (4–1), *Crocidura suaveolens* (1–1), *Myotis brandtii* (2–2), *Myotis nattereri* (1–2), *Myotis bechsteinii* (6–1), *Myotis myotis* (6–1), *Myotis blythii* (1–1), *Myotis dasycneme* (6–1), *Eptesicus serotinus* (1–2; 6–1; 4–2), *Eptesicus nilssonii* (2–1), *Nyctalus noctula* (1–1), *Plecotus auritus* (4–1), *Micromys minutus* (1–2; 2–1), *Rattus norvegicus* (1–3), *Mustela nivalis* (1–1), *Tetrastes bonasia* (1–2; 3–1; 5–1), *Coturnix coturnix* (4–1), *Scolopax rusticola* (4–1), *Columba livia dom.* (5–1), *Columba sp.* (4–2), *Aegolius funereus* (6–1), *Dendrocopos major* (1–1; 2–1), *Picoides tridactylus* (4–1), *Alauda arvensis* (4–1), *Hirundo rustica* (5–1), *Delichon urbicum* (2–1), *Anthus trivialis* (1–1), *Prunella modularis* (6–1; 2–1), *Sylvia communis* (6–1; 2–1), *Sylvia atricapilla* (3–1), *Regulus sp.* (1–1; 6–1), *Erithacus rubecula* (1–2; 3–3), *Turdus pilaris* (4–1), *Turdus viscivorus* (5–1), *Turdus sp.* (1–1), *Periparus ater* (1–1; 5–2), *Cyanistes caeruleus* (2–1; 5–1), *Lophophanes cristatus* (1–1), *Paridae sp.* (4–3), *Sitta europaea* (6–1; 2–1), *Troglodytes troglodytes* (1–1), *Pyrrhula pyrrhula* (1–1), *Coccothraustes coccothraustes* (4–2), *Garrulus glandarius* (1–1), *Passeriformes sp.* (1–1; 2–1), *Anguis fragilis* (1–1), *Lacerta sp.* (4–2), *Lacerta vivipara* (3–1), *Colubridae sp.* (3–1), *Odonata sp.* (1–2), *Orthoptera sp.* (1–2; 3–3), *Diptera sp.* (3–1; 2–1)

Appendix 22. The diet of *Strix aluco* in Slovakia, Šarkanica cave
Appendix 22. Potrava *Strix aluco* na Slovensku, jaskyňa Šarkanica

month / year mesiac / rok	6/79	9/80	10/81	10/82	10/83	11/87	7/91	2/94	2/95	1/96	1/98	10/00	7/03	1/05	6/05	10/06	2/07	2/08	2/09	2/10	Σ	%
sample / zber	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
<i>Rana temporaria</i>	6	1+ 17	1			3	2			1						2	1		3		36	0.55
<i>Microtus arvalis</i>	3	1	1	2		1	9	2	5	3	1	2				1		1	1	2	44	0.67
Coleoptera sp.	1	6	1+ 9		1	5	1+ 22	2	2	2		2	2		3	5		5	1- 0	1- 0	67	1.03
<i>Sorex araneus</i>	18	1+ 45	1+ 17	7	2	22	1+ 61	1+ 15	19	1+ 24	9	8	3	1- 1	1- 5	1- 8	1- 0	1- 8	2- 4	2- 2	278	4.26
<i>Musccardinus avellanarius</i>	42	65	1+ 29	1+ 31	10	1+ 84	1+ 87	1+ 26	27	1- 7	1- 4	17	11	1- 4	1- 15	1- 18	1- 6	1- 9	1- 23	2- 7	522	8.00
<i>Apodemus flavicollis</i>	1- 82	1- 119	1+ 100	2- 12	1+ 55	1+ 173	1+ 312	1+ 100	109	1+ 123	1+ 51	1+ 67	60	1+ 91	87	1- 75	1+ 92	124	2- 47	1- 72	1951	29.89
<i>Clethrionomys glareolus</i>	46	86	1+ 42	19	21	61	98	34	65	28	1+ 39	20	1+ 43	1+ 30	31	1- 21	1- 13	37	61	1- 27	822	12.59
Orthoptera sp.																2+ 11		1			12	0.18
Limacidae sp.	1+ 202	1+ 320	2- 18	38	1- 20	3- 25	1- 184	4- 4	158	1- 74	1- 19	1- 20	1- 33	3- 6	1+ 154	1+ 193	1- 43	137	1+ 367	1+ 305	2320	35.54
<i>Glis glis</i>	7	7	5		1	5	8	5	3	1	1	3	4		1	6	2	9	1+ 25	1+ 14	107	1.64
<i>Sorex minutus</i>	2	5	1			5	7	1	1	2	1	2	4	1	1	2		3	1		39	0.60
<i>Turdus philomelos</i>	4	3	1	1		4	5	2				1			2	2		1	1	2	29	0.44
<i>Sorex alpinus</i>	1	2	1	2		3	6	1						2	2						20	0.31
<i>Talpa europaea</i>	1	3	1	1		1	4		1	1			2				1		2		18	0.28
<i>Fringilla coelebs</i>	3	1	1	1	1	5	3												1	1	17	0.26
<i>Microtus subterraneus</i>	3	2	1	2		2							1	1	3	1					16	0.25
<i>Erithacus rubecula</i>	1		1			2	4	3				1							1		13	0.20
<i>Microtus agrestis</i>	3	3	1			2						1	1					1			12	0.18
<i>Turdus merula</i>	2	2	2			1	3							1							11	0.17
<i>Plecotus auritus</i>	2	1				4			1	1			1								10	0.15
<i>Turdus viscivorus</i>	1		2				2	1		1				1		1					9	0.14
<i>Sitta europaea</i>	1								1	1						1	1		1	2	8	0.12
<i>Barbastella barbastellus</i>	1								3	1	1				1						8	0.12
<i>Arvicola amphibius</i>	1								1			1				2	1		1	1	8	0.12
<i>Periparus ater</i>							1	1	1				1		2				1		7	0.11
<i>Cyanistes caeruleus</i>	1					2		1					1				1	1			7	0.11
<i>Delichon urbicum</i>	2					2			1							1			1		7	0.11

Appendix 22. continuation / pokračovanie

month / year mesiac / rok	6/79	9/80	10/81	10/82	10/83	11/87	7/91	2/94	2/95	1/96	1/98	10/00	7/03	1/05	6/05	10/06	2/07	2/08	2/09	2/10	% Σ		
sample / zber	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
<i>Parus major</i>	1								1					1	2						5 0.08		
<i>Coccothraustes</i>												1									5 0.08		
<i>coccothraustes</i>						2		1	1														
<i>Rhinolophus</i>	1						1	1										1	1		5 0.08		
<i>hipposideros</i>																							
<i>Myotis myotis</i>	1	1					1								1			1			5 0.08		
Mammalia	1- 214	1- 344	1+ 202	76	1+ 91	1+ 376	1+ 598	1+ 187	235	194	1+ 108	1+ 124	1+ 132	1+ 132	1- 147	1- 137	115	196	1- 167	1- 125	3900	59.75	
Aves	17	20	6	1+ 10	3	1+ 31	21	1+ 14	10	1- 3	2	7	5	2	6	11	3	1- 3	1- 6	9	189	2.90	
Amphibia, Reptilia, Pisces	6	1+ 17	1	0	0	3	2	0	0	0	1	0	1	0	0	3	1	0	4	0	39	0.60	
Evertebrata	1+ 203	1+ 326	2- 18	47	1- 21	3- 30	1- 206	3- 6	160	1- 76	1- 19	1- 22	1- 35	3- 173	6	1+ 157	1+ 209	1- 43	143	1+ 367	1+ 305	2399	36.76
Σ	440	707	227	133	115	440	827	207	405	273	130	153	173	140	310	360	162	342	544	439	6527	100.00	
Diversity H'	1.84	1.83	1.79	2.10	1.53	2.11	1.88	1.81	1.70	1.58	1.60	1.93	1.87	1.15	1.44	1.65	1.24	1.53	1.22	1.08	1.88		
Other species (sample – number) / Ostatné druhy (zber – počet):																							
<i>Neomys anomalus</i> (1–1; 2–1; 3–1; 7–1), <i>Neomys fodiens</i> (6–4), <i>Crocodyrus leucodon</i> (1–1; 3–1), <i>Crocodyrus suaveolens</i> (12–1), <i>Rhinolophus euryale</i> (18–1), <i>Myotis mystacinus</i> (19–1), <i>Myotis nattereri</i> (1–1; 16–1), <i>Myotis bechsteinii</i> (14–1; 16–1), <i>Eptesicus serotinus</i> (6–1; 7–1; 10–1; 16–1), <i>Pipistrellus pipistrellus</i> (7–1; 10–1; 11–1; 18–1), <i>Elomys quercinus</i> (12–1), <i>Dryomys nitedula</i> (1–1; 7–1; 10–1), <i>Sicista betulina</i> (13–2), <i>Micromys minutus</i> (5–1), <i>Apodemus sylvaticus</i> (8–1), <i>Rattus norvegicus</i> (8–1), <i>Tetrastes bonasia</i> (1–1; 2–1), <i>Columba oenas</i> (16–2), <i>Glaucidium passerinum</i> (2–1), <i>Aegolius funereus</i> (10–1), <i>Strix aluco</i> (2–1), <i>Apus apus</i> (2–1), <i>Picus canus</i> (8–1), <i>Dendrocopos major</i> (1–1; 7–1; 12–1; 17–1), <i>Dendrocopos syriacus</i> (13–1), <i>Dendrocopos leucotos</i> (9–1), <i>Hirundo rustica</i> (6–1), <i>Anthus trivialis</i> (4–1), <i>Lanius excubitor</i> (20–1), <i>Sylvia atricapilla</i> (9–1), <i>Regulus</i> sp. (6–1; 7–1; 10–1; 19–1), <i>Sylvidae</i> sp. (2–4; 5–2; 8–1), <i>Muscicapa striata</i> (6–1), <i>Saxicola rubetra</i> (6–1; 8–1), <i>Turdus torquatus</i> (9–2; 12–1), <i>Turdus pilaris</i> (6–1), <i>Turdus</i> sp. (18–1), <i>Aegithalos caudatus</i> (20–1), <i>Lophophanes cristatus</i> (8–1), <i>Certhia familiaris</i> (12–1), <i>Certhia</i> sp. (16–1; 20–1), <i>Troglodytes troglodytes</i> (2–1; 12–1; 16–1), <i>Carduelis spinus</i> (7–1; 9–1), <i>Carduelis cannabina</i> (6–1), <i>Pyrrhula pyrrhula</i> (11–1; 13–1), <i>Loxia curvirostra</i> (6–2), <i>Garrulus glandarius</i> (6–1), <i>Passeriformes</i> sp. (1–3; 2–2; 3–2; 4–1; 6–3; 8–2; 16–2), <i>Aves</i> sp. (1–1; 4–1), <i>Lacerta vivipara</i> (13–1; 16–1; 19–1)																							

Appendix 23. The diet of *Strix aluco* in Slovakia, Voniaca valley
Appendix 23. Potrava *Strix aluco* na Slovensku, Dolina Voniaca

month / year mesiac / rok	4/79	9/80	10/81	10/82	10/83	11/87	7/91	10/00	5/02	7/03	6/05	Σ	%									
sample / zber	1	2	3	4	5	6	7	8	9	10	11											
Limacidae sp.	2-	4	1+	62	1+	23	1+	63	1+	86	19	1-	23	1-	0	3-	3	1-	92	443	30.96	
Sorex araneus	8	1+	22	4	5	1+	18	1+	20	5	7	9	4	7	3	1+	20	1+	76	183	12.79	
Clethrionomys glareolus	12	1-	9	4	1-	5	27	1-	6	5	16	3	16	30	9	1+	43	1+	202	387	27.04	
Apodemus flavicollis	26	2-	5	10	3-	2	1-	28	2-	16	16	9	1+	4	1	1-	1-	1	22	1.54		
Glis glis	5	3	3	1	3	3	4	4	3	3	1-	0	16	1.12	3	1-	1-	17	1.19	9.50		
Microtus arvalis	3																			14	0.98	
Turdus philomelos	2			3		12	16	7	9	1	12	52	136	9.50						14	0.98	
Muscardinus avellanarius	6	12	3	6		2	2	1	2	2	1	2	10	0.70						7	0.49	
Sorex minutus	1	5	2	2		2	2	1	2	1	1	6	0.42							6	0.42	
Microtus subterraneus	1	1		1		2	2	1	2	1	3	8	0.56							6	0.42	
Fringilla coelebs	1			2	2			1	1	2	7	0.49								6	0.42	
Coleoptera sp.																				6	0.42	
Talpa europaea	2							1	1	1	1	6	0.42							6	0.42	
Myotis myotis	1	1				1	1	2	1	1	6	0.42								6	0.42	
Turdus merula		1	1					1	1	2	1	6	0.42							6	0.42	
Mammalia	1+	70	1-	59	24	1-	23	1-	23	93	1-	84	63.66							911	63.66	
Aves	7	5	1	4	1-	2	1+	14	4	1+	13	3	4	1-	9	66	4.61			66	4.61	
Amphibia, Reptilia, Pisces	3	0	0	0	0	1	0	0	0	0	0	0	4	0.28						4	0.28	
Evertebrata	2-	4	1+	62	1-	23	1+	70	1+	65	1+	24	1-	92	450	31.45				450	31.45	
Σ	84	126	48	97	161	175	58	121	16	104	441	1431	100.00							1431	100.00	
Diversity H'	2.45	1.71	1.56	1.26	1.77	1.95	1.79	2.57	1.33	1.93	1.48	2.07								2.07		
Other species (sample – number) / Ostatné druhy (zber – počet):																						
Sorex alpinus (6-2; 8-1), Neomys anomalus (10-2), Neomys fodiens (1-1; 5-1), Crocidura leucodon (8-1), Myotis mystacinus (6-1; 10-1), Myotis nattereri (4-1; 5-1), Myotis bechsteinii (2-1; 8-1), Myotis blythii (7-1; 8-1; 10-1), Myotis dasycneme (8-1), Vespertilio murinus (8-1; 10-1), Eptesicus serotinus (1-1; 8-1), Pipistrellus pipistrellus (1-1), Plecotus auritus (8-1), Eliomys quercinus (8-1), Arvicola amphibius (1-1; 6-1), Microtus agrestis (6-1), Mustela nivalis (1-1), Aegolius funereus (1-1), Picus canus (8-1), Hirundo rustica (6-1; 7-1; 8-1), Delichon urbicum (8-1), Motacilla alba (9-1), Sylvia curruca (2-1), Muscicapa striata (8-1), Saxicola rubetra (7-1), Erithacus rubecula (2-2; 6-2; 8-1), Turdus torquatus (8-1), Turdus viscivorus (1-1), Turdus sp. (11-1), Parus major (6-1), Periparus ater (6-1; 11-2), Cyanistes caeruleus (2-1; 6-1), Poecile palustris (8-1), Paridae sp. (5-1), Fringilla montifring (9-1), Garrulus glandarius (8-1), Passeriformes sp. (1-2; 4-1; 5-1; 6-2; 11-1), Rana temporaria (1-3; 5-1)																						

