



CHARACTERISTIC OF THE POPULATION OF GEESE COVERED BY THE PROTECTION OF BIODIVERSITY PROGRAMME IN POLAND

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ABSTRACT

Domestic goose is a species strongly associated with the agricultural landscape, tradition and culture of local communities. Currently, a unique collection of 14 breeds of geese kept on four farms across the country is included in the programme for the protection of the goose population in Poland. Endangered geese are protected using an *in situ* method – keeping live animals in their natural environment. All goose breeds included in the protection programme represent a valuable part of the genetic diversity of the species. Based on the analysis of the results for the 2021 or 2022 period, it was found that these geese maintain good health, achieve good production and hatchability parameters, and their mating method protects them from an inbred increase.

Key words: geese, biodiversity, breed characteristics, productivity

INTRODUCTION

Global livestock production is based on fewer and fewer breeds, and traditional farming systems using native breeds are being marginalised [Krawczyk and Krupiński 2017]. FAO data [FAO 2020] shows that in Europe and the Caucasus, about 53% of native breeds of livestock and domesticated animals are at risk of extinction. This is particularly unfavourable in poultry production, where efforts to maximise productivity and breeding profitability have led to the extinction or significant genetic impoverishment of a number of native poultry breeds. According to Szwaczkowski [2022], the percentage of endangered poultry breeds in the world is remarkably high, i.e. turkeys, 34%, chickens, 33%, geese, 31% and ducks, 21%. Meanwhile, protection of native poultry breeds is important both in advanced countries, where it forms part of policy recommendations for sustainable agricultural development, and in developing countries, where indigenous poultry breeding predominates [Hoffmann 2011,

Padhi 2016]. There are currently more than 180 recognised breeds of native geese worldwide, including more than 150 local populations originating from Europe and Asia. These breeds show better adaptability to extensive rearing, higher disease resistance, higher reproduction rates and also better meat quality compared to geese of commercial flocks. Native goose breeds are maintained and researched in many countries worldwide, including Slovakia [Hanusová et al. 2017], Lithuania [Razmaitė et al. 2022], China [Li et al. 2007, Li et al. 2011], Turkey [Tilki et al. 2009, Kirmizibayrak et al. 2011, Onder et al. 2017], Egypt [Abdel-Kafy et al. 2016, Abdel-Kafy et al. 2021] and Iraq [Ismael 2011].

A number of native goose breeds have already become extinct in Poland, including poleska, rzeszowska, kujawska, wieruszowska and poznańska geese [Książkiewicz 2010]. Unfortunately, removal of populations admirably adapted to local conditions entails the loss of multiple valuable traits, including, inter alia, high survival, resistance to disease and adverse environmen-

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tal conditions, high reproductive capacity, the instinct to lay eggs and drive goslings, etc. [Romanov et al. 1996]. According to Książkiewicz [2007], work on the preservation and evaluation of dying out varieties of native geese began in the 1950s, when Wanda Kłosowicz, Ph.D., from the Institute of Genetics and Animal Breeding of the Polish Academy of Sciences in Jastrzębiec, compared the slaughter value of regional varieties of geese. Subsequently, Kłosowicz and Kukielka [1958] evaluated podkarpacka, kielecko-lubelska, suwalska, rypińska and kartuska geese, among others, in terms of the quantitative and qualitative evaluation of the feathers. The study found the highest commercial value of feathers and down in rypińska and kartuska geese, which were also characterised by a shorter period of regrowth and maturation of feathers. At that time, origin flocks of geese were identified, but also a division according to body weight was introduced for the first time: heavy geese, which included suwalska, kartuska and rypińska and light geese: podkarpacka and kielecko-lubelska geese. In the 1970s, a team of workers under the direction of Professor Adam Mazanowski, Ph.D, began to bring the disappearing native geese from various geographical areas of Poland to the Waterfowl Test Station of the Central Research and Development Poultry Centre in Dworzyska (STDW). Over time, the collection of birds increased and, together with researchers from the National Research Institute of Animal Production, with the participation of national scientific units, an initiative was taken to develop programmes for the protection of geese. These activities were preceded by an inventory of flocks of native breeds, the development of their genetic and production characteristics and an appropriate mating system [Kołodziej 1971, Wężyk 1975, Mazanowski 1984, Puchajda 1991, Smalec 1991, Wężyk et al. 1998, Mazanowski and Kiełczewski 1999]. Conservation flocks of geese were formed at the STDW in Dworzyska near Poznań from geese purchased from private farms in the area of their occurrence, gradually expanding this collection with domestic and foreign breeds. There, studies were conducted on domestic northern and southern geese as well as geese of foreign origin, including analysis of slaughter traits in relation to breed, sex and length of rearing [Mazanowski et al. 2006, Gornowicz et al. 2015, Gornowicz et al. 2016, Lewko et al. 2022]. In recent years, evaluation of hatchability and performance indices of geese based on *in ovo* technology with selected symbiotic preparations, vitamins and enzymes has also been conducted [Lewko – unpublished mat. 2023].

