

Development of animal genetic resources in the Slovak Republic

Ján Tomka*, Marta Oravcová, Ján Huba

National Agricultural and Food Centre – Research Institute for Animal Production Nitra, Lužianky, Slovak Republic

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The first step in conservation of animal genetic resources is monitoring of populations. Research Institute for Animal Production Nitra is responsible for this task in the Slovak Republic. The status of populations is monitored on regular basis in cooperation with the Breeding Services of the Slovak Republic, s. e. and authorized breeders' organizations. The development of 15 breeds during 10-year period was studied in this work. Twelve breeds were classified as being endangered in 2015 from which 6 were classified as critically endangered. The class of endangerment of three breeds was upgraded and two breeds downgraded. Despite the support for in situ conservation the effective population size decreased in six breeds. Based on the results it is assumed that financial support is not the only factor for maintaining the live animals. Important factor is the passion and tradition of farmers in maintaining certain breed.

Keywords: biodiversity, animal genetic resources, monitoring, conservation, local breed

1 Introduction

Organization for Food and Agriculture reported in the Second State of World Animal Genetic resources that 17 % of all breeds are classified as being "at risk of extinction" (FAO, 2015). The main reason of rapid erosion of farm animal diversity is lack of economic profitability of local breeds (Gandini and Oldenbroek, 1999). Slovak Republic has provided the support for the conservation of animal genetic resources via Rural Development Programme (RDP) in period 2007–2013 and continues to provide this support in the period 2014–2020. This support is provided as the compensation of income loss due to lower production (MP SR, 2007, MPRV SR, 2015). In the recent period 13 breeds are eligible for this support in Slovakia. The aim of the study was to analyze the development of local breeds in the Slovak Republic in period 2005–2015, which covers the whole period of support via RDP.

2 Material and methods

The development of 15 breeds in the Slovak Republic was analyzed. The data on purebred animals registered in herdbooks in years 2005 (published by Oravcova et al., 2006), 2010 and 2015 were used. These data are part of the animal genetic resources monitoring, which is performed in cooperation with the Breeding Services of the Slovak Republic, s.e. and authorized breeders' organizations of respective breeds. Based on the data, the effective population size was calculated according to formula $Ne = 4 * M * F / (M + F)$ (Falconer and Mackay, 1996), although this requires assumptions which are often not met (Hall, 2016). The degree of endangerment was assessed according to following limits: critically endangered ($Ne \leq 50$) (CE), endangered ($50 < Ne \leq 200$) (E), monitored ($200 < Ne \leq 1000$) (M) and not endangered ($1000 < Ne$) (NE).

3 Results and discussion

Twelve breeds were classified as being endangered in 2015 from which 6 were classified as critically endangered (Table 1). All of the studied breeds except for Slovak Simmental cattle, Tsigai and Improved Valachian were supported in previous period (2007–2013) and are supported in recent period (2014–2020).

* **Corresponding Author:** Ján Tomka. National Agricultural and Food Centre – Research Institute for Animal Production Nitra, Hlohovecká 2, Lužianky, Slovak Republic, E-mail: tomka@vuzv.sk

Table 1 Number of purebred registered females (F), males (M) and degree of endangerment (DE) of local populations of cattle, sheep, goats and horses

	2005 (Oravcova et al., 2006)			2010			2015		
	F	M	DE	F	M	DE	F	M	DE
Slovak Spotted	17 828	258	M	30 784	173	M	16 956	150	M
Slovak Pinzgau	1 176	42	E	1 969	26	E	1 583	20	E
Valachian	30	1	CE	65	7	CE	383	19	E
Tsigai	12 589	651	NE	11 406	420	NE	6 203	396	NE
Improved Valachian	23 224	951	NE	15 724	811	NE	7 261	492	NE
White Shorthaired	402	64	M	864	59	M	8 43	45	E
Brown Shorthaired	n. a.	n. a.	-	29	4	CE	70	11	CE
Lipitsa	80	13	CE	145	15	E	163	6	CE
Shagya arab	85	20	E	165	16	E	131	9	CE
Hutsul	70	13	CE	120	14	E	107	10	CE
Furioso	167*	15*	E	211	31	E	181	31	E
Nonius	20	7	CE	39	11	CE	29	13	CE
Noric of Murany	64	7	CE	219	14	E	110	17	E
Slovak Sport Pony	50	7	CE	145	7	CE	76	5	CE
Slovak Warmblood	263	10	CE	1 794	23	E	855	16	E

*data for year 2004

In cattle the class of endangerment of Slovak Spotted breed was not changed during the whole period. However the effective population size was decreasing continually. Results showed increase of purebred registered Pinzgau animals in first half of the studied period and decrease in the second half. However the effective population size was also decreasing continually during the whole period. If we take into account the mass selection in simplified way ($N_e(\text{sel})=7/10*N_e$) as presented by Duchev (2006), the effective population size of Slovak Pinzgau cattle would be close to limits of critically endangered class. Continual decrease of breeding females registered as dual-purpose and increase of females registered in beef production programme was also observed. This trend supports the observations of Oravcova et al (2010), who stated that farmers are more using crossing with beef breeds to transform their herds to beef production and extensive farming.

The number of purebred registered Valachian sheep was increasing during the whole period (Table 1) and the class of endangerment was upgraded in the end of the studied period. Although the number of animals increased during the period, when support was provided, farmers declare that the increase is mainly due to their enthusiasm for the breed and its tradition (Tomka et al., 2014). On the other hand the number of purebred registered animals and effective population size of Tsigai and Improved Valachian sheep was decreasing rapidly. The number of purebred animals decreased by 60 % in Tsigai sheep and by 50 % in Improved Valachian sheep. In goats the effective population size of White shorthaired breed decreased in last few years and the class of endangerment was downgraded to endangered class in the end of the period. The effective population size of Brown shorthaired goat increased, however the breed is still categorized as critically endangered.

The situation in horses is different to previous species. This is due to rather small populations and different reasons of their keeping. Therefore the status of some horse breeds changed during the period due to slight changes of effective population size oscillating around the limit of critically endangered class. All studied horse breeds are eligible for the support via RDP and the state is also supporting their conservation by some state enterprises (National Stud Farm in Topolcianky, Forests of the Slovak Republic, Banska Bystrica).

4 Conclusions

When taking into account recent results, it can be concluded that the support for endangered breeds is only one of factors that contribute to successful conservation of endangered breeds. The passion and tradition for keeping such breeds is also a strong factor. There is need for identifying non-production

roles of animal genetic resources including. In order to improve economic profitability and to exploit the potential of local breeds, the compensations for environmental services of animal genetic resources should be considered. The maintaining of countryside by animals should be preferred. Successful conservation of animal genetic resources requires the national legislation and long-term strategy which is lacking in the Slovak Republic. The efforts undertaken by different stakeholders are not organized and have only a short-term effect. In case of critically endangered breeds more intensive cryoconservation should be used.

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