Appendix 24. The diet of *Strix aluco* in Slovakia, Javorníková valley and Javornícková valley**Appendix 24.** Potrava *Strix aluco* na Slovensku, doliny Javorníková a Javornícková

month / year mesiac / rok	4/79		7/92		8/00		8/02		7/03		6/05		Σ	%
sample / zber	1		2		3		4		5		6			
<i>Microtus arvalis</i>	1+	28		1		2			1-	0	1-	0	31	3.22
<i>Rana temporaria</i>	1+	29	1-	0	2-	0		2	1+	24		5	60	6.22
<i>Sorex araneus</i>		15	1+	19		5				6		5	50	5.19
<i>Muscardinus avellanarius</i>		12	1+	14	1-	3		5	1-	2		9	45	4.67
<i>Clethrionomys glareolus</i>		49	1+	28	1-	17		16		26	1-	13	149	15.46
<i>Apodemus flavicollis</i>	1-	75	1-	27	1+	127	1+	42	2-	17		58	346	35.89
Coleoptera sp.	1-	0		1		8		3	1+	13		1	26	2.70
Limacidae sp.	1-	40		20	1-	28	1-	7	1+	58	1+	49	202	20.95
<i>Glis glis</i>		4		1								1	6	0.62
Mammalia		203		96		156		63	1-	52		86	656	68.05
Aves		4		2		0		1		3		3	13	1.35
Amphibia, Reptilia, Pisces	1+	29	1-	0	2-	0		3	1+	25		5	62	6.43
Evertebrata	1-	40		21		36	1-	10	1+	76	1+	50	233	24.17
Σ		276		119		192		77		156		144	964	100.00
Diversity H'		2.20		1.95		1.16		1.39		1.86		1.53	2.00	

Other species (sample – number) Ostatné druhy (zber – počet):

Erinaceus concolor (1–1), *Talpa europaea* (1–2), *Sorex minutus* (1–4; 2–1), *Sorex alpinus* (1–3; 2–1; 3–1), *Rhinolophus hipposideros* (1–1), *Eptesicus serotinus* (1–1), *Nyctalus noctula* (1–1), *Pipistrellus pipistrellus* (1–2), *Dryomys nitedula* (1–1), *Sicista betulina* (2–1), *Arvicola amphibius* (3–1), *Microtus subterraneus* (1–2; 2–2), *Microtus agrestis* (1–2; 5–1), *Mustela nivalis* (2–1), *Dendrocopos medius* (4–1), *Erithacus rubecula* (2–1; 5–3), *Turdus pilaris* (1–1), *Turdus philomelos* (6–1), *Turdus* sp. (6–1), *Paridae* sp. (1–1), *Fringilla coelebs* (2–1; 6–1), *Garrulus glandarius* (1–1), *Passeriformes* sp. (1–1), *Anguis fragilis* (4–1), *Salmo trutta* (5–1), *Orthoptera* sp. (5–2), *Hymenoptera* sp. (5–3)

Appendix 25. The diet of *Strix aluco* in Slovakia, Brestová

Appendix 25. Potrava *Strix aluco* na Slovensku, Brestová

layer; month / year vrstva; mesiac / rok	2–10		0–2		4/79		10/83		5/96		6/01		7/03		6/05		Σ	%
sample / zber	1		2		3		4		5		6		7		8			
Coleoptera sp.	2-	0	2	1-	0			1-	0	2+	40	1		1			44	3.03
Limacidae sp.	1+	110	1-	13	1-	13	1-	2	1-	36	1+	92	20	2-	3		289	19.92
Microtus arvalis	1+	38		12		7		1		14	1-	3	2		3		80	5.51
Glis glis	1+	19	1+	9		5		1	1-	1	1-	1			1		37	2.55
Rana temporaria		23	1+	11	1+	22			2-	1	1-	6	4	1-	1		68	4.69
Muscardinus avellanarius		29		4		13		2	1+	25		13	4		5		95	6.55
Clethrionomys glareolus		57		19		22		8	1+	69	1-	18	7		23		223	15.37
Apodemus flavicollis	1-	92		28		51		12		75	1-	54	23	1+	78		413	28.46
Sorex araneus		12		3		5				2		4	1		1		28	1.39
Arvicola amphibius		1		3		3				5		2	2				16	1.10
Salmo trutta		8		1		1				1			2				13	0.90
Talpa europaea		4		2		4							1		1		12	0.83
Microtus subterraneus		4				4				4							12	0.83
Nyctalus noctula		4		2		2		2									10	0.69
Delichon urbicum		1		1		1				3		2			2		10	0.69
Turdus philomelos				1		4				1		2	1				9	0.62
Turdus merula		2		1						2		1	1		1		8	0.55
Myotis myotis		3		1		2				1							7	0.48
Neomys fodiens		4		1													5	0.34
Dryomys nitedula		3				2											5	0.34
Microtus agrestis		1				1						1	1		1		5	0.34
Cyanistes caeruleus		2				2							1				5	0.34
Mammalia		278		86		122		28		199	1-	101	41	1+	113		968	66.71
Aves	1-	12		8		12		3		14		10	3		4		66	4.55
Amphibia, Reptilia, Pisces		32		12	1+	24		0	1-	3	1-	6	6	1-	1		84	5.79
Evertebrata	110	1-	15	2-	13	1-	2	1-	36	1+	132	21	2-		4		333	22.95
Σ		432		121		171		33		252		249	71		122		1451	100.00
Diversity H'		2.34		2.52		2.44		1.96		2.01		1.95	2.00		1.30		2.39	

Other species (sample – number) Ostatné druhy (zber – počet):

Sorex minutus (1–2; 4–1; 5–1), *Sorex alpinus* (2–1), *Crocidura leucodon* (1–2), *Myotis mystacinus* (6–1), *Myotis nattereri* (6–1), *Myotis bechsteinii* (1–1; 6–2), *Myotis blythii* (1–1; 3–1; 5–1), *Myotis daubentonii* (6–1), *Eptesicus serotinus* (2–1; 4–1), *Plecotus auritus* (5–1), *Sicista betulina* (1–1), *Accipiter nisus* (2–1), *Porzana porzana* (2–1), *Picus canus* (4–1; 8–1), *Dendrocopos syriacus* (3–1), *Dendrocopos* sp. (4–1), *Hirundo rustica* (1–1), *Riparia riparia* (1–1), *Prunella modularis* (2–1), *Sylvia communis* (1–1), *Sylvia curruca* (1–2), *Turdus pilaris* (1–1), *Turdus viscivorus* (2–1), *Parus major* (5–2; 6–1), *Periparus ater* (6–1), *Paridae* sp. (4–1), *Sitta europaea* (5–1; 6–1), *Fringilla coelebs* (1–1; 5–2), *Carduelis carduelis* (6–1), *Pyrrhula pyrrhula* (6–1), *Coccothraustes coccothraustes* (5–1), *Garrulus glandarius* (3–2), *Corvus monedula* (2–1), *Passeriformes* sp. (3–2; 5–2), *Hyla arborea* (1–1), *Lacerta agilis* (3–1), *Lacerta vivipara* (5–1)

Appendix 26. The diet of *Strix aluco* in Slovakia, Odštepená skala rock
Appendix 26. Potrava *Strix aluco* na Slovensku, Odštepená skala

month / year mesiac / rok	detrit		10/79	10/81	10/82	10/83	7/90	7/91	5/96	5/02	7/03	5/05	Σ	%								
sample / zber	1	2	3	4	5	6	7	8	9	10	11											
<i>Glis glis</i> <i>Microtus subterraneus</i> <i>Microtus arvalis</i> <i>Rana temporaria</i> Limacidae sp. Coleoptera sp. <i>Sorex araneus</i> <i>Clethrionomys glareolus</i> <i>Apodemus flavicollis</i> <i>Muscardinus avellanarius</i> <i>Sorex minutus</i> <i>Talpa europaea</i> <i>Arvicola amphibius</i> <i>Microtus agrestis</i> <i>Nyctalus noctula</i> <i>Myotis myotis</i> <i>Parus major</i> <i>Sorex alpinus</i> <i>Dryomys nitedula</i> <i>Turdus merula</i> <i>Turdus philomelos</i> <i>Fringilla coelebs</i>	1+	22		5	2		5	1	3		2	1	41	1.13								
	1+	19	3	3	3		5	1					34	0.94								
	1+	35		8	2		13	2	3	2	2		67	1.85								
	1+	47	1	1-	3	4	1	6	1-	0	1	2	1	68	1.88							
	449	1+	82	1+	350	1+	190	3-	1	1-	121	1+	116	1-	17	1-	22	24	54	1426	39.39	
	6		1	5	1+	11	4	1						28	0.77							
	87	14	1-	26	1+	43	8	38	10	3	3	1-	0	1-	2	234	6.46					
	189	18	1-	56	1-	31	1+	26	58	27	1+	23	1+	25	10	17	480	13.26				
	310	1-	16	1-	94	4-	4	1+	43	1+	179	1-	31	1+	39	1+	37	1+	32	39	824	22.76
	1-	45	5	25	21	6	1+	35	14	11	10	3	7	182	5.03							
1-	5		3	4		1+	11	5				1	29	0.80								
<i>Talpa europaea</i> <i>Arvicola amphibius</i> <i>Microtus agrestis</i> <i>Nyctalus noctula</i> <i>Myotis myotis</i> <i>Parus major</i> <i>Sorex alpinus</i> <i>Dryomys nitedula</i> <i>Turdus merula</i> <i>Turdus philomelos</i> <i>Fringilla coelebs</i>	16	1	3			4	1	4	1	2	1	2	30	0.83								
	9		5			8	1	3	1				27	0.75								
	9	2	2	3		2						1	19	0.52								
	5		1			1	1	1	1	1	1	1	10	0.28								
	2		2			1	1	1	2	2		8	0.22									
	5					1	1	1	2	2		8	0.22									
	4			2		1						7	0.19									
	1		1				1	1	2	1	1	1	7	0.19								
	2		1				1	1	2	2	1	7	0.19									
	3					1	1	2	1			7	0.19									
1		1			2						1	5	0.14									
Mammalia	767	1-	59	1-	237	1-	118	1+	83	1+	365	1-	98	1+	93	1+	81	49	72	2022	55.86	
Aves	27	2	1-	6	1-	1	1	15	9	5	3	2	4	75	2.07							
Amphibia, Reptilia, Pisces	1+	47	1	1-	3	4	1	6	1	2	1	2	1	69	1.91							
Vertebrata	455	1+	83	1+	355	1+	201	2-	5	1-	122	1+	116	1-	17	1-	22	24	54	1454	40.17	
Σ	1296	145	601	324	90	508	224	117	107	77	131	3620	100.00									
Diversity H'	2.04	1.47	1.52	1.50	1.40	2.04	1.76	2.12	1.76	1.52	1.65	1.97										
Other species (sample – number) Ostatné druhy (zber – počet):																						
<i>Erinaceus concolor</i> (8–1), <i>Neomys fodiens</i> (1–2; 3–1), <i>Crocodyrus leucodon</i> (1–2), <i>Myotis bechsteinii</i> (1–2; 7–1), <i>Vespertilio murinus</i> (3–1), <i>Eptesicus serotinus</i> (1–2; 7–1), <i>Plecotus auritus</i> (6–3), <i>Sicista betulina</i> (4–3; 6–1), <i>Micromys minutus</i> (3–1), <i>Microtus tatricus</i> (1–1), <i>Mustela nivalis</i> (9–1), <i>Columba livia</i> dom. (7–1), <i>Columba oenas</i> (6–1; 10–1; 11–1), <i>Glaucidium passerinum</i> (1–2), <i>Aegolius funereus</i> (1–1), <i>Picus canus</i> (6–1), <i>Dendrocopos leucotos</i> (1–1), <i>Alauda arvensis</i> (1–2), <i>Hirundo rustica</i> (1–1), <i>Delichon urbicum</i> (1–2), <i>Sylvia atricapilla</i> (6–3), <i>Ficedula</i> sp. (9–1), <i>Saxicola rubetra</i> (8–1), <i>Erithacus rubecula</i> (7–2), <i>Turdus viscivorus</i> (6–1; 11–1), <i>Cyanistes caeruleus</i> (1–1; 6–3), <i>Poecile palustris</i> (1–2), <i>Sitta europaea</i> (11–1), <i>Troglodytes troglodytes</i> (6–1), <i>Emberiza citrinella</i> (7–1), <i>Carduelis spinus</i> (7–1), <i>Coccothraustes coccothraustes</i> (1–1), <i>Passer domesticus</i> (6–1), <i>Passeriformes</i> sp. (1–3; 2–2; 3–4; 4–1; 5–1; 7–1; 8–1), <i>Salmo trutta</i> (7–1)																						

Appendix 27. The diet of *Strix aluco* in Slovakia, Sebeslavce**Appendix 27.** Potrava *Strix aluco* na Slovensku, Sebeslavce

month / year mesiac / rok	6/02		4/03		10/03		5/04		3/05		5/06		3/07		2/08		10/09		Σ	%					
sample / zber	1		2		3		4		5		6		7		8		9								
<i>Apodemus flavicollis</i>	1+	55	38	1-	23	3	1+	60	1-	11	1-	25	1+	20		36		271	28.98						
<i>Clethrionomys glareolus</i>	6		5		7		1		1+		15		11		3		6		54	5.78					
<i>Sorex araneus</i>	2		5		1+		9		1		1						4		22	2.35					
<i>Rana temporaria</i>	6		3		2+		36		1-		1		2-		0		1-		1	47	5.03				
<i>Microtus arvalis</i>	2-	8	52		43		2		1-		28		1+		45		1+		89	1-	6	1-	18	291	31.12
<i>Neomys fodiens</i>													1+		6				1	7	0.75				
<i>Limacidae</i> sp.			7		1-		0				2		1+		15				24	2.57					
<i>Glis glis</i>	4	1-	0		7				6				2				4	1+	11	34	3.64				
<i>Turdus philomelos</i>			1		4		1		1								1+		10	17	1.82				
<i>Muscardinus avellanarius</i>	1		2		8		1		2				2						5	21	2.25				
<i>Arvicola amphibius</i>	1		1		2		1		3		5		2				1	3	19	2.03					
<i>Sorex minutus</i>	1				5				1								4		11	1.18					
<i>Coleoptera</i> sp.			1		3						1		1		1		4	11	1.18						
<i>Turdus merula</i>	1		1		4		1						1				3	11	1.18						
<i>Turdus pilaris</i>	1		1		3		1		2		1				1			10	1.07						
<i>Fringilla coelebs</i>	1		2		2												3	8	0.86						
<i>Erithacus rubecula</i>			1		2				2								2	7	0.75						
<i>Rattus norvegicus</i>	1		1		3				1								1	7	0.75						
<i>Neomys anomalus</i>	1		1		1						1						2	6	0.64						
<i>Microtus agrestis</i>			2										4					6	0.64						
<i>Parus major</i>	1		1		2				2									6	0.64						
<i>Talpa europaea</i>					2		1						1				1	5	0.53						
Mammalia	80	109	1-	114	9	118	63	144	38	92	767	82.03													
Aves	6	12	22	5	8	2	1-	4	2	1+	23	84	8.98												
Amphibia	6	3	2+	36	0	1-	1	0	2-	0	0	1-	1	47	5.03										
Evertebrata	0	8	3	0	1-	0	3	1+	16	2	5	37	3.96												
Σ	92	132	175	14	127	68	164	42	121	935	100.00														
Diversity H'	1.64	2.00	2.52	2.30	1.70	1.17	1.62	1.71	2.52	2.33															

Other species (sample – number) Ostatné druhy (zber – počet):