As emphasised by Smalec [1991], preservation of goose diversity is prompted not only by economic, breeding and scientific considerations, but also by biological and environmental, cultural-ethnographic and even emotional ones. The Convention on Biological Diversity, which imposed an obligation on each of its signatories

to preserve the biodiversity of plants and animals within their own country [Krawczyk and Krupinski 2017] was ratified by Poland in 1995. At that time, on the FAO's initiative, a comprehensive programme for the conservation of genetic resources in agriculture was developed with the main objective of conserving livestock populations at risk of extinction. It was also decided to establish the World Database for Farm Animal Genetic Resources and Domestic Animal Diversity Information System (DAD-IS). Subsequently, based on the information contained in the World Database, a catalogue of genetic resources was developed, known as the World Watch List for Domestic Animal Diversity 2000 [FAO 2000]. EFABIS is the source of European data on breeds under conservation programmes for the Domestic Animal Diversity Information System.

Currently, Poland has one of the most numerous and valuable collections of local breeds and varieties of geese, which are perfectly adapted to harsh environmental conditions and intricately linked to the agricultural landscape, tradition and culture of local communities. The programme for the conservation of the goose population includes 14 breeds of geese kept on four farms in the country. The richest gaggle of geese is those kept in the National Research Institute of Animal Production – ZD Kołuda Wielka at the Water Poultry Genetic Resources Station in Dworzyska near Poznań. These are: garbonosa (Ga), kartuska (Ka), kielecka (Ki), lubelska (Lu), podkarpacka (Pd), pomorska (Po), suwalska (Su), rypińska (Ry), landes (LsD-01), romańska (Ro), słowacka (Sł) and kubańska (Ku) geese. Also of great value are zatorska geese (ZD-1) kept at the Agricultural University of Cracow – Rząska Farm and biłgorajska geese (Bi) located at the private farm “Majątek Rutka” near Lublin and, since 2012, at the University of Life Sciences in Wrocław (UPWr) – Research and Teaching Station in Swojczyce (SB-D).

The podkarpacka (Pd), biłgorajska (Bi), garbonosa (Ga), kartuska (Ka), kielecka (Ki), lubelska (Lu), pomorska (Po) rypińska (Ry), suwalska (Su) and zatorska (ZD-1) geese have been included by FAO among the world genetic resources to be protected [FAO 2000]. These populations provide excellent material for physiological studies on vital mechanisms, as well as for studies on the evolutionary history of livestock based on work in immunogenetics, cytogenetics, embryology, serum protein polymorphism and molecular genetics methods [Smalec 1991, Mazanowski and Szukalski 1998, Kisiel and Książkiewicz 2004, Książkiewicz et al. 2006, Kapkowska et al. 2011, Wrzaszcz 2011, Andres et al. 2018, Dobrzański et al. 2019, Łukaszewicz et al. 2019, 2022, Gumułka et al. 2023]. They are morphologically and productionally diverse. Birds with beautiful feathering are ornaments of country yards, make good use of meadows and poor pastures and wastelands, providing

meat with good taste and dietary qualities [Okruszek et al. 2005, Książkiewicz 2006, Mazanowski et al. 2006, Gornowicz et al. 2012]. Also geese of native breeds can be used in future genetic improvement programmes for commercial flocks. This is confirmed by Mazanowski et al. [2005], who conducted a study on the possibility of using geese of conservation breeds, including, inter alia, słowacka or kubańska geese, for crossbreeding with other breeds, in particular with the Biała Kołodzka®.

Waterfowl, like other domesticated bird species, is used for egg and meat production. However, in Poland there has never been a tradition of consuming goose eggs. Therefore, the efforts of domestic waterfowl breeding were focused on breeds, lines and lines for meat use. The most frequently used breeds were medium-heavy meat breeds – geese derived from the white Italian goose. Selection work was carried out in order to obtain parent flocks with good performance indicators, producing offspring characterized by the desired meat content and good feed utilization. Egg production was assessed only in terms of reproduction. Currently, large-scale commodity production of fattened geese in Poland is based on the Biała Kołodzka® goose. However, the *in situ* breeding line of geese kept in Poland (14) covered by the conservation programme for the protection of animal genetic resources constitute approximately 2%. Geese of conservative breeds and their hybrids differ in their slaughter yield and the percentage of tissue components in the carcass as well as the chemical composition of the meat. Native breeds of geese require a longer breeding period. However, their carcasses are less fatty than those of intensively bred geese, and the meat is finely fibrous, which improves its taste [Okruszek et al. 2008]. Research work was also carried out on the fatty acid profile of meat. It was shown that the lipid content in the tested muscles and adipose tissue depended on the breeds of geese. Okruszek [2012] showed that in the meat of Rypińska and Garbonosa geese characterised by a high proportion of the polyunsaturated fatty acids, therein long-chain PUFAs, what is beneficial regarding consumers' health. In turn, research by Gornowicz et al. [2017] concerned the estimation of the share of the fatty acid profile of the breast muscles of domestic southern geese varieties (lubelska, kielecka, podkarpacka) depending on the breeding system. The authors showed a higher content of monounsaturated fatty acids (MUFA) by 5.84 p.p. ($P \leq 0.05$) and n^{-3} polyunsaturated fatty acids (PUFA) by 0.58 p.p. in the breast muscles of organically reared geese compared to the muscles of conventionally bred birds. Moreover, it was found that the ratio of PUFA n^{-6} to n^{-3} in the breast muscles of organically reared geese was at the level recommended in human dietetics and amounted to 5.96:1, and in the case of conventional breeding it reaches the value of 9.58:1.

