Some performance differences caused by keeping circumstances in case of two Hungarian native sheep breeds (Tsigai and Racka)

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Introduction

The maintenance of the rare breeds is a complex task. It means the preservation of constancy of genetic merit, of keeping environment, as well as of production level, simultaneously. This constancy, however, exists under fairly wide borders in the real life; the keeping environment itself shows large variety. It is usually difficult to decide, is a given environment suitable for the conservation breeding of a certain breed, just as, is an environment proper for the typical utilisation of a breed.
In this writing up we would like to search after answer in the following two base questions: 1) is the new keeping place, unconditionally, the ex situ mode of gene conservation (in case of Tsigai), and 2) does the ex situ circumstance have reason for the existence in the utilisation of a rare breed (in case of Racka).

Tsigai

The Tsigai arrived at historical Hungary by means of its wool quality finer than the other contemporary home sheep breeds at that time. The name of the Tsigai can be connected with its wool properties. Some consider the alternate breed name, Cigája, to be of Rumanian origin. 'Tsigai,' ('Tigáie' in the Rumanian language) means short, fine, silky quality wool. A second definition as a collective noun refers to the breed/group of sheep producing such wool. The etymology of the Rumanian word is unknown. The word is mentioned earliest in 1649 when a merchant of Campulung requested for such wool from a merchant of Brassó (Drăgănescu, 2001). The Hungarian etymology is also unclear; however, we suppose that the roof of this name is an old-Turkish one (*čïγ = to wreathe*, connected to its fleece characteristics; Gáspárdy, 2003). In Hungary, other names have been and continue to see limited use, Berke (e.g. in Háromszék county, because of the coat surface and colouration of newborn lambs); Zombori juh ("Zombor sheep," in the Bánát region); and Oláh juh ("Oláh sheep," in Gömör county).
The wool is white with a little greyish tinge, which is due to dispersed black fibres. The overwhelming majority of the fleece is down, having very low pith content (Schandl, 1941). The wool of the Tsigai was qualified in the past as a third-class (C/D) wool. The relatively tick downs are covered by 2-3 epithelium cells. Pliant wool covers the body everywhere, except the face and the extremities. The grease is yellowish, oily, easy cleaned by washing, and medium abundant. Cloths manufactured of Tsigai wool are less fine, thus knit commodities and broad cloths (military cloths, "fuzzy cloths of Brassó") were manufactured from this wool. Tsigai wool of D quality was used for blankets (Kántor, 1941). The lamb's wool was usually purchased by hat-makers. Felt-makers also highly valued Tsigai wool.

The Transylvanian Tsigai, considered to be the ancient type of Hungarian native Tsigai, was wide in the chest, with short legs and a long trunk, similar to the proportions of the original mountain sheep. In late 1980-ies, this mountain ecotype was newly introduced into Hungary from Carpathians, and it is bred under hilly conditions (Keszthelyi et al., 1999). On the course of the natural spreading of the breed in the Carpathian basin, animals distributed in southern counties, mainly. On the Hungarian Great Plain, the animals grew taller, their rumps became wider, and their bellies better filled out, as seen in the side view (Gáspárdy et al., 2002). This later, by the beginning of the 20th century developed type of Hungarian Tsigai represents the newer lowland ecotype.

The wool characteristics of the present-day Hungarian native Tsigai ecotypes are presented in Table 1. From this comparison it will be clear that the two native ecotypes do not differ substantially from each other. But, the smaller sized mountain ecotype produces less greasy fleece with shorter and less homogenous staple, undoubtedly. This reduced wool yield can be caused by its smaller size on the first hand, on the second hand by its lower wool producing ability or probably by its harsher keeping and

poorer feeding condition. The significant difference seem between the figures of staple homogeneity also certifies the more primitive type or the more variegated keeping environment of mountain ecotype.

Table 1: Comparison of wool traits of ewes in mountain- and lowland ecotypes within gene reserve Tsigai variant

Trait	Mountain ecotype (n=32)		Lowland ecotype (n=55)		P-value
	Mean	±sd	Mean	±sd	
Greasy fleece weight, kg	2,79	0,42	3,31	0,40	<0,001
Staple length, cm	6,58	1,23	7,51	1,56	<0,001
Average fineness, µm:	34,04	3,40	33,11	5,36	0,253 NS
- shoulder	32,99	3,60	31,81	3,23	0,074 NS
- thigh	35,09	3,53	34,36	9,83	0,581 NS
Average pith content, %	2,53	1,25	2,07	1,67	0,065 NS
- shoulder	2,18	1,36	1,78	1,07	0,105 NS
- thigh	2,87	1,58	2,37	1,48	0,106 NS
Average staple homogeneity*, cv%:	25,94	2,97	24,09	3,08	<0,001
- shoulder	25,63	3,11	23,28	3,43	<0,001
- thigh	26,24	3,52	24,91	3,11	0,031
Average crimping, per 1cm:	3,71	0,55	3,69	0,63	0,870 NS
- shoulder	3,70	0,69	3,55	0,74	0,258 NS
- thigh	3,72	0,68	3,83	0,74	0,393 NS
Evenness, %	94,10	5,84	95,52	3,96	0,235 NS