Sorex alpinus (9–1), *Rhinolophus hipposideros* (9–1), *Myotis mystacinus* (3–1; 5–1), *Myotis emarginatus* (3–1), *Eptesicus serotinus* (3–1), *Nyctalus noctula* (9–1), *Plecotus auritus* (2–1), *Sciurus vulgaris* (7–1), *Micromys minutus* (3–1; 7–1), *Mustela erminea* (9–1), *Mustela nivalis* (2–1), *Picus viridis* (1–1), *Delichon urbica* (3–1), *Anthus trivialis* (4–1), *Lanius collurio* (3–1), *Prunella modularis* (2–1), *Sylvia atricapilla* (3–1; 9–2), *Regulus* sp. (2–1), *Ficedula albicollis* (9–1), *Turdus viscivorus* (2–1; 3–1; 9–2), *Troglodytes troglodytes* (3–1), *Carduelis carduelis* (2–1), *Carduelis cannabina* (2–1), *Carduelis chloris* (6–1), *Passer domesticus* (5–1), *Sturnus vulgaris* (7–3), *Garrulus glandarius* (1–1), *Passeriformes* sp. (4–1; 8–1), *Diptera* sp. (8–1; 9–1)

Appendix 28. The diet of *Strix aluco* in Slovakia, Mošovce, park**Appendix 28.** Potrava *Strix aluco* na Slovensku, Mošovce, park

month / year mesiac / rok	8/95	10/95	6/98	7/99	9/00	10/01	5/02	4/05	Σ	%
sample / zber	1	2	3	4	5	6	7	8		
<i>Coleoptera</i> sp.	1+ 8	4		4 1-	1	11	4		32	4.24
<i>Carduelis carduelis</i>	1+ 6			1	1	1			9	1.19
<i>Passer domesticus</i>	1+ 11	4	1+ 20		15 1-	6	1		57	7.55
<i>Rana temporaria</i>	3		1	7	21	1+ 42	1- 1 1-	0	75	9.93
<i>Apodemus flavicollis</i>			2	1	7	1+ 27	2	4	43	5.70
<i>Turdus pilaris</i>		3	1	3	2 1-	0	1+ 10		19	2.52
<i>Microtus arvalis</i>	1- 6	12	7 2-	3	91	146 1-	19	1+ 44	328	43.44
<i>Fringilla coelebs</i>	2		1	1	6	7	1		18	2.38
<i>Mus cf. musculus</i>	3			4	5	3	1		16	2.12
<i>Muscardinus avellanarius</i>			2	5	2	4	3		16	2.12
<i>Clethrionomys glareolus</i>					5	5	5		15	1.99
<i>Turdus philomelos</i>	1	1		1	4	2	1		10	1.32
<i>Arvicola amphibius</i>	1		1	1	2	2			7	0.93
<i>Micromys minutus</i>					6	1			7	0.93
<i>Neomys fodiens</i>					4	2			6	0.79
<i>Talpa europaea</i>				3	1	1	1		6	0.79
<i>Erithacus rubecula</i>				1	3		2		6	0.79
Mammalia	1- 12	13	13 1-	18	130	195	34 1+	49	464	61.46
Aves	1+ 128	10	5 1+	38	41 1-	32 1+	22 2-	1	177	23.44
Amphibia, Reptilia, Pisces	3	0	1	8	22 1+	44 1-	1 1-	0	79	10.46
Evertebrata	1+ 8	4	0	4 1-	2	12	5	0	35	4.64
Σ	51	27	19	68	195	283	62	50	755	100.00
Diversity H'	2.42	1.73	2.08	2.62	2.22	1.91	2.48	0.47	2.45	

Other species (sample – number) Ostatné druhy (zber – počet):

Sorex araneus (6–1; 7–1), *Sorex minutus* (8–1), *Neomys anomalus* (7–1), *Crocidura suaveolens* (5–1; 6–1; 7–1), *Myotis mystacinus* (1–1), *Nyctalus noctula* (4–1), *Apodemus sylvaticus* (2–1; 6–1), *Rattus norvegicus* (1–1; 5–2), *Microtus subterraneus* (3–1), *Microtus agrestis* (5–4; 6–1), *Streptopelia decaocto* (6–1), *Streptopelia turtur* (4–1), *Picus viridis* (4–1; 6–1; 7–1), *Hirundo rustica* (6–1), *Delichon urbicum* (4–3; 7–1), *Motacilla alba* (1–2; 2–2), *Sylvia communis* (5–1), *Sylvia atricapilla* (6–2; 7–1), *Phylloscopus trochilus* (5–2), *Phylloscopus collybita* (5–1), *Regulus* sp. (4–1; 5–1; 7–3), *Sylviidae* sp. (6–2), *Phoenicurus ochruros* (3–1; 5–1; 6–1), *Turdus merula* (1–1; 3–1; 4–2; 6–1), *Parus major* (1–1; 6–3), *Periparus ater* (7–1), *Cyanistes caeruleus* (1–1; 5–1; 6–3), *Sitta europaea* (2–1; 5–1), *Certhia familiaris* (6–1), *Carduelis spinus* (8–1), *Carduelis cannabina* (2–1; 4–2), *Serinus serinus* (4–1; 5–2), *Sturnus vulgaris* (2–1), *Passeriformes* sp. (3–1), *Salmo trutta* (4–1; 5–1; 6–2), *Hymenoptera* sp. (5–1; 6–1; 7–1)

Appendix 29. The diet of *Strix aluco* in Slovakia, Turčianska Štiavnička, stately home**Appendix 29.** Potrava *Strix aluco* na Slovensku, Turčianska Štiavnička, kaštieľ

month / year mesiac / rok	9/96		6/97		9/99		6/00		10/01		Σ	%
sample / zber	1		2		3		4		5			
<i>Myotis emarginatus</i>	1+	9				3	1-	0		2	14	2.72
<i>Apodemus flavicollis</i>	1+	29	1+	37	1-	7	1-	14		17	104	20.19
<i>Sorex araneus</i>		4		1	1+	9		5		4	23	4.47
<i>Mus cf. musculus</i>	1-	0		6	2+	22	1-	5		1	34	6.60
<i>Microtus arvalis</i>	2-	3	2-	1	1-	4	1+	79	1-	3	90	17.48
<i>Rhinolophus hipposideros</i>		3				4	1-	0	1+	6	13	2.52
<i>Clethrionomys glareolus</i>		22		12	1-	4		39		12	89	17.28
<i>Muscardinus avellanarius</i>		5		10		4		11		1	31	6.02
<i>Passer domesticus</i>		5		2		6		5			18	3.50
<i>Microtus subterraneus</i>		2		4		2		4			12	2.33
Coleoptera sp.		1				1		9			11	2.14
<i>Turdus merula</i>		2				2		3		1	8	1.55
<i>Sorex minutus</i>		1				1		6			8	1.55
<i>Arvicola amphibius</i>						1		5			6	1.17
<i>Microtus agrestis</i>								6			6	1.17
Mammalia		80		78		70		176		49	453	87.96
Aves		10		7	1+	14	1-	11		7	49	9.51
Amphibia		0		0		2		0		0	2	0.39
Evertebrata		1		0		1		9		0	11	2.14
Σ		91		85		87		196		56	515	100.00
Diversity H'		2.13		2.01		2.77		2.04		2.23	2.66	

Other species (sample – number) Ostatné druhy (zber – počet):

Talpa europaea (3–1; 4–1), *Neomys anomalus* (5–1), *Crociodura suaveolens* (3–3), *Myotis mystacinus* (2–2; 5–1), *Myotis myotis* (1–1; 3–1), *Myotis daubentonii* (2–1), *Vespertilio murinus* (2–1), *Nyctalus noctula* (3–1), *Barbastella barbastellus* (1–1), *Glis glis* (2–1), *Sicista betulina* (2–1; 3–2), *Micromys minutus* (3–1; 4–1), *Apodemus agrarius* (5–1), *Ondatra zibethicus* (2–1), *Dendrocopos major* (4–1), *Anthus trivialis* (3–1), *Motacilla cinerea* (5–1), *Sylvia atricapilla* (1–1; 3–1; 5–1), *Saxicola torquata* (3–2), *Erithacus rubecula* (2–1), *Turdus pilaris* (4–1), *Turdus philomelos* (5–2), *Parus major* (1–1; 5–1), *Cyanistes caeruleus* (4–1), *Emberiza citrinella* (3–1), *Fringilla coelebs* (2–1; 5–1), *Carduelis chloris* (1–1), *Pyrrhula pyrrhula* (2–1), *Coccothraustes coccothraustes* (2–2), *Passer montanus* (3–1), *Rana temporaria* (3–2)

Appendix 30. The diet of *Strix aluco* in Slovakia, Banská Bystrica, park**Appendix 30.** Potrava *Strix aluco* na Slovensku, Banská Bystrica, park

period / obdobie	02, 05		06	07a	07b	08a		08b		08c	08d		Σ	%	
samples / zbery	1		2	3	4	5		6		7		8			
<i>Microtus arvalis</i>	5	1+	28	1-	6	10	3	1-	4	4		11	71	10.76	
<i>Nyctalus noctula</i>	1		3		3	8	1+	11		8	2	5	41	6.21	
<i>Turdus pilaris</i>	1		5		10	9	4	1+	19	9		4	61	9.24	
Orthoptera sp.			4				1			1	1+	10	16	2.42	
Limacidae sp.						1					1+	6	7	1.06	
<i>Apodemus flavicollis</i>			5		9	20	22	10	1-	7	4	12	89	13.48	
<i>Turdus merula</i>			1		3	7	8	4		10	7	4	44	6.67	
<i>Rattus norvegicus</i>			1		2	9	7	3		2	1	6	31	4.70	
<i>Carduelis chloris</i>					2	10	6	1		5	5		29	4.39	
<i>Turdus philomelos</i>					2	6	5	3		4	3	4	27	4.09	
<i>Parus major</i>			1		7	2	6			4	1	3	24	3.64	
<i>Fringilla coelebs</i>			3		2	5	6	1		4	1	2	24	3.64	
<i>Crocidura suaveolens</i>			1		7	3	2	1		3	1	4	22	3.33	
<i>Carduelis carduelis</i>			1		1	3	2	1		5	2		15	2.27	
<i>Erithacus rubecula</i>					1	3	1	1		4	1	1	12	1.82	
<i>Columba livia dom.</i>					1	6	3	1		1			12	1.82	
<i>Apodemus sylvaticus</i>					3		5	2			1	1	12	1.82	
Coleoptera sp.			1		1	3	1			2	1	2	11	1.67	
<i>Cyanistes caeruleus</i>						5	1	1			1	1	9	1.36	
<i>Coccothraustes coccothraustes</i>					3	2	1			2			8	1.21	
<i>Clethrionomys glareolus</i>					2		3	2		1			8	1.21	
<i>Micromys minutus</i>					3					1		3	7	1.06	
<i>Passer domesticus</i>					2	1	2	1				1	7	1.06	
<i>Motacilla alba</i>						5		1					6	0.91	
<i>Delichon urbicum</i>					1	1	1					2	5	0.76	
<i>Sturnus vulgaris</i>					1	1				3			5	0.76	
Mammalia	13	1+	57		45	57		30	1-	29	15	44	290	43.94	
Aves	8	1-	36		71	65		24	1+	69	33	1-	27	333	50.45
Amphibia	0		0		0	0		0		1	0	0	1	0.15	
Evertebrata	1		5		3	3		1		2	2	1+	19	36	5.45
Σ	22		98		119	125		55		101	50		90	660	100.00
Diversity H'	2.21		2.73		2.94	3.06		2.70		2.98	2.71		2.91	3.24	

02, 05 – April 2002, leg. M. Adamec + 15. 10. 2005, **06** – 22. 4. 2006 + 9. 9. 2006 + 3. 11. 2006, **07a** – 3. 3. 2007 + 6. 4. 2007 + 28. 4. 2007, **07b** – 14. 7. 2007 + 9. 8. 2007 + 15. 9. 2007 + November 2007 + December 2007, **08a** – 3. 1. 2008 + 24. 2. 2008 + 24. 3. 2008, **08b** – 13. 4. 2008 + 3. 5. 2008 + 22. 6. 2008, **08c** – 19. 7. 2008 + 10. 8. 2008 + 14. 9. 2008, **08d** – 5. 10. 2008 + 15. 11. 2008 + 23. 12. 2008, Poláček 2009

Other species (**samples** – number) Ostatné druhy (**zbery** – počet):

Sorex minutus (3–1), *Neomys anomalus* (6–1), *Muscardinus avellanarius* (6–1; 7–2), *Mus cf. musculus* (6–1; 8–2), *Arvicola amphibius* (4–1), *Streptopelia decaocto* (4–1; 6–1; 7–1), *Dendrocopos major* (2–1; 4–1), *Hirundo rustica* (7–1), *Sylvia borin* (8–1), *Sylvia atricapilla* (6–2; 7–1), *Sylvia sp.* (8–1), *Phylloscopus trochilus* (6–1), *Phylloscopus collybita* (4–1), *Phylloscopus sibilatrix* (6–1), *Regulus sp.* (8–1), *Sylviidae sp.* (2–3; 4–1), *Ficedula albicollis* (6–1), *Phoenicurus ochruros* (3–1; 4–2), *Turdus torquatus* (8–1), *Periparus ater* (4–2; 5–1; 6–1), *Poecile palustris* (2–1), *Emberiza citrinella* (5–1), *Fringilla montifringilla* (5–1), *Carduelis spinus* (1–1; 4–2; 5–1), *Carduelis cannabina* (8–1), *Pyrrhula pyrrhula* (3–1), *Serinus serinus* (3–1), *Passer montanus* (5–1; 6–1), *Garrulus glandarius* (3–1; 4–2), *Passeriformes sp.* (4–1), *Aves sp.* (2–1), *Rana temporaria* (6–1), *Dermaptera sp.* (8–1), *Insecta sp.* (4–1)