The main objective of the programme for the conservation of genetic resources of geese is to preserve individual populations from extinction by maintaining the genetic balance in each protected flock at an unchanging level, while preserving the characteristic phenotypic traits of birds of both sexes. It is also to strive to maintain the characteristic production traits of the breeds, including meat taste and dietary qualities, disease resistance and other traits, including behavioural traits, specific to individual populations at optimal levels [Calik et al. 2021].

Populations of endangered geese are protected through *in situ* methods – which involve keeping live animals in their natural habitat. As the gander is homogametic (ZZ) with respect to the sex chromosome, the semen used for reproduction limits the genetic variability of the population to one sex, hence, until the technique of storing bird embryos or ova in liquid nitrogen is mastered, ex-situ conservation method cannot be performed.

The numbers of individual geese populations (total males and females – entered in the breed registry) on a five-year basis and current from 2000 onwards are shown in Table 1.

In line with the conservation programme, over the last two decades the population of geese under protection has increased significantly. Comparing the current state with the year 2000, the number of geese has more than doubled, which was associated with an increase in the number of females and males in individual populations, the inclusion of kubańska geese in the stock in 2007, and the establishment of a second farm keeping biłgorajska geese in 2012 (UPWr, SB-D). In the National Research Institute of Animal Production, as a result of observations and studies and adopted global solutions, as well as based on data from the implementation of conservation programmes, a model for estimating the endangered status of native breeds was developed, adapted to Polish conditions [Polak et al. 2021]. Based on the number of males and females entered in the books and the value of the threat status indicator in all the above-mentioned populations of geese, it was concluded that these breeds currently require further protection. The current endangered status for all the above-mentioned breeds of geese together with a description of the method of its estimation can be found on the website of the National Research Institute of Animal Production at: <http://www.bioroznorodnosc.izoo.krakow.pl/status-zagrozenia-ras>.

Characteristics and specific features of geese breeds under the protection programme

According to Książkiewicz [2007], geese included in the biodiversity programme with regard to their origin (region) as well as body weight were divided into three groups, i.e. domestic: southern and northern and foreign origin.

Table 1. Population size of geese covered by the genetic resources protection programme in Poland between 2000 and 2023

Breed symbol	Year					
	2000	2005	2010	2015	2020	2023
Lu	146	166	285	297	355	327
Ki	149	168	281	313	334	331
Pd	129	163	299	293	331	319
Ga	187	167	314	263	322	328
Ka	162	163	338	334	352	333
Ry	165	168	281	304	362	335
Su	161	165	343	327	367	345
Po	194	167	287	344	323	306
Ro	196	168	280	298	355	309
Sł	195	250	300	328	331	333
LsD-01	212	249	300	342	466	377
Ku*	–	–	373	464	452	429
ZD-1	216	300	468	470	459	464
Bi	273	267	495	599	549	589
Total	2385	2561	4644	4976	5358	5125

Goose breed: garbonosa (Ga), kartuska (Ka), kielecka (Ki), lubelska (Lu), podkarpacka (Pd), pomorska (Po), suwalska (Su), rypińska (Ry), landes (LsD-01), romańska (Ro), słowacka (Sł), kubańska (Ku), zatorska (ZD-1), biłgorajska (Bi).

*The breed was included in the programme in 2007.

Source: <http://www.bioroznorodnosc.izoo.krakow.pl/drob/gesi>.

Domestic southern geese descended from the greylag goose (*Anser anser* L.), i.e. the lubelska (Lu), kielecka (Ki), podkarpacka (Pd) geese, are characterised by a lower body weight and small stature and a lower laying rate. Geese are distinguished by their high resistance to unfavourable environmental conditions, good musculature and low carcass fatness. They are very suitable for backyard rearing [Mazanowski et al. 2007]. This group of birds also includes biłgorajska geese (Bi), which were purchased from small farmers from a village near Biłgoraj in 1971 and in 1973. The flock was supplemented with biłgorajska geese from a decommissioned RZD farm in Uhrusk. Biłgorajska geese are characterised by good health, high slaughter value, good fodder utilisation per unit of production and a high proportion of down in the pluck. This population may be useful in work aimed at obtaining commodity cross-breeds [Puchajda, 1991, Puchajda-Skowrońska et al. 2006, Łukaszewicz et al. 2019]. Zatorska geese (ZD-1), on the other hand, were produced from varieties of domestic geese: podkarpacka, garbonosa, suwalska and pomorska. This work began at the National Research Institute of Animal Production in 1956 under the direction of Professor Helena Bączkowska. In 1961, the flock was closed against the inflow of foreign blood and selected for body weight and laying rate of geese. In 1967

the flock was moved to the Experimental Department of the Agricultural Academy in Cracow. Until 1984 the birds had the status of a breeding flock, between 1985 and 1995 of a breeding material reserve flock, and since 1996 they were included in the national genetic resources of the goose population. ZD-1 geese are characterised by a high dietary value of meat, a low amount of fat in the carcass and good quality feathers. They are very suitable for backyard rearing [Andres et al. 2018, Ochrem et al. 2018, Gumułka and Połtowicz 2020]. Garbonosa geese (*Anser cygnoides*) are characterised by low fat cover and particularly good hatching rates of both eggs and goslings. They have good combinatorial ability with other breeds and can therefore be used to create commodity cross-breeds.

