

## CHANGES IN THE RATE OF WILD BOAR DAMAGE TO ZIELONKA GAME INVESTIGATION CENTRE FIELD CROPS IN 2004-2007

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**Abstract.** Wild boar causes damage to the field crops in the Zielonka Game Investigation Centre for nine months a year. The most susceptible crops include rye, cereal mixes, oats, triticale, wheat, maize and potato. The reduced damage area (the damaged part of a manipulation area) in the research period varied from 8.42 ha in 2006 to 20.42 ha in 2005. The annual average reduced damage area was 14.42 ha.

**Key words:** wild boar, reduced damage area, hunting damage, oats, wheat, maize, potato

### INTRODUCTION

Following the intensification of agricultural production and the growing scale of large-field management, the high rate of change in environmental landscape provides a highly favourable food conditions for large ungulates. Also, as the penetration of natural forest refuges intensifies, large maize and cereal crops become not only an abundant food source, but also an effective refuge during the greater part of the year, mostly for wild boar. The arable land, as the new habitat, provides wild boar with an opportunity to feed both at night-time and at daytime, under favourable conditions. The research on the stomach content of wild boars in the research area (Zielonka Game Investigation Centre) showed that ca. 80% of the content was the crops [Wlazełko and Łabudzki 1992]. This constitutes a serious problem of the game damage to field crops. Leaseholders and land managers have to pay money compensation as an equivalent for the damage caused by elk, red deer, fallow deer, and, first and foremost, wild boar. Therefore, the rate of game damage under various local environmental conditions needs to be monitored, while decisions and activities are required to minimize the damage.

## STUDY AREA AND METHODOLOGY

Observations were made during four hunting seasons from 2004 to 2007 in the Zielonka Game Investigation Centre (Zielonka GIC). With respect to hunting, Zielonka GIC is managed by the Department of Game Management and Forest Protection, Poznań University of Life Sciences. Zielonka GIC is located in Poznań Highland within 15-35 km north of Poznań. Its forest part (ca. 7,500 ha) is a typical lowland forest hunting ground with various landscape and environmental features. The habitat conditions support the development of Scots pine (*Pinus sylvestris* L.) forest with the admixture of oak (*Quercus robur* L.), spruce (*Picea abies* (L.) H. Karst.) and beech (*Fagus sylvatica* L.). The forest stand species and age structure provide game with numerous refuges. Also, used meadows, the abundance of water and over 70% of the agro-forestral boundary, are objective drivers supporting big game densities above the average.

The field isolation strip of Zielonka GIC forest part is ca. 4,000 ha in area. Most field crops are located on V- and VI-class soils, while only a small part of the area is more fertile soils. The arable land is mostly used for planting rye, oats, wheat, cereal mixes, maize and potato. Most data that were used for determining the character and type of the damage to crops in the study area, and for tracking its rate during the vegetation season, were taken from official damage estimation records that were made by Zielonka GIC technical personnel together with land owners.

The following items were analysed in detail: game species that caused the damage, date of the damage, total crop area, crop plant, reduced damage area, the percentage of damage, productivity (quintals per 1 ha), and the compensation paid. In the period of intensified damages (spring, summer), some particularly susceptible areas were also directly observed, and special focus was placed on the wild boars penetrating the fields. The researchers also took part in estimating hunting damage in the study area.

As the compensation depends on such factors as the productivity per 1 ha – varying in each administration unit – the crop structure, the cropped area changed from year to year, and the location of susceptible crops, **a reduced damage area, which equals to 100% of the actual damage area in a crop field**, was chosen as a single common measure of the damage. The reduced damage area was calculated as follows:

$$P_z = P_u \times \%$$

where:

$P_z$  – reduced damage area, ha,

$P_u$  – overall area where game (mainly wild boar) caused some damage, a so-called manipulation area, ha,

% – damage area as a percentage of a given manipulation area

The formula was used to calculate the area of a crop field where 100% of the actual damage to the crop occurred.

## RESULTS AND COMMENTS

In the study period (2004-2007), the reduced damage areas in the Zielonka Game Investigation Centre were found to be highly diversified. The total of all reduced dam-

age areas per crop and the total as a percentage of the overall area in the study period are shown in Figure 1. The areas of each crop as a percentage of the total are shown in Figure 2. The totals in each season during the study period are shown in Figure 3.

