

Woodland Brown *Lopinga achine* (Nymphalidae, Satyrinae) still surviving in the Hlučín region?

Tomáš Kuras & Monika Mazalová

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Abstract: The study is focused on the distribution of the critically endangered *Lopinga achine* in the Hlučín region, near the border to Poland. *Lopinga achine* has been considered extinct there since the early 1970s. The paper provides data on the current distribution at several new localities in the vicinity of Vřesina near Opava, Pišť, Hat' and Děhylov (Silesia). The population of *L. achine* is not abundant in the Hlučín region. Host plant of the larvae is the sedge *Carex brizoides*, which makes it different from most other European populations. Currently, two isolated populations of *L. achine* survive in the Czech Republic (i.e. populations in Silesia and southeastern Moravia). Both the populations are threatened with extinction due to changes in forest management.

Key words: butterflies, Czech Republic, faunistic, habitat affinity, *Lopinga achine*, Silesia

Introduction

Woodland Brown, *Lopinga achine* (Scopoli, 1763), has a Eurosiberian distribution. The species inhabits light deciduous forests of lowlands and highlands within its range, having a single generation per year. In the central Europe, the adults appear from late May to early July (Beneš et al. 2002). *Lopinga achine* belongs to the most endangered butterflies both in the Czech Republic and the Europe. It is listed as vulnerable (VU) in the Red List of Butterflies of Europe (van Swaay et al. 2010) and is also listed in Annex IV of Directive 92/43/EEC and Annex II of the Bern Convention. In the Czech Republic, the species is protected under the law (in the category „critically endangered“) and is also recorded as critically endangered (CR) in the Red List (Hejda et al. 2017). During the 20th century it became extinct in the majority of its original localities. These were mostly located in lowland forests throughout the Czech Republic (Beneš et al. 2002). At the end of the millennium, the last known surviving population of the species was located in the Hodonínská doubrava near Mutěnice (Konvicka et al. 2008).

In the Hlučín region, the species previously occurred in several localities, i.e. the vicinity of Bohuslavice („Bor forest“), Háj ve Slezsku („Ohrozima forest“) and Bolatice-Borová (Pijáček 1949, 1951; Stiova 1973; Beneš & Kuras 1997). However, the species has been never recorded again after 1971 and thus has been considered extinct in the region (Beneš & Kuras 1997). In 2018, *L. achine* was found at a new locality in an isolated forest fragment near the village of Děhylov (Kuras et al. 2023). The unique recent record of *L. achine* was the reason for conducting an indicative field survey of the Hlučín region, with the aim of recording potential occurrence of the species also at other localities in the surroundings of the new record from 2018.



Fig. 1: Locations of *Lopinga achine* (red points) in the Hlučín area (on the basis of the map of Czech Office for Surveying, Mapping and Cadastre).

Material and methods

An indicative field survey of forest stands located in Silesia near the border with Poland in the Hlučín region was carried out between 2018 and 2023. During 2021 and 2022, we studied the population structure of *L. achine* at the locality near Děhylov (see Kuras et al. 2023). In 2023, we conducted field survey at other potentially suitable forest habitats in the wider Hlučín area. The area of interest is roughly restricted by the villages of Chuchelná, Pišť, Hat, Bohuslavice, Bolatice and Děhylov. Suitable forest habitats were searched during June for flying adults. The number of individuals, coordinates and the date were recorded as standard for each site where at least one individual was observed. The butterflies were captured if possible, the sex of the individuals was recorded, and then they were released again at the same site.

Faunal data arrangement

Faunistic records are listed according to their faunistic mapping square (*sensu* Pruner & Mika 1996). Each record include precise GPS coordinates, date of the record, the number of individuals observed, sex (in case they were identified; M – male, F – female) and additional information about the habitat (*sensu* Chytrý et al. 2010). Observations were made by the authors if not specified otherwise.

Results and discussion

Overview of *Lopinga achine* records:

1. Vřesina u Opavy (6075ac): 49°57'30.30"N, 18°11'43"E (11.vi.2023, 2♂♂), 49°57'42"N, 18°11'48"E (Dařanec Nature Reserve, 3.vii.2023, 2♀♀), 49°57'29"N, 18°11'45"E (11.vi.2023, 1♂); dispersed deciduous forest, along the forestpath and in forest openings; biotopes L3.2, L5.4 and L7.2.
2. Pišť (6075ac): 49°57'47"N, 18°12'38"E (11.vi.2023, 1♂), 49°57'57"N, 18°11'35"E (Doubrava forest, 11.vi.2023, 1♂), 49°58'3"N, 18°11'24"E (11.vi.2023, 1♂); 49°57'49"N, 18°12'59"E (16.vi.2023, 1 spec.); dispersed deciduous forest; biotopes L3.2 and L7.2.
3. Hat (6075ad): 49°57'31"N, 18°13'35"E (16.vi.2023, 2♂♂), 49°57'39"N, 18°13'54"E (16.vi.2023, 1 spec.); dispersed deciduous forest; biotopes L5.4 and L7.2

4. Děhylov (6175ac): 49°51'59"N, 18°11'31"E (Štěpán Nature Reserve, 6.vi.2023, 1♂, D. Miček observ.), 49°52'4"N, 18°10'59"E (Děhylovský potok - Štěpán Special Areas of Conservation, 26.v.2018 1♂, D. Miček observ., 28.vi.2018, 1 spec., 22.vi.–1.vii.2021 40♂♂/41♀♀, 10.vi.–1.vii.2022 150♂♂/145♀♀); approx. 30 years old oak plantation (Buček forest); and dispersed deciduous and mixed forest; biotope L3.2.