The native northern geese, i.e. the kartuska (Ka), rypińska (Ry), suwalska (Su) and pomorska (Po) geese, are derived from the Greylag Goose (*Anser anser* L.). Breeders contributed to the development of these geese, who for many years selected birds for breeding that were quite heavy, characterised by good musculature but also a tendency to fat deposition. These birds belong to the late-maturing group and are suitable for autumn fattening for so-called “lard geese”. They are distinguished from southern geese by their much higher body weight and dimensions. They are characterised by good health and resistance to unfavourable environmental factors, excep-

tionally good carcass musculature and good feed conversion. They are very suitable for commodity crossbreeding [Mazanowski et al. 2006, Książkiewicz 2010].

Geese of foreign origin, i.e. romańska (Ro), słowacka (Sł), landes (LsD-01) and, those derived from the swan goose (*Anser cygnoides*), kubańska (Ku) were imported to Poland from Denmark, France and Russia. These birds are characterised by significant values of functional and reproductive traits and good adaptation to domestic environmental and climatic conditions. They are very suitable for breeding in large and small flocks and for the creation of commodity crossbreds. They constitute valuable breeding material [Książkiewicz et al. 2006, Książkiewicz et al. 2007, Łukaszewicz et al. 2022].

Full characteristics of all the aforementioned breeds are presented in the Programme for the Conservation of the Goose Population [Calik et al. 2021], in the Album of Farm Animals Covered by Genetic Resources Conservation Programmes in Poland [Krawczyk et al. 2022] and on the website of the National Research Institute of Animal Production www.bioroznorodnosc.izoo.krakow.pl/drob.

Breeding methods and performance evaluation for geese

The protection programme for the genetic resources of geese covers birds of a given breed which have undergone an assessment of their performance value, meet the conditions for entry in the book of breeding animals and are characterised by a phenotype in accordance with the breed standard. Healthy geese of correct body conformation are selected for mating. Geese: Bi, Lu, Ki, Pd, Ka, Ry, Su, Ga, Po, Ro, LSD-01, Sł, Ku are mated randomly, in four flocks (a, b, c, d). Ganders and geese are mated at a sex ratio of 1:4, with a 1:3 mating allowed in justified cases. In the fourth year of use, offspring are obtained to restore the goose population. For the next four years, ganders from flock 'a' are matched with geese from flock 'b', ganders 'b' with geese 'c' and so on, so the principle of rotation of breeders applies, thus reducing inbreeding. For the renovation of the flock, healthy geese are selected, without conformation defects and phenotypically compatible with the pedigree pattern. The possibility of additional reproduction of geese within subgroups is allowed during the four-year life of the flock. On the other hand, in the case of zatorska geese (ZD-1), in order to reconstitute the population, 20 flocks are assembled once every 2 or 3 years, each consisting of 1 gander and 4–6 geese. The condition for mating individuals is that they are not related in the two previous generations. This method keeps the inbreeding rate low.

The effective protection of endangered breeds of geese is ensured by their regular monitoring, which enables a rapid reaction to unfavourable changes in the structure and size of the protected population, as well as the production results. According to current legislation,

an assessment of the performance value of geese in conservation flocks is carried out, which includes: determination of the percentage survival rate of birds (males and females) during rearing and production, determination of body weight of birds (at 8 and 11 or 8 and 12 weeks of age), determination of sternum length (measured along the entire length of the sternum crest at 11 or 12 weeks of age), determination of week of age, determination of breast muscle thickness (measured on the left side of the body at 11 or 12 weeks of age), determination of the number of eggs laid (from the beginning of laying for the next 20 weeks and for the next three years of production), determination of egg weight (monitored for 2 weeks during peak laying), determination of the percentage of fertilisation of eggs, hatchability of healthy goslings from laid and fertilised eggs (each season).

There is no selection in the geese flocks covered by the protection programme, so any changes occurring in the development of the values of the traits under study are due to the genetic characteristics of the breed and the environmental conditions in which the birds are housed. Current performance evaluation results for goose flocks are presented in Table 2 and Figures 1–5.

From the data presented, it can be seen that the effective size (N_e) of the evaluated populations, which depends on the number of males and females, ranged from 223.02 to 487.09, which had a direct impact on the low level of inbreeding of the flocks (F_x), whose average value ranged from 0.10 (Bi) to 0.22 (Po and Ro). The highest number of deaths and health deficiencies (above 10%) during the rearing period was recorded in Bi gandens, while during the production period in Ro and LsD-01 gandens (19.7 and 23.6%).

The results obtained indicate a high differentiation between breeds in terms of production traits, i.e. body weight, egg weight and laying rate. The highest body weight at 12 weeks of age of the birds was observed in Ro and LsD-01 gandens and geese (σ , 4586–4718 g; ρ , 4057–4290 g), while the lowest in Ki gandens (σ , 3893 g) and in Bi, Ki and Pd geese (ρ , 3500–3559 g). Goose laying rates assessed up to week 20 ranged from 35 eggs (Ki, Bi) to 53 eggs (Po, Ro). Average egg weight assessed for 2 weeks at the peak of laying ranged from 142.5 g (ZD-1) to 179.1 g (Ry). Recorded rates of egg fertilisation and hatchability of goslings (except for geese LSD-01 and ZD-1) were high, indicating good biological quality of eggs and correct hatching procedure.

