Acta Sci. Pol.
Silv. Colendar. Rat. Ind. Lignar. 5(1) 2006, 135-144

POTENTIAL INFLUENCE OF PREDATORS ON THE POPULATIONS OF THE HARE AND GROUND NESTING BIRDS IN THE HUNTING AREAS OF THE WARMIA AND MAZURY REGION

Dariusz Zalewski, Marta Sarnowska, Stanisław Szypowski
University of Warmia and Mazury in Olsztyn

Abstract. The aim of the study was to determine the actual influence of predators on the populations of small game animals in the hunting areas of the Warmia and Mazury region. The experiment was carried out in the area of the Game Breeding Centre in Załuski, belonging to the District Board of the Polish Hunting Association in Olsztyn, situated in the Warmia and Mazury Province in the Forest Division of Nidzica. It consists of two field hunting grounds covering a total area of 9,638 ha. Artificial nests were established in 11 diverse study sites located in the areas representative of the hunting grounds. Three trials were performed. While checking the nests placed in experiment I (after day 21), all nests (143) were found destroyed. In experiment III, during the check after seven days from the date the eggs were placed in the nests, all nests were found completely destroyed. The results of the study indicated a strong potential predatory pressure on the populations of small game animals.

Key words: predator, prey, animal protection, small game, biodiversity

INTRODUCTION

Our activities concerning Polish wildlife are limited to the passive registration of phenomena which negatively affect the number of species – and not only those that are protected by law, but also game species. The notion of active nature protection more and more frequently means nothing but a good advertising slogan [Przybylski 2000]. This has a particularly negative effect on the species of small game animals, birds and small mammals that are placed under protection. The decline in their number is attributed first of all to the increase of pressure from predators, the reduction of the acreage of breeding sites for birds or hiding places, e.g., for hares in an urban and transformed landscape, and splitting the acreage of individual animals by a network of heavy traffic roads

Corresponding author – Adres do korespondencji: Dr inż. Dariusz Zalewski, Chair of Fur-bearing Animal Breeding and Game Management of University of Warmia and Mazury in Olsztyn, Oczapowskiego 5, 10-718 Olsztyn, Poland, e-mail: d.zalewski@uwm.edu.pl

[Goszczyński and Wasilewski 1992, Reynolds and Tapper 1995, Bresiński 1999, Dziedzic et al. 2000]. All these factors are favourable for predators such as the fox, which increasingly adjusts to the conditions created by the man, and now more intensely populates rural and suburban areas and more frequently feeds on rubbish left by people [Kamieniarz 1996]. Additionally, hunting pressure on the fox has been reduced, as well as poaching, which used to be significant factors in the reduction of predators [Tapper 1995]. In 1993, in western Poland, and later also in other places, the activities of scattering rabies vaccines began, which was one of the causes of a reduction in the mortality rate among foxes [Kołodziej 1996]. Also, other species of predators besides the fox should be taken into consideration. The number of partridges in Poland in the 1990s was reduced almost three-fold [Kamieniarz and Panek 2000, Panek et al. 2002]. One of the major causes of this situation was an increase in the population of predators that are active in the nesting period.

The aim of this study was to demonstrate the current influence of predators on the populations of the hare and ground nesting birds in the hunting areas of the Warmia and Mazury region, based on the example of the Game Breeding Centre in Załuski, managed by the District Board of the Polish Hunting Association in Olsztyn.

MATERIALS AND METHODS

The experiment was carried out in the area of the Game Breeding Centre in Załuski, which belongs to the District Board of the Polish Hunting Association in Olsztyn, and which is situated in the Warmia and Mazury Province in the Forest Division of Nidzica. It consists of two hunting grounds, No. 176 and 180, of a total area of 9638 ha, including 895 ha of forests – 9.3% in about 40 complexes, the largest of which cover to 200 ha, managed by the District Organization of the Polish Hunting Association in Olsztyn.

The sites that were selected for the experiment were representative of the hunting areas in the analysed hunting grounds. There were divided into four types of areas: field-bog, forest-bog, field, and forest. The objective of this study was to carry out three trials in the following periods: experiment I – from April to June 2002, experiment II – from July to September 2002, experiment III – from March to May 2003.