During 2018–2023, we recorded *Lopinga achine* at 4 cadastral areas (see Fig. 1). It is very likely that the species will also be found at other sites. Most of the records come from close localities, thus it is evident that the species forms more or less interconnected populations and/or metapopulation in the area.

Except of the small locality near Děhylov (Kuras et al. 2023), butterflies were observed rather sporadically. Relatively short period of the adults' emergence (June), inconspicuity of the butterflies in the forest, local occurrence, low abundance, and the low faunistic knowledge of the region probably resulted in the fact that occurrence of *L. achine* has been overlooked in the region for a long time and thus the species was considered extinct (Beneš & Kuras 1997).

The typical habitat where the butterflies have been observed is light deciduous forest with a high proportion of herbaceous cover dominated by *Carex brizoides* (Fig. 2). In terms of habitat classification (*sensu* Chytrý et al. 2010), these were mostly oak forests, i.e. Polonian oak-hornbeam forests (L3.2), wet acidophilous oak forests (L7.2), or acidophilous beech forests (L5.4). The canopy openness and the composition of tree species within the forest stand is similar to the habitats in the Hodonínská Doubrava forest (southern Moravia), where the species is associated with Pannonian thermophilous oak forests on sand L6.3 (Konvicka et al. 2008). Similar habitats (Polonian oak forests) as in the Hlučín region host an abundant population of *L. achine* in a large forest complex near the village of Kobiór in southern Poland (about 50 km northeast of Hlučín; *pers. observ.*).

Lopinga achine preferred forest gaps with a rich undergrowth of *Carex brizoides* L. at the localities of interest. *Carex brizoides* represents a host plant of larvae (ca. 50 ovipositions on *C. brizoides* leaves were observed, Kuras et al. 2023). However, the association with host plant species is regionally specific. *Carex montana* L. is reported as a host plant in Sweden (Bergman 1999, 2001), *C. alba* Scop. in the Bavarian Alps (Streitberger et al. 2012), *C. fritschii* Waisbecker and *C. michelii* Host in the Pannonian region of the Czech Republic (Konvicka et al. 2008), *C. brizoides* L. and *C. montana* L. in Poland (Buszko & Masłowski 2008), *Brachypodium sylvaticum* (Huds.) P. Beauv. in Switzerland (SBN 1987). The trophic relationship to *C. brizoides* indicates a mutual postglacial origin of the *L. achine* population from Hlučín with populations in southern Poland.

Occurrence of *L. achine* in the Hlučín region represents the only other known recent appearance of the species in the Czech Republic. The population in Hlučín seems to be unique and distinctive from the South Moravian population (Konvicka et al. 2008), due to its location in the Polonian region (Culek et al. 2005) and the larval association with *Carex brizoides*. However, the Hlučín population is also isolated and butterfly abundance is rather low (cf. Konvicka et al. 2008), so this newly found population of the Forest Brown is in severe risk of extinction.

It would be very useful to map in detail occurrence of the species in the forest complex north and west of Hlučín (i.e., especially the forests around Bělá, Chuchelná, Bolatice, Dobroslavice, Bohuslavice and Smolkov). Then, in cooperation with forest owners, implement measures to support the survival of the species in the future. *Lopinga achine* represents a suitable indication species of well-preserved light deciduous lowland forests. The extraordinary conservation status of the species and the fact that it occurs in the Czech Republic in the last two remnant

populations should result in adequate conservation efforts. The species should be included among the conservation priorities of protected areas where it occurs. These are the Děhylovský potok - Štěpán Special Areas of Conservation and the Dařanec Nature Reserve.



Fig. 2: Light deciduous forest with a high proportion of herbaceous cover is a typical habitat where the butterflies have been observed.

