RABBIT GENETIC RESOURCES IN THE CZECH REPUBLIC

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ABSTRACT

The aim of the study was to describe population size and selected performance characteristics of Czech local breeds, and compare the breeds with a commercial hybrid (Hyplus). In the study, seven Czech original breeds were included, giant breed Moravian Blue (MB), medium breeds Czech White (CW), Czech Spotted (CS), Czech Solver (CSo), Moravian White of Brown Eye (MW) and small breeds Czech Black Guard Hair (CB) and Czech Gold (CG). Population size shows that CSo, MW and CB which are critically endangered. Growth of rabbits was highly significantly ($P \leq 0.001$) affected by genotype and the highest daily weight gain was in MB (42.6 g) and the lowest in CB (26.6 g). All breeds had significantly higher ($P \leq 0.002$) dressing percentage than Hyplus rabbits (57.0 %). The highest nutrient digestibility was in CW with fat and crude fibre showing significantly the highest digestibility ($P \leq 0.001$; $P \leq 0.035$).

Key words: Rabbit, genetic resources, population size, performance.

INTRODUCTION

World rabbit meat production is around 1.5 million t a year and Europe is the main producer. Most of this production in Europe is realized using specialized genotypes and the role of pure breeds in meat production is weak (Bolet *et al*., 2000). In the Czech Republic, about 43 t of rabbit meat is produced annually; however, around 70 % of the rabbit meat consumption is from fancy breeders. Bolet *et al*. (2000) stated that in Europe, more than 150 national breeds have been registered from 11 countries. These breeds present a wide range of characteristics and constitute a unique reserve of genetic variability: the diversity of their adult size, growth, conformation, coat colour, fur type is well known; their potential diversity concerning zootechnical performance and genetic polymorphism have hardly been studied. Khalil (1993) suggested that performance, origin and domestic use of recognized breed populations are needed to register. In the scientific literature there are limited available evaluation reports on local rabbit breed characterization.

In the Czech Republic, seven national rabbit breeds were registered in the Program of Rabbit genetic resources in 1997. Breeds vary in body size, growth, colour and reproduction, however, all known data are used for general description are from fancy breeders. On the other hand, there is lack of information about the breeds in defined conditions.

The aim of the study was to review the data of Czech rabbit genetic resources; describe population size and selected performance characteristics and compare the breeds with a commercial hybrid.

MATERIALS AND METHODS

The study of population of the Czech national rabbit breeds was conducted on the based on the Central Herd Book of rabbits which has been registered by Czech Association of Breeders since 2000. Rabbit breeds included in the study are in different breed classification, giant breed Moravian Blue (MB),

medium breeds Czech White (CW), Czech Spotted (CS), Czech Solver (CSo), Moravian White of brown eye (MW) and small breeds Czech Black Guard Hair (CB) and Czech Gold (CG). Breed characteristics are given in Table 1. Population size was evaluated according to a FAO methodology based on number of females (Scherf *et al*., 2000).

Rabbit performance and nutrient digestibility were based on results of a nutrient balance experiment with 80 rabbits. The experiment was carried out from weaning age at 42 days to 90 days of age. At the beginning, the rabbits were split into 8 groups according to the seven breeds and the Hyplus rabbits . Rabbits were housed in individual metabolic cages (0.15 m^2 per rabbit). A twelve-hour photoperiod was used. Water and feed were available *ad libitum*. Rabbits were fed on pelleted commercial type diets (18.6 % crude protein, 16.5 % crude fibre, 3.69 % crude fat). The digestibility of nutrients was determined as a coefficient of total tract apparent digestibility of nutrients by the method of Perez *et al.* (1995). The collection period was from 56 to 63 days of age. During the collection period, the total faeces excretion was collected daily in plastic bags and stored at -18 ^oC until analysis. Faeces were analysed for dry matter, crude protein, fat and crude fibre.

At the end of the experiment, six rabbits per group of the average weight were slaughtered in an experimental slaughterhouse. They were fasted overnight, and slaughtered the following morning by electric stunning and bleeding by jugular cut. The method of slaughter measurement was harmonised by Blasco and Ouhayoun (1996). Data were processed by one-way ANOVA using GLM procedure. The significance of differences between groups was tested by the Duncan test on the level of significance $P \leq 0.05$.