Appendix 31. The diet of *Strix aluco* in the Czech Republic**Appendix 31.** Potrava *Strix aluco* v České republice

species / region druh / oblast'	3	4	6	8	7	5	1	2	Σ	%
<i>Microtus arvalis</i> %	67.14	19.26	28.96	19.54	9.74	21.57	18.77	15.64		
<i>Microtus arvalis</i> ks	2+ 94	1+ 787	1+ 393	1+ 204	1- 776	1+ 146	201	170	2771	15.90
<i>Glis glis</i>		1+ 85	1+ 29	1+ 29	3- 5	1- 1	2- 0	2- 0	149	0.85
<i>Clethrionomys glareolus</i>	15	1+ 587	127	1+ 186	1- 682	1- 45	1+ 200	113	1955	11.21
Coleoptera sp.	2	1+ 57	2- 1	1+ 21	1- 41	1+ 17	1- 1	12	152	0.87
<i>Crocodyra suaveolens</i>		1+ 12	1		1- 3	1+ 7			23	0.13
<i>Parus major</i>		1+ 34	4	8	1- 24	1+ 11	1- 1	4	86	0.49
<i>Cyanistes caeruleus</i>		1+ 17	3	1	1- 7	1+ 6		2	36	0.21
<i>Sitta europaea</i>		1+ 26			1- 11	2		2	41	0.24
<i>Crocodyra leucodon</i>		1+ 27	5		3- 0	5		1	38	0.22
<i>Lepus europaeus</i>		1+ 11			4		1	2	18	0.10
<i>Hyla arborea</i>		1+ 8			2			3	13	0.07
<i>Astacus</i> sp.		1+ 7							7	0.04
<i>Eliomys quercinus</i>			1+ 5						5	0.03
<i>Rhinolophus</i>			1+ 5						5	0.03
<i>hipposideros</i>										
<i>Myotis nattereri</i>		2	1+ 6						8	0.05
<i>Nyctalus noctula</i>		1	1+ 8		1- 3	2		5	19	0.11
<i>Myotis bechsteinii</i>		2	2+ 12	1	5	1			21	0.12
<i>Myotis myotis</i>	1-	0	2+ 16		14				30	0.17
<i>Barbastella barbastellus</i>		2	2+ 13		1- 0				15	0.09
<i>Pipistrellus pipistrellus</i>	2-	1	3+ 59		3- 0	1			61	0.35
<i>Mus cf. musculus</i>	2-	5	2+ 38	1-	0 45	6	2	7	103	0.59
<i>Passer domesticus</i>	1-	14	2+ 33	9	1- 33	8	6	6	109	0.63
<i>Apodemus microps</i>		1	2+ 15		1- 1	2			19	0.11
<i>Talpa europaea</i>	1-	22	1+ 20	10	73	2	1+ 16	11	154	0.88
<i>Microtus subterraneus</i>	1-	43	1+ 38	20	199	1- 7	1+ 49	3-	0 356	2.04
<i>Rana temporaria</i>	4-	1	1+ 40	1+ 45	1+ 216	2-	1	1+ 29	1- 6	338 1.94
Limacidae sp.	1-	10	3+ 82	1+ 17	4-	2	4	1-	1 117	0.67
<i>Apodemus agrarius</i>	1-	0		1+ 12	22				34	0.20
<i>Phoenicurus ochruros</i>			3	1+ 6	1- 0				9	0.05
<i>Musccardinus avellanarius</i>	1-	34	34	1+ 38	1+ 249	1-	8	1-	7 3-	1 371 2.13
<i>Dryomys nitedula</i>		1-	0	4	1+ 15				19	0.11
<i>Apodemus flavicollis</i>	2-	9	1496	2-	180 305	1+ 3438	1-	143	2-	101 1- 163 5835 33.47
<i>Streptopelia decaocto</i>	1	1-	2	1	1+ 25		1		30	0.17
<i>Strix aluco</i>	1	1-	0	1	1+ 17			2	22	0.13
<i>Garrulus glandarius</i>		1-	3	2	1+ 38	2		1	46	0.26
<i>Turdus merula</i>	1	1-	23	15	1- 3	1+ 144	7	12	2-	1 206 1.18
<i>Turdus philomelos</i>	4	1-	54	1-	13	1+ 219	13	1-	11 2-	4 332 1.90
<i>Turdus viscivorus</i>		1-	8	1-	1	1+ 55	6	1-	0 71	0.41
<i>Sylvia communis</i>			3		1+ 15				18	0.10
<i>Carduelis chloris</i>			8		1+ 20				28	0.16
<i>Fringilla coelebs</i>		41	1-	7	1-	2	1+ 103	1+ 13	7	1- 4 177 1.02
<i>Coccothraustes</i>										
<i>coccothraustes</i>		22	1-	0	1-	1	53	1+ 14	1-	1 2 93 0.53
<i>Serinus serinus</i>			5			7	2+ 11	1		24 0.14
<i>Erithacus rubecula</i>		22	1-	1	2	45	2+ 22	1-	1 1-	1 94 0.54
<i>Ficedula albicollis</i>			2			1-	1	2+ 14		17 0.10

Appendix 31. continuation / pokračovanie

species / region druh / oblasť	3	4	6	8	7	5	1	2	Σ	%								
<i>Delichon urbicum</i>		10	1	2	1-	6	2+	14	1	4	38	0.22						
<i>Hirundo rustica</i>		1-	5	1-	1	1-	0	3-	3	4+	64	1-	0	7	80	0.46		
<i>Sorex araneus</i>	1-	2	1-	124	1-	30	1-	27	1+	591	3-	4	1+	117	71	966	5.54	
<i>Arvicola amphibius</i>		2		2		10	1-	2	1+	111	1-	0	1+	29	13	169	0.97	
<i>Sorex minutus</i>			1+	118	1-	12		21	1-	111	2-	0	2+	72	20	354	2.03	
<i>Microtus agrestis</i>		2	2-	11	2-	2	1-	8	3-	12	2-	0	3+	94	3+	108	237	1.36
<i>Neomys fodiens</i>			1-	6	1-	1		2		44			1+	10	1+	10	73	0.42
<i>Neomys anomalus</i>			1-	2		3				20				1	1+	13	39	0.22
<i>Apodemus sylvaticus</i>			1-	66	1-	19	1-	7		211		10	17	1+	56	386	2.21	
<i>Micromys minutus</i>			1-	8		7		6	2-	10		5	8	2+	26	70	0.40	
<i>Rana arvalis</i>														1+	6	6	0.03	
<i>Pelobates fuscus</i>			1-	0		1		1	2-	0		3		2+	17	22	0.13	
<i>Rana cf. esculenta</i>		2	1+	108	3-	0	2-	4	2-	35	2-	1	2-	4	3+	153	307	1.76
<i>Myotis daubentoni</i>				1											1+	6	7	0.04
<i>Rattus norvegicus</i>			1-	1		2		5		14			1		4	27	0.15	
<i>Regulus</i> sp.				5		2		1	1-	2			4		2	16	0.09	
<i>Passer montanus</i>				6		2				17		3			5	33	0.19	
<i>Emberiza citrinella</i>				4		2		2		12		5	1		2	28	0.16	
<i>Sylvia atricapilla</i>				5				2		13		4			2	26	0.15	
<i>Carduelis carduelis</i>				6						16		1			1	24	0.14	
Mammalia	124	3468		1109		890		6669	1-	400		934		802	14396	82.58		
Aves	12	420	1-	121	1-	66		996	2+	249	1-	98	1-	81	2043	11.72		
Amphibia, Reptilia, Pisces	2	1-	125		44		50	1-	262	2-	7		37	2+	191	718	4.12	
Evertebrata	2	74	2+	83	1+	38	2-	43	1+	21	2-	2		13	276	1.58		
Σ	140	4087		1357		1044		7970		677		1071		1087	17433	100.00		
Diversity H'	1.33	2.38		2.87		2.40		2.41		2.91		2.70		2.81	2.72			

3 – Dačicko region (Obuch 1994), 4 – Podyjí (Reiter et al. 1997), 6 – Moravský kras Mts. (Zima et al. 1998), 8 – Nízký Jeseník Mts. (Obuch 1994), 7 – Zlínsko region (Zvřáhal & Obuch 1996), 5 – Pálava Mts. (Obuch 1994) + 3 samples / zbery, 1 – Pošumaví region (Obuch 1994) + 2 zbery, 2 – Třeboňsko region (Obuch 1994) + 2 samples / zbery

Other species (region – number) Ostatné druhy (oblasť – počet):

Erinaceus europaeus (1–1), *Erinaceus concolor* (6–1), *Sorex alpinus* (7–4; 1–1), *Myotis mystacinus* (4–2; 8–2; 7–1; 5–1), *Myotis brandtii* (6–1; 2–1), *Myotis emarginatus* (4–1; 6–2), *Myotis dasycneme* (6–1), *Vespertilio murinus* (6–1; 5–2), *Eptesicus serotinus* (4–2; 6–4), *Plecotus auritus* (4–1; 6–3; 8–1; 7–2; 5–1; 1–2; 2–1), *Plecotus austriacus* (4–4; 6–2), *Miniopterus schreibersii* (6–1), *Leporidae* sp. (6–3), *Sciurus vulgaris* (7–4), *Martes martes* (1–4), *Mustela nivalis* (4–1; 5–1), *Tachybaptus ruficollis* (7–2; 1–1), *Anas platyrhynchos* (1–1), *Accipiter nisus* (4–1; 7–1), *Buteo buteo* (4–1), *Falco tinnunculus* (7–1), *Rallus aquaticus* (8–1; 2–1), *Columba livia dom.* (4–1; 7–5), *Columba oenas* (6–1; 7–2), *Columba palumbus* (7–1), *Streptopelia turtur* (4–2; 7–4; 1–1), *Cuculus canorus* (4–2), *Aegolius funereus* (6–1; 1–1), *Apus apus* (4–1; 7–1; 5–1), *Dryocopus martius* (7–1; 1–1), *Picus canus* (6–1; 8–2; 1–2), *Picus viridis* (4–1; 6–1), *Dendrocopos major* (4–4; 7–6; 1–1; 2–1), *Dendrocopos syriacus* (4–4), *Dendrocopos leucotos* (7–1), *Dendrocopos minor* (7–1; 5–1), *Dendrocopos* sp. (6–1), *Jynx torquilla* (4–3; 7–5; 5–2), *Alauda arvensis* (6–1; 1–1), *Galerida cristata* (5–1), *Riparia riparia* (7–1; 5–4; 1–1), *Anthus trivialis* (4–1), *Motacilla alba* (4–1; 7–2; 1–1), *Motacilla cinerea* (2–1), *Lanius collurio* (4–1; 5–1; 1–2), *Prunella modularis* (4–4; 6–3; 8–2; 7–6; 5–1; 1–1), *Acrocephalus palustris* (4–1; 6–1; 8–1; 7–1), *Acrocephalus arundinaceus* (4–1), *Hippolais icterina* (7–1), *Sylvia curruca* (4–1; 8–1; 7–2), *Phylloscopus trochilus* (4–5; 6–1; 7–4; 5–1), *Phylloscopus collybita* (4–1), *Phylloscopus sibilatrix* (6–1), *Sylviidae* sp. (4–17; 7–1; 5–3; 2–1), *Muscicapa striata* (4–1; 8–1; 7–3; 1–1), *Saxicola rubetra* (7–3), *Turdus pilaris* (3–1; 4–2; 6–2; 7–7; 1–3; 2–1), *Turdus iliacus* (4–1; 6–1; 7–1), *Aegithalos caudatus* (4–4), *Periparus ater* (4–1; 1–1), *Lophophanes cristatus* (7–1), *Poecile palustris* (4–1; 6–1; 7–1), *Poecile montanus* (4–1), *Paridae* sp. (7–2; 5–1; 1–3; 2–7), *Certhia* sp. (4–6; 6–1; 7–1), *Troglodytes troglodytes* (4–1; 6–2; 7–10; 2–2), *Emberiza schoeniclus* (2–2), *Fringilla montifringilla* (4–2), *Carduelis spinus* (4–1; 7–2; 1–4), *Carduelis cannabina* (4–3; 6–1; 5–1; 1–1; 2–1), *Pyrrhula pyrrhula* (4–1; 5–2; 1–1), *Loxia curvirostra* (4–1), *Sturnus vulgaris* (4–1; 8–1; 7–2; 5–1; 1–3; 2–1), *Oriolus oriolus* (5–1; 2–1), *Corvus cornix+frugilegus* (2–1), *Passeriformes* sp. (3–4; 4–14; 6–8; 8–2; 7–22; 5–14; 1–13; 2–7), *Aves* sp. (1–1), *Aves* sp. juv. (4–1; 6–1; 7–6; 2–2), *Anguis fragilis* (4–2; 7–1), *Lacerta agilis* (7–2), *Lacerta* sp. (5–2; 2–4), *Salmo trutta* (7–1; 1–2), *Salmonidae* sp. (6–2), *Cypriniformes* sp. (7–2; 2–1), *Pisces* sp. (4–6; 6–1; 7–3; 1–2; 2–1)

Appendix 32. The diet of *Strix aluco* in the Mediterranean region

Appendix 32. Potrava *Strix aluco* v mediteránnej oblasti

species / sites druhy / lokality	4		3		2		5		6		1		Σ	%
<i>Pipistrellus kuhlii</i>	1+	6											6	0.35
<i>Microtus lichtensteini</i>	1+	8		4									12	0.71
<i>Muscardinus avellanarius</i>			1+	23			1-	7		7		5	42	2.47
<i>Apodemus flavicollis</i>		14	1+	168	2-	0		119		89		70	460	27.06
<i>Apodemus sylvaticus</i>		4	1+	9			1-	0		2			15	0.88
<i>Microtus arvalis</i>			1+	18			1-	0	1-	0		1	19	1.12
Coleoptera sp.		5	1+	83	2+	19	3-	3	1-	19	3-	0	129	7.59
Limacidae sp.	2-	0	1-	30	1+	24	1+	114	1+	96	1-	14	278	16.35
<i>Rana temporaria</i>							1+	11				4	15	0.88
<i>Microtus rossiaemeridionalis</i>							1+	9		1			10	0.59
<i>Dinaromys bogdanovi</i>			1-	0			1+	26	1-	0			26	1.53
<i>Glis glis</i>		3	1-	23	1-	0	1+	128	1-	32	1-	20	206	12.12
<i>Nyctalus noctula</i>									1+	11			11	0.65
<i>Microtus subterraneus</i>			1-	1				12	1+	14		3	30	1.76
<i>Rana cf. esculenta</i>			2-	0				11	1+	25	1-	0	36	2.12
<i>Chionomys nivalis</i>			1-	0			2-	0	1+	15	1+	12	27	1.59
<i>Sorex araneus</i>		2		14		1	2-	0	1-	3	2+	25	45	2.65
<i>Arvicola amphibius</i>				3			1-	0	1-	0	2+	15	18	1.06
<i>Microtus agrestis</i>				12			2-	0	1-	0	2+	22	34	2.00
<i>Clethrionomys glareolus</i>		3		21		1	1-	9	1-	3	1+	28	65	3.82
<i>Eliomys quercinus</i>											1+	6	6	0.35
<i>Talpa europaea</i>			1				1-	0		6		4	17	1.00
<i>Crocodyra leucodon</i>				3				8		3			14	0.82
<i>Sorex minutus</i>				2				4		3		1	10	0.59
<i>Fringilla coelebs</i>								5		3		1	9	0.53
<i>Dryomys nitedula</i>				1				4		3			8	0.47
<i>Cyanistes caeruleus</i>								3		4			7	0.41
<i>Parus major</i>				1				1		3		1	6	0.35
<i>Turdus philomelos</i>				1				1		4			6	0.35
<i>Sorex alpinus</i>		1		4				1					6	0.35
<i>Hirundo rustica</i>								1		3		1	5	0.29
<i>Delichon urbicum</i>								2		3			5	0.29
<i>Turdus merula</i>		1		2				1		1			5	0.29
Scorpionida sp.										5			5	0.29
Mammalia		44		313	3-	2		340	1-	209	1+	216	1124	66.08
Aves		1	1-	13		0	1+	49		31		10	104	6.11
Amphibia, Reptilia		3	2-	0		0		23	1+	30		5	61	3.59
Evertebrata		1-	5	113	2+	43		117	1+	120	2-	14	412	24.22
Σ		53		439		45		529		390		245	1701	100.00
Diversity H'		2.30		2.19		0.87		2.44		2.68		2.45	2.82	

4 – Veľká Paklenica, 13. 7. 2000, + Velebit Mts, 8.–12. 7. 2000, Croatia, **3** – Topla Rebev, Kočevski Rog, 7. 8. 1993, Slovenia, leg. B. Kryštufek & M. Uhrin, **2** – Monte Polino, Calabria, 20. 5. 1993, Italy, **5** – Tara river, Durmitor, 19.–21. 8. 1983, 5 samples / zberov, Montenegro, **6** – Rodopi + Struma valley, 27. 4. –5. 5. 1985, 4 samples / zbery, Bulgaria (Obuch & Benda 1996), **1** – Salanches + Chedde, 14. 3. 1977, Savoy Alps, France

Appendix 32. continuation / pokračovanie

Other species (site – number) Ostatné druhy (lokality – počet):