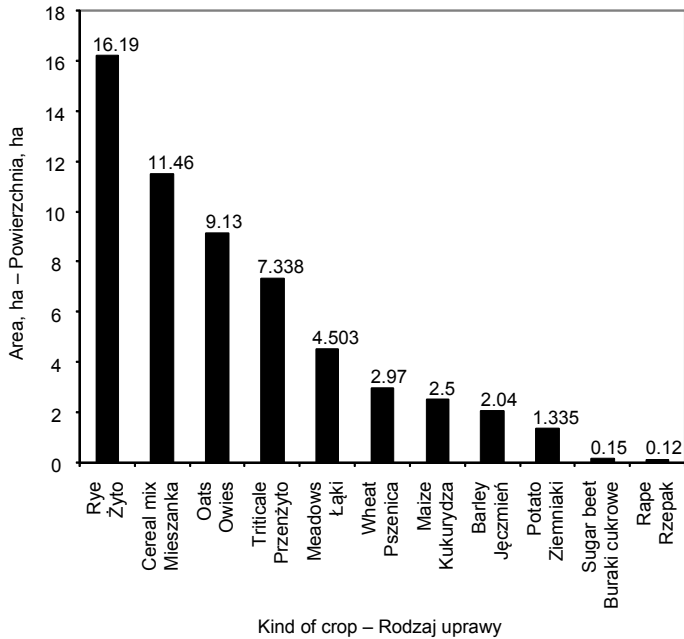


Fig. 1. Overall reduced wild boar damage area in the Zielonka Game Investigation Centre in 2004-2007

Rys. 1. Łączna powierzchnia zredukowana szkód powodowanych przez dziki na terenie Ośrodka w latach 2004-2007

During the whole study period (2004-2007), the largest reduced damage area was found for rye (16.19 ha). Another significant damage (11.46 ha) concerned the cereal mix. Other damaged crops in the study period were as follows: oats (9.13 ha), triticale (7.34 ha), wheat (2.97 ha), maize (2.5 ha), barley (2.04 ha), potato (1.34 ha). The smallest reduced damage area in the four-year study period concerned sugar beet (0.15 ha) and rape (0.12 ha).

The largest damage caused by feeding wild boar during the study period was recorded in 2005 (20.42 ha). The second and third largest reduced damage areas were recorded in 2007 (18.43 ha) and in 2004 (10.42 ha), while the smallest one (8.42 ha) was observed in 2006.

The damages in Zielonka GIC fields occurred for nine months a year, and were observed from March to November. Late winter observations showed that initial damages to crops occurred as early as in February in winter crops that replaced potato. The earliest damages were recorded only if the weather had become warmer and the soil had thawed. Such damages were caused mainly by wild boar searching for potatoes that were deep in the soil, which resulted in damaging these crops.

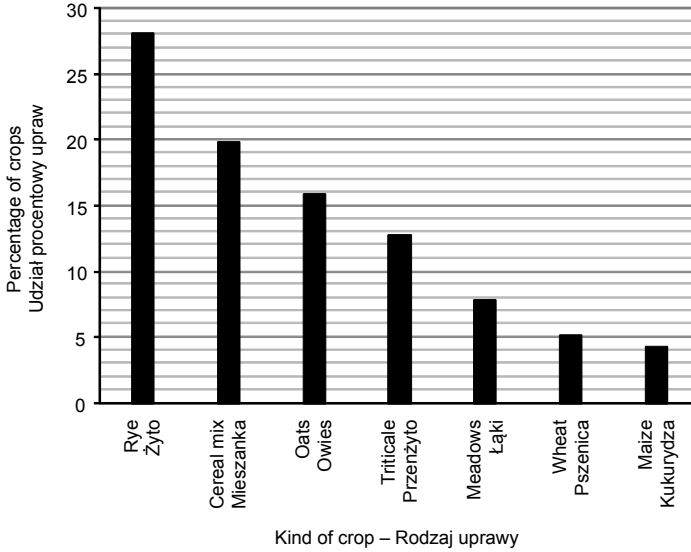


Fig. 2. Percentage of crops in the overall reduced wild boar damage area in 2004-2007

Rys. 2. Udział procentowy poszczególnych upraw w ogólnej powierzchni zredukowanej szkód powodowanych przez dziki w latach 2004-2007

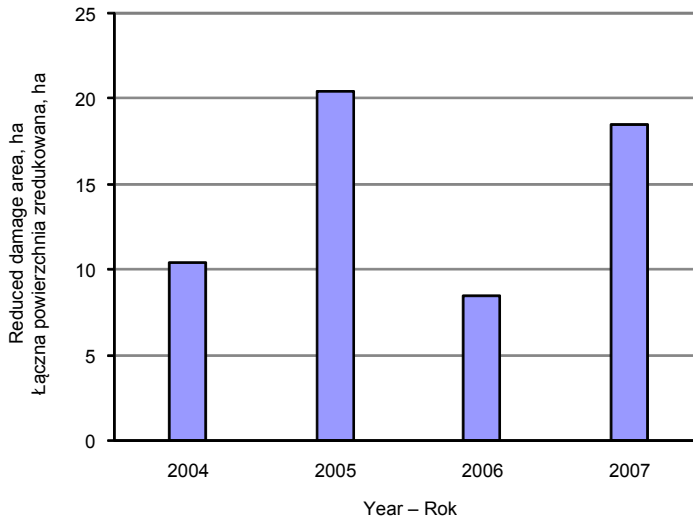


Fig. 3. Overall reduced wild boar damage area during the four hunting seasons in the research period in the Zielonka Game Investigation Centre

Rys. 3. Łączna powierzchnia zredukowana szkód powodowanych przez dziki w poszczególnych sezonach analizowanego okresu na terenie OHZ „Zielonka”

The earliest recorded damages to crops in the study period were damages to winter crops of rye and wheat in March and April. The size of the reduced damage area increased again in July, and the damages to the crops were largest in August.