Data on the performance of geese are published annually in the “*Results of the assessment of the performance and breeding value of poultry populations included in the genetic resources protection programme.*” They provide valuable information for breeders maintaining native breeds of geese, entities involved in breed conservation, but also farmers involved in the backyard rearing of geese.

Table 2. Current goose population size (pcs.), effective population size (Ne) and inbreeding coefficient (Fx) along with flock healthiness

Breed symbol	Population size 2023, pcs.		Ne	Fx	Mortality and health-related culling (%) in:			
	♂	♀			rearing period		production period	
					♂	♀	♂	♀
Lu	81	246	243.74	0.21	7.4	0.9	2.6	3.9
Ki	87	244	256.53	0.19	5.6	1.9	0.0	1.2
Pd	80	239	239.75	0.21	0.0	2.9	2.8	2.8
Ga	78	250	237.80	0.21	4.3	1.0	2.7	1.7
Ka	79	254	241.03	0.21	8.7	3.1	5.0	3.7
Ry	79	256	241.48	0.21	4.3	6.4	7.8	2.6
Su	83	262	252.13	0.20	1.4	2.2	6.4	2.9
Po	74	232	224.42	0.22	2.9	0.0	2.4	5.2
Ro	73	236	223.02	0.22	5.0	3.8	19.7	4.2
Sł	82	251	247.23	0.20	3.0	0.0	2.1	3.9
LsD-01	79	298	249.78	0.20	1.2	0.6	23.6	7.9
Ku	98	331	302.45	0.17	0.0	0.0	3.0	1.7
ZD-1	145	319	398.75	0.13	4.6	6.3	2.1	3.2
Bi	172	417	487.09	0.10	10.7	8.0	4.71	5.9

Breed symbol: garbonosa (Ga), kartuska (Ka), kielecka (Ki), lubelska (Lu), podkarpacka (Pd), pomorska (Po), suwalska (Su), rypińska (Ry), landes (LsD-01), romańska (Ro), słowacka (Sł), kubańska (Ku), zatorska (ZD-1), biłgorajska (Bi).

Data sources: Kowalczyk et al. 2021 (Bi), Andres 2022 (ZD-1), Calik et al. 2022 (Lu, Ki, Pd, Ga, Ka, Ry, Su, Po, Ro, Sł, LsD-01, Ku).