Talpa caeca (5–3), *Sorex* sp. (5–1), *Neomys anomalus* (5–2; 6–1), *Neomys fodiens* (1–1), *Crocidura suaveolens* (6–2), *Myotis mystacinus* (6–1), *Myotis blythii* (5–1; 6–2), *Vespertilio murinus* (5–1), *Eptesicus serotinus* (3–1; 5–2; 6–1), *Pipistrellus pipistrellus* (4–2; 5–1), *Plecotus austriacus* (6–1), *Miniopterus schreibersii* (6–1), *Tadarida teniotis* (6–1), *Leporidae* sp. (1–1), *Mus* cf. *domesticus* (1–1), *Mus* cf. *macedonicus* (5–2; 6–1), *Apodemus mystacinus* (6–3), *Rattus rattus* (6–3), *Microtus multiplex* (1–1), *Anatidae* sp. (5–1), *Falco tinnunculus* (5–1), *Perdix perdix* (5–1), *Coturnix coturnix* (5–2), *Crex crex* (5–1), *Scolopax rusticola* (5–1), *Columba livia* (5–1), *Streptopelia turtur* (5–3), *Aegolius funereus* (5–1), *Lanius collurio* (5–4), *Sylvia atricapilla* (3–1), *Phylloscopus trochilus* (3–1), *Phylloscopus collybita* (6–1), *Regulus* sp. (5–1), *Sylviidae* sp. (3–1), *Phoenicurus* sp. (5–1), *Erithacus rubecula* (3–2; 6–2), *Turdus pilaris* (1–1), *Turdus* sp. (3–2; 5–4; 1–2), *Cyanistes cristatus* (6–1), *Poecile palustris* (3–1; 5–3), *Paridae* sp. (5–1), *Troglodytes troglodytes* (1–1), *Carduelis chloris* (6–1), *Pyrrhula pyrrhula* (5–1), *Coccothraustes coccothraustes* (5–1; 6–2), *Passer domesticus* (6–2), *Garrulus glandarius* (5–1), *Passeriformes* sp. (3–1; 5–2; 6–1; 1–3), *Aves* sp. (5–4), *Lacerta viridis* (6–1), *Lacertidae* sp. (4–1; 5–1; 6–3; 1–1), *Ablepharus kitaibeli* (6–1), *Serpentes* sp. (4–2)

Appendix 33. The diet of *Strix aluco* in RomaniaAppendix 33. Potrava *Strix aluco* v Rumunsku

species / sites druhy / lokality	2	1	5	6	3	4	8	7	9	Σ	%						
Limacidae sp.	1+ 122	115	81	2-	0	1-	0	2-	1	1-	3	1-	1	2-	0	323	14.56
Sorex araneus	10	1+ 40	1-	11					2							63	2.84
Myotis myotis	2	1+ 17	1-	1					1							21	0.95
Muscardinus avellanarius	29	1+ 108	1-	40	1-	2	1	7	2		3	2-	0			192	8.65
Clethrionomys glareolus	54	1+ 133	1-	41		8	3	6	1-	0	1-	1		0		246	11.09
Microtus subterraneus	1-	5	1+ 38	1-	6	5		1			2					57	2.57
Chionomys nivalis	4	1+ 16	1-	0												20	0.90
Rana temporaria	1-	12	1+ 78	1+ 65	1-	2	1	1-	0	1-	0	1+	10	1-	0	168	7.57
Rana cf. esculenta	1-	0	2-	0	1+ 28		1	1	1							31	1.40
Microtus arvalis		1	1-	0	1+ 13			2			1					17	0.77
Glis glis	1+	53	1-	49	1+ 83	4	6	1-	3	5	1	2-	0			204	9.19
Apodemus flavicollis	1-	67	1-	105	1+ 184	2+ 63	1+ 16	1+ 42	1+ 22	1-	2	3-	0			501	22.58
Nyctalus noctula			2	1-	0			2+	10	2	1					15	0.68
Pipistrellus pipistrellus				1					1+	6				1		8	0.36
Barbastella barbastellus										2+	11					11	0.50
Vespertilio murinus	1		2						1+	6						9	0.41
Rattus rattus													2+	9		9	0.41
Orthoptera sp.	2-	1	3-	0	3-	0							4+	63		64	2.88
Sorex minutus		2		14		4		2					2			24	1.08
Talpa europaea			6		9		1	1								17	0.77
Turdus philomelos		5		2		9										16	0.72
Fringilla coelebs		2		2		6		1								11	0.50
Myotis bechsteinii		2		8												10	0.45
Rhinolophus ferrumequinum		1		7												8	0.36
Neomys fodiens		3		5												8	0.36
Arvicola amphibius		2		3		3										8	0.36
Microtus agrestis		3		4							1					8	0.36
Parus major		1			1		1		2				3			8	0.36
Coleoptera sp.				5				1								6	0.27

Appendix 33. continuation / pokračovanie

species / sites druhy / lokality	2	1	5	6	3	4	8	7	9	Σ	%								
<i>Myotis blythii</i>	3	3								6	0.27								
<i>Microtus tatricus</i>	1	5								6	0.27								
<i>Turdus merula</i>	2		1		2	1				6	0.27								
<i>Erithacus rubecula</i>		2	1			1	1			5	0.23								
<i>Apodemus sylvaticus</i>			5							5	0.23								
<i>Myotis mystacinus</i>		4	1							5	0.23								
<i>Cyanistes caeruleus</i>			1		1				3	5	0.23								
Mammalia	244	576	409	1+	84	28	72	45	34	2-	12	1504	67.78						
Aves	18	1-	18	38	1-	0	4	1+	12	4	2	1+	12	108	4.87				
Amphibia, Reptilia, Pisces	1-	13	81	1+	97	1-	2	2	1-	2	1	1+	10	1-	2	210	9.46		
Vertebrata	1+	123	115	1-	86	2-	0	1-	0	2-	2	1-	3	1-	1	2+	67	397	17.89
Σ	398	790	630		86	34	88	53	47		93	2219	100.00						
Diversity H'	2.25	2.59	2.46		1.02	1.77	2.02	2.13	2.38		1.34	2.79							

2 – Pacific cave, pellets / vývržky, Apuseni, Bihariei, 12. 8. 2002, **1** – Pacific cave, detrit, 12. 8. 2002, **5** – Misidului valley, detrit, Apuseni, Padurea Craiului, 16. 8. 2002, **6** – Misidului, pellets / vývržky, 16. 8. 2002, **3** – Sighistel, Apuseni, Bihariei, 11. 8. 2002, **4** – Suncuius, Ungurului cave, Apuseni, Padurea Craiului, 15. 8. 2002, **8** – Gura Ponicovei cave, Banat, Munti Lovcei, September 2009, leg. M. Uhrin, **7** – Prapastile Zarnestilov, Piatra Craiului, 13. 7. 1983, leg. J. Zima, **9** – Litkov, Delta Dunarii, 12. 6. 2006, leg. J. Andreska

Other species (**site** – number) / Ostatné druhy (**lokalita** – počet):

Sorex alpinus (7–1), *Crocidura leucodon* (5–3), *Crocidura suaveolens* (5–1), *Rhinolophus hipposideros* (1–3; 8–1), *Rhinolophus euryale* (8–1), *Myotis brandtii* (1–1; 8–1), *Myotis daubentonii* (2–1), *Myotis dasycneme* (1–1), *Eptesicus serotinus* (1–1; 8–1), *Pipistrellus nathusii* (9–2), *Miniopterus schreibersii* (8–3), *Mus cf. musculus* (5–2), *Apodemus agrarius* (3–1), *Rattus norvegicus* (5–1), *Sus scrofa* (1–1), *Coturnix coturnix* (7–1), *Gallinula chloropus* (9–1), *Columba oenas* (5–1), *Apus apus* (4–1), *Picus canus* (5–1; 4–1; 9–1), *Jynx torquilla* (5–1), *Hirundo rustica* (1–2), *Delichon urbicum* (1–1), *Bombicilla garrulus* (2–1), *Phylloscopus trochilus* (1–1), *Regulus* sp. (2–1), *Muscicapa striata* (8–1), *Saxicola rubetra* (5–1), *Turdus torquatus* (5–1), *Turdus pilaris* (1–1), *Turdus viscivorus* (5–3; 4–1), *Turdus* sp. (1–2), *Aegithalos caudatus* (2–1; 1–1; 5–1; 9–1), *Periparus ater* (1–1), *Poecile montanus* (2–2), *Sitta europaea* (5–2), *Troglodytes troglodytes* (1–1), *Cinclus cinclus* (1–1; 4–2), *Carduelis chloris* (5–2), *Coccothraustes coccothraustes* (2–1; 5–2), *Sturnus vulgaris* (5–1; 9–3), *Garrulus glandarius* (5–1), *Nucifraga caryocatactes* (5–2), *Passeriformes* sp. (2–2; 4–4; 7–1), *Aves* sp. (1–1), *Bombina* sp. (5–4), *Rana ridibunda* (9–2), *Lacerta agilis* (1–1; 4–1), *Lacerta* sp. (2–1), *Salmo trutta* (1–2), *Gryllotalpa* sp. (9–3), *Bivalvia* sp. (9–1)

Appendix 34. The diet of *Strix aluco* in the Crimea and the Caucasus**Appendix 34.** Potrava *Strix aluco* na Kryme a Kaukaze

species / sites druhy / lokality	1		2		4		3		Σ	%
Lacertidae sp.	1+	7		3	1-	1		2	13	0.62
<i>Porzana porzana</i>	1+	6		1					7	0.34
<i>Microtus rossiaemeridionalis</i>	1+	22		7		37	2-	0	66	3.17
Coleoptera sp.	2+	31	1+	28	1-	20	2-	1	80	3.84
<i>Apodemus flavicollis</i>	2+	109	2+	93	5-	0	1-	18	220	10.56
<i>Sorex minutus</i>			1+	8	1-	0			8	0.38
<i>Vespertilio murinus</i>		1	1+	8		11	1-	0	20	0.96
Limacidae sp.	1-	22	1+	90		159	4-	1	272	13.06
<i>Sorex caucasicus</i>	1-	0	2-	0	1+	59	1-	6	65	3.12
<i>Sorex volnuchini</i>					1+	23		2	25	1.20
<i>Apodemus uralensis</i>	4-	1	3-	11	1+	453		142	607	29.14
<i>Apodemus agrarius</i>				1	1+	16			17	0.82
<i>Microtus majori</i>	2-	0	2-	0	1+	84		36	120	5.76
<i>Chionomys gud</i>	1-	0	1-	0	1+	62	2-	0	62	2.98
<i>Chionomys roberti</i>					2-	0	2+	20	20	0.96
<i>Glis glis</i>	3-	0	3-	0	2-	25	2+	160	185	8.88
<i>Talpa levantis</i>						3	1+	11	14	0.67
<i>Fringilla coelebs</i>						1	1+	8	9	0.43
<i>Rana</i> sp.		2	1-	0	1-	14	1+	26	42	2.02
<i>Turdus</i> sp.		5		3		15		10	33	1.58
<i>Dryomys nitedula</i>						18		7	25	1.20
<i>Neomys teres</i>						7		1	8	0.38
<i>Crocidura suaveolens</i>		1				7			8	0.38
<i>Eptesicus serotinus</i>		2				4		1	7	0.34
<i>Mus</i> sp.		1		2		3		1	7	0.34
<i>Arvicola amphibius</i>						7			7	0.34
Mammalia		149	1-	135		828		408	1520	72.97
Aves	1+	37	1-	9		66		40	152	7.30
Amphibia, Reptilia		9		3	1-	16	1+	30	58	2.78
Evertebrata		54	2+	118		179	4-	2	353	16.95
Σ		249		265		1089		480	2083	100.00
Diversity H'		2.15		1.79		2.24		2.08	2.65	

1 – Jalta environs, Crimea, south / juh, 5 samples / zberov, 26.–27. 8. 1989, 2 – Sokolnoe, Bolšoj kañon, Crimea, 28. 8. 1989, 4 – Baksan valley, Central Caucasus, 11 samples / zberov, 24. 2. 1980 + 23.–26. 8. 1982, Bylym and Žanchoteko, 3 – Krasnaja Poljana, canyon / kañon, Western Caucasus, 7.–8. 9. 1978

Other species (site – number) / Ostatné druhy (lokalita – počet):

Neomys anomalus (1–1; 2–3), *Crocidura leucodon* (3–1), *Rhinolophus ferrumequinum* (3–2), *Nyctalus noctula* (1–3), *Pipistrellus pipistrellus* (1–2; 4–1), *Hypsugo savii* (2–1), *Plecotus auritus* (4–1), *Sciurus vulgaris* (1–2), *Sicista caucasica* (4–2), *Micromys minutus* (4–3), *Rattus rattus* (1–4), *Cricetulus migratorius* (4–2), *Microtus oeconomus* (2–1), *Coturnix coturnix* (1–2; 3–1), *Rallidae* sp. (1–6; 3–1), *Cuculus canorus* (3–1), *Otus scops* (4–1), *Tachymartus melba* (1–1; 2–1), *Dendrocopos* sp. (2–1; 3–1), *Delichon urbicum* (1–3; 4–1), *Hirundinidae* sp. (4–1), *Lanius collurio* (1–1), *Sylviidae* sp. (1–1; 2–1), *Paridae* sp. (4–2), *Pyrrhula pyrrhula* (4–2; 3–3), *Coccothraustes coccothraustes* (4–1; 3–1), *Fringillidae* sp. (1–6; 2–1; 4–12; 3–4), *Passeriformes* sp. (1–6; 4–27; 3–9), *Aves* sp. (2–1; 4–3; 3–1), *Pelobatidae* sp. (3–1), *Hyla schelkownikowi* (4–1; 3–1), *Decapoda* sp. (1–1)

Appendix 35. The diet of *Strix aluco* in Iran, Kyrgyzstan and Nepal
Appendix 35. Potrava *Strix aluco* v Iráne, Kirgizsku a v Nepále

country / krajina mountain range / pohorie species / sites druhy / lokality	Elborz					Iran					Zagros			Kyrgyzstan			Nepal		Σ	%
	1	2	3	4	5	6	7	8	9	10	Alaj	Fergan	Sivalik							
<i>Apodemus hircanicus</i>	3+	80	12	7	1-	0	3-	0	2-	0	4-	0	0	99	8.65					
Limacidae sp.		3+	43	2			1-	0	1-	0	3-	0	0	45	3.93					
<i>Crocidura caspia</i>	1	1+	11								1-	0	0	12	1.05					
<i>Glis glis</i>	4	2+	36	4			1-	0	1-	0	3-	0	0	44	3.85					
<i>Microtus dorothea</i>	4	1+	6											10	0.87					
<i>Microtus cf. irani</i>			2+	10	1						1-	0	0	11	0.96					
<i>Meriones persicus</i>				1+	8	1								9	0.79					
Coleoptera sp.	1	2	3	1+	8						3	0	3	17	1.49					
<i>Apodemus witherbyi</i>				2+	12	1+					1-	0	0	18	1.57					
<i>Mus cf. abbotti</i>		2				3	1+	9		3	1-	0	0	17	1.49					
Salmonidae sp.						1+	9							9	0.79					
Decapoda sp.		1				1+	13	1+	9		2-	0	0	23	2.01					
Cypripiniformes sp.	1-	0	1-			2+	38	1+	17		3-	0	0	55	4.81					
<i>Rana ridibunda</i>	1-	0	2			2+	39	1+	13		3-	0	0	54	4.72					
<i>Bufo viridis</i>	2-	0	2-	0	1-	1	2+	69	2+	61	1-	0	0	131	11.45					
<i>Vespertilio murinus</i>							1+	6			6			6	0.52					
<i>Alticola argentatus</i>							2+	9			9			9	0.79					
<i>Microtus carruthersi</i>							1+	5	1					6	0.52					
<i>Rattus turkestanicus</i>											1+	5		5	0.44					
<i>Microtus sikimensis</i>	2-	0	2-	0	1-	3-	0	2-	0	1-	0		2+	121	10.58					
<i>Rattus eha</i>	1-	0	2-	0		3-	0	2-	0				2+	99	8.65					
<i>Soriculus caudatus</i>	1-	0	2-	0	1-	2-	0	2-	0				2+	85	7.43					
<i>Soriculus nigrescens</i>		1-	0			1-	0	1-	0				1+	44	3.85					
<i>Soriculus gruberi</i>													1+	19	1.66					
<i>Mus</i> sp.													1+	12	1.05					
Pelobatidae sp.													1+	19	1.66					
<i>Cricetulus migratorius</i>			2	4	4	1	3	1			1-	0	0	15	1.31					