Table 1 Breed characteristic in breeding standards

Breed	When established	Colour genotype	Live weight of adult rabbits (kg)	Live weight at 90 days (kg)	Share of genetic resources on (Population) size (%)
MB	1890	ABCdgh	5.5 – 6.5	2.5	80
CW	1930	a	4.0 – 5.0	2.0	70
CS	1900	ABCDgKk	3.3 – 4.0	1.5	50
CSo	1959	Abcdg	3.5 – 4.25	1.8	80
MW	1984	$a^{chi}bCDg$	3.3 – 4.0	1.4	80
CB	1975	$a^{chi}bCDG$	2.5 - 3.25	1.2	90
CG	1959	$AbCDGy_3$	2.5 – 3.25	1.3	90

RESULTS AND DISCUSSION

Results of population size (Table 2) show that breeds CSo, MW and CB are in critical situation. Kerdiles and Rochambeau (2002) evaluated the effective population size (N_c) in two French breeds and stated that very low number of N_c is associated with an increase of inbreeding. However, population size of critically endangered breeds show that number of females is stabilized in these breeds even slightly increased in CB.

Table 2 Female population size and FAO classification of populations in categories of risk

Breed	2006	2007	2008	2009	2010	2011	Classification of FAO
MB	161	165	164	145	141	106	Endangered
CW	154	160	138	145	136	97	Endangered
CS	289	318	314	298	296	251	Endangered
CSo	65	67	67	65	61	43	Critical
MW	93	88	75	87	82	68	Critical
CB	45	56	46	53	52	59	Critical
CG	106	128	158	163	131	106	Endangered

Growth of rabbits (Table 3) was highly significantly (P≤0.001) affected by breed, large breed MB and medium breed CW grew faster than a control hybrid Hyplus and mainly small breeds (MW, CB) had significantly lower growth which agrees with Bolet *et al.* (2000). Trends in growth of breeds were similar to our previous experiment (Tůmová *et al*., 2011). Breeds with higher growth had significantly higher feed intake (P≤0.001) but FCR was not significantly affected by breed. Results of dressing percentage revealed that all pure breeds had significantly higher values (P≤0.002) than the hybrid Hyplus. The significantly highest dressing percentage was in the small breed CG. Our data agree with findings of Bolet *et al.* (2000) who also reported higher dressing percentage in some pure breeds compared to control hybrid.

Table 3 Rabbit performance.

Breed	Live weight at 90 days of age (g)	Daily weight gain (g)	Daily feed intake (g)	FCR (kg)	Dressing percentage (%)
MB	3248^{a}	42.6^{a}	166^{a}	3.68	59.5^{ab}
CW	2769^{ab}	39.6^{ab}	132^{ab}	3.34	60.2^{ab}
CS	2188^{b}	30.7^{bc}	123^{ab}	4.01	60.6^{ab}
CSo	2015^{b}	29.8^{bc}	107^{b}	3.58	60.2^{ab}
MW	2188^{b}	25.9^{c}	103^{b}	3.98	61.3^{a}
CB	1960^{b}	23.9^{c}	98^{b}	4.26	58.1^{bc}
CG	1938^{b}	26.6^{bc}	102^{b}	3.83	62.0^{a}
Hyplus	2575^{ab}	34.0^{b}	138^{ab}	4.16	57.0^{c}
SEM	48.86	1.20	4.14	0.008	0.36
Significance	0.001	0.001	0.001	ns	0.002

Means with the same superscript within columns do not differ significantly, P ≤0.05

Table 4 Coefficient of digestibility of nutrients

Breed	Dry matter	Crude protein	Fat	Crude fibre
MB	0.586	0.733	0.823^{c}	0.199^{c}
CW	0.649	0.777	0.921^{a}	0.346^{a}
CS	0.603	0.729	0.901^{a}	0.237^{bc}
CSo	0.58.4	0.741	0.897^{ab}	0.258^{bc}
MW	0.6.09	0.722	0.901^{a}	0.274^{ab}
CB	0.583	0.678	0.890^{ab}	0.238^{bc}
CG	0.573	0.692	0.911^{a}	0.216^{bc}
Hyplus	0.609	0.730	0.882^{b}	0.307^{ab}
SEM	0.440	0.454	0.242	0.361
Significance	ns	ns	0.001	0.035

Means with the same superscript within columns do not differ significantly P ≤0.05

Dry matter and crude protein digestibility (Table 4) were not significantly affected by breed, however, fat digestibility was significantly the lowest (P≤0.001) in the large breed MB and the second lowest digestibility was in Hyplus rabbits. The significantly highest digestibility of crude fibre (P≤0.035) was in the medium breed CW, which also showed the highest digestibility of other nutrients. Presumably, the highest nutrient digestibility resulted into the lowest feed conversion.

CONCLUSION

Results of the study show that the population of three breeds (CSo, MW CB) is in critical situation and it is necessary to support their keeping. Preliminary results of growth, feed consumption and nutrient

digestibility of CW suggest that this breed has good performance and may be used for alternative or organic rabbit meat production. On the other hand, there is the need for further studies of all production characteristics Czech rabbit genetic resources.

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