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Summary

The neural network model has met our expectations in terms of prediction quality. Its application for lactation curve analysis and for predicting 305-d lactation yields seem justified, since the quality parameters of neural networks were better that those for the Wilmink model. It was found that daily-yield-based predictions by regression models and neural network were more accurate that those by the official milk recording system (SYMLEK). A properly prepared (trained) neural network may generate yield predictions for individual cows or group of cows, while application of mathematical models requires that a new equation be developed each time the group of cow changes.

SUITABILITY OF DOUBLE HYBRIDS OF BILGORAJSKIE AND WHITE ITALIAN GEESE FOR OAT FATTENING

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Introduction

In Poland, the production of geese is based exclusively on White Italian geese that were imported from Denmark in 1962. These geese acclimatized quickly to new environmental conditions and became competitive with domestic geese because of high and versatile usability. This caused a gradual displacement of domestic races and lines of geese, among which ten groups make now a genetical resource [2, 7]. The groups of mainatined geese are used in research to produce commercial hybrids, among others [3, 6]. One of the domestic goose lines used in many studies is Bilgorajskie geese, being maintained as a closed flock The observations made about this flock for many years indicate their high usability. These geese are characterized by good health conditions, good feed utilization, high slaughter value, and also a considerable con-

tent of down in plucking [4].The objective of the present work was, therefore, to evaluate the effects of bilateral crossing and possibilities of the use of Bilgorajskie geese and White Italian WD-11 geese to produce hybrids suitable for oat fattening.

Material and methods

One-day old goslings of Bilgorajskie geese (Bi), White Italian geese (WI), and hybrids from crossing Bilgorajskie males with White Italian females (BiW) and White Italian males with Bilgorajskie females (WIBi) were used. In total, 256 geese, 32 males and 32 females in each genetical group, were examined. Geese were reared *ad libitum* rich mix exclusively to 3 wk of age. From week 4 of age, rich mix was limited and silage composed of steamed potatoes (87%), 00-rapeseed meal (5%), faba bean meal (4%), and dry alfalfa (4%) was included to the food ration, while gradually increasing the amount. From week 15 of age, geese were fed exclusively oat grain for successive three weeks. During the experiment, survival rate, feed intake, and body weight were controlled on week 8, 14 and 17. Seven females and seven males were selected for slaughter from each group using systematic sampling. Slaughter and simplified slaughter performance were carried out according to the methods used in the previous study on geese [4]. For the traits controlled, the heterosis effects, being a deviation from indirect inheritance (H) were calculated from the following equation:

H = x hybrid group - 1/2(x paternal group + x maternal group)

The heterosis effects, measured in units for a given trait, were expressed in per cents, assuming the value of indirect inheritance as 100%. The results obtained were analysed statistically using variance analysis in orthogonal or non-orthogonal system and Duncan's test.

Results and discussion

The results for body weights (Table 1) prove that hybrids had highly significantly greater body weight than Bilgorajskie geese and smaller body weight than White Italian geese, irrespective of age. Thus, irrespective of the direction of crossing, hybrids had intermediate body weight relative to initial groups. Mazanowski *et al*. [3] also found intermediate body weight for hybrids from crossing White Italian geese with Cuban geese, although, at 12 wk of age, the hybrids (males and females) from Cuban males and hite Italian females were heavier than those from the reverse crossing. In the present study, the average body weight calculated jointly for hybrids (BiWI and WIBi) of both sexes was on a similar level at 14 and 17 wk of age, and the calculated difference was only 48 g and 73 g. Considering the body weight within the sex, it was found that males weighed 5.73 kg (BiWI) and 5.56 kg (WIBi), being heavier by 16

and 12 than females. week 15 to 17 of age, the survivability was found to be 100% in all the groups of geese.

Table. 1. Body weight of geese (g) and feed consumption (kg)

Specification	Sex	Statistical measures	Group			
Age of geese (week)			Bi	WI	BiWI	WIBi
8	males	x v	3255 12,17	4607 10,37	3845 8,24	3465 11,63
	females	x v	3016 11,16	3758 14,96	3513 6,35	3443 12,16
	total	x v	3132^{A} 12,32	4075^{B} 16,55	3676^{C} 8,74	3433^{D} 11,87
14	males	x v	4217 10,33	5975 8,45	4855 6,77	4831 9,39
	females	x v	3658 10,38	4989 11,94	4227 8,80	4372 0,53
	total	x v	3930^{A} 12,58	5403^{B} 13,77	4532^{C} 10,31	4580^{C} 11,00
17	males	x v	4881 10,80	7158 10,57	5731 8,81	5564 10,16
	females	X v	4181 10,47	5828 14,40	4925 10,07	4976 12,11
17	Total (males and females)	x v	4521^{A} 13,20	6380^{B} 16,36	5316^{C} 12,01	5243^{C} 12,24
Feed coversion, kg/kg body weight		Period (weeks)				
- mixture		0 - 17	3,42	2,62	2,98	2,95
- silage		0 - 17	4,03	5,03	4,52	4,80
- oat		0 - 17	1,95	1,90	1,99	1,92

a,b - significant at $P \leq 0,05$ A,B,C,D - significant at $P \leq 0,01$

The intakes of rich mix and silage per 1 kg body weight were the highest for Bilgorajskie geese (Bi) and White Italian geese (WI), respectively (Table1). In the groups of hybrids (BiWI ans WIBi), the intake of both rich mix and silage was on a similar level (3.02 kg rich mix and 4.52 kg silage), being intermediate relative to initial groups. The intake of oat grain per 1 kg body weight was similar for all the analysed groups. Puchajda *et al*. [5] reported similar intakes of rich mix and oat, but higher by about 1 kg intake of silage for White Italian WD-1 geese.

The results presented in Table 2 indicate high adiposis in White Italian geese, but low one - in Bilgorajskie geese. Particularly great differences, being proved statistically, were found for perienteric fat. The carcasses of Bilgorajskie geese contained also 3.87 to 6.16% less skin with subcutaneous fat than

other groups of eese. The differences were highly statistically significant. Statistically significant diferences between pure races were also noted for such traits as slaughter yield and percentage of edible giblets. The results obtained are not confirmed by Puchajda's [4] study. Intermediate values for the traits analysed were found for hybrids.

The slaughter yield for hybrids was greater by 1.61% (BiWI) and 1.26% (BiWI) than for Bilgorajskie geese, and it was significantly smaller by 1.35% (BiWI) and 1.70% (WIBi) than for White Italian geese. Statistically significant differences were also found for the content of edible giblets.

Table 2. Slaughter yield and dates of partial dissection of carcasses 17-week old geese

Specification	Statistical measures	Group			
		Bi	WI	BiWI	WIBi
Bird weight prior to slaughter	x	100	100	100	100
Weight of feathery	x	5,81	4,76	5,60	5,03
	v	21,28	22,35	24,11	22,03
Eviscerated carcass with neck	x	61,28^{Aa}	64,24^{Bb}	62,89^{c}	62,54^{ac}
	v	2,82	2,16	2,37	2,56
Giblets	x	6,40^{Aa}	5,26^{Bc}	5,57^{B}	5,82^{b}
	v	7,87	9,78	14,19	10,37
Depot fat	x	3,26	3,99	3,99	3,70
	v	28,92	18,52	24,43	28,06
Intestinal fat	x	1,62^{Aa}	3,19^{Bc}	2,69^{B}	2,36^{b}
	v	40,61	27,64	29,18	46,60
Eviscerated carcass	x	100	100	100	100
Breast muscles	x	16,79^{a}	15,07^{b}	16,37^{ab}	15,34^{b}
	v	10,18	9,68	9,01	10,37
Thigh muscles	x	9,08^{A}	7,67^{Bb}	8,23^{BCa}	8,31^{C}
	v	4,81	7,85	8,45	6,18
Leg muscles	x	7,91^{A}	6,79^{B}	7,19^{B}	7,14^{B}
	v	5,60	7,61	8,89	6,54
Leg and thigh muscles	x	16,99^{A}	14,46^{Ba}	15,41^{Bb}	15,44^{Bb}
	v	4,92	7,32	8,50	5,50
Breast and leg muscles	x	33,75^{Aa}	29,53^{Bc}	31,79^{b}	30,79^{B}
	v	6,14	7,64	8,00	6,97
Skin with subcutaneous fat	x	19,60^{A}	25,76^{B}	23,47^{B}	24,01^{B}
	v	14,77	10,78	14,89	13,26

A,B - significant at $P \leq 0,01$; a,b,c - significant at $P \leq 0,05$

The carcass percentages of breast and leg muscles were greater for hybrids than for White Italian geese, but they were significantly smaller than for Bilgorajskie geese (Table 2). Significant differences in all the analysed traits

were found between Bilgorajskie geese and White Italian geese. The results obtained has not been confirmed by the Puchajda's [8] study on Bilgorajskie and White Italian geese.

Table 3. Effects of heterosis for selected traits in geeses hybrids

Specification	BiWI	WIBi
Conversion / 1 kg body weight:		
- mixture,	-1,32*	-2,32*
- silage,	-0,22	+5,96***
- oat,	+3,38**	-0,26
Body weight:		
- 8 week,	+2,01*	-4,73**
- 14 week,	-2,88*	-1,85*
- 17 week,	-2,47*	-3,81**
Slaughter yield,%	+0,21	-0,35
Content of muscles:		
- Breast,	+2,76*	-3,70**
- Thigh,	-1,73*	-0,78
- Leg,	-2,18*	-2,86*
- Breast and leg,	+0,47	-2,69*
Content of skin with subcutaneus fat	+3,48**	+5,86***

* for H from $\pm$1,1 to $\pm$3,0%; ** for H from $\pm$3,1 to $\pm$5,0%; *** for H>$\pm$5,0%

The heterosis effects ranged from -4.73% to +5.96% (Table 3). Most frequently, the heterosis effects did not exceed the values from ±1.1% to ±3.0%. Negative heterosis effects were noted for body weight at 14 and 17 wk of age, and for the content of leg muscles for both groups of hybrids. Positive heterosis effect was noted for the content of breast muscles in genetic group BiWI. Negative heterosis effects for body weight gain were reported by Kniżetova *et al*. [1] for crossing Bohemian geese with White Italian geese. The hybrids obtained as a result of double crossing of Bilgorajskie geese with White Italian geese had most often intermediate and similar values for the traits analysed. The geese from crossing Bilgorajskie males with White Italian females had, however, slightly better usability than the hybrids (WIBi) from the reverse crossing.

Concluding, it was found that hybrids from crossing Bilgorajskie geese with White Italian geese can be successfully use for oat fattening, irrespective of the direction of crossing.

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НОВЫЕ ДАННЫЕ ПО ФИЗИОЛОГИИ ПИТАНИЯ ПЯТНИСТЫХ ОЛЕНЕЙ

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В последние годы благодаря усовершенствованию старых и применению новых методов исследования физиология пищеварения и обмена веществ, то есть питания животных, обогатилась большим количеством принципиально важных фактов. Коренным образом изменилось представление о превращении и использовании питательных веществ в пищеварительном тракте жвачных животных и в частности пятнистых оленей.

В данном сообщении делается попытка обобщить наиболее важные достижения современной физиологии в этой области. В основу обзора положены работы, вышедшие главным образом из лаборатории кафедры «Зоотехнии» Калининградского Технического Государственного Университета.

В ряде исследований прежде всего были вскрыты основные закономерности в деятельности слюнных желез. Оказалось, что околоушные железы секретируют непрерывно; подчелюстные и подъязычные – только при приеме корма. Деятельность слюнных желез подчинена процессам, протекающим в преджелудках. Летучие жирные кислоты (ЛЖК), образующиеся в рубце, участвуют в регуляции паротидного слюноотделения не только рефлекторно со стороны рубца, но и гуморальным путем, действуя на центр слюноотделения.