Appendix 35. continuation / pokračovanie

country / krajina	Iran										Kyrgyzstan		Nepal		Σ	%	
mountain range / pohorie	Elborz				Zagroz				Alaj	Fergan	Sivalik						
species / sites druhy / lokality	1	2	3	4	5	6	7	8	9	10							
Mammalia	1+	89	71	26	31	14	2-	23	3-	12	31	14	1+	392	703	61.45	
Aves	1-	1	9	1+	8	1	1-	7	1+	15	13	2	1-	12	77	6.73	
Amphibia, Reptilia, Pisces	3-	0	3-	0	1-	4	1	2+	155	2+	93	2-	0	2-	19	275	24.04
Evertebrata	1-	1	2+	46	5	1+	12	0	13	9	0	0	3-	3	89	7.78	
Σ	91	129	2.01	40	55	16	198	129	44	16	426	1144	100.00				
Diversity H'	0.54			2.41	2.50	1.55	1.99	2.02	2.54	1.72	1.97	3.40					
1 – Asalem, 1997, 2002, 2 – Czurti, 1996, 2002, 3 – Derež Naud, 5, 10, 2002 + Teng Rah, 13, 5, 1997, 4 – Bavineh, 17, 10, 1998, 5 – Khosrow Abad, 18, 10, 1998 + Yasug, 1, 5, 1996, 6 – Bishapur cave, 21, 4, 2000, 7 – Firuz Abad, canyon / kañon, 21, 4, 2000, 8 – Kalek, 20, 5, 1990, 9 – Arslan Bob, 10, 7, 1988, 10 – Dur Pany, r. 1981																	
Other species (site – number) / Ostatné druhy (lokalita – počet):																	
<i>Erinaceus concolor</i> (7–1), <i>Hemiechinus auritus</i> (6–1), <i>Talpa streeti</i> (2–2), <i>Suncus etruscus</i> (2–1; 5–1; 10–1), <i>Crocidura suaveolens</i> (3–1; 6–2; 8–1), <i>Myotis mystacinus</i> (10–1), <i>Myotis blythii</i> (6–2; 8–1), <i>Myotis annectans</i> (10–2), <i>Murina hutereaui</i> (10–1), <i>Scotophilus heathi</i> (10–1), <i>Eptesicus serotinus</i> (6–1), <i>Eptesicus bottae</i> (6–2), <i>Eptesicus</i> sp. (10–1), <i>Nyctalus noctula</i> (9–1), <i>Hesperoptenus</i> sp. (10–1), <i>Miniopterus schreibersii</i> (6–1), <i>Ochotona rutila</i> (8–2), <i>Sciurus anomalus</i> (4–1), <i>Sciuridae</i> sp. (10–3), <i>Dryomys nitedula</i> (7–1; 8–2), <i>Apodemus cf. uralensis</i> (8–3), <i>Rattus rattus</i> (2–1; 6–2), <i>Bandicota indica</i> (10–1), <i>Meriones tristrami</i> (4–1), <i>Meriones libycus</i> (7–3), <i>Meriones crassus</i> (6–1), <i>Tatera indica</i> (7–1), <i>Ellobius talpinus</i> (8–1; 9–3), <i>Ellobius lutescens</i> (4–3), <i>Microtus obscurus</i> (3–2; 4–1), <i>Microtus kirgisorum</i> (9–4), <i>Falco tinnunculus</i> (7–1), <i>Alectoris chukar</i> (4–1; 7–1; 8–1), <i>Ammoperdix griseogularis</i> (5–1; 7–2), <i>Gallinula chloropus</i> (6–1), <i>Tringa</i> sp. (6–1), <i>Columba livia</i> (6–1; 7–1; 8–1; 9–1), <i>Streptopelia se-negalensis</i> (4–1), <i>Streptopelia orientalis</i> (8–2), <i>Otus scops</i> (4–1; 7–1), <i>Strigidae</i> sp. (10–1), <i>Merops apiaster</i> (7–1), <i>Dendrocopos syriacus</i> (4–1; 7–1), <i>Picidae</i> sp. (10–1), <i>Ptyonoprogne rupestris</i> (8–1), <i>Pycnonotus leucogenys</i> (7–3), <i>Lanius collurio</i> (7–1), <i>Lanius</i> sp. (4–1), <i>Phylloscopus</i> sp. (3–1), <i>Saxicola rubetra</i> (3–1), <i>Oenanthe</i> sp. (7–1), <i>Luscinia megarhynchos</i> (2–1), <i>Turdus merula</i> (2–3), <i>Turdus philomelos</i> (2–2; 3–1), <i>Turdus viscivorus</i> (3–1), <i>Turdus</i> sp. (2–1; 9–1; 10–1), <i>Parus major</i> (3–1), <i>Paridae</i> sp. (8–3), <i>Sitta europaea</i> (2–1; 3–2), <i>Sitta tephronata</i> (7–1), <i>Emberiza</i> sp. (6–1; 10–1), <i>Fringilla coelebs</i> (2–1; 3–1; 4–1), <i>Coccothraustes coccothraustes</i> (3–1), <i>Fringillidae</i> sp. (10–1), <i>Petronia petronia</i> (4–1; 7–1; 8–1), <i>Corvidae</i> sp. juv. (10–1), <i>Passeriformes</i> sp. (1–1; 4–1; 6–2; 8–4; 10–6), <i>Aves</i> sp. juv. (6–1), <i>Laceritidae</i> sp. (2–1), <i>Agamidae</i> sp. (4–4; 7–1), <i>Sauria</i> sp. (7–1), <i>Scorpionida</i> sp. (4–4)																	

Appendix 36. The diet of *Strix aluco* in Poland: cities and their suburbs**Appendix 36.** Potrava *Strix aluco* v Poľsku: mestá a ich okolie

species / sites druhy / lokality	3		2		1		7		6		4		5		Σ	%	
<i>Carduelis chloris</i>	2+	18	5		4	2-	0						1-	0	27	0.39	
<i>Passer domesticus</i>	1+	138	1-	155	1+	487	1+	1257	1-	106	5-	0	5-	10	2153	30.79	
<i>Passer montanus</i>	1+	13	1+	29	28		1+	83	20		1-	0	3-	2	175	2.50	
<i>Coleoptera</i> sp.			3+	58	2-	0	3-	0	1-	0			3	2-	0	61	0.87
<i>Delichon urbicum</i>			2+	14	3		1-	0							17	0.24	
<i>Streptopelia decaocto</i>	1		1+	12	4		1-	0			1				18	0.26	
<i>Microtus arvalis</i>	1-	1	1+	71	4-	0	130		31		1-	2	60		295	4.22	
<i>Parus major</i>			1+	17	1+	24	3-	0	1-	0	1+	12	2-	0	53	0.76	
<i>Sturnus vulgaris</i>	2		1+	12	1+	12	2-	0			1		1-	0	27	0.39	
<i>Pelobates fuscus</i>	2		1+	10	2+	22	2-	0					1-	0	34	0.49	
<i>Rana arvalis</i>					2+	24	2-	0					1-	0	24	0.34	
<i>Serinus serinus</i>			2		1+	7									9	0.13	
<i>Cyanistes caeruleus</i>			3		1+	9	1-	0			3				15	0.21	
<i>Turdus pilaris</i>					1+	6					1				7	0.10	
<i>Turdus merula</i>			4		1+	10	1-	0							14	0.20	
<i>Hirundo rustica</i>					1+	6									6	0.09	
<i>Arvicola amphibius</i>			1-	1	2+	60	3-	0	1-	0			13		74	1.06	
<i>Crociodura suaveolens</i>					2+	22	2-	0					1-	0	22	0.31	
<i>Mus</i> cf. <i>musculus</i>	11		38		1+	107	1+	199	2-	9	2-	1	2-	15	380	5.43	
<i>Rattus norvegicus</i>	4		1-	2	10		1+	52	1-	3	5		1-	4	80	1.14	
<i>Apodemus agrarius</i>	2-	0	1-	23	2-	27	1+	254	2+	143	17		2-	21	485	6.94	
<i>Microtus subterraneus</i>	1-	0	3-	0	44		76		2+	62	2+	31	3-	3	216	3.09	
<i>Apodemus flavicollis</i>	1-	0	2-	1	3-	0	3-	8	2+	74	1+	17	1+	85	185	2.65	
<i>Clethrionomys glareolus</i>	2-	0	1-	22	4-	1	4-	9	1+	78	1+	29	2+	298	437	6.25	
<i>Crociodura leucodon</i>							1-	0			2+	15			15	0.21	
<i>Eptesicus serotinus</i>			1				1-	0			2+	16			17	0.24	
<i>Micromys minutus</i>			8		1-	4	2-	1	6		2+	17	16		52	0.74	
<i>Apodemus sylvaticus</i>			14		2-	3	2-	9	2-	0	2+	31	1+	46	103	1.47	
<i>Sorex araneus</i>	1-	0	3-	1	30		5-	1	1-	8	10		2+	182	232	3.32	
<i>Sorex minutus</i>			2-	0	3-	0	4-	0	2-	0	5		2+	91	96	1.37	
<i>Neomys fodiens</i>	1-	0	2-	0	3-	2	4-	0	2-	1	1-	0	2+	157	160	2.29	
<i>Microtus agrestis</i>			1-	0	1-	0	3-	0	1-	0			2+	47	47	0.67	
<i>Microtus oeconomus</i>			1-	4	3-	0	3-	4	1-	4	1-	0	2+	106	118	1.69	
<i>Talpa europaea</i>			3		13		27		4				9		56	0.80	
<i>Phoenicurus ochruros</i>			2		5										7	0.10	
<i>Muscardinus avellanarius</i>					1								5		6	0.09	
Mammalia	2-	16	1-	230	1-	394	1-	773	1+	423	1+	225	1+	1159	3220	46.05	
Aves	1+	172	274		1+	731	1+	1788	1-	205	2-	45	3-	89	3304	47.25	
Amphibia, Pisces	1-	3	1+	87	63		5-	3	1+	58	2-	0	1+	193	407	5.82	
Evertebrata	0		3+	58	2-	0	3-	0	1-	0	3		2-	0	61	0.87	
Σ	191		649		1188		2564		686		273		1441		6992	100.00	
Diversity H'	1.06		2.72		2.54		1.67		2.26		2.90		2.47		2.81		

3 – Poznań, park, 1965–66 (Bogucki 1967), 2 – Toruń (Zalewski 1994), 1 – Salwatorský kopec (Bocheński 1990), 7 – Warszawa, city centrum (Goszczynski et al. 1993), 6 – Warszawa, parks (Goszczynski et al. 1993), 4 – Lublin (Wiacek & Niedzwiedz 2008), 5 – Puszcza Kampinoska (Goszczynski et al. 1993)

Appendix 37. The diet of *Strix aluco* in Poland: forested regions**Appendix 37.** Potrava *Strix aluco* v Poľsku: lesnaté oblasti

species / sites druhy / lokality	2		1		3		4		5		6		Σ	%
<i>Turdus philomelos</i>	1+	12											12	0.34
<i>Rattus norvegicus</i>	1+	8				2		4					14	0.40
<i>Talpa europaea</i>	1+	21		10		7	1+	10	1-	5		4	57	1.61
<i>Muscardinus avellanarius</i>			1+	6				4					10	0.28
<i>Rana arvalis</i>	1-	0	2+	28	1-	0			1-	0			28	0.79
<i>Rana temporaria</i>	2-	0	2+	51	2-	0	1+	18	3-	0	2-	0	69	1.95
<i>Sicista betulina</i>	1-	0	1+	9	1+	15			1-	0			24	0.68
<i>Microtus oeconomus</i>	1-	23	2-	3	2+	126	2-	0	4-	0	3-	0	152	4.29
<i>Microtus agrestis</i>		17		3	1+	17				13		2	52	1.47
<i>Apodemus agrarius</i>	1-	3	1-	0	1+	35		5	1-	5		12	60	1.69
<i>Micromys minutus</i>	1-	0		1	1+	17				10			28	0.79
<i>Neomys fodiens</i>		2			1+	20		3	1-	2			27	0.76
<i>Sorex araneus</i>	1-	38		48	1+	130	1-	16	2-	26	1+	64	322	9.09
<i>Sorex minutus</i>	1-	11		10	2+	73	1-	3	2-	4	1+	24	125	3.53
<i>Arvicola amphibius</i>	2-	0	1-	0	1+	18	2+	22		9	1-	0	49	1.38
<i>Mus cf. musculus</i>		12	2-	0	1-	6	2+	34		15		10	77	2.17
<i>Passer domesticus</i>	1-	0					2+	20	1-	0			20	0.56
<i>Microtus arvalis</i>		89	4-	0	1-	42	1+	72	1+	282	3-	8	493	13.91
<i>Microtus subterraneus</i>	2-	0		4	2-	0		5	2+	59	2-	0	68	1.92
<i>Lepidoptera</i> sp.	1-	0			1-	0			2+	22			22	0.62
<i>Dermaptera</i> sp.									1+	10			10	0.28
<i>Diptera</i> sp.									1+	8			8	0.23
<i>Coleoptera</i> sp.		35	1+	32	4-	0	2-	0	1+	96	2-	5	168	4.74
<i>Apodemus sylvaticus</i>	2-	4	2-	0	3-	0	1-	2	2+	71		13	90	2.54
<i>Apodemus flavicollis</i>		21	2-	0		15		8	1-	15	1+	27	86	2.43
<i>Clethrionomys glareolus</i>		90		68		102	2-	5		123	1+	83	471	13.29
<i>Myotis nattereri</i>											2+	13	13	0.37
<i>Myotis myotis</i>	2-	0	1-	0	2-	0		7	2-	0	2+	44	51	1.44
<i>Myotis daubentonii</i>	1-	0			1-	1			1-	0	2+	26	27	0.76
<i>Plecotus auritus</i>											1+	6	6	0.17
<i>Crocidura suaveolens</i>								4		1			5	0.14
Mammalia		543	1-	245	1+	701		223		742		389	2843	80.24
Aves	1+	66		21	3-	0	1+	22	1-	25		19	153	4.32
Amphibia, Reptilia, Pisces	1+	144	2+	152	5-	0		22	5-	0	1-	17	335	9.46
Evertebrata	1-	35		32	4-	0	2-	0	2+	140	2-	5	212	5.98
Σ		788		450		701		267		907		430	3543	100.00
Diversity H'		2.75		2.61		2.42		2.64		2.41		2.65	3.20	