In order to determine the influence of predators on their prey, sites for building artificial nests (Phot. 1) were established in each type of study area. Artificial nests were built on the ground, so the influence of predators on their prey in case of that experiment concerned primarily ground-nesting birds, as well as small game mammals, e.g. the hare. The experiment involved establishing a total of 11 diverse study sites (control points) in the four above-mentioned types of areas:

– in a field-bog area – 6 study sites,
– in the forest-bog area – 2 study sites,
– in the forest area – 2 study sites,
– in the field area – 1 study site.

In experiments I and II, 13 nests were placed in each of the above-mentioned study sites, which gives a total of 143 nests used in each experiment (Table 1).

Phot. 1. An artificially established nest
Fot. 1. Sztucznie założone gniazdo

Table 1. The model used for experiments I and II, taking into consideration the number of study sites, the number of nests and the number of eggs
Tabela 1. Schemat metodyki I i II doświadczenia, uwzględniający liczbę powierzchni próbnych, liczbę gniazd oraz liczbę wyłożonych jaj

Type of a research area Typ terenu badań	Number of study sites Liczba wyznaczonych powierzchni próbnych	Number of nests Liczba wyłożonych gniazd	Number of eggs Liczba jaj
Field-bog – Polno-bagienny	6	78	468
Forest-bog – Leśno-bagienny	2	26	156
Forest – Leśny	2	26	156
Field – Polny	1	13	78
Total – Razem	11	143	858

In subsequent experiments, each artificially built nest had 6 eggs, 4 of which were unhatched eggs from the chicken brooder and 2 were consumable eggs bought in a shop.

Nests were built in basins close to trees and bushes, in high grass, next to drainage ditches and in open fields.

The method was partially changed in experiment III, where 200 nests in total were placed in all types of study sites (Table 2).

Table 2. The model used for experiment III, taking into consideration the number of study sites, the number of nests and the number of placed eggs
Tabela 2. Schemat metodyki III doświadczenia, uwzględniający liczbę powierzchni próbnych, liczbę gniazd oraz liczbę wyłożonych jaj

Type of a research area Typ terenu badań	Number of study sites Liczba wyznaczonych powierzchni próbnych	Number of nests Liczba wyłożonych gniazd	Number of placed eggs Liczba wyłożonych jaj
Field-bog – Polno-bagienny	6	40	240
Forest-bog – Leśno-bagienny	2	60	360
Forest – Leśny	2	60	360
Field – Polny	1	40	240
Total – Razem	11	200	1 200

In experiment I, the nests were checked after 21 days. After experiment I, the corrections of method were introduced and in trial II and III the nests were checked after 3, 7, 14 and 21 days. While checking, the nests were photographed to obtain documentation material. The entire material was compiled and presented in the form of charts and tables.

CHARACTERISTICS OF THE RESEARCH AREA

The field-bog area. This was a partially wet area, cut across by drainage ditches and narrow stripes of meadows. A large percentage of the area is covered by bushes, bordering on agricultural areas. In this area, the nests were placed next to bushes, along a drainage ditch and in an open field.

The forest-bog area. A forest part of this area is situated on hills, and consists of old-growth forest and young forestry. This part borders on a field-bog area. The nests in this area were placed next to trees and bushes.

The field area. This area is composed of fields of small farms, which border on the fields of a large farm. Boundary strips overgrown with trees and field can be found in this area. Nests were placed some distance from farms, next to bushes and boundary strips.

The forest area. Average stand age was 50 to 60 years. The dominant habitat types are mixed humid forest, fresh forest and mixed fresh forest. The nests were placed at the boundaries of forests of differentiated age structure.

RESULTS AND DISCUSSION

The pressure from predators on the nests of ground-nesting birds is very intense. This is demonstrated by the results of the conducted experiment. Initially, such a strong influence of predators on the population of small game was not expected for a given area, therefore the nests in the first experiment were not checked until after day 21. After this

period, all placed nests, i.e. 143 in total, were destroyed. The results of experiment I are presented in Table 3 and in Figure 1.