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References

- Beneš J. & Kuras T. (1997): Dlouhodobé změny diverzity heliofilních motýlů (Lepidoptera) Opavské pahorkatiny a Nízkého Jeseníku (Česká republika). II. [Long-term diversity changes of butterflies and burnets (Lepidoptera) in the Opavská pahorkatina Hills and the Nízký Jeseník Mountains (Czech Republic) – II.] – Čas. Slez. Muz. Opava (A), 46: 265–286.
- Beneš J., Konvička M., Dvořák J., Fric Z., Havelda Z., Pavlíčko A., Vrabec V. & Weidenhoffer Z. (2002): Motýli České republiky: Rozšíření a ochrana. I, II. [Butterflies of the Czech Republic: Distribution and Conservation I., II.]. Praha: SOM. 857 pp.
- Bergman K. & Landin J. (2002): Population structure and movements of a threatened butterfly (*Lopinga achine*) in a fragmented landscape in Sweden. – Biol. Conserv., 108: 361–369.
- Bergman K. (1999): Habitat utilization by *Lopinga achine* (Nymphalidae: Satyrinae) larvae and ovipositing females: implications for conservation. – Biol. Conserv., 88: 69–74.

- Bergman K. (2001): Population dynamics and the importance of habitat management for conservation of butterfly *Lopinga achine*. – J. Appl. Ecol., 38: 1303–1313.
- Buszko J. & Masłowski J. (2008): Motyle dzienne Polski [Butterflies of Poland]. Koliber, Nowy Sącz, 274 pp.
- Hejda R., Farkač J. & Chobot K. [eds] (2017): Červený seznam ohrožených druhů České republiky. Bezobratlí [Red List of threatened species of the Czech Republic. Invertebrates]. – Příroda, Praha, 36: 1–612.
- Chytrý M., Kučera T., Kočí M., Grulich V. & Lustyk P. [eds] (2010): Katalog biotopů České republiky [Habitat Catalogue of the Czech Republic]. Ed. 2. Agentura ochrany přírody a krajiny ČR, Praha, 445 pp.
- Konvicka M., Novak J., Benes J., Fric Z., Bradley J., Keil P., Hrcek J., Chobot K. & Marhoul P. (2008): The last population of the Woodland brown butterfly (*Lopinga achine*) in the Czech Republic: habitat use, demography and site management. – J. Insect. Conserv., 12: 549–560.
- Kuras T., Mazalová M., Koubíková L. & Losík J. (2023): Okáč jílkový (*Lopinga achine*), stále přežívá na Hlučínsku? Populační struktura a návrh managementu izolované populace druhu v okolí Děhylova [*Lopinga achine*, still surviving in the Hlučín region? Population structure and management proposal of an isolated population of the species in the vicinity of Děhylov], p. 12–13. In: Laštůvka Z. & Šefrová H. [eds], XIII. lepidopterologické kolokvium. Program a sborník abstraktů z konference 1. února 2023. MENDEL v Brně, Brno, 28 pp.
- Pijáček J. (1949): Okáč jílkový – *Pararge achine* Scop. [Woodland Brown – *Pararge achine* Scop.]. – Přírod. Sborn. Ostrav. Kraje, Ostrava, 10: 76.
- (1951): První příspěvek k průzkumu motýlí fauny na Hlučínsku [First contribution to the survey of butterfly fauna in the Hlučín region]. – Přírod. Sborn. Ostrav. Kraje, Ostrava, 12: 248–258.
- Pruner L. & Míka P. (1996): Seznam obcí a jejich částí v České republice s čísly mapových polí pro síťové mapování fauny [List of settlements in the Czech Republic with associated map field codes for faunistic grid mapping system]. – Klapalekiana, 32: 1–115.
- Schweizerischer Bund für Naturschutz (SBN) (Hrsg.) & Lepidopterologen-Arbeitsgruppe (1987): Tagfalter und ihre Lebensräume. (1987): Tagfalter und ihre Lebensräume: Arten, Gefährdung, Schutz. Band 1. Schweizerischer Bund für Naturschutz, Basel, 516 pp.
- Stiova L. (1973): Výskyt denních motýlů v oblasti Oderských vrchů, Jeseníků a Hlučínské pahorkatiny [Distribution of butterflies in the Oderské vrchy Hills, Jeseníky Mountains and Hlučínská pahorkatina Highlands]. – Entomol. Zpravod., Ostrava-Poruba, 3(2, 3): 1–20, 1–15.
- Streitberger M., Herman G., Kraus W. & Fartman T. (2012): Modern forest management and the decline of the Woodland Brown (*Lopinga achine*) in Central Europe. – For. Ecol. Manage., 269: 239–248.
- Van Swaay C., Cuttelod A., Collins S., Maes D., López Munguira M., Šašić M., Settele J., Verovnik R., Verstrael T., Warren M., Wiemers M. & Wynhof I. (2010): European Red List of Butterflies. Publications Office of the European Union, Luxembourg, 47 pp.

Author's addresses: Tomáš Kuras; Department of Ecology and Environmental Sciences, Faculty of Science, Palacký University Olomouc, Šlechtitelů 241/27, CZ-783 71 Olomouc – Holic; E-mail: tomas.kuras@upol.cz

Monika Mazalová; Department of Ecology and Environmental Sciences, Faculty of Science, Palacký University Olomouc, Šlechtitelů 241/27, CZ-783 71 Olomouc – Holic; E-mail: monika.mazalova@upol.cz