2 – Wigry National Park (Zawadzka & Zawadzki 2007), 1 – Romincka forest (Zmihorski & Osojca 2006), 3 – Luknajno jezioro (Kowalski & Lesiński 1988), 4 – Beskid Niski (Kulczycki 1964), 5 – Olawa (Gramsz 1991), 6 – Szachownica cave (Kowalski & Lesiński 1990)

Appendix 38. The diet of *Strix aluco* in Germany, Herrnhot (Uttendörfer 1939, 1952)
Appendix 38. Potrava *Strix aluco* v Nemecku, Herrnhot (Uttendörfer 1939, 1952)

species / sites druhý / locality	1	5	3	2	9	6	4	8	7	Σ	%						
<i>Microtus arvalis</i>	1+	259	344	533	415	1611	357	262	1-	341	413	4535	53.27				
	2+	43	21	15	16	1-	13	5	1-	10	11	157	1.84				
<i>Microtus agrestis</i>	6	4	2+	47	13	1-	14	6	16	1-	5	117	1.37				
<i>Talpa europaea</i>	1	2	1+	20	26	1-	12	6	3	1-	2	10	82	0.96			
<i>Microtus subterraneus</i>				1+	10	5	4					19	0.22				
<i>Muscardinus avellanarius</i>			7	2+	15	1-	0	1		1		24	0.28				
<i>Salmo trutta</i>				1+	5			2		1		8	0.09				
<i>Passer montanus</i>				1+	56	1+	152	1+	72			396	4.65				
<i>Clethrionomys glareolus</i>	17	1-	16	1-	27	102	127	296	80	1+	105	115	128	1013	11.90		
Muridae sp.	1-	17	1-	43	11	46	1+	32	1+	24	28	14	180	2.11			
<i>Arvicola amphibius</i>	1-	2	7	1-	1	20	1+	16	2+	18	1-	0	4	59	0.69		
Pisces sp.			1-	0	1-	1		2+	14			3	19	0.22			
<i>Regulus</i> sp.			2	1	1-	0		0	1+	9	1+	20	1-	1	51	0.60	
<i>Sturnus vulgaris</i>			1	20	2-	0	1-	0	2	1+	44	78	1-	10	267	3.14	
<i>Passer domesticus</i>	2-	0	1-	7	3-	1	1-	116	2-	2	1+	20	2+	22	0.26		
<i>Turdus merula</i>			2		1-	0						19	0.22				
<i>Carduelis chloris</i>			1	5	1-	0						1+	11	5	0.06		
<i>Serinus serinus</i>												1+	7	1	19	0.22	
<i>Garrulus glandarius</i>			2	3	3	1-	0			3	1+	6		6	0.07		
<i>Columba palumbus</i>												1+	9	1	23	0.27	
Leporidae sp.			2	2	5	1-	0		4		3	1+	36	2-	2	129	1.52
<i>Sorex</i> sp.	2	12	17	16	16	1-	36	1-	5	1-	3	1+	12	1+	8	32	0.38
<i>Fringilla coelebs</i>			2			1-	1	5		4	1+	254	2+	128	445	5.23	
Coleoptera sp.	2-	1	2-	5	14	1-	23	4-	6	2-	10	2-	51	1+	75	474	5.57
<i>Amphibia</i> sp.	2-	2	32	1+	96	1-	28	117	1+	57	1-	16	51	1+	75	474	5.57
<i>Rattus norvegicus</i>			2	7	2		14	2		3		6		3	39	0.46	
<i>Neomys</i> sp.			4	6	5		6	3		1		6		1	32	0.38	
Chiroptera sp.				1			6			1		3		1	12	0.14	
<i>Emberiza citrinella</i>					5					3		2		1	11	0.13	
<i>Hirundo rustica</i>				1	5					1		1		2	10	0.12	
<i>Parus major</i>										3		3		3	6	0.07	

Appendix 38. continuation / pokračovanie

species / sites druhy / lokality	1	5	3	2	9	6	4	8	7	Σ	%							
Mammalia	1+	347	458	799	702	2222	584	427	1-	583	620	6742	79.20					
Aves	2-	7	46	1-	48	71	215	1-	27	1+	185	1-	49	769	9.03			
Amphibia, Reptilia, Pisces	2-	2	32	1+	103	44	1-	137	1+	74	34	1-	52	1+	79	557	6.54	
Evertebrata	2-	1	2-	14	1-	23	4-	6	2-	10	2-	4	2+	254	2+	128	445	5.23
Σ		357	541	964	840	2580	695	586	1074		876	8513	100.00					
Diversity H'		1.05	1.54	1.77	1.98	1.47	1.78	2.00	2.24		1.78	1.90						

1 – Herrnhut, Batzenhütte, 5 – H., Lindenalee, 3 – H., Eulholz, 2 – H., Buchschenke, 9 – Herrnhut – weitere Plätze, 6 – H., Neubertheisdorf, 4 – H., Kunnersdorfer Tal, 8 – H., Petersbach, 7 – H., Sandberg

Appendix 39. The diet of *Strix aluco* in Germany, Berlin, Grünewald (Wendland 1975)Appendix 39. Potrava *Strix aluco* v Nemecku, Berlín, Grünewald (Wendland 1975)

species / year druhy / rok	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	Σ	%
<i>Apodemus cf. flavicollis</i>	1- 146	1- 125	1+ 304	532	345	1+ 585	381	1- 246	1+ 532	271	1- 77	1+ 232	137	1- 108	1- 66	4087	28.50
<i>Rattus norvegicus</i>	1- 20	1+ 48	1+ 85	100	55	54	59	67	48	1- 14	1- 6	1- 14	13	23	1- 11	617	4.30
<i>Clethrionomys glareolus</i>	1+ 53	36	28	89	57	1+ 80	44	1- 24	63	1+ 47	1- 7	1- 13	24	17	14	596	4.16
<i>Microtus arvalis</i>	1+ 176	1+ 86	1- 27	112	107	111	83	1+ 156	97	68	1- 18	57	29	37	1+ 61	1225	8.54
<i>Rodentia</i> sp.	1+ 69	1+ 74	26	83	72	64	38	1- 22	1- 30	28	1- 6	23	2- 2	1- 10	15	562	3.92
<i>Insectivora</i> sp	3+ 236	1+ 71	30	97	1+ 134	1- 33	2- 16	1- 23	1- 28	1- 23	2- 2	2- 8	3- 1	2- 4	1- 7	713	4.97
other Mammalia	11	1+ 19	17	21	24	24	14	16	25	10	6	5	4	11	8	215	1.50
<i>Aves</i> sp.	2- 92	1- 141	1- 170	745	486	473	493	1+ 650	549	318	1+ 215	279	1+ 223	1+ 249	1+ 296	5379	37.51
<i>Amphibia</i> sp.	63	1+ 111	1+ 72	1+ 257	1+ 168	84	77	1- 57	3- 10	2- 10	1- 11	2- 9	2- 6	1- 11	3- 0	946	6.60
Mammalia	1+ 711	459	1+ 517	1034	794	951	635	1- 554	823	461	1- 122	352	210	1- 210	1- 182	8015	55.89
Aves	2- 92	1- 141	1- 170	745	486	473	493	1+ 650	549	318	1+ 215	279	1+ 223	1+ 249	1+ 296	5379	37.51
Amphibia	63	1+ 111	1+ 72	1+ 257	1+ 168	84	77	1- 57	3- 10	2- 10	1- 11	2- 9	2- 6	1- 11	3- 0	946	6.60
Σ	866	711	759	2036	1448	1508	1205	1261	1382	789	348	640	439	470	478	14340	100.00
Diversity H'	1.92	2.07	1.74	1.75	1.84	1.64	1.58	1.49	1.45	1.52	1.21	1.38	1.29	1.44	1.26	1.72	

Appendix 40. The diet of *Strix aluco* in Belgium (Delmee et al. 1979)
Appendix 40. Potrava *Strix aluco* v Belgicku (Delmee et al. 1979)

species / sites druhý / lokality	15	16	14	13	6	12	11	4	8	1	3	5	10	7	2	9	Σ	%		
<i>Oryctolagus cuniculus</i>	2+ 32	8	12	53		2	14 1-	0	1	2-	0		1				123	0.80		
	1+ 164	1+ 283	1+ 167	1+ 1307		1- 17	2- 56	2- 15	1- 9	4- 0	4- 12	2- 1	2- 1	3- 0	3- 4	2- 2	2038	13.19		
<i>Apodemus</i> sp.	140	1+ 182	1+ 159	1- 650	4	1+ 79	326 1-	63	25	1+ 57	124 1+	33	15	23	1+ 65	24	1969	12.74		
<i>Microtus subterraneus</i>	2+ 70	1- 16	1+ 37	216		1+ 16	1- 27	3- 0	5	1- 1	1- 12	2	3	1	12	418	2.71			
<i>Clethrionomys glareolus</i>	1+ 273	189	1+ 188	1040	4	40 1-	261	86	1+ 37	43	211 1-	8	19	18	1+ 77	26	2520	16.31		
<i>Neomys fodiens</i>	2	3	5	1+ 51			6			1-	0					67	0.43			
<i>Crocidura russula</i>		8	2	1+ 48		1-	1			1-	0					59	0.38			
<i>Elomys quercinus</i>	1- 0	5	2	1+ 60		2	1- 3			1-	0				1	73	0.47			
<i>Rattus norvegicus</i>	1- 1	10	7	1+ 90			16	1-	0	1-	5				1	131	0.85			
<i>Coleoptera</i> sp.	15	3-	0	1-	10	1+ 246	1	14	2-	9	2-	3		1	1-	1	302	1.95		
<i>Talpa europaea</i>	1- 39	1- 53	78	1+ 1120	1+ 8	34	2- 64	55	2-	1	3-	2	35	1- 3	1- 5	1- 19	1- 3	1520	9.84	
<i>Microtus arvalis</i>	2- 6	2- 8	3- 0	4- 15	1+ 22	3+ 460	3- 0	1- 0	1- 0	2- 0	4- 0		1-	0	2- 0	1- 0	511	3.31		
<i>Arvicola amphibius</i>		3	6	24		2	1+ 13	2		1+ 7					1	51	0.33			
<i>Pisces</i> sp.			2-	0		2+	20			1+ 7			1		2	30	0.19			
<i>Muscardinus avellanarius</i>	2		3-	0		2	1+ 17	1+ 7	1		4			3	4	3	43	0.28		
<i>Amphibia</i> sp.	46	1-	18	54	402	1-	3	92	1+ 48	1+ 21	15	1-	23	3	8	7	2- 1	3	744	4.82
<i>Sorex minutus</i>	1- 15	1- 2	1-	0	17	11	1+ 9	1+ 7	2+ 13	1+ 17	3	2		1		97	0.63			
<i>Sorex araneus</i>	1- 95	1- 86	1-	88	1168	1- 0	34	351	1+ 211	30	1+ 101	1+ 437	1+ 40	1+ 32	1+ 44	65	32	2814	18.21	
<i>Microtus agrestis</i>	2- 35	145	103	1- 529	1+ 10	41	1+ 360	1+ 143	1- 5	1+ 62	1+ 305	19	9	1+ 42	1+ 66	1+ 39	1913	12.38		
<i>Mustela nivalis</i>		1		6			2	1		1					1	12	0.08			
Mammalia	712	721	689	5093	26	275	1933	577	112	280	1+ 1150	108	83	136	1+ 313	128	12336	79.84		
Aves	1+ 164	1+ 283	1+ 167	1+ 1307		1- 17	2- 56	2- 15	1- 9	4- 0	4- 12	2- 1	2- 1	3- 0	3- 4	2- 2	2038	13.19		
Amphibia, Pisces	46	1-	18	54	402	1- 3	112	1+ 48	1+ 21	22	1- 23	3	9	7	2- 3	3	774	5.01		
Σ	937	1022	920	7048	26	296	2115	641	142	311	1188	112	93	144	321	134	15450	100.00		
Diversity H'	2.11	2.00	2.16	2.25	1.31	2.13	2.16	1.84	1.93	1.81	1.65	1.62	1.86	1.69	1.87	1.72	2.30			
15 – Bon-Secours, 16 – Hainaut occ.-6 lokalit, 14 – Slambruges, 13 – Bebel, 6 – Faures, 12 – Entre-S.M, 5 lokalit, 11 – Le Mesnil, 4 – Domaine, 8 – M. Fontaine, 1 – Bizieres, 3 – G. Collin, 5 – Douglas, 7 – Houpeaux, 10 – T. Vincent, 2 – Bonniers, 9 – T. Pestiaux																				

15 – Bon-Secours, 16 – Hainaut occ.-6 lokalit, 14 – Stamburges, 13 – Beboell, 6 – Faures, 12 – Entre-S.M. 5 lokalit, 11 – Le Mesnil, 4 – Domaine, 8 – M. Fontaine, 1 – Bizieres, 3 – G. Collin,
5 – Douglas, 7 – Houpeaux, 10 – T. Vincent, 2 – Bonniers, 9 – T. Pestiaux

Appendix 41. Gazetteer (T – table in text, A – table in appendices)

Appendix 41. Prehľad lokalít (T – tabuľka v texte, A – tabuľka v prílohách)

country / krajina	site / lokalita	orographical unit / geomorfologický celok	table no. / číslo tabuľky	dietary type / typ potravy	coordinates / súradnice		altitude / nadmorská výška [m]
					N	E	
Slovakia	Malé Karpaty	Malé Karpaty Mts.	T2	A			
	Zádielská dolina valley, upper part / horná časť	Slovenský kras Mts.	T3, T10	E	48° 38′	20° 49′	510
	Ohnište cave		T3, T9	D	48° 38′	20° 50′	410
	Erňa cave		T3, T9	D	48° 37′	20° 50′	380
	Zbojnická jaskyňa cave		T3, T9, A19	D	48° 33′	20° 34′	380
	Dolný Vrch		T3	A	48° 34′	20° 41′	530
	Jasov, Teplica		T3	A	48° 41′	20° 57′	300
	Hatiny, Bodva		T3	A	48° 40′	20° 60′	260
	other sites / ostatné lokality		T3	A			
	Silická ľadnica cave		T3, A2	A	48° 33′	20° 30′	480
	Líščia diera cave		T3, A3	A	48° 29′	20° 28′	370
	Maštaľná cave		T3, A4	A	48° 36′	20° 28′	570
	Ratková, Hámor	Revúcka vrchovina Mts.	T4	A	48° 37′	20° 05′	320
	Nandraž, gallery / štôľňa		T4, A5	A	48° 37′	20° 10′	420
	Jelšava, gallery / štôľňa		T4	A	48° 40′	20° 16′	480
	other sites / ostatné lokality		T4	A			
	Hrušov, granary / sýpka		T4	A	48° 30′	20° 03′	250
	Pokoradz, quarry / lom		T4, A6	A	48° 26′	20° 02′	470
	Prihradzany, church / kostol		T4	G1	48° 35′	20° 14′	270
	Nižné Valice, manor house / kaštieľ		T4, T15	G2	48° 27′	20° 12′	210
	Teplý Vrch		T4	G1	48° 28′	20° 05′	260
	Španie Pole, church / kostol		T4	G1	48° 31′	20° 08′	370
	Tornaľa, Činča valley	Bodvianska pahorkatina Mts.	A7	A	48° 27′	20° 27′	250
	Steblova skala	Cerová vrchovina Mts.	A7	A	48° 15′	19° 59′	460
	Hajnáčka, Ragáč		A7	A	48° 13′	19° 59′	430
	Šurice quarry / lom		A7	A	48° 13′	19° 55′	530
	Pohanský vrch		A7	A	48° 12′	19° 55′	550
	Soví vrch		A7	A	48° 12′	19° 54′	490
	Bystrická dolina valley	Veľká Fatra Mts.	T6, T7, A20	E	48° 49′	19° 03′	600
	Izbica cave		T6, T7	E	48° 49′	19° 02′	830
	Belianska valley, Suchá		T6	B	48° 57′	19° 06′	900
	Belianska valley, Šindolná		T6	B	48° 59′	19° 05′	720
	Belianska valley, Žiarna		T6	B	48° 59′	19° 02′	770
	Havranovo		T6, T7, A8	B	48° 56′	18° 57′	820
	Blatnická dolina valley, Laskárska		T6	B	48° 55′	18° 57′	820
	Blatnická dol. valley, Slnčné skaly		T6	B	48° 55′	18° 57′	850
	Dedošová, Veľké Studienky		T6	C	48° 54′	19° 02′	1230
	Necpalská Dedošová		T6	C	48° 57′	19° 05′	840
	Selenec, Pod Hubnou		T6	C	48° 56′	19° 04′	740
	Čierny Kameň		T6	C	48° 56′	19° 09′	1450
	Vrícko, Vrania skala	Malá Fatra Mts.	A9	B	48° 58′	18° 41′	920
	Kľačno, Drevená dolina valley		A9	B	48° 57′	18° 41′	750
	Turie, Pod Ostrou		T10, A9	E	49° 08′	18° 46′	670
	Kukurišova dolina valley		A9	B	49° 11′	18° 57′	960

