

4. Genetic analysis of individual breeds of poultry used in breeding programs in Slovakia

The topic of today's lecture is the Genetic analysis of individual breeds of poultry used in breeding programs in Slovakia

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The current economic situation causes an interest in specialized poultry lines in advanced countries in the world, focusing on egg-laying or meat-based performance. Due to the intense breeding, many genes have been lost and may be missing in the future. Therefore, the reasons for keeping poultry genetic resources are the same as for all species of farm animals.

With the growing demand for poultry products from extensive systems, it is important to raise native poultry breeds suitable for free-range and organic farming because of their good adaptation to the local conditions. Native poultry breeds play an important social role and have a positive impact on maintaining rural society and traditional form of agriculture as well as gratifying local traditions. They represent a gene source for future breeding strategies and research. Alternative native breeds in the poultry production system have an important advantage of biodiversity and sustainable agricultural production.

In Slovakia, we currently have 4 recognized native breeds of poultry: 2 chicken breeds (Oravka, Bantam Oravka) and 2 goose breeds (Slovak Goose, Suchovska Goose).

Oravka is a dual-purpose poultry breed with good egg production, growth ability and adaptability on alternative outdoor. The goal was to develop a breed suitable for harsh climatic conditions of northern Slovakia which can be kept in free range. Hard rectangular frame, the comb is a rosette, the legs are medium length without feather with yellow colour with red tinted strip, feather is rich with solid structure.

Body weight from 2.8 to 3.3 kg for cock and from 2.2 to 2.7 kg for hen. Laying is from 180 to 200 eggs per year with an average egg weight of 58 grams and brownish eggshell.

Yellow-brownish Oravka is the oldest and most common colour variety of Oravka. Created by combinatorial crossing of regional fowl with breeds of Rhode Island Red, Wyandotte White and New Hampshire. Recognised in the year 1990.

White Oravka was created by crossing of Yellow-brownish Oravka with Plymouth Rock White. **Recognised** in the year 2008.

Black Oravka was created by crossing of White Oravka with breeds of Dresdner Black, Plymouth Rock Black and Barnevelder Black. Recognised in the year 2017.

Crele Oravka is a combination of rusty partridge colourations with a sparrow hawk pattern. Created by the crossing of Yellow-brownish Oravka, White Oravka and Crele Bielefelder. Recognised in year 2022.

Barred Oravka is created by crossing White Oravka with Barred American Rock. Recognised in year 2022.

Current status of Oravka

At the Slovak University of Agriculture in Nitra, the ex-situ breeding of a flock of Yellow-brownish Oravka is carried out, monitoring of the population size of oravka in Slovakia, monitoring of performance through parameters such as ejaculate quality, hatching, growth performance, egg production, egg quality, carcass parameters, and meat quality. A system and method of authentication for reliable differentiation between oravka and other chicken breeds using genetic analysis targeting 7 FAO recommended microsatellite markers and DAPC analysis has been developed.

At the National Agricultural and Food Centre - Research Institute of Livestock Production (NAFC-RIAP) in Nitra, ex-situ breeding of yellow-breasted nuthatches and monitoring of performance through hatchability, growth performance, egg production and egg quality indicators are carried out. At the same time, isolation, cultivation and cryopreservation of blastodermal and primordial germ cells in chickens. Cryopreservation of ejaculate is carried out on the roosters with the assessment of their quality using fluorescence microscopy, flow cytometry and transmission electron microscopy methods. Semen samples of individual roosters are stored in the gene bank of NAFC-RIAP in Nitra.

The role of the Slovak Association of Breeders is the creation of new colour variants of Oravka in reproductive flocks with individual laying and pedigree hatching, exterior judging of Oravka at poultry exhibitions and recognizing of reproductive flocks, monitoring of laying (collective and individual) of Oravka hens in reproductive flocks.

Bantam Oravka is a bantam form of a large breed. Bantam Oravka should follow the large fowl standard in all respects, however, the feathering colour is more intense compared with large Oravka. Dual-purpose poultry breeds with good egg production, growth ability and adaptability on alternative outdoor.