The cereal mix in the study area most often comprises oats and barley, and wild boar (also deer family) was found to feed in such fields as early as in April. The game lost some interest in the cereal mix in May, and no damages at all were recorded in June. The size of damage increased again in July due to a high content of milk in maturing grain. The reduced damage area reached its maximum in August, in some areas being twice as high as the damage to rye and oats.

The evident damage to oats was recorded as early as in April, and it diminished throughout May and June. The reduced damage area of oats increased again in July, and reached its maximum in August.

The total damage to barley in the study period constituted a small percentage of the overall crop damage. The game actively penetrated these crops in April – following the sowing season – and then not until July.

Maize is considered by wild boar one of the most attractive crops in terms of taste and nutritional value. However, in Zielonka GIC there are not many large maize fields. The earliest damages occurred in May and June following the sowing. The reduced damage area clearly diminished in July and August; however, a strong increase was observed in September. Smaller damage was recorded in October, as the maize harvest was nearly ending.

As for root crops, some damage was found in potato fields (that were strongly secured against game). First damages to these crops occurred in April, while the largest ones were observed in May and June. The second period of intensified penetration of the potato fields was September.

In the study area there are also small areas of hay-growing meadows and pastures where wild boar damage was found in spring, i.e. in March, April and May. The damage resulted from wild boar searching for rhizomes and grubs, being wild boar's favourite food.

The overall reduced game damage area in Poland varies from 0.1 to 0.2% of all Poland's arable land. The damage is therefore not a problem in terms of economy or society [Krupka and Drozd 1980].

In the four-year period, the overall reduced damage area in Zielonka hunting ground – characterised by various habitats and game density above average (the annual average size of the wild boar population is 130 individuals per 7,500 ha of forest) – varied from 8.42 ha in 2006 to 20.42 ha in 2005. The annual average was 14.42 ha, which equals to 1,92 ha per 1000 ha of forest in the hunting ground; the average number of harvested wild boars was 16 per 1000 ha of forest. On the other hand, the annual average reduced damage area revealed in a macroregion research in Central-Eastern Poland was larger than that in the study area, i.e. 2.4 ha per 1000 ha of forest, with the annual average number of harvested wild boars **not exceeding five per 1000 ha of forest** [Drozd 1986].

The observations and research clearly showed that the size of game damage to field crops depends on many local factors, including environmental conditions, the volume of food resources in each forest complex, the level of hunting ground management, the length of agro-forestral boundary, and a reasonable population management.

In the lowland forest complex of Zielonka GIC, where a dense wild boar population (16 to 20 individuals per 1000 ha) – apart from red deer, fallow deer and roe-deer – is to

be found, the size of damage to field crops indicated above can be considered acceptable in terms of economy. This results mainly from a reasonable wild boar population management. One should also recognise Zielonka GIC personnel efforts aimed at protecting the susceptible crops. Examples include the use of electrical devices (fencing the crops that are attracted by game with a low-voltage wire) and introducing so-called barrier belts (a plot of land in a forest complex where maize grain was treated with a soil miller so that wild boar would be less attracted by field crops and spend more time feeding in such a belt) from early spring until the end of harvest.

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## DYNAMIKA SZKÓD WYRZĄDZANYCH PRZEZ DZIKI W UPRAWACH POLNYCH OŚRODKA HODOWLI ZWIERZINY „ZIELONKA” W LATACH 2004-2007

**Streszczenie.** W Ośrodku Hodowli Zwierzyny „Zielonka” szkody wyrządzane przez dziki w uprawach rolnych występują przez dziewięć miesięcy w roku. Najbardziej są narażone takie uprawy, jak: żyto, mieszanki zbóż, owies, pszenżyto, pszenica, kukurydza i ziemniaki. Powierzchnia zredukowana wyrządzonych szkód w okresie badawczym wahała się ekstremalnie od 8,42 ha w 2006 roku do 20,42 ha w 2005 roku. Średnia roczna wynosiła 14,42 ha.

**Słowa kluczowe:** dzik, powierzchnia zredukowana szkód, szkody łowieckie, owies, pszenica, kukurydza, ziemniaki

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