Appendix 41. continuation / pokračovanie

country / krajina	site / lokalita	orographical unit / geomorfologický celok	table no. / číslo tabuľky	dietary type / typ potravy	coordinates / súradnice		altitude / nadmorská výška [m]
					N	E	
Slovakia	Stráňavy, Hýrov canyon / kaňon	Malá Fatra Mts.	T9, A9	D	49° 09′	18° 49′	540
	Zázrivá, Havrania skala	Kysucká vrchovina Mts.	A9	B	49° 17′	19° 10′	860
	Mošovské skaly	Žiar Mts.	A10	B	48° 57′	18° 46′	660
	Ondrašovské skaly		A10	B	48° 57′	18° 47′	720
	Zniev		A10	B	48° 58′	18° 47′	780
	Slovenské Pravno, Sokol		A10	B	48° 55′	18° 45′	620
	Vyšehradné, water station / vodáreň		A10	B	48° 53′	18° 41′	520
	Drieňov	Stražovské vrchy Mts.	T2, A11	A	48° 41′	18° 25′	280
	Čierna Lehota, Sokolia skala		A11	B	48° 53′	18° 21′	620
	Sovia skrýš cave		A11	B	48° 51′	18° 13′	470
	Malinová, nestbox / búdka		A11	B	48° 52′	18° 35′	540
	Uhrovecký hrad		A11	B	48° 44′	18° 24′	670
	Rokoš		T10, A11	E	48° 45′	18° 26′	830
	Malý Manín	Súľovské vrchy Mts.	T10, A11	E	49° 09′	18° 30′	700
	Hlboké, waterfall / vodopád	Vtáčnik Mts.	A11	B	49° 12′	18° 36′	520
	Žarnov		A12	B	48° 37′	18° 33′	740
	Jasenová skala		A12	B	48° 37′	18° 35′	850
	Veľká skala		A12	B	48° 38′	18° 35′	590
	Cígelf, Veľký Grič		A12	B	48° 42′	18° 40′	700
	Sebedražie		A12	B	48° 44′	18° 39′	550
	Hradec		A12	B	48° 45′	18° 42′	580
	Turček	Kremnické vrchy Mts.	A13	B	48° 45′	18° 55′	720
	Horná Ves		A13	B	48° 41′	18° 54′	520
	Jastrabia skala		A13	B	48° 38′	18° 55′	640
	Poštárka	Javorie Mts.	A13	B	48° 34′	19° 06′	400
	Rabenstein	Štiavnické vrchy Mts.	A13	B	48° 28′	18° 51′	710
	Sitno		A13	B	48° 24′	18° 52′	960
	Kysihýbeľ		A14	G1	48° 27′	18° 56′	580
	Jánošíkova skala	Poľana Mts.	A13	B	48° 40′	19° 24′	840
	Kaľamárka		A13	B	48° 36′	19° 25′	780
	Melichova skala		A13	B	48° 36′	19° 27′	860
	Klenovec	Veporské vrchy Mts.	A13	B	48° 40′	19° 46′	700
	Oravská Polhora, Pekárka	Oravské Beskydy Mts.	A14	C	49° 34′	19° 26′	850
	Oravice, Peciská	Západné Tatry Mts.	A14	C	49° 17′	19° 45′	850
	Oravice, Tichá dolina valley		A14	C	49° 17′	19° 48′	900
	Osobitá		A14	C	49° 16′	19° 43′	1170
	Habovka, Blatná dolina valley		A14	C	49° 16′	19° 40′	830
	Makov, Čierne	Javorníky Mts.	A15	C	49° 21′	18° 29′	640
	Makov, Potok	Turzovská vrchovina Mts.	A15	C	49° 23′	18° 28′	600
	Vysoká nad Kysucou, Nižný Kelčov		A15	C	49° 23′	18° 30′	580
	Klokočov, school / škola		T15, A15	G2	49° 27′	18° 34′	540
	Čadca, Bzdivonka		A15	C	49° 29′	18° 43′	530
	Čadca, Jurošovský vrch		A15	C	49° 27′	18° 46′	560

Appendix 41. continuation / pokračovanie

country / krajina	site / lokalita	orographical unit / geomorfologický celok	table no. / číslo tabuľky	dietary type / typ potravy	coordinates / súradnice		altitude / nadmorská výška [m]
					N	E	
Slovakia	Skalité, church / kostol	Kysucké Beskydy Mts.	T15, A15	G2	49° 30'	18° 54'	530
	Oščadnica, park		A15	C	49° 25'	18° 51'	430
	Oščadnica, Magura and Tertež		A15	C	49° 27'	18° 58'	900
	Východný Šíp	Šípska Fatra Mts.	A16	C	49° 10'	19° 11'	1040
	Biele Brehy	Chočské vrchy Mts.	A16	C	49° 07'	19° 19'	780
	Predný Choč, Válovy		A16	D	49° 07'	19° 20'	1030
	Turická dolina, Bačova skala		A16	C	49° 07'	19° 23'	750
	Vyšný Kubín, pod Chočom		A16	C	49° 10'	19° 20'	700
	Lúčky, Prašivá		A16	C	49° 09'	19° 21'	960
	Sielnický hrad castle		A16	C	49° 09'	19° 26'	880
	Brankovský vodopád waterfall	Nízke Tatry Mts.	A17	C	48° 59'	19° 18'	810
	Demänovská dol., Okno cave		A17	C	49° 01'	19° 35'	840
	Demänovská Zbojnická jaskyňa cave		A17	subfossil	49° 00'	19° 35'	870
	Pekliko, Výria jaskyňa cave	Slovenský raj Mts.	A18	C	48° 54'	20° 26'	700
	Klauzy, Biely potok		A18	C	48° 56'	20° 25'	630
	Duča cave		T9, A18	D	48° 52'	20° 18'	990
	Stratenská jaskyňa cave		T9, A18	D	48° 52'	20° 19'	990
	Poráčska valley / dolina	Volovské vrchy Mts.	A18	C	48° 53'	20° 47'	790
	Muránska planina Mts.	Muránska planina Mts.	T11	B			
	Tisovec, square / námestie		T11, T15	G2	48° 41'	19° 57'	400
	Zbojská		A21	C	48° 45'	19° 52'	850
	Pod Kľakom cave		A21	C	48° 46'	19° 58'	1280
	Malá Stožka		A21	C	48° 46'	19° 56'	1000
	Pätina, cottage / horáreň		A21	C	48° 47'	19° 56'	810
	Trsteník, cottage / poľovnícka chatka		A21	C	48° 48'	20° 06'	940
	Župkova Magura		A21	C	48° 49'	20° 10'	1040
	Voniaca valley		T12, A23	E	48° 42'	19° 57'	910
	Šarkanica cave		T12, A22	E	48° 43'	19° 59'	750
	Javornícková dolina valley		T12, A24	E	48° 43'	20° 00'	630
	Javorníková dolina valley		T12, A24	E	48° 44'	20° 01'	600
	Brestová		T12, A25	E	48° 45'	20° 01'	600
	Odštiepená skala		T12, A26	E	48° 45'	20° 01'	730
	Malé Leváre, čerpačka	Borská nížina lowland	T13	F	48° 31'	16° 57'	150
	Horný les		T13	F	48° 21'	16° 51'	145
	Jurský šúr, jelšina	Podunajská rovina lowland	T13	F	48° 14'	17° 13'	130
	Jurský šúr, Panónsky háj		T14	G1	48° 13'	17° 13'	130
	Gabčíkovo, park		T14	G1	47° 54'	17° 35'	120
	Bratislava, Sad Janka Kráľa		T15	G2	48° 08'	17° 07'	140
	Malé Vranie		T15	G2	47° 52'	17° 32'	115
	Kalinkovo		T15	G2	48° 03'	17° 14'	120
	Ptruksa	Východoslovenská rovina lowland	T13	F	48° 29'	22° 08'	100
	Boľany, lodge / horáreň		T13	F	48° 28'	22° 06'	100
	Malé Trakany, cottages / chatky		T13	F	48° 24'	22° 09'	105
	Biel, manor house / kaštieľ		T14	G1	48° 24'	22° 03'	110

Appendix 41. continuation / pokračovanie

country / krajina	site / lokalita	orographical unit / geomorfologický celok	table no. / číslo tabuľky	dietary type / typ potravy	coordinates / súradnice		altitude / nadmorská výška [m]
					N	E	
	Martin, field museum / skanzen	Turčianska kotlina basin	T14	G1	49° 02′	18° 56′	440
	Marské vršky		T14	G1	48° 57′	18° 52′	460
	Sebeslavce		T14, A27	G1	48° 57′	18° 57′	540
	Kláštorské lúky		T15	G2	48° 58′	18° 52′	430
	Turčianska Štiavnička		T15, A29	G2	49° 05′	19° 01′	440
	Necpaly, park, manor / park, kaštieľ		T15	G2	48° 59′	18° 58′	520
	Mošovce, park		T14, A28	G1	48° 55′	18° 53′	490
	Dolné Semerovce, Potok	Podunajská pahorkatina Mts.	T14	G1	48° 08′	18° 51′	160
	Kirť, park	Juhoslovenská kotlina basin	T14	G1	48° 07′	19° 29′	160
	Halič, park		T15	G2	48° 21′	19° 35′	240
	Vranov nad Topľou	Východoslovenská pahorkatina Mts.	T14	G1	48° 53′	21° 42′	210
	Bogdanický vršok	Borská nížina lowland	T15	G2	48° 25′	16° 53′	150
	Vysoká pri Morave		T15	G2	48° 19′	16° 55′	140
	Brodzany, park	Nitrianska pahorkatina Mts.	T15	G2	48° 37′	18° 20′	190
	Slovenská Ľubča, castle / zámok	Zvolenská kotlina basin	T15	G2	48° 46′	19° 17′	440
	Banská Bystrica, park		T15, A30	G2	48° 44′	19° 08′	350
	Ďurkov, manor house / kaštieľ	Košická kotlina basin	T15	G2	48° 42′	21° 27′	250
Czech Republic	Kančí obora	Dolnomoravský úval lowland	T13	F	48° 46′	16° 52′	150
	Rabňšpurk		T13	F	48° 40′	16° 56′	150
France	Salanches	Savoy Alps	A32		45° 57′	06° 39′	900
Italy	Monte Polino	Appennino Lucano	A32		39° 57′	16° 11′	1400
Slovenia	Topla Reber	Kočevski Rog	A32		45° 40′	14° 58′	600
Croatia	Veľká Paklenica	Velebit	A32		44° 20′	15° 29′	450
Montenegro	Tara, canyon / kaňon	Durmitor	A32		43° 14′	19° 01′	700
Bulgaria	Simitli	Pirin	A32		41° 52′	23° 07′	300
	Peruštica	Rhodopi	A32		42° 02′	24° 33′	700
	Laki		A32		41° 51′	24° 51′	900
	Kričin		A32		41° 59′	24° 29′	650
Romania	Pacific cave / jaskyňa	Bihariei	A33		46° 33′	22° 40′	800
	Sighistel		A33		46° 32′	22° 34′	600
	Unguru Mare cave / jaskyňa	Padurea Craiului	A33		46° 56′	22° 33′	365
	Misidului		A33		46° 55′	22° 32′	600
	Prapastiile Zarnestiilor	Piatra Craiului	A33		45° 31′	25° 17′	1060
	Gura Ponicovei	Munti Lovcei	A33		44° 36′	22° 15′	126
	Litkov, canal / kanál	Delta Dunarii	A33		45° 09′	29° 19′	1
Ukraine	Aj Petri, Jalta environs	Crimea	A34		44° 30′	34° 06′	500
	Sokolinoe, Bolšoj canyon / kaňon		A34		44° 31′	33° 58′	700
Russia	Krasnaja Poljana, canyon / kaňon	Western Caucasus	A34		43° 38′	40° 08′	270
	Žanchoteko, Baksan valley / dolina	Central Caucasus	A34		43° 31′	43° 11′	900
Jordan	Iraq al Wahaj, cave / jaskyňa	Ajlun	T17		32° 19′	35° 43′	740
Israel	Hula, Wádí Kadesh	Jordan Valley	T17		33° 07′	35° 34′	200
Lebanon	Bcharré	Lebanon	T17		34° 15′	36° 00′	1340
	Cedar Forest / Cédrový les		T17		34° 15′	36° 03′	1900

Appendix 41. continuation / pokračovanie

country / krajina	site / lokalita	orographical unit / geomorfologický celok	table no. / číslo tabuľky	dietary type / typ potravy	coordinates / súradnice		altitude / nadmorská výška [m]
					N	E	
Syria	Qal at Salahidin	Jebel An Nusariyah	T17		35° 36´	36° 06´	570
	Rabiah		T17		35° 48´	36° 05´	190
Turkey	Cevlik	Samandag	T17		36° 07´	35° 56´	70
	Belen, Topbogayi Geg	Nur Daglari	T17		36° 30´	36° 14´	1000
	Karadut	Nemrut Dag	T17		37° 55´	38° 48´	900
	Abant Golu	Koroglu Daglari	T17		40° 36´	31° 17´	1400
Iran	Asalem	Bogrov Dagh	A35		34° 41´	48° 51´	300
	Curti	Elborz	A35		36° 49´	50° 40´	620
	Derez Naud		A35		36° 40´	54° 04´	1400
	Bavineh		A35		33° 36´	47° 12´	1200
	Khosrow Abad	Zagros	A35		34° 10´	46° 22´	1300
	Bisahpur cave		A35		29° 47´	51° 35´	750
	Firuz Abad canyon		A35		28° 56´	52° 32´	1550
	Kalek	Alaj Mts.	A35		39° 50´	70° 55´	2400
Kyrgyzstan	Arslan Bob	Fergana Mts.	A35		41° 19´	72° 56´	1600
Nepal	Dur Pany	Sivalik	A35		27° 07´	87° 24´	2400