Table 3. The pressure from predators on bird nests, according to the model used for experiment I
Tabela 3. Presja drapieżników na gniazda ptaków według schematu doświadczenia I

Type of a research area Typ terenu badań	Number of nests Liczba wyłożonych gniazd	Number of destroyed nests (after day 21) Liczba zniszczonych gniazd (po 21 dniu)
Field-bog – Polno-bagienny	78	78
Forest-bog – Leśno-bagienny	26	26
Forest – Leśny	26	26
Field – Polny	13	13
Total – Razem	143	143

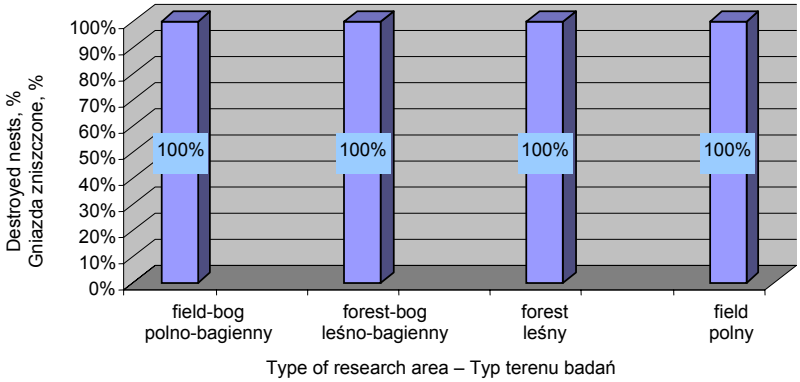

Fig. 1. The influence of predators on bird nests, according to the model of experiment I
Rys. 1. Wpływ drapieżników na gniazda ptaków według schematu doświadczenia I

In experiments II and III, nests were checked every few days, according to the determined schema (Table 4). While checking the nests placed in experiment II, all of them were treated jointly, without giving the number of nests destroyed in each type of area. In check A, which was conducted after 3 days, 14 nests were found destroyed (10%), in check B, 71 nests in total were destroyed (50%), in C, 100 nests were destroyed (70%), and in the last check, D, conducted on day 21, 143 nests were destroyed (100%). The results are presented in Table 4 and in Figure 2.

In the subsequent stage of research, the type of the area where eggs were placed was also taken into consideration while checking the nests in experiment III, and the number of built nests was increased from 143 to 200. Accordingly, the results of the last experiment were the most precise and provided a better illustration of the pressure from predators on their prey with reference to each type of the area. Moreover, this experiment involved filming a number of nests for some time in order to register the predators.

Table 4. The pressure from predators on bird nests according to the model of experiment II
Tabela 4. Presja drapieżników na gniazda ptaków według schematu doświadczenia II

Type of a research area Typ terenu badań	Number of nests Liczba wyłożonych gniazd	Number of destroyed nests – Liczba zniszczonych gniazd			
		check A (after 3 days) kontrola A (po 3 dniach)	check B (after 7 days) kontrola B (po 7 dniach)	check C (after 14 days) kontrola C (po 14 dniach)	check D (after day 21) kontrola D (po 21 dniach)
Field-bog – Polno-bagienny	78	–	–	–	78
Forest-bog – Leśno-bagienny	26	–	–	–	26
Forest – Leśny	26	–	–	–	26
Field – Polny	13	–	–	–	13
Total – Razem	143	14	71	100	143

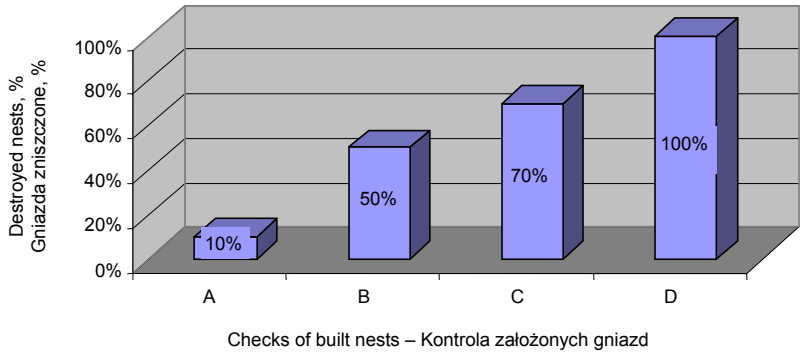

Fig. 2. The influence of predators on bird nests according to the model of experiment II
Rys. 2. Wpływ drapieżników na gniazda ptaków według schematu doświadczenia II

While carrying out check A (after 3 days) in the forest area and in the field area, all placed eggs were found destroyed (Table 5). In the field-bog area, 3 days after placing the eggs, 27 nests were destroyed, and 5 were damaged by predators. In check B (on day 7 after placing the eggs), no nests were left out of the total number of nests built in the field-bog area (40). Similarly, in the field-bog area, 57 nests were destroyed after the first 3 days, and 3 remaining nests were destroyed in 3 subsequent days. The results of experiment III are presented in Table 5 and in Figure 3.