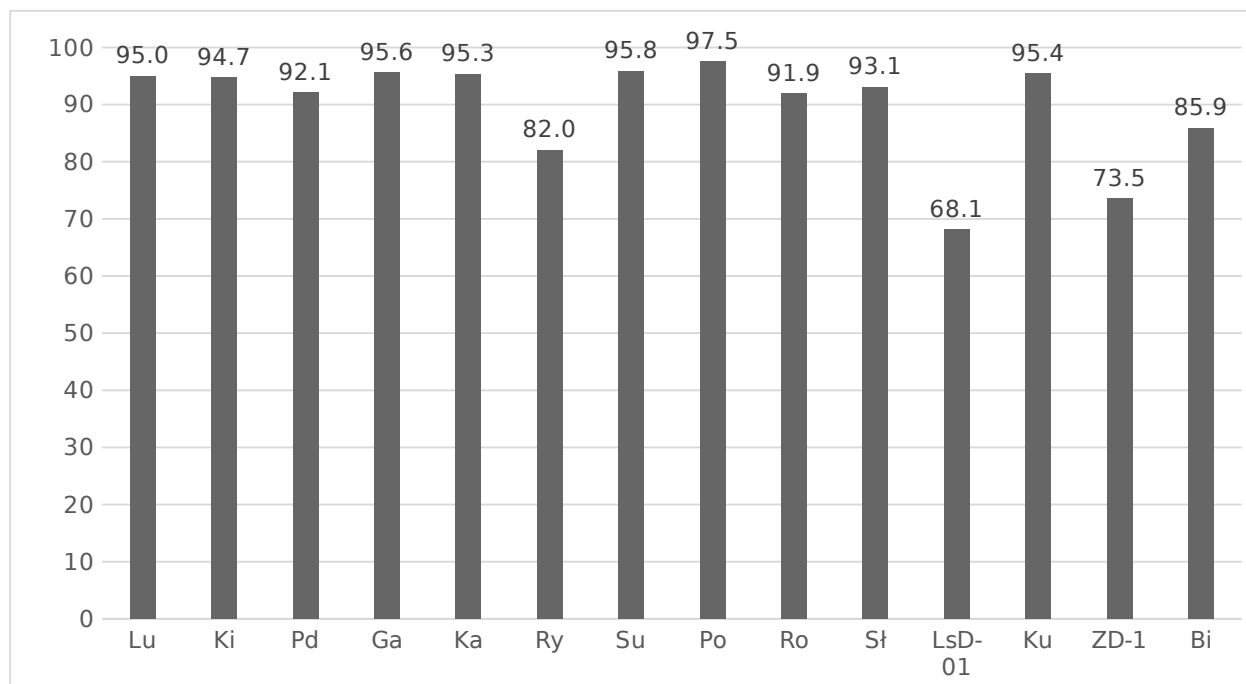


Fig. 1. Fertile eggs, %

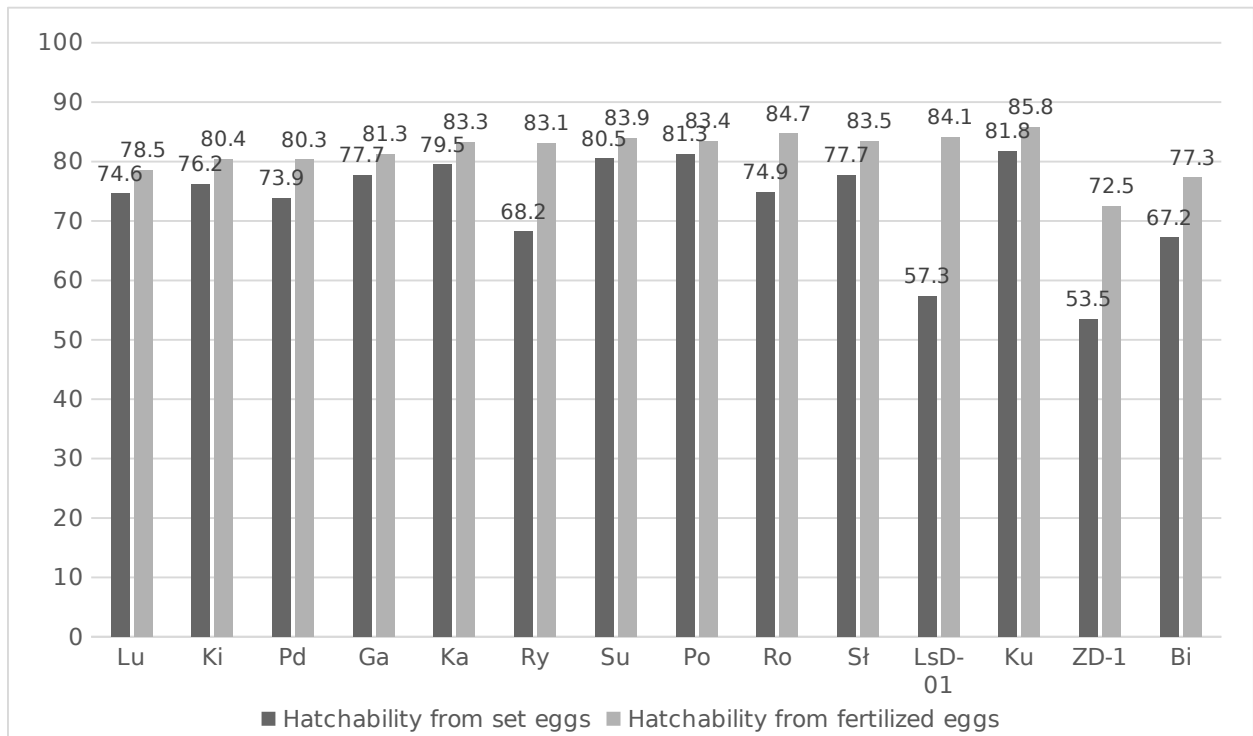


Fig. 2. Hatchability parameters, %

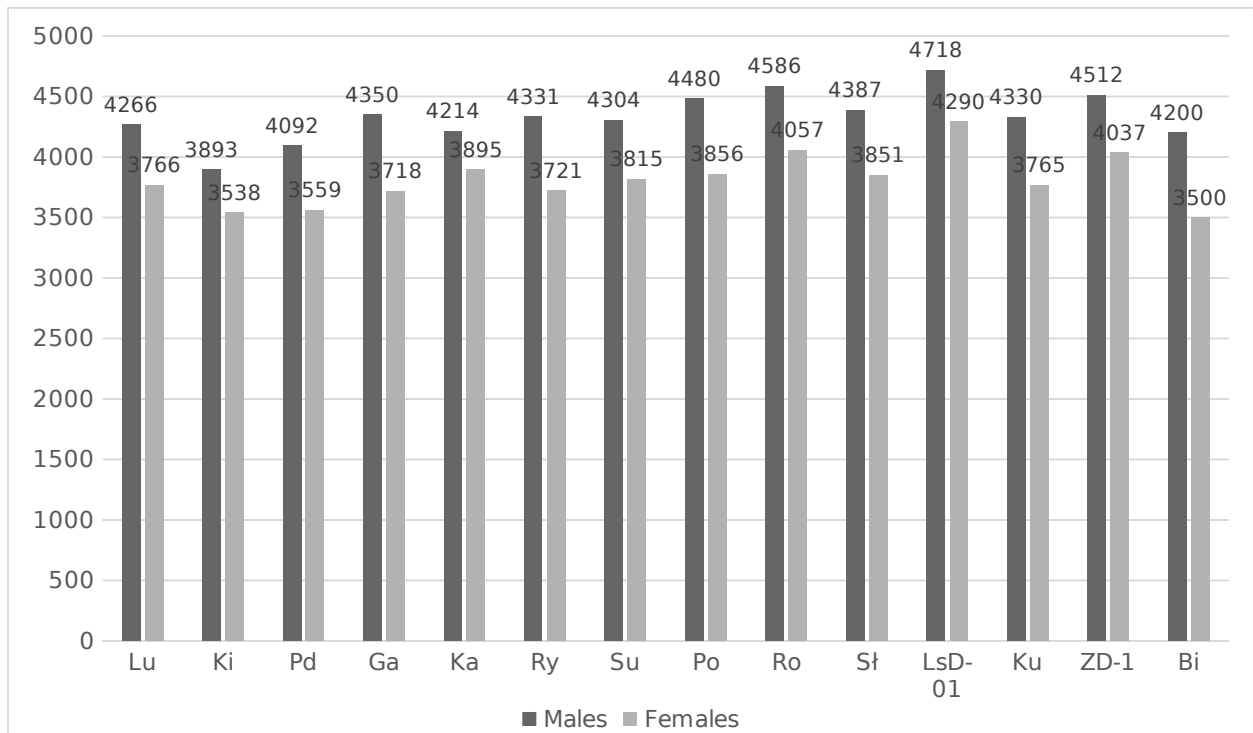


Fig. 3. Body weight at 11 or 12 weeks, g

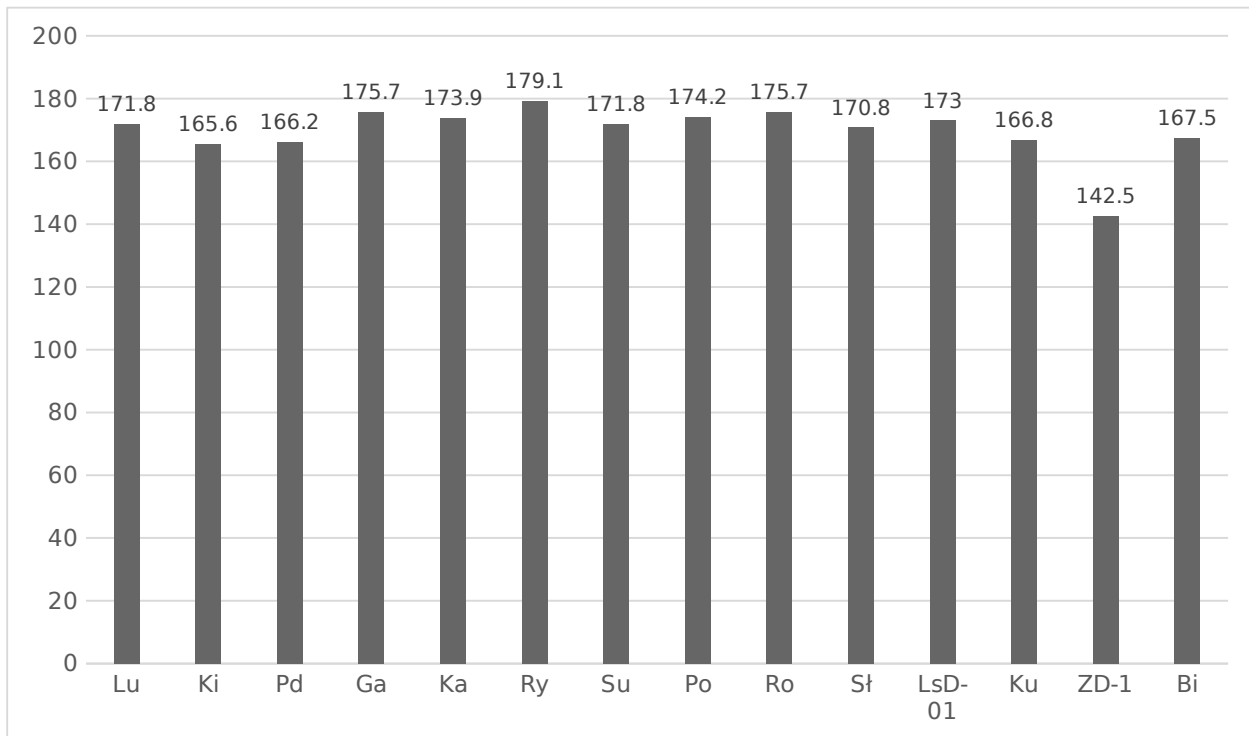


Fig. 4. Egg weight in the peak of production, g

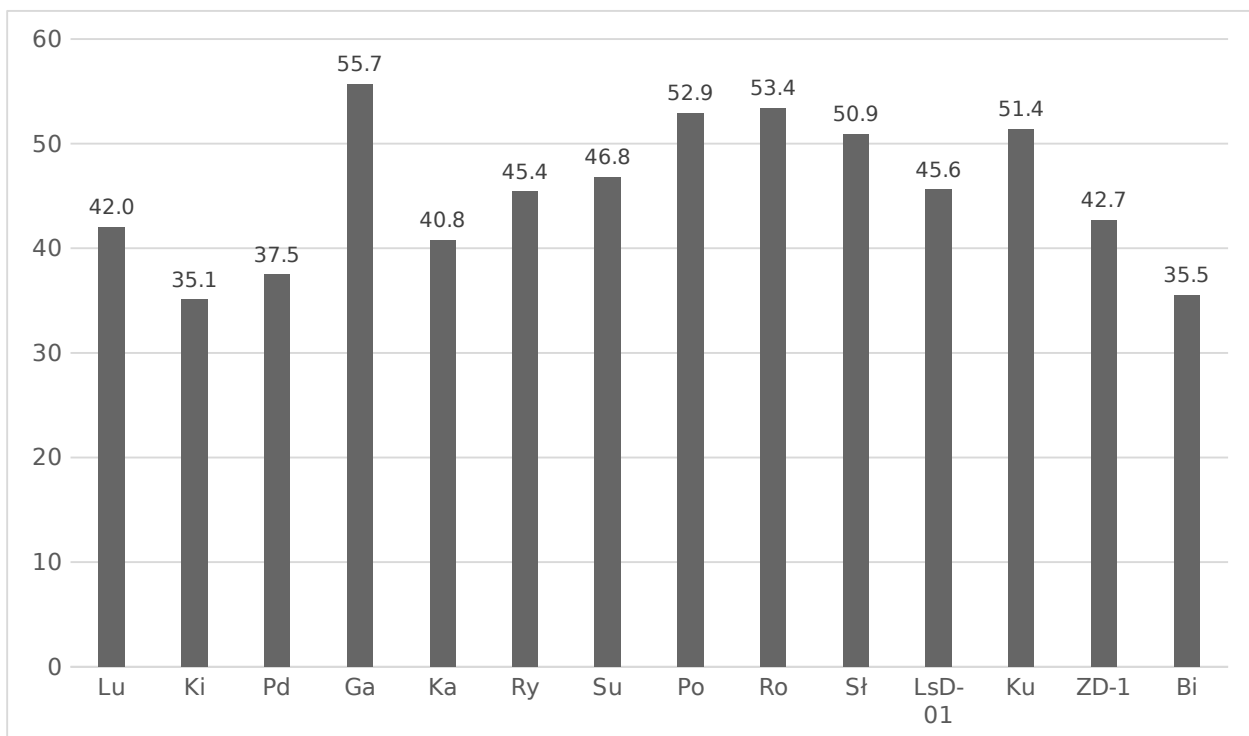


Fig. 5. Number of eggs at 20 weeks of laying

Organisational attitudes towards implementation of the goose conservation programme

The breeders of protected flocks of geese, entities herd-book of breeding animals for these populations, i.e. the National Research Institute of Animal Production, which keeps 12 herd-books (Lu, Ki, Pd, Ga, Ka, Ry, Su, Po, Ro, Sł, LsD-01 and Ku) and the National Poultry Council – Chamber of Commerce (KRD-IG) in Warsaw – 2 books (ZD-1 and Bi), which at the same time is the entity responsible for assessing the use value of all poultry species in Poland, participate in the implementation of the protection programme. By virtue of Article 34(3) of the Act on the organisation of breeding and reproduction of farm animals [Dz. U. 2021 poz. 36], the coordination of activities in the field of protection of genetic resources of farm animals is conducted by the National Research Institute of Animal Production. The Working