* Staple homogeneity in cv% using fibre diameter and its standard deviation at given part of body

Racka

The Hungarian Racka is an old, unique, twisted horn breed. Some supposes that the Hungarian settlers took such animals along. The archaeological findings did not confirm this mind. The most reliable reason for twisted horn is a mutation happened at about the 14th century. Both male and female individuals in this breed carry the long, straight, V-letter like twisted horn. The breed is existing in two colour variants according to the pigmentation of the flies and of the guard hairs. The white Racka have short, pale brownish guard hairs, and long, yellowish white fleece, and yellowish corneous matter. The newborns are more darker coloured in fleece. The black Racka are characterised by an entirely bright black colour, which, especially the fleece, becomes greyish by aging. Horns as claws are slate grey (Dunka, 2000). Independently from the colour, the head is fine, relatively small like the ears. The eyes are vivid. The temper is lively and nervous, therefore shy. The Hungarian Racka is known as a triple purpose breed: milk-meat-wool. The milk is used to make cheese of different kind. The Racka meat is lean and tasty, though its amount is little. At the same time, the meat content of carcass is remarkable advantageous because of the fine bones. Their fat depots are mostly limited to abdominal fat and to croup tallow. Their fleece is mixed. Long staples can reach 30 cm, and is utilised in manufacturing carpets (e.g. Torontál carpet made in Hungary). For fur caps, -collars, and –lined jackets the hide of the one-week-old lambs are used in furriery.

The original distribution of Racka was much more extended in the past. The crowded out Racka became the grazers of the meagre, alkaline soils in Hortobágy by 1960-ies. Since later time, its population grew continuously; Racka flocks reappeared in other country parts. Nowadays, this breed as an ornamental parkland one is very useful in the extensive meat production. During the vegetation period the only source of their feedstuff is the pasture. Most of the progenies are regularly marketed as suckling lambs for Easter. A less frequently, but traditionally applied fattening mode is the extensive fattening of the wethers. These castrated males can be reared up in the ewe herd, and slaughtered for vintage or for any other occasion in autumn. Broiler lamb production is not at all typical.

In Table 2/a/b/c can be seen the fattening characteristics (adjusted for 20, 30 and 35 before slaughter weight, respectively) of Racka by colour variants and by fattening types. In each fattening type (with ad libitum feed-intake) both sexes took place with same numbers with except of the extensive one, where only grazing wethers were evaluated. Beside the slaughter age the carcass weight and gain parameters sows significant differences. Deviation from the tendency is observable in the carcass weight of the

extensively fattened wethers. This drop in weight can be explained by the more developed, heavier horns, and larger fleece and intestines of older individuals. It is true that the intensity of the growth is generally weak in this breed, but from this trial it becomes obvious that the degree of the response to the fattening on concentrate is weak too.

Table 2/a: Fattening characteristics in Hungarian Racka breed

Effects	n	Age at slaughter, day LSM SEM	Warm carcass weight, kg LSM SEM	Total daily gain, g LSM SEM	Net daily gain, g LSM SEM
Colour variant:		p = .054	p = .127	p = .884	p = .743
white	35	175.0 2.8	13.56 .07	177.1 3.2	88.0 1.5
black	35	183.4 3.5	13.39 .09	177.8 4.1	87.3 1.9
Fattening type:		p < .001	p < .001	p < .001	p < .001
suckling – 20 kg	20	91.4^{a} 4.6	9.28^{a} .12	216.2^{d} 4.9	113.6^{d} 2.5
intensive – 30 kg	20	155.4^{b} 4.0	13.95^{b} .11	182.5^{b} 4.2	90.7^{b} 2.2
intensive – 35 kg	20	170.1^{b} 3.8	16.14^{d} .10	198.9^{c} 4.1	96.7^{c} 2.1
extensive – 35 kg	10	299.9^{c} 5.1	14.52^{c} .13	112.2^{a} 5.3	49.6^{a} 2.7

There is a decrease too in case of wethers in the lean meat yield of back muscles. The consequence of the short fattening on concentrate is the increased amount and percent of lean meat.

