

RATIONAL HUNTING MANAGEMENT – THE IMPACT ON PLANT PRODUCTION AND ANNUAL CULLING OF WILD GAME ANIMALS

Marian Flis 

University of Life Sciences in Lublin, Poland
✉ marian.flis@up.lublin.pl

Abstract. The article reviews the field of hunting wild animals at the turn of the century, and the recent necessity to do so, mainly due to the increasing damage to agricultural and forest crops caused by ungulates. The existence of wild animals is inextricably linked to access to particular natural environments. In these areas, animals live and perform basic life functions, one of the most important of which is daily feeding. The current population management model provides for annual culling in accordance with the principles set out in the hunting management guidelines, i.e. obtaining a certain group of animals, considering population structures, so as to ensure the sustainability of the population. At the same time, these guidelines indicate that population management should eliminate or minimize the damage caused by animals, mainly to agricultural crops. A simulation of a 5-year suspension of hunters' activity in the field of hunting management, especially the shooting of large game animals, clearly shows what the consequences would be in terms of the dynamics of the numbers of individual species. In this short period of time, the number of deer and wild boars would increase quite significantly: estimates indicate that the number of deer would increase several times, while that of wild boars would grow by as much as 30 times. With such high densities of ungulates, due to their pressure on their habitats, it would be impossible to conduct rational agricultural management, and in some situations forest management as well. Such solutions would result in very high amounts of compensation having to be paid to the injured parties by the legal owner of the game animals, i.e. the State Treasury. Therefore, these burdens would actually be borne by society as a whole. However, examples from 2016-2018 showed that the State as an institution is completely unprepared for this, both substantively and financially.

Keywords: hunting management, shooting game, large game, hunting damage, compensation for damage, hunting clubs

INTRODUCTION

Hunting is a form of social activity that has always been known to humanity. Primitive peoples hunted and killed wild animals to survive, as their meat was the basic source of food due to the fact that there were no alternative sources of obtaining high-value food and food in general. Fishing or gathering alone did not provide the appropriate quantity and quality of food, therefore hunting was necessary. This is evidenced by the results of research conducted on the remains of *Homo sapiens*,

especially from the Ice Age, a time of exceptional food shortages and when agricultural production was seasonal. At that time, the basis of human nutrition was the meat of wild animals. As civilizations developed, the art of killing wild animals also improved, and with it the effectiveness of hunting. This undoubtedly contributed to attempts to domesticate animals, which is often indicated as the main reason for projects in the field of domestication and subsequent animal breeding. Even primitive farming provided constant access to food and the possibility of it being available at various times of

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the yearly cycle (Konarzewski, 2005; Mann, 2005; Konarzewski, 2015; Seprell, 2021). Although the dog and cat were the first to be domesticated, which in turn was conditioned by the need to defend themselves against other wild animals in early tribal societies, the main idea of domestication was the need for meat (Driscoll et al., 2009; Teletchea, 2019).

With the domestication of basic animal species, now considered farm animals, people mastered the art of cultivating land and plants. Although the first mentions of this process date back to 130,000 years ago, it is generally accepted that it is much more recent than animal domestication. It is assumed that the main trends related to agriculture primarily concerned the cultivation of cereals and date back to about 7 thousand years ago; in actual fact, it was about the time that sheep and goats were domesticated, mainly in the area of the Fertile Crescent. Therefore, the process of animal breeding and farming can be described as inherent to human food, but also to the growing demand for feed for farm animals (Bell, 1987; Flis, 2023a). However, it should be emphasized that hunting as a source of food, and in later periods as a form of rest and recreation as well as trophies for competition, has never been eliminated from the life of societies. With the development of civilization, both farming methods and hunting techniques changed, which was determined not only by the development of new technologies, but also by intensive changes in the natural environment. Modern hunting is definitely different to the model shaped by many generations of initially hunters and later hunters. At the turn of the century, the ownership of game and the legal possibilities of hunting on various lands in the context of their ownership changed radically. The consequence of environmental changes is the significant impoverishment of the living areas of animals both in forest ecosystems and agroecosystems, and thus the extinction of many species, while creating almost unlimited life opportunities for others that have a wide ecological tolerance, and thus in terms of the choice of environments in which exist (Jezierski, 2007; Flis, 2011; Gwiazdowicz, 2012; Dziedzic, 2014; Flis, 2018a; Kościelniak-Marszał, 2020). The aim of this study is to present historical and current administrative, legal and economic solutions regarding the possibilities of conducting hunting activities in forest and agricultural areas in terms of annual shootings and damage caused by ungulates in forest ecosystems and agroecosystems.