It can be assumed that during the last experiment the pressure of predators was the strongest, as already on day 7 after placing the eggs, all nests had been destroyed. As follows from the data presented above, the populations of small game animals are seriously threatened, since all placed eggs were destroyed in such a short period of time. Particularly in a breeding season, small game species have no chances to maintain their nests with such a large number of predators. In the case of this experiment, this especially concerns predatory mammals, as was demonstrated by the pictures recorded by a video camera. Predators observed in the vicinity of the nests included, first of all, foxes and representatives of the *Accipitridae*, including kites.

Table 5. The pressure from predators on bird nests according to the model of experiment III
Tabela 5. Presja drapieżników na gniazda ptaków według schematu doświadczenia III

Type of a research area Typ terenu badań	Number of nests Liczba wyłożonych gniazd	Number of destroyed nests – Liczba zniszczonych gniazd				
		check A (after 3 days) kontrola A (po 3 dniach)	check B (after 7 days) kontrola B (po 7 dniach)	check C (after 14 days) kontrola C (po 14 dniach)	check D (after day 21) kontrola D (po 21 dniach)	for the whole period of the experiment po całym okresie doświadczenia
Field-bog Polno-bagienny	40	27 + 5 partially destroyed częściowo zniszczone	8	–	–	40
Forest-bog Leśno-bagienny	60	57	3	–	–	60
Forest Leśny	60	60	–	–	–	60
Field Polny	40	40	–	–	–	40
Total Razem	200	189	11	–	–	200

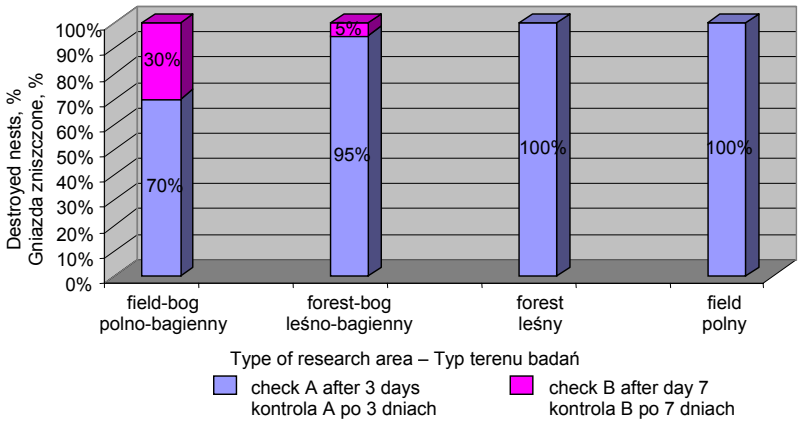

Fig. 3. The influence of predators on bird nests in percentage terms, according to the model of experiment III
Rys. 3. Wpływ drapieżników na gniazda ptaków według schematu doświadczenia III

While putting together the most important factors influencing this decline, the following should be mentioned (among others): the increase of the fox population and other predators, mechanization of agriculture, intensification of poaching, weather conditions, development of urbanization and motorization and changes in the structure of agricultural landscape [Goszczyński 1995, Bresiński 1999, Kamieniarz 2001, Panek et al. 2002].

In this situation, there is a need to plan actions aimed at the improvement of living conditions for small game animals [Dziedzic et al. 2000, Panek et al. 2002]. Currently, the most effective way of counteracting the decrease in the number of these species, although not the only one, is the regulation of the population of predators in a breeding season, first of all, of the fox [Dziedzic et al. 2000, Panek et al. 2002].

Another method to improve environmental conditions, and thus increase the reproductive success and the density of small game population, is the protection and increase in the number of sites that are suitable for building nests. This may consist in creating strips of wild herbaceous and frutescent plants in a reproductive period, and in autumn and winter – in building temporary protective and feeding plots [Bresiński 1999].