Group for the Protection of Poultry Genetic Resources operating at the National Research Institute of Animal Production, appointed by the Director of IZ-PIB, is responsible for assessing the implementation and effectiveness of the protection programme. In the work on the protection of goose breeds, the National Research Institute of Animal Production and the Universities (Wrocław University of Life Sciences and Krakow University of Agriculture) cooperate with FAO, the Ministry of Agriculture and Rural Development, KRD-IG, the National Animal Breeding Centre, Agricultural Advisory Centres and non-governmental organisations. The native breeds of geese are often presented at exhibitions, fairs, cooking shows and workshops. They are not only a living testimony to Polish breeding thought, but also to an increasingly developing form of recreation – agrotourism – which encourages the use of these populations on a wider scale, not only for the production of high-value animal products, but also as an integral part of the native landscape.

CONCLUSIONS

Goose breeds covered by the biodiversity programme in Poland are linked to the agricultural landscape, tradition and culture of local communities. Endangered populations of geese are protected using the *in-situ* method – which involves protecting live animals in their natural environment. All the goose breeds presented above represent a valuable part of the genetic diversity of this species. Geese maintain good health, achieve good production and hatchability parameters, and their mating method protects them from increased inbreeding.

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CHARAKTERYSTYKA POPULACJI GĘSI OBJĘTYCH W POLSCE PROGRAMEM OCHRONY BIORÓŻNORODNOŚCI

STRESZCZENIE

Gęsi domowe są gatunkiem ściśle związanym z rolniczym krajobrazem, tradycją oraz kulturą lokalnych społeczności. Obecnie w Polsce programem ochrony populacji gęsi objęta jest unikatowa w skali światowej kolekcja 14 ras gęsi utrzymywanych w czterech fermach na terenie całego kraju. Gęsi zagrożone wyginięciem chroni się metodą *in situ*, polegającą na utrzymywaniu żywych zwierząt w ich naturalnym środowisku. Wszystkie rasy gęsi objęte programem ochrony stanowią cenny element różnorodności genetycznej tego gatunku. Na podstawie analizy wyników za okres 2021 lub 2022, stwierdzono że gęsi te zachowują dobrą zdrowotność, uzyskują dobre wyniki produkcyjne oraz parametry wylęgowości, a ich sposób kojarzeń zabezpiecza je przed wzrostem inbrodu.

Słowa kluczowe: gęsi, bioróżnorodność, charakterystyka ras, produktywność

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