RESULTS AND DISCUSSION

Modern hunting models

Currently, all activities related to hunting management in Poland are carried out by two institutions. The first and dominant one is hunting clubs, associated in one nationwide organization, the Polish Hunting Association. The second one is the State Forests Administration. All activities in this area are carried out in administratively separated areas, such as hunting districts. In turn, the division into hunting districts is made by way of an act of local law, i.e. a resolution of the competent assembly of the voivodeship to which the division applies. One rather important issue is the fact that the area of hunting districts cannot be less than 3,000 hectares, which is important mainly for ecological reasons in terms of the functioning of the population of individual game species, especially large game. There are almost 5,000 hunting districts in the country, the vast majority of which are leased by hunting clubs, with the rest are managed as game breeding centers (Fig. 1).

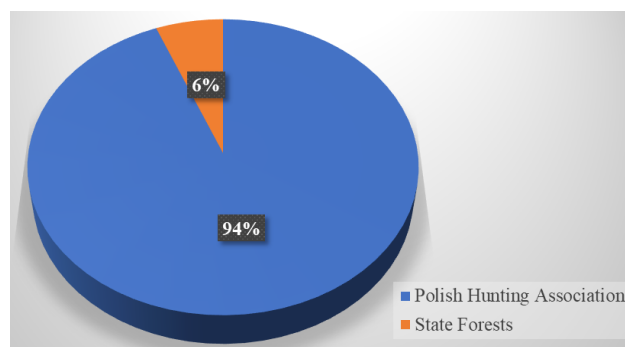


Fig. 1. Structure of the participation of hunting districts in the field of hunting management conducted by individual institutions

Source: own elaboration.

Due to the possibility of managing individual areas (lease management) not owned by hunters, these entities pay rent each year, known in hunting as a tenancy fee. The lease fee is paid to the communes and municipalities within which the hunting grounds are located. This amount is set annually, and takes into consideration the hunting category of the grounds and the price of rye. In the 2022/23 hunting season, hunting entities paid a total of PLN 22.3 million of these liabilities. The amounts paid annually in rent go to the budgets of local

governments, not landowners, which has been quite widely criticized in recent years and even leads to conflict situations in some cases (Flis, 2023b).

The basic elements of hunting management are those related to the appropriate management of population dynamics of individual species. These tasks involve conducting annual inventories of game in spring, determining potential reproduction possibilities, and thus the growth rate realized, and based on these data, determining the extent of hunting activities in this population, or deciding to suspend shooting. Quite important in this respect is also the possibility of the occurrence of diseases in wild animals, and thus the activity of hunters in the field of sanitary shooting of game, which is currently carried out in the wild boar population because of the occurrence of the African swine fever virus (Olech and Suchecka, 2016; Popczyk, 2016; Flis, 2019; Flis, 2023b). Hunting management is also related to the need to improve the living conditions of animals in changing environmental conditions, which often significantly limit or even exclude the functioning of individual populations. Every year, activities are carried out to enrich or supplement the feeding base or supplement it in the winter. Elements related to seasonal migrations are extremely important to how many populations function. Thus, in the era of progressive urbanization and therefore shrinking areas of animal habitat, combined with the isolation of some habitats and the possibility of communication via road infrastructure, many population processes of individual species are significantly

disrupted. Hence, the role of hunters is also focused on planning processes regarding the preservation of migration corridors and communication routes (Fig. 2). It is worth emphasizing that all the activities described here are financed from hunters' own funds (Kozłowski et al., 2018; Flis, 2023a; Flis, 2023b; Flis, 2023c).