Cock weighting from 1.0 to 1.3 kg, then from 0.9 to 1.1 kg. Hens lay approximately 140 brownish eggs per year, with an average weight of about 40 grams.

Yellow-brownish Bantam Oravka was bred in the 1980s as the result of crossbreeding of large Yellow-brownish Oravka with Bantam Sumavian and Bantam Dresdner, recognised in the year 1990.

White Bantam Oravka was bred by crossing of Yellow-brownish Bantam Oravka, White Bantam Dresdner and White Bantam Plymouth Rock. Recognised in the year 2017.

Crele Bantam Oravka is a combination of rusty partridge colourations with a sparrow hawk pattern and was created by crossing of Yellow-brownish Bantam Oravka and Crele Bantam Bielefelder. The breed was recognised in the year 2017.

Current status of Bantam Oravka

In Slovak University of Agriculture in Nitra realised monitoring of performance (egg production, egg quality).

The role of the Slovak Association of Breeders is the create of new colour variants of Bantam Oravka in reproductive flocks with individual laying and pedigree hatching, exterior judging of

Bantam Oravka at poultry exhibitions and recognizing of reproductive flocks, monitoring of laying (collective, individual) of Bantam Oravka in reproductive flocks.

Slovak Goose is a middle-heavy breed of goose noble appearance and firm constitution. This breed was established in the 1940s on the basis of regional breeds from the southwestern part of Slovakia (from Nitra and Levice areas) by crossing with the goose breed from Germany and Hungary. The aim of breeding was to create a weight triple purpose (meat, liver, feather) goose suitable for corn areas. It is a strong, resistant goose with a good pasturing ability and with preserved clucking instinct. The feather is pure white and made of medium-quality feathers. The first standard of the Slovak goose was published by Malík (1966).

Body weights for males range from 6.8 to 8.0 kg, and for females from 5.7 to 7.0 kg. Geese lay 12 or more eggs in a season; the eggs are white and weigh some 130 g.

The Suchovska goose is a medium-heavy three-purpose goose with a preserved clucking instinct. This breed originated at the end of the 1980s in the village of Suchá nad Parnou from the local population of the yellow-coloured domestic goose by crossbreeding with French breeds such as the Toulouse goose and the Landes goose, and German goose breeds such as the Pomeranian goose and the Steinbach goose. The goose breed was created to breed goose of bigger body frames, firm constitutions and compact and solid bodies. Feather is smoother, with more dust, colour is yellow-wild, female is similarly coloured as a male with a larger amount of grey admixture, overall appears darker. Suchovska goose was recognized in the year 1995.

Ganders generally weigh 6.5-7.5 kg, and females 5.5-6.5 kg, usually laying some 12-16 eggs in a season, the eggs weigh about 140 g, white eggshell.

Current status of Slovak and Suchovska Goose

In the Slovak University of Agriculture in Nitra realised monitoring of the population size of Slovak and Suchovska goose in Slovakia, performance (hatching, growth ability, carcass parameters, meat quality). histological and histochemical evaluation of geese muscle tissue, characterization of the genetic diversity and structure of both native Slovak goose breeds based on six microsatellite loci analyses.

In the National Agriculture and Food Centre –Research Institute for Animal Production (NAFC–RIAP) Nitra realised cryopreserve gander semen of Slovak and Suchovska Goose breeds. Semen samples of individual ganders are stored in the gene bank at NPPC–RIAP Nitra.

The role of the Slovak Association of Breeders is exterior judging of Slovak and Suchovska Goose at poultry exhibitions and recognizing of reproductive flocks.

Future breeding goals

Until the next period, we will be focusing on the improvement of exterior characteristics of native chickens a goose breeds. The small number of recognized flocks puts increased pressure on poultry judges when judging poultry at shows and recognizing reproductive flocks. The cooperation of the Slovak Breeders' Association with the Slovak University of Agriculture in Nitra and NAFC–RIAP Nitra will be very important to increase the performance of the oravka (ejaculate quality, egg production, egg quality, growth ability, meat quality). A high risk for the reproduction of Slovak Goose is a tendency of gander to be monogamic and the mutual refusal, which exist in both sexes

Thank you for your attention!