Table 2/b: Carcass traits in Hungarian Racka breed

Effects	n	Lean meat on thigh*, kg LSM SEM	Lean meat on back*, kg LSM SEM	Whole lean meat*, kg LSM SEM	Lean meat content of carcass, % LSM SEM
Colour variant:		p = .698	p = .756	p = .280	p = .611
white	25	1.32 .01	1.20 .04	5.48 .07	75.2 .5
black	25	1.32 .01	1.18 .04	5.38 .07	74.8 .5
Fattening type:		p < .001	p < .001	p < .001	p < .001
intensive – 30 kg	20	1.20^{a} .01	1.17^{b} .04	5.17^{a} .08	76.1^{b} .5
intensive – 35 kg	20	1.37^{b} .01	1.39^{c} .04	6.02^{b} .07	76.3^{b} .5
extensive – 35 kg	10	1.39^{b} .02	1.00^{a} .05	5.10^{a} .09	72.6^{a} .7

* lean meat yield in the left half evaluated

As a disadvantageous consequence of intensive fattening it can be drawn that the protein content of the thigh (m. semitendinosus) is significantly lower. The more favourable position of wethers in the case of water- and fat content is statistically not proven, but its reality is imaginable.
There were found not any differences in investigated parameters between Racka colour variants. This fact proves the sameness, the same meat producing ability of the two colour variants, and confirms the proper breeding work regarding their gene conservation.

Table 2/c: Meat properties in Hungarian Racka breed (from thigh)

Effects	n	Water content, % LSM SEM	Protein content, % LSM SEM	Ash content, % LSM SEM	Fat content, % LSM SEM
Colour variant:		p = .491	p = .419	p = .116	p = .713
white	25	75.7 .3	18.9 .1	1.03 .01	3.9 .3
black	25	75.8 .3	19.0 .1	1.05 .01	3.8 .2
Fattening type:		p = .463	p = .003	p = .129	p = .318
intensive – 30 kg	20	76.2 .4	18.1^{a} .02	.99 .02	4.3 .3
intensive – 35 kg	20	76.0 .4	18.2^{a} .02	.99 .02	4.5 .4
extensive – 35 kg	10	74.7 1.1	20.6^{b} .06	1.15 .06	2.8 1.1

Conclusion

From this current wool investigation it can further be established that the Hungarian native Tsigai did not changed essentially on the course of the last century, and does not differ well in the wool characteristics from the animals existed around 1950 (Záhonyi, 2002) or 1900 (Szentkirályi, 1923). Szentkirályi was the person, who have been described and evaluated the Hungarian Tsigai from 1860-ies on at first. However, it was found out that the shearing weight slightly increased, the staple shortened, the fibre became finer and less medullated. The fleece of silvery glitter and of characteristic structure is white almost without exception, although, the breed became poorer in colour varieties (according to the short hair colour). The explanation of this change is the obligate breeding program of 1950-ies, which requested same criteria in both Tsigaias and Merinos. This aspect does not dominate today.

It is supposed that the current Hungarian ecotypes do not differ significantly in wool producing ability from each other. The slight difference is caused basically by the keeping environment (but certain genetic separation is revealed among the share populations; Gáspárdy et al., 2004). We can state that the today mountain ecotype found the adequate keeping environment at its new place. The permanent natural environmental impact is very important in the maintenance of ecotypes, but calls also the attention to the conservation of identical gene pool. This identical gene pool can be saved by a careful mating plan and by a continuous rotation of rams. So, it means that individuals of a given breed or ecotype are allowed to keep under ex situ condition for shorter time or for few generations. However, if this time period is longer than this the danger of genetic loss will increase: not the most proper animals will be selected as parents because of phenotypic modification. Moreover, if the selection and mating are based on pedigree and/or on probably DNA analysis the result can not be manifested in the conformation and performance. Continuous connection to the in situ nucleus populations and buying of breeding animals from them is a commendable advice for such places.

In the case of Racka it is undoubtedly clear that the new keeping condition (intensive fattening) alter the phenotypic performances. From certain reasons (e.g. bigger yield, shorter time) this new environment can be advantageous, especially if a non-breeding animal is affected, and if this new environment causes financial reach for the owner, finally. So, the ex situ circumstance can be reasonable for certain utilisation of a rare breed, if we have no doubt about its all consequences. For example, a long-lasting unusual environmental impact produced on breeding animals should be unimaginable. The larger variance in performances as indispensable concomitant of traditional meat production is well-known (Gáspárdy et al., 2001) and it is in contradiction with the standard quality of modern foodstuff. However, in average, the traditional food meets more the exigencies composed against the quality products or functional food.

In some ex situ environment, the peculiarity of the Racka for tourism can be prevailing in the sight of the long twisted (screwed) horns and the long tresses of wool, which offer an unaccustomed spectacle. Anyway, in ex situ condition, the breeders have to avoid the overfeeding, to take care of body size, energy balance in order to make a healthy and fertile population to reproduce.

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