The impact of game on agrocenoses

One of the inherent elements of how a population functions is its staying permanently or periodically in specific environments, which are referred to as living areas. Additionally, animals tend to migrate in specific annual and daily cycles, which is mainly determined by the period of sexual drive or feeding. In the current conditions of ecosystem changes, and mainly the almost logistical increase in stressors of anthropogenic origin, especially in forest environments, there have been specific changes in the behavior of animals that were until recently referred to as forest animals. Wild boars were the first to respond to these changes, and now there is an almost constant incidence of deer in the environments of large-scale agricultural crops. These types of changes contribute significantly to the destruction of crops due to feeding and trampling, which in legal and social terms is referred to as hunting damage (Fig. 3) (Flis, 2013; Sporek and Sporek, 2016; Węgorek, 2002).

In a situation where wild game animals cause damage to agricultural crops, which according to the Supreme Court's interpretation are all crops established on agricultural land, compensation is due. Even though,



Fig. 2. Properly planned and implemented game crossings partially eliminate the negative impact of road infrastructure on the functioning of the population
Source: own elaboration.



Fig. 3. Corn crop destroyed almost 100% by red deer
Source: own elaboration.

according to the law, free wild game animals are the property of the State Treasury, legal and material liability for damage to agricultural crops caused by such animals is borne by the tenants or managers of the hunting districts where it occurred. Therefore, in the light of legal provisions, it is these entities that determine the extent of losses, evaluate them and pay appropriate compensation to farmers. This procedure usually consists of a preliminary damage assessment and a final assessment, during which the amount of compensation due is established. These calculations include the size of the damaged area, the degree of destruction and the market value of a given agricultural product. Therefore, the amounts of compensation paid by hunters each year vary, because they depend not only on the extent of the damage, but also on the economic situation on agricultural markets and the potential prices obtained by farmers for specific products (Flis, 2010; Sporek, 2014; Flis, 2023c). Despite this, over the last decade, a gradual increase in compensation amounts has been observed, which is confirmed by the trend line equation of $y = 5123.8x + 61228$ (Fig. 4).

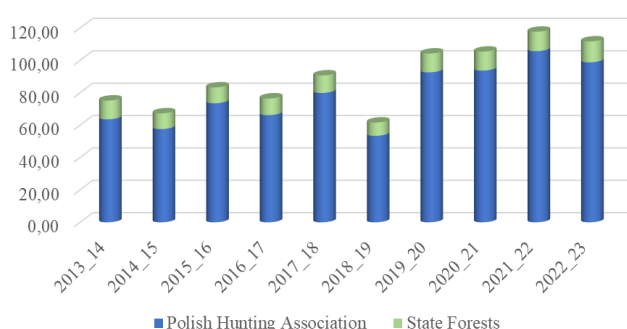


Fig. 4. The amounts of compensation paid by the Polish Hunting Association and the State Forests over the last decade
Source: own elaboration – Based on Central Statistical Office data (GUS).

The problems described here are becoming increasingly acute, mainly due to the fact of continued intensification of agriculture and the emergence of large-scale plantation crops, where all preventive actions by hunters usually do not bring results, and therefore animals have colonized this type of crops not only as feeding places but also as adapted living environments. It is also important to highlight the fact that emerging new varieties of crops and new species not yet cultivated in Poland contribute to the increased interest in these crops

among wild animals. According to research conducted in southwestern Poland and Germany, the annual increase in energy supply per 1 ha of crops in arable fields ranged from 6% to 7%, and protein up to 8%. Thus, it has a significant impact on the individual condition, as well as on the reproduction and population growth rates, which is a key element that directly affects the population dynamics and thus the extent of damage to agricultural crops (Zawadzki et al., 2011; Flis and Rataj, 2017; Flis, 2018b; Głodkowska and Gałązka, 2018).

Lack of hunter activity and its consequences

In recent years, there has been a growing wave of criticism towards the shooting of wild game animals, and thus also towards the actions of hunters in this regard. Influenced by reports from various pseudo-protection organizations, disseminated mainly through the use of social media, many people have formed negative attitudes towards hunting and the necessity of conducting such activities, to the extent that they demand the cessation of hunting. Those with negative attitudes towards hunting cannot be convinced that the annual capture of a certain part of the wild animal population is justified for both natural and economic reasons. Considering the fact that managing wild animal populations within the framework of hunting management conducted by hunters is based on the principles of sustainable development, the annual shooting of a specific pool of animals of individual species does not negatively affect how these populations function further. This is confirmed by statistical data, which show clearly that despite annual hunting, most large game species continue to grow. Therefore, the current shape and model of population management of these species seems to be optimal, and hunting at a sustainable level guarantees population stability, even with a slight upward trend (Fig. 5 and Fig. 6).

In order to illustrate the potential growth of the populations of particular large game species in the natural environment, in the absence of hunting and the complete cessation of hunting, a stimulation of the dynamics of game numbers for the next five years was produced. When performing this simulation, the numerical input data was used according to data from the Central Statistical Office's spring inventory of 2023. For the purposes of forecasting growth, the guidelines of the Supreme Hunting Council on hunting planning for managing large game populations were adopted (GUS, 2023;

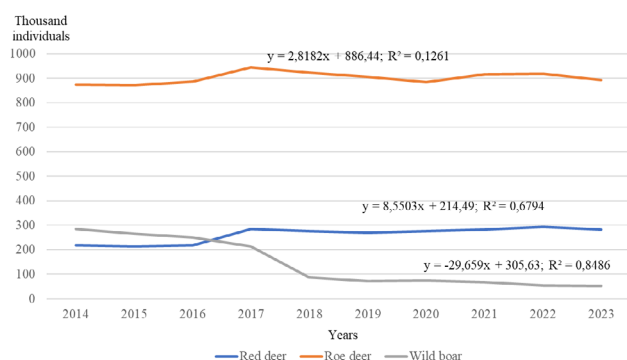


Fig. 5. Dynamics of the abundance of red deer, roe deer and wild boar over the last decade

Source: own elaboration – Based on Central Statistical Office data (GUS).

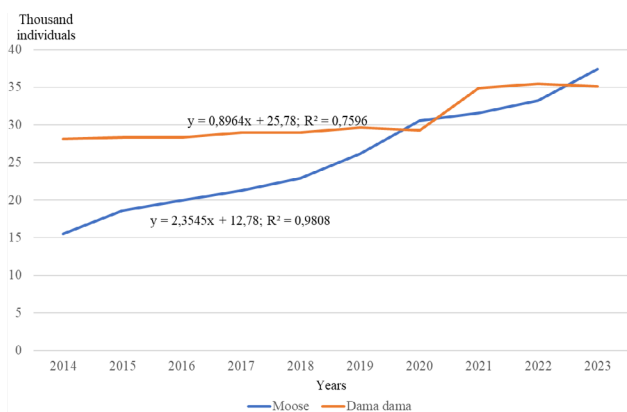


Fig. 6. Dynamics of the abundance of moose and fallow deer over the last decade

Source: own elaboration – Based on Central Statistical Office data (GUS).

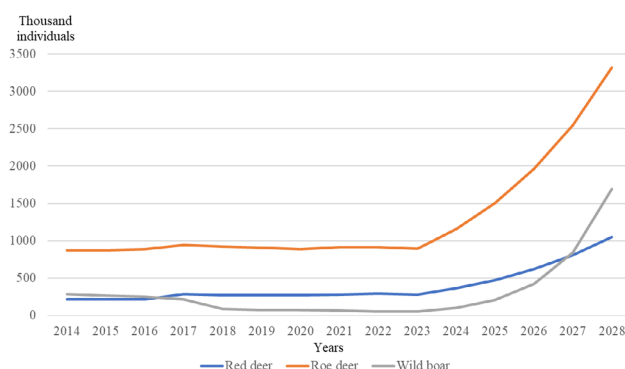


Fig. 7. Forecast of red deer, roe deer and wild boar numbers for the next 5 years, with the cessation of annual shooting

Source: own elaboration – Based on Central Statistical Office data (GUS).

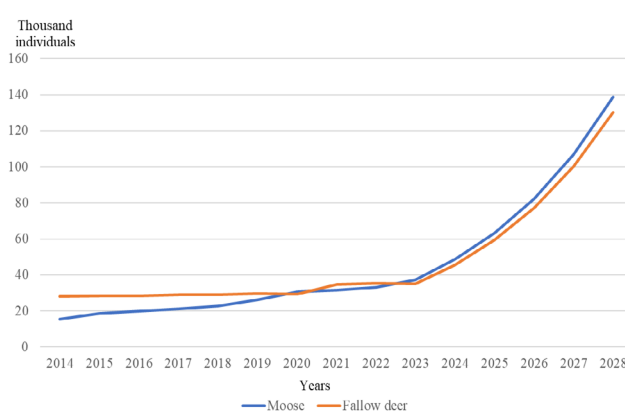


Fig. 8. Forecast of moose and fallow deer numbers for the next 5 years, with the cessation of annual shooting

Source: own elaboration – Based on Central Statistical Office data (GUS).

Uchwała, 2013). For the simulation, the assumed level of increase was 30% of the spring number of fawns and 200% for wild boars (Fig. 7 and Fig. 8).

These simulations show that the cessation of hunters' activities and the cessation of shooting altogether within a period of five years would lead to an unimaginable increase in the numbers of individual species. After five years of no hunting, there would be just over 1 million deer, 3.3 million roe deer and 1.7 million wild boars in the environment. Adding moose, which are currently not hunted due to the 22-year moratorium, such a high number of ungulates would lead to a situation in which it would be impossible to conduct rational, or

even any, agricultural and forest management. Because of overpopulation and changes in the behavior of ungulates described earlier, the pressure they exert on agroecosystems would be so great that it would be impossible to grow any agricultural plants successfully. This situation would also have a very significant impact on forest environments, where the damage in the younger stages of development of tree stands would be so great that it would be impossible to regenerate the forest and carry out any production in this area.

In the situation described here, it seems necessary to undertake measures to reduce wild game animal numbers on an annual basis and to do so in line with the

principles of sustainable development, and above all, the trophic possibilities of the ecosystems in which the animals live. Such a small group (hunters), numbering just over 120,000 people, though quite often subjected to criticism framed as ‘killing’, is able to carry out its activities without the need for any interference from the State apparatus. It is also worth emphasizing that in addition to the economic and financial losses described here, in the absence of hunters’ activity, we would be dealing with a situation in which both compensation and all fees for activities to estimate losses would have to come from the budget sums of the State Treasury as the legal owner of wild game animals.

CONCLUSION

The discussion of the historical, social, and mainly economic aspects of hunting wild animals presented here show that, although the need for hunting has changed dramatically, it remains elements of the functioning of modern societies. The increasingly popular populist slogans about the need to stop hunting altogether, which have appeared in recent years, offer no justifications other than emotional ones. Ongoing changes in the natural environment result in highly dynamic changes in the behavior of wild animals, with a tendency to become more and more common in agroecosystems, especially in extensive plantations. This state leads to an increase in the reproductive potential of individual populations and, consequently, a stronger impact on the habitats, which in economic terms leads to damage and the need for compensation paid by hunters. In the event of a complete cessation of hunters’ activities, which would result in large game animals not being hunted, the simulations performed for a period of five years indicate an unimaginable increase in the numbers of animals of these species, which would lead to a complete inability to carry out plant production in agroecosystems and forests, not to mention collisions and road accidents. Additionally, all issues related to compensation in this respect would then be covered by society as a whole, and not, as before, from hunters’ own funds.

REFERENCES

Bell, G.D.H. (1987). The history of wheat cultivation. In: *Wheat breeding*. Springer, Dordrecht (pp. 31–49). https://doi.org/10.1007/978-94-009-3131-2_2

- Driscoll, C.A., Macdonald, D.W., O’Brien, S.J. (2009). From wild animals to domestic pets, an evolutionary view of domestication. *PNAS*, 106 (Supplement 1), 9971–9978. <https://doi.org/10.1073/pnas.090158610>
- Dziedzic, R. (2014). Łowiectwo: historia, kultura, funkcjonowanie, znaczenie. *Stud. Włoc.*, 16, 90–105. Retrieved from: https://bazhum.muzhp.pl/media/files/Studia_Wlclawskie/Studia_Wlclawskie-r2014-t16/Studia_Wlclawskie-r2014-t16-s90-105/Studia_Wlclawskie-r2014-t16-s90-105.pdf
- Flis, M. (2010). Szkody łowieckie w świetle uwarunkowań ekonomicznych i prawnych. *Wiś Roln.*, 4(149), 95–103. Retrieved from: <https://doi.org/10.53098/wir.2010.4.149/06>
- Flis, M. (2011). Prawo własności i prawo do polowania a odpowiedzialność za szkody łowieckie. *Wiś Rol.*, 3(152), 182–188.
- Flis, M. (2013). Ecological, legal and economic aspects of evaluating the damages caused by wild animals. *Environ. Prot. Nat. Res.*, 24, 3(57), 53–58. 10.2478/oszn-2013-0029
- Flis, M., Rataj, B. (2017). Zmiany w krajobrazie rolniczym a wskaźniki rozrodu dzików. *Wiad. Zoot.*, LV(4), 124–131. Retrieved from: https://wz.iz.edu.pl/files/WZ_2017_4_art14.pdf
- Flis, M. (2018a). Rola gospodarki łowieckiej w ochronie przyrody. *Stud. Mat. Cent. Eduk. Przyr. Leś. Rog.*, 20, 55/1, 113–122. Retrieved from: <https://bibliotekanauki.pl/articles/880247>
- Flis, M. (2018b). Szkody łowieckie – stan faktyczny i kolejne rozwiązania prawne. *Zag. Doradz. Rol.*, 4, 112–122.
- Flis, M. (2019). Biologia, reprodukcja i demografia dzików w realiach wzmożonego odstrzału ze względu na występowanie wirusa afrykańskiego pomoru świń, *Życie Wet.*, 94(2), 149–153. Retrieved from: <https://zycie-weterynaryjne.pl/wp-content/uploads/2023/12/ZW-02-2019-07.pdf>
- Flis, M. (2023a). Rolnictwo i łowiectwo – konflikt czy wspólnota interesu. In: *Lasy i leśnictwo a rozwój obszarów wiejskich* (pp. 46–60). Wielkopolski Oddział Polskiego Towarzystwa Leśnego. Poznań.
- Flis, M. (2023b). Efektywna gospodarka leśna i rolna a zadania myśliwych. In: *Wyzwania współczesnego łowiectwa w Polsce* (pp. 35–44). Warszawa: Kancelaria Senatu.
- Flis, M. (2023c). Kondycja finansowa kół łowieckich na tle zobowiązań z tytułu szkód w uprawach i płodach rolnych. *Agro. Sci.*, online first, 1–10. <https://doi.org/10.24326/as.2023.5114>
- Głodkowska, M., Gałązka, A. (2018). Intensyfikacja rolnictwa a środowisko naturalne. *Zesz. Probl. Post. Nauk Rol.*, 592, 3–13. 10.22630/ZPPNR.2018.592.1
- Gwiazdowicz, D.J. (2012). Łowiectwo a ochrona przyrody. [w:] *Problemy współczesnego łowiectwa w Polsce* (pp. 89–114). Poznań: Ofic. wyd. G&P.

- Jezierski, W. (2007). Możliwości życiowe niektórych gatunków zwierząt łownych. Sylwan, 5, 3–16. Retrieved from: <https://bibliotekanauki.pl/articles/1016738>
- Konarzewski, M. (2005). Na początku był głód. Ewolucja ludzkiej diety. Warszawa: Wydawnictwo Państwowego Instytut Wydawniczy.
- Konarzewski, M. (2015). Od paleolitu do syntetycznego hamburgera: ewolucyjna historia zwyczajów żywieniowych człowieka. In: Ewolucja na talerzu, czyli wczoraj, dziś i jutro żywienia człowieka. Poznań: Wydawnictwo Uniwersytetu Przyrodniczego w Poznaniu.
- Kościelniak-Marszał, M. (2020). Transformacja Polskiego Związku Łowieckiego w świetle ewolucji modelu łowiectwa w Polsce. Stud. Prawnostr., 50, 173–206. <https://doi.org/10.31648/sp.6039>
- Kozłowski, T., Kozłowski, J., Kozłowska, P. (2018). Uwarunkowania prawne w funkcjonowaniu gospodarki łowieckiej. Zesz. Nauk. Gdań. Szk. Wyż., 2(19), 101–112. <https://doi.org/10.24426/zngsw.v19i2.51>
- Mann, N.J. (2005). Omega-3 fatty acids in the Australian diet. Lipid Technol., 17(4), 79–82.
- Popczyk, B. (2016). Zarządzanie populacją dzika *Sus scrofa* w Polsce. In: Zarządzanie populacjami zwierząt. Wydawca – Polski Związek Łowiecki, Łowiec Polski Sp. z o.o. Warszawa, 29–45.
- GUS (2023). Rocznik Statystyczny Leśnictwa 2023 (pp. 154–173). Warszawa: Główny Urząd Statystyczny. Retrieved from: <https://stat.gov.pl/obszary-tematyczne/roczniki-statystyczne/roczniki-statystyczne/rocznik-statystyczny-le-snictwa-2023,13,6.html>
- Seprell, J.A. (2021). Commensalism or cross-species adoption? A critical review of theories of wold domestication. Front. Vet. Sci., 8, 662370. <https://doi.org/10.3389/fvets.2021.662370>
- Sporek, M. (2014). Szkody łowieckie w uprawach rolnych. J. Agribus. Rural Dev., 2(32), 181–188.
- Sporek, K., Sporek, M. (2016). Zmiany środowiska przyrodniczego i ich wpływ na populację zwierząt. In: Zarządzanie populacjami zwierząt (pp. 125–141). Warszawa: Polski Związek Łowiecki, Łowiec Polski.
- Teletchea, F. (2019). Animal domestication: A brief overview. In: Animal Domestication, IntechOpen. <https://doi.org/10.5772/intechopen.86783>
- Uchwała Naczelnej Rady Łowieckiej (2023). Uchwała w sprawie przyjęcia zmian w „Zasadach selekcji populacyjnej i osobniczej zwierząt łownych w Polsce oraz zasadach postępowania przy ocenie zgodności odstrzału”. Warszawa: Naczelna Rada Łowiecka– 15 lutego 2023 roku.
- Węgorek, P. (2002). Cykl zasiedlania wielkoobszarowych upraw kukurydzy przez subpopulacyjne ugrupowania dzików i dynamika narastania szkód w zależności od fazy rozwojowej tych upraw. Progr. Plant Prot., 42(2), 730–735.
- Zawadzki, A., Szuba-Trznadel, A., Fusch, B. (2011). Baza pokarmowa, charakterystyka populacji i sezonowość rozrodu dzików na terenie Gór Kaczawskich. Zesz. Nauk. Uniwers. Przyrod. Wroc. Biol. Hod. Zw., 63, 363–376.