Bearing in mind the decreasing populations of small game animals, the privileged status of predators becomes more and more inexplicable. For the last dozen years, the struggle against predation and hunting damage has gradually weakened, which is the reason why the significance of the active protection of hunting grounds has been diminished. The belief that the nature should be regulated by itself, which has been strengthened particularly in the last years, does not stand up to criticism. The idea of self-regulation in a distorted, anthropomorphized environment poses a large threat to small game animals and other protected species. The result is that the situation for all predators in Poland has never been better, while the populations of small game animals, birds and small, protected mammals have never been in such a catastrophic state [Panek et al. 2002]. The current attitude towards predation in Poland has turned out to be very detrimental for many species of birds and small game mammals. Unconventional methods of limiting the number of predators from hunting areas have been eliminated. The periods for hunting for predators have been systematically shortened, the example of which is the fox. By the order of the Ministry of Environmental Protection, Natural Resources, and Forestry of 1 April 1995, the period for hunting this species was shortened by two months (currently, fox hunting is allowed from 1 September to 31 March). Most predators are nowadays under complete protection [Przybylski 2000].

All of these actions resulted in that a large group of our hunters began to diminish the significance of the need to fight against predators. For hunters, the fox is not primarily a harmful predator, but only a potential source of fur [Kamieniarz 1996]. This fact constitutes one of important causes of a too little pressure of hunters on predators. Although this is not the only one or the most important, it is very significant from the point of view of the balance between the predator and its prey. However, what should be remembered is the fact that hunting exploitation in the fox population will constantly diminish under the current legal conditions.

CONCLUSIONS

The analysis carried out on the basis of the performed research concerning the influence of predators on the population of small game animals in the Game Breeding Centre of the District Board of the Polish Hunting Association in Olsztyn, enabled to formulate the following statements and conclusions:

1. The conducted research reveals that with the current population levels of predators, the breeding success with the populations of ground nesting birds and small game mammals is highly threatened.

2. In the area of the Game Breeding Centre, in a summer period during the first three days after building, nests are 70-100% destroyed by predators, and by day 7 they are 100% destroyed.

3. Unfortunately, the research did not identify the main predator responsible for the damage.

4. The main factors that reduce the population of small game animals in Poland include a systematically increasing number of predators and limited possibilities of their reduction under current legal regulations.

5. As regards the research carried out in the forest area, it can be assumed that protective conditions in the form of forestation, with increased populations of predators, cease to be important for the protection of small game animals.

6. To help small game animals survive and maintain their balance, it is necessary to undertake actions aimed at a reduction of predators, primarily the fox. It is essential to introduce legal changes in the near future to effectively counteract the excessive pressure of predators in many hunting areas on the populations of small game and other animals.

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POTENCJALNE ODDZIAŁYWANIE DRAPIEŻNIKÓW NA POPULACJE ZAJĄCA ORAZ PTACTWA GNIEŻDŻĄCEGO SIĘ NA ZIEMI W ŁOWISKACH WARMII I MAZUR

Streszczenie. Celem pracy było sprawdzenie rzeczywistego oddziaływania drapieżników na stan zwierzyny drobnej w łowiskach Warmii i Mazur. Doświadczenie przeprowadzono na terenie Ośrodka Hodowli Zwierzyny w Załuskach Zarządu Okręgowego Polskiego

Związku Łowieckiego w Olsztynie, który jest położony w Nadleśnictwie Nidzica. Obejmuje dwa obwody łowieckie o łącznej powierzchni 9638 ha. Na reprezentowanych terenach charakteryzujących łowiska wyznaczono łącznie 11 zróżnicowanych powierzchni próbnych, w których wyznaczono miejsca zakładania sztucznych gniazd. Wykonano trzy powtórzenia. Podczas kontroli gniazd wyłożonych w doświadczeniu I (po 21 dniach) zostały zniszczone wszystkie gniazda (143). W III doświadczeniu, już podczas kontroli po siedmiu dniach od wyłożenia jaj, wszystkie gniazda zostały zniszczone w całości. Wyniki przeprowadzonych badań świadczą o potencjalnie dużej presji drapieżników na populację zwierzyny drobnej.

Słowa kluczowe: drapieżnik, ofiara, ochrona zwierząt, zwierzyna drobna, bioróżnorodność

Accepted for print – Zaakceptowano do druku: 20.02.2006

For citation – Do cytowania: Zalewski D., Sarnowska M., Szypowski S., 2006. Potential influence of predators on the populations of the hare and ground nesting birds in the hunting areas of the Warmia and Mazury Region. Acta Sci. Pol., Silv. Colendar. Rat. Ind. Lignar. 5(1), 135-144.