

ISSN 1330-7142

UDK = 636.592.1:636.061/.8

## PHENOTYPIC TRAITS IN ZAