

ADAPTATION EXPERIMENTS OF HUNGARIAN TURKEY BREEDS AND THEIR CROSSES IN VIETNAM (MGE-NEFE project, Hungary–Vietnam, 2006-2007)

Dong Xuan^{1,2}, K.D.T. – Szalay^{1,2}, I.T. – Duc Tien³, P. – Minh Thu³, P.T.

¹Association of Hungarian Small Animal Breeders for Gene Conservation (MGE)
Isaszegi ut 208., H-2100 Godollo, Hungary

²Research Institute for Animal Breeding and Nutrition, Division for Small Animal Research
(ATK-KATKI), Isaszegi ut 200., H-2100 Godollo, Hungary

³NIAH Poultry Research Centre (POREC), Tu Liem, Thuy Phuong, Hanoi

dothidongxuan@gmail.com; xuan@katki.hu; it.szalay@gmail.com; szalay@katki.hu;

Summary

Rearing and reproduction of old Hungarian poultry breeds: Copper turkey, Bronze turkey and their reciprocal crosses sent from the Godollo Gene Bank of old Hungarian poultry breeds to Vietnam for adaptation experiments were studied in 2006-2007. Consequent data were obtained and compared in flocks of the same origin in Vietnam and Hungary. Results showed that all production and reproduction traits as well as livability studied were better in Vietnam, except egg weight. Among breeds and crosses, Hungarian Bronze turkey seems to have the best adaptability to the new conditions. The study is part of a NEFE project (code: 5980-3/ADM/KuM/2006), supervised and financed by the Ministry of Foreign Affairs of Hungary and the Canadian International Development Aid (CIDA) and co-financed by MGE. Hungarian experiments are part of the GAK-OKO-TERM project (ATK-KATKI-MGE; 2005-2007), financed by KPI.

Keywords: *Hungarian turkey, adaptability, production, reproduction, livability*

Introduction

1000 turkey hatching eggs of old Hungarian poultry breeds: Copper turkey, Bronze turkey and their reciprocal crosses were sent in May, 2006 from the Godollo Gene Bank of old Hungarian poultry breeds (Szalay, 2002) to Vietnam for adaptation experiments. Flocks of the same origin are studied parallel in Vietnam and Hungary, with the participation of the Research Institute for Animal Breeding and Nutrition (ATK), Division of Small Animal Research (KATKI) in Hungary, and the National Institute of Animal Husbandry, Poultry Research Centre (POREC), Thuy Phuong, Hanoi in Vietnam. The aim of the study was to obtain results on the adaptability of Hungarian turkey breeds in Vietnam, and propose the subsequent development of breeding stocks of old Hungarian poultry breeds in Vietnam, which are suitable for keeping on family mixed farms of poor regions of South-East Asia, with special attention paid to sustainability and conservation of local poultry genetic resources (see Dong Xuan & Szalay, 2003; Dong Xuan et al., 2006; Szalay & Dong Xuan, 2007). Framework for the study is a NEFE project (code: 5980-3/ADM/KuM/2006), supervised and financed by the Ministry of Foreign Affairs of Hungary and the Canadian International Development Aid (CIDA) and co-financed by MGE. Hatching and rearing results of the two breeds and their crosses in 2006 and egg production, egg weight and hatchability results in 2007 of the series of adaptation experiments (comparative study) are shown and briefly discussed in this paper.

Results

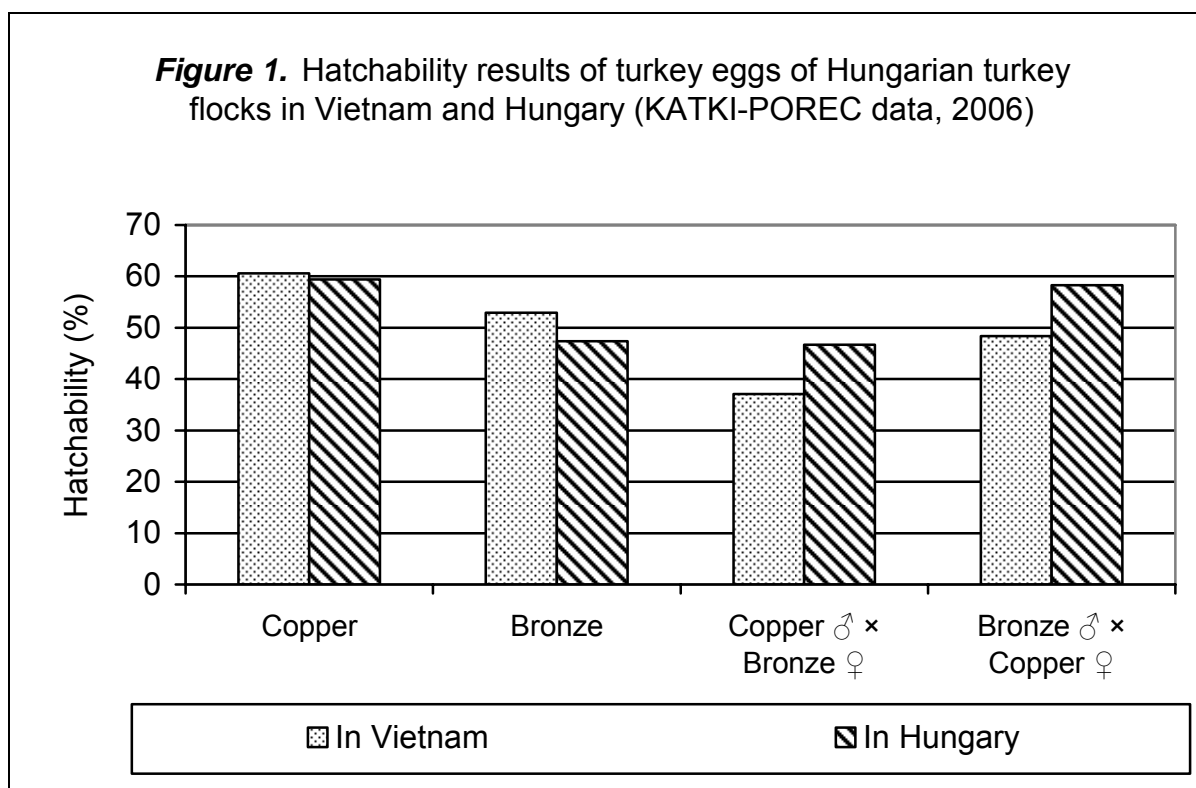
1. 2006 results of Hungarian turkey adaptation experiments in Vietnam

1.1. Hatchability results of turkey eggs in Vietnam and Hungary originated from the Godollo Gene Bank, Hungary (May – June, 2006)

Shipping did not really influence hatching results of turkey eggs: better hatching results were obtained in the case of pure breeds (Copper and Bronze turkey) in Vietnam, while hatching of reciprocal crosses of the two breeds – presumably because of shipping anomalies – showed better results in Hungary (*Table 1 and Figure 1*).

Table 1. Hatchability results of turkey eggs in Vietnam and Hungary originated from the Godollo Gene Bank, Hungary (May – June, 2006)		
Breed (genotype)	Hatchability of incubated eggs (%)	
	In Vietnam (unbroken eggs only*)	In Hungary
Copper	60,6	59,4
Bronze	52,9	47,4
Copper ♂ × Bronze ♀	37,1	46,7
Bronze ♂ × Copper ♀	48,4	58,3

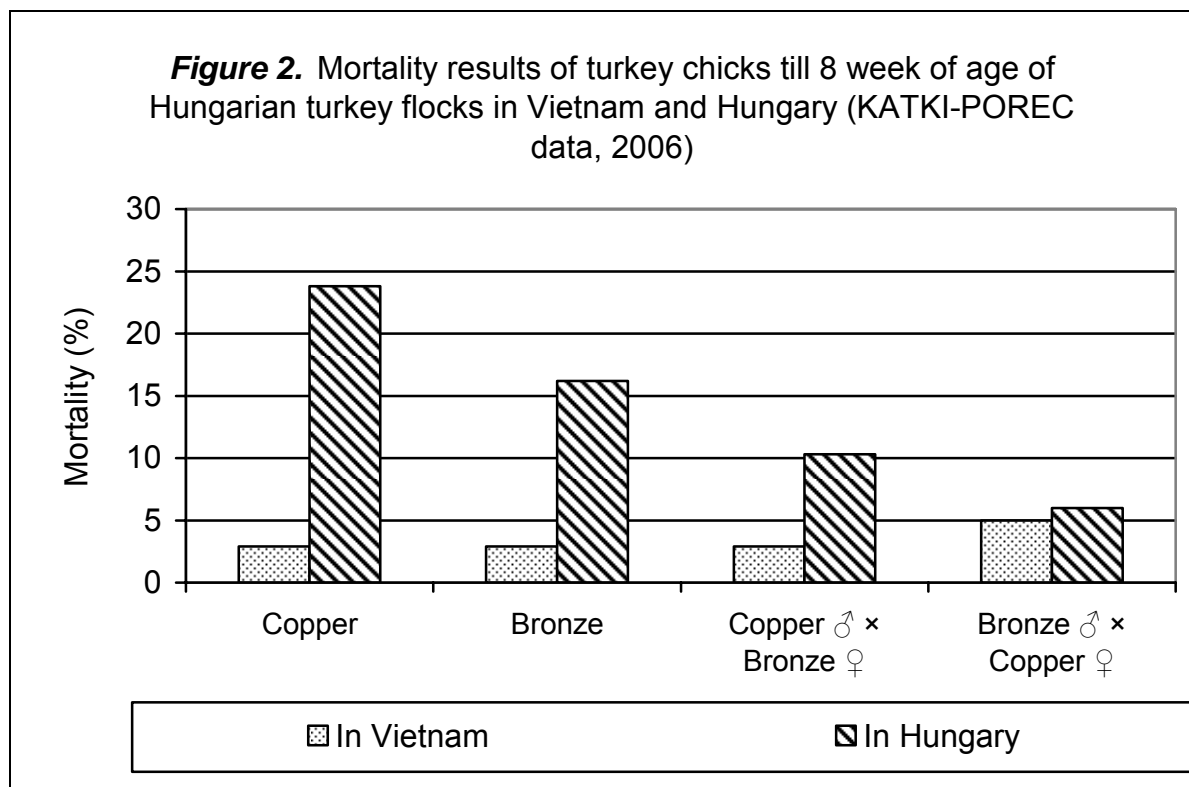
*During the 1st shipping some eggs were delivered broken. Results show the hatchability of unbroken eggs only.



1.2. Mortality results of turkey flocks in Vietnam and Hungary originated from the Godollo Gene Bank, Hungary (May – June, 2006)

Livability of turkey flocks can be well characterized by the mortality results during the rearing period. Results show that turkey breeds studied can be reared with much better results in Vietnam than in Hungary. It is valid for all genotypes studied, especially for the two breeds. Livability of crosses is better than that of the breeds in both environments. Mortality results of 15 week rearing are shown in *Table 2 and Figure 2*.

Breed (genotype)	Mortality till 15 weeks of rearing (%)	
	In Vietnam	In Hungary
Copper	2,9	23,8
Bronze	2,9	16,2
Copper ♂ × Bronze ♀	2,9	10,3
Bronze ♂ × Copper ♀	5,0	6,0

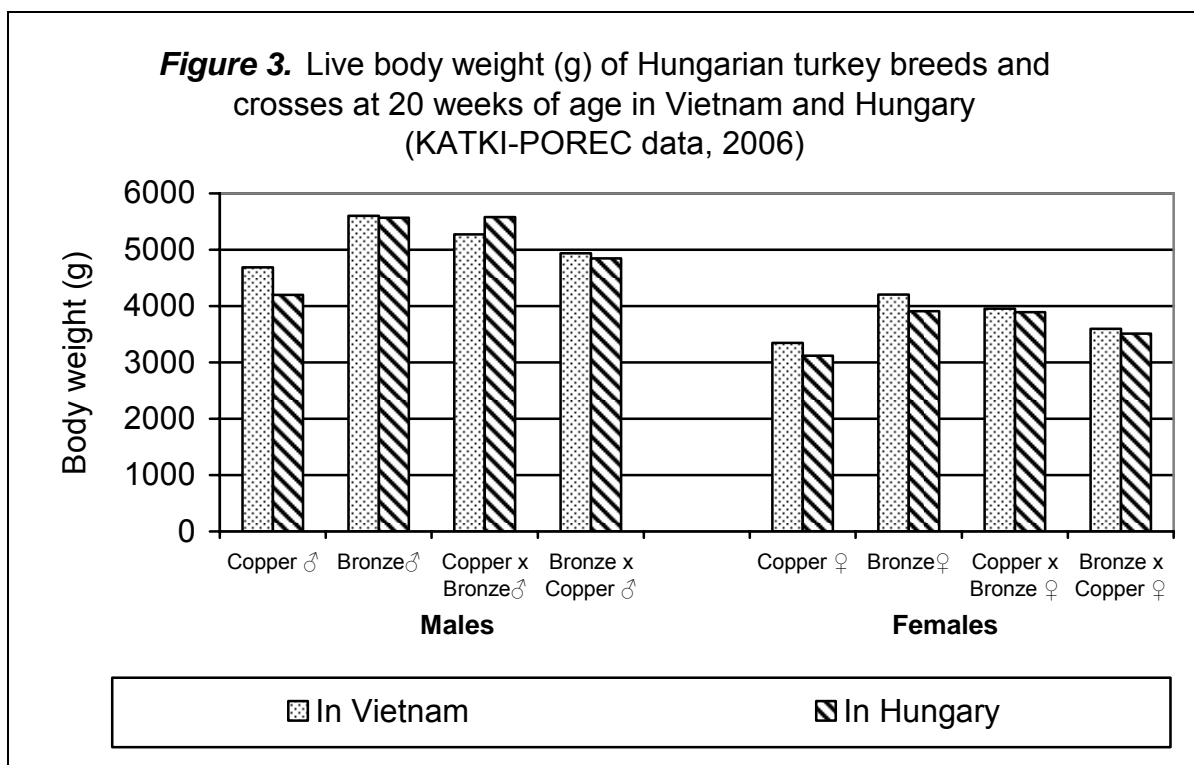


No mortality was observed after 4 weeks of age (except the only one in Bronze turkey flock in Vietnam between 4 and 8 weeks of age.) No mortality was observed in flocks, during egg production (till 48 weeks of age), in either countries.

1.3. Live body weight of turkey flocks at 20 weeks of age in Vietnam and Hungary originated from the Godollo Gene Bank, Hungary (2006)

Body weight records of all turkey flocks show that significantly higher body weight in all genotypes studied can be obtained in Vietnam than in Hungary. Bronze turkey showed better results than Copper turkey, and Copper turkey male x Bronze turkey female crosses showed higher body weight than the reciprocal cross in both environments. It is worth mentioning that crossings for the 15 week body weight are characterized by intermedier inheritance in Vietnam, while heterosis is observed in Hungary (Table 3. and Figure 3).

Breed (genotype/sex)		Live body weight (g) at 20 weeks of age	
		In Vietnam	In Hungary
Copper	♂	4685	4198
	♀	3345	3120
Bronze	♂	5604	5567
	♀	4207	3910
Copper ♂ × Bronze ♀	♂	5272	5577
	♀	3957	3893
Bronze ♂ × Copper ♀	♂	4939	5847
	♀	3597	3512

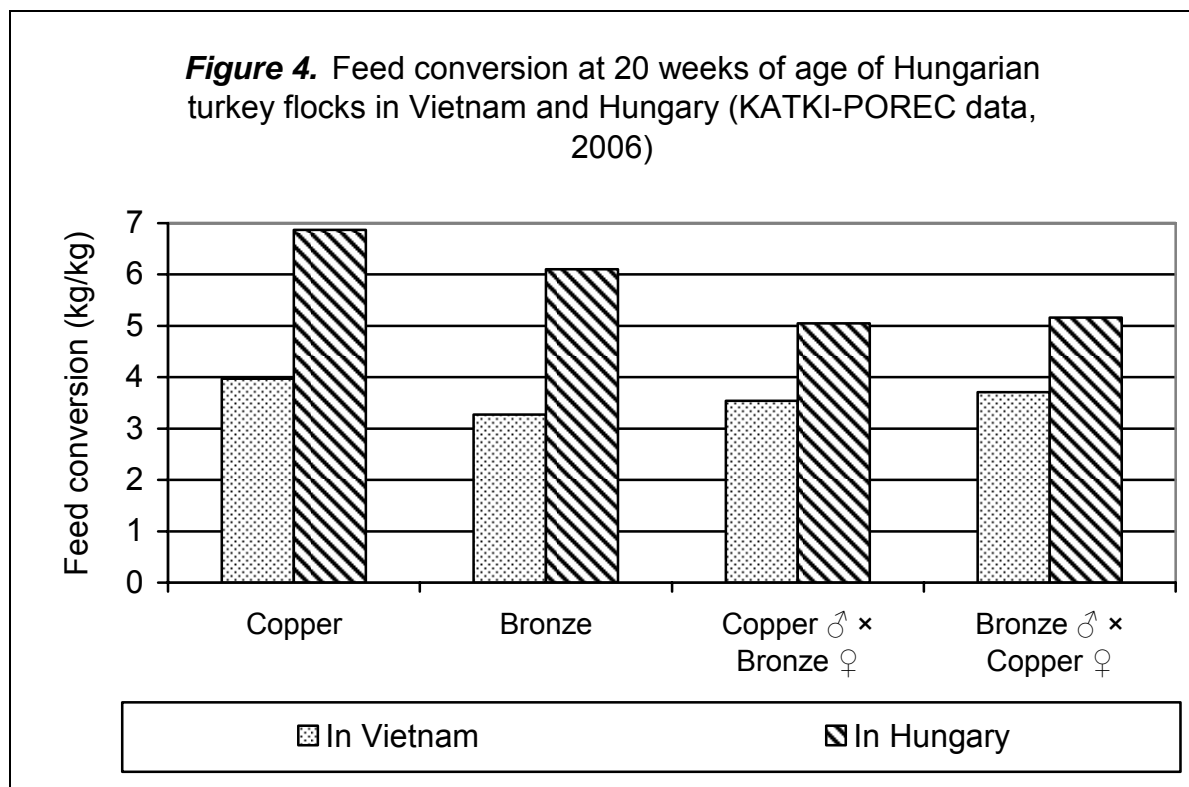


1.4. Feed conversion at 20 weeks of age of turkey flocks in Vietnam and Hungary originated from the Godollo Gene Bank, Hungary (2006)

Feed conversion rate (feed used for 1 kg meat production) of all turkey genotypes studied was better in Hungary than in Vietnam, which can be the result of different feed for rearing. Results are shown in *Table 4* and *Figure 4*.

Table 4. Feed conversion at 20 weeks of age of Hungarian turkey flocks in Vietnam and Hungary (KATKI-POREC data, 2006)		
Breed (genotype)	Feed conversion (kg feed/kg body weight gain) at 20 weeks of age	
	In Vietnam	In Hungary*
Copper	3,97	6,87
Bronze	3,27	6,10
Copper ♂ × Bronze ♀	3,54	5,05
Bronze ♂ × Copper ♀	3,71	5,16

Kept free range all day (30-90 m²/bird pasture) from 10 weeks of age.

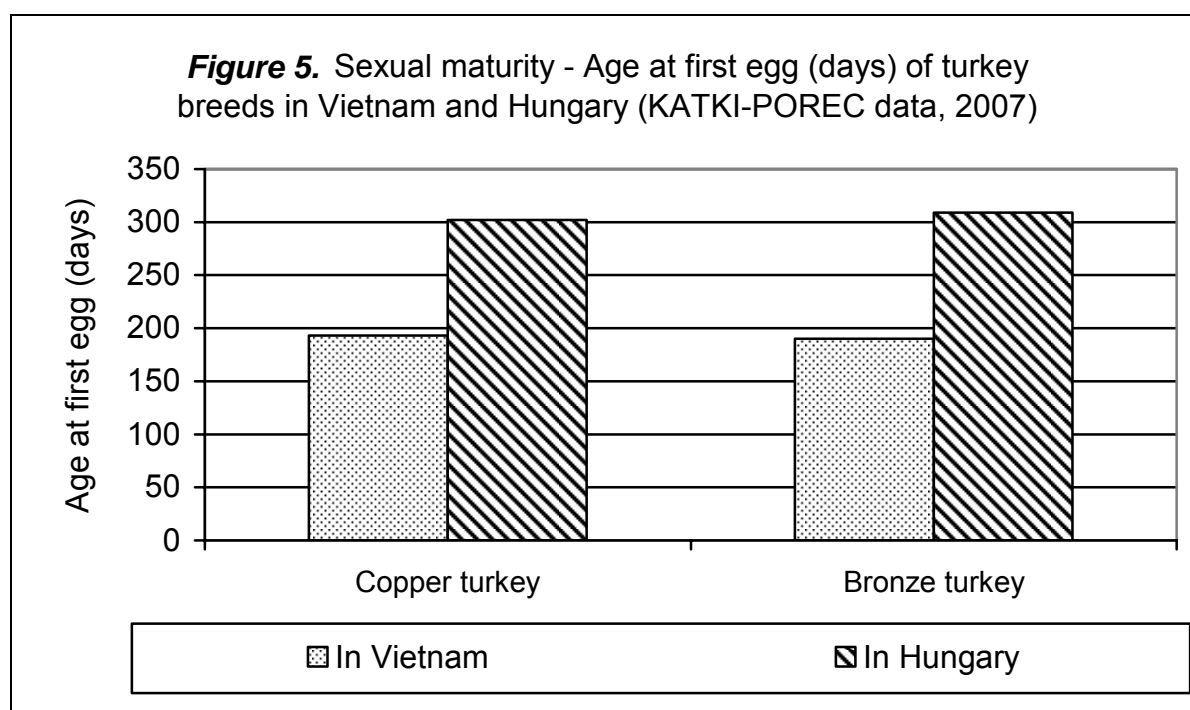


2. 2007 results of Hungarian turkey adaptation experiments in Vietnam

2.1. Sexual maturity

More than 100 days difference was observed in sexual maturity of turkey females in Vietnam and Hungary. In Vietnam, first eggs were laid at 190th and 193th days of age (beginning of January), while in Hungary, egg production started at the age of 302 and 309 days (second half of March). The great difference is due to the high seasonality of turkey egg production in continental climate, where turkey starts egg production in springtime. This seasonality cannot be observed in Vietnamese climate (*Table 5 and Figure 5*).

Breed (genotype)	Age at first egg (days)	
	In Vietnam	In Hungary
Copper	193	302
Bronze	190	309

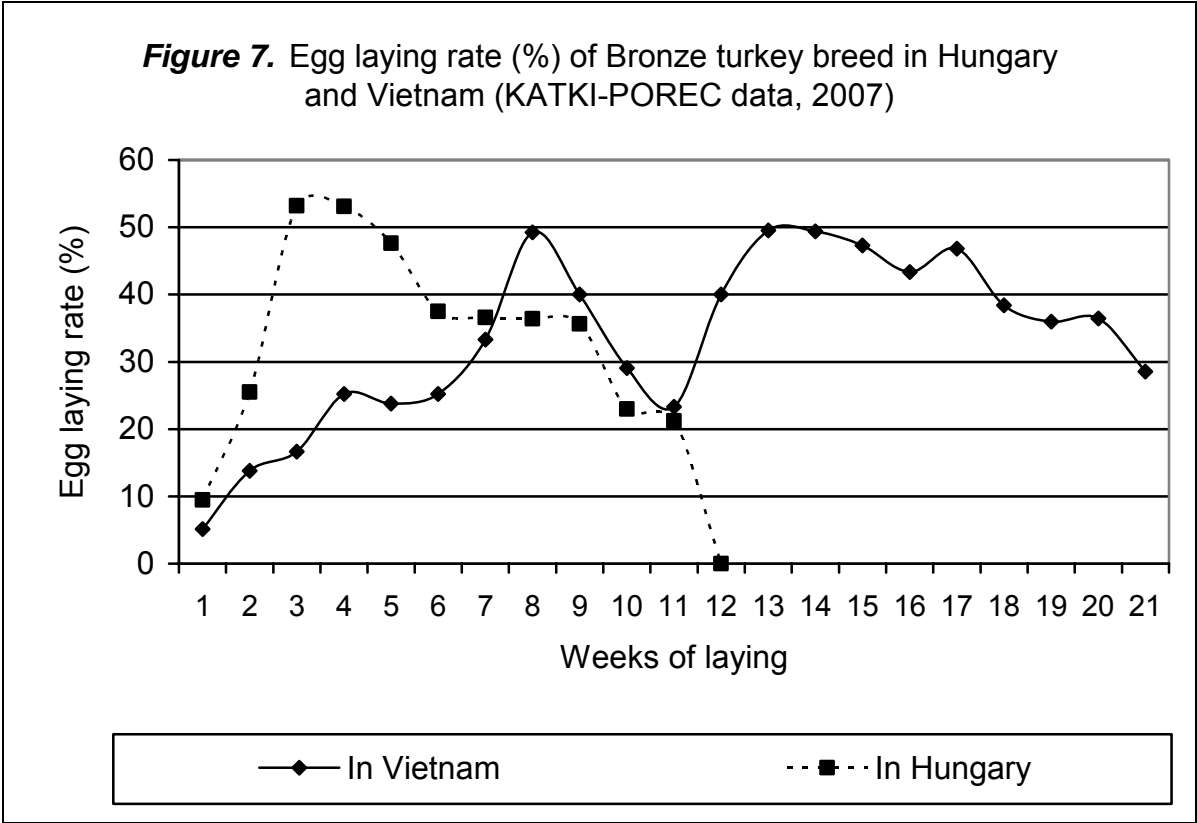
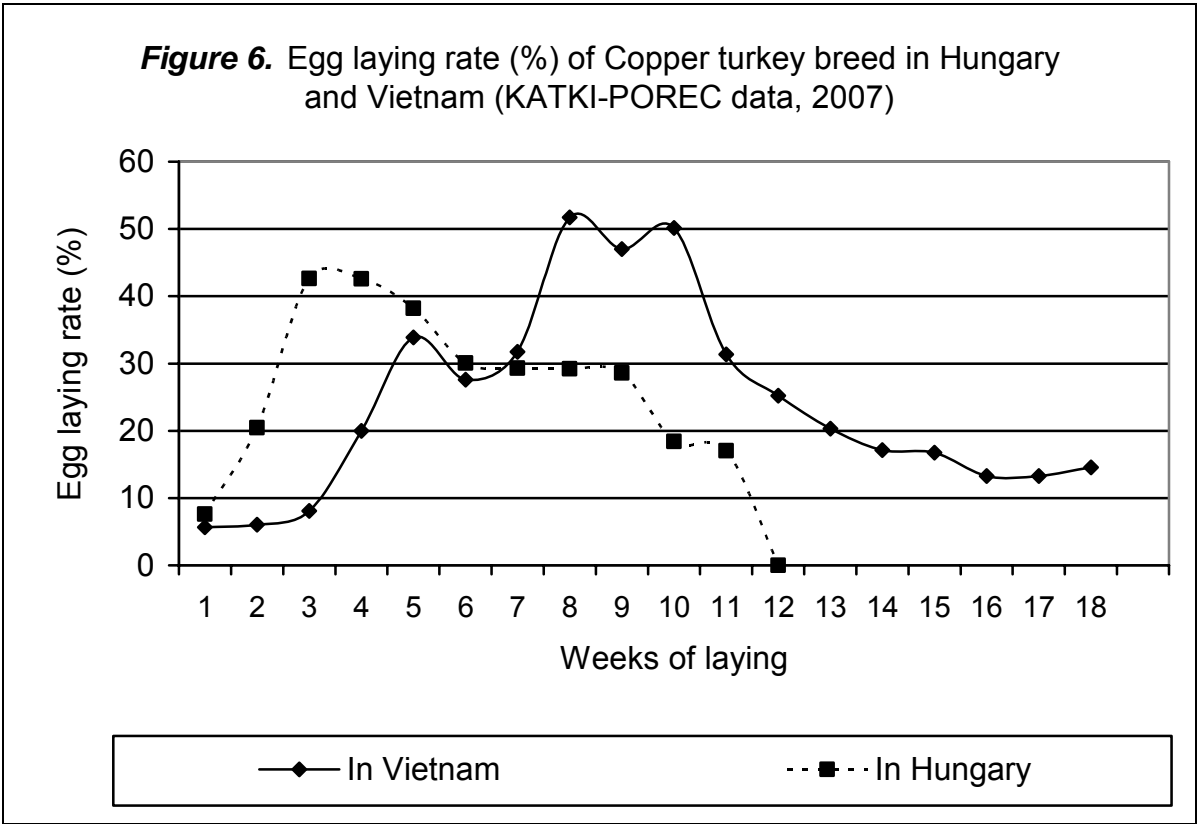


2.1. Egg production of Bronze and Copper turkey breeds in Hungary and Vietnam

Egg production differences can be explained by the same seasonality mentioned in the previous section for sexual maturity. Turkeys start laying more than 100 days earlier in Vietnam, but the rise of egg production curve is somewhat lower. They reach peak production in the 8th week of laying, compared with 3rd week of laying for maximum egg production in Hungary. Season of egg production ends within 12 weeks in Hungary, but lasts as long as 21 weeks (the end of data recording) or more in North-Vietnam. Seasonality differences can be explained by different climate and day-length changes. Egg production will be further studied in the second half of 2007.

Egg production of both breeds shows the same tendencies in a given country, but Bronze turkey has somewhat higher peak in Hungary and more elongated egg production in Vietnam.

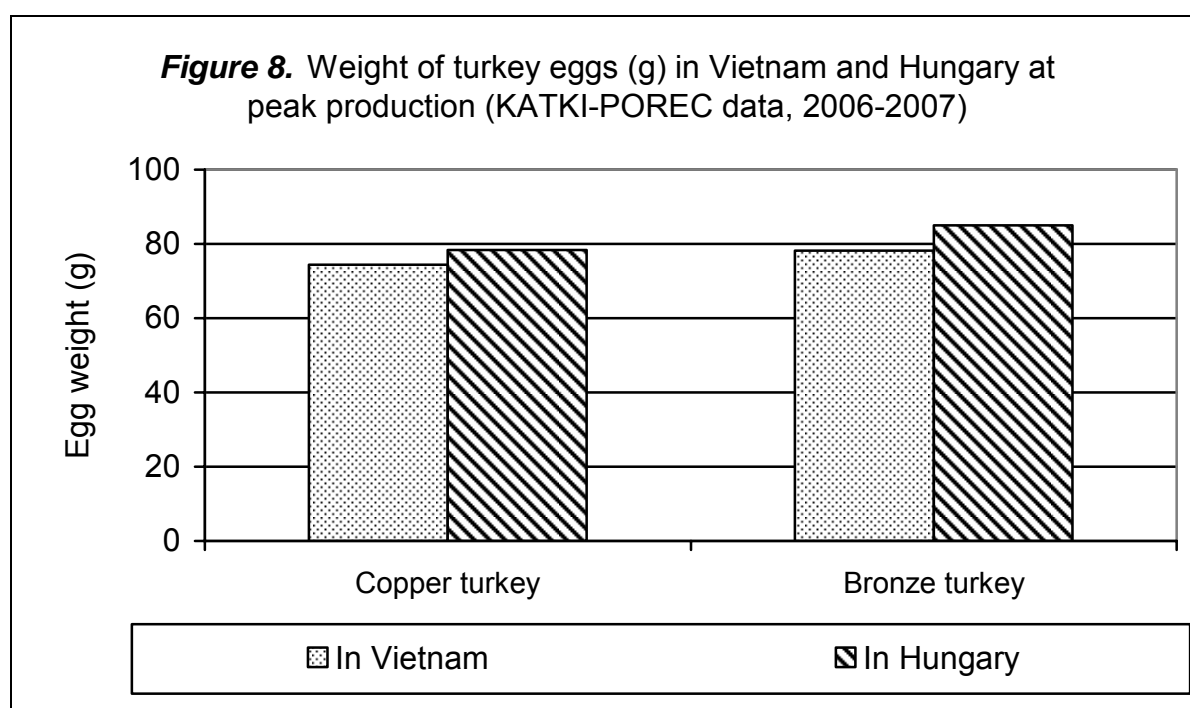
As the result of all egg production characteristics, total number of eggs produced in Vietnam is much higher than in Hungary. Egg production rates are compared in *Figure 6* for Copper and *Figure 7* for Bronze turkey breeds.



2.2. Egg weight of Bronze and Copper turkey breeds in Hungary and Vietnam

Egg weight is the only production trait, which shows better results in Hungary, than in Vietnam. The reason for this phenomenon can be found in the early start of laying and the more elongated season of production in Vietnam (*Table 6; Figure 8.*)

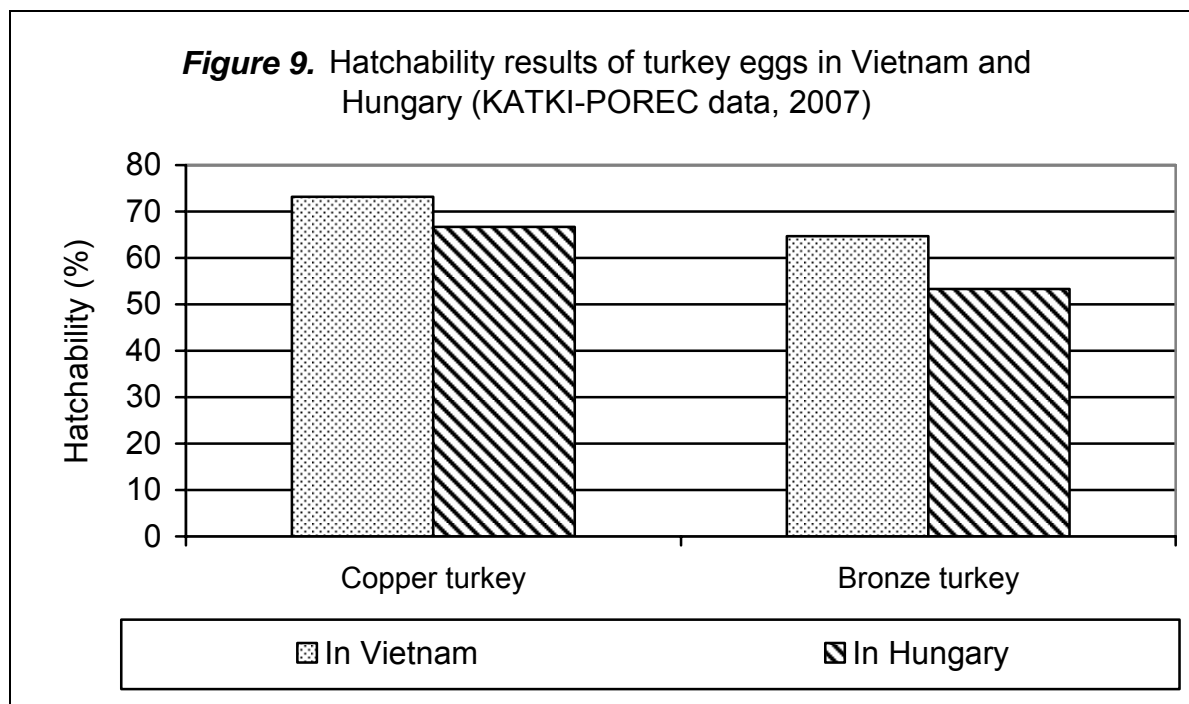
Table 6. Weight of turkey eggs (g) in Vietnam and Hungary at peak production (KATKI-POREC data, 2006-2007)		
Breed (genotype)	Hatchability of incubated eggs (%)	
	In Vietnam	In Hungary
Copper	74,4	78,4
Bronze	78,2	85,0



2.3. Hatchability results of turkey eggs produced in Vietnam and Hungary

Hatchability results of turkey eggs produced by the flocks reared in Vietnam and Hungary show the same differences as the hatchability after shipping in 2006. Copper turkey is characterized by better hatching rate than Bronze turkey in both countries (*Table 7, Figure 9.*)

Table 7. Hatchability results of turkey eggs produced in Vietnam and Hungary (KATKI-POREC data, 2007)		
Breed (genotype)	Hatchability of incubated eggs (%)	
	In Vietnam	In Hungary
Copper	73,2	66,7
Bronze	64,7	53,3



Conclusions

Based on the first and second period results of adaptation experiments of Hungarian turkey breeds and their crosses, it can be concluded that turkey genotypes studied can be reared in Vietnam with real success. Hatching results of breeding eggs shipped to Vietnam indicate that good (maybe somewhat better) results can be obtained in Vietnam than in Hungary. It was confirmed by hatching results of eggs produced in Vietnam in 2007. As regards body weight gain and livability till 20 weeks of age, better results can be obtained in Vietnam, than in Hungary. Crossings of turkey breeds showed heterosis for body weight and feed conversion in Hungary, but did not in Vietnam. In Vietnamese conditions purebred Hungarian Bronze turkey gives the best results in this respect. Livability was found much better in Vietnam in all genotypes studied, but no mortality was observed after 8 weeks of age in either environments. It also means that 100% of birds survived during egg production too. As regards reproduction characteristics, turkeys start egg production more than 100 days earlier in Vietnam, and produce more but – due to early start of laying and longer production – somewhat smaller eggs.

Data obtained so far on the adaptation of Hungarian turkey breeds and crosses demonstrate well the excellent adaptability of these breeds in Vietnamese environment, however, crosses do not show heterosis for certain traits, as Copper male x Bronze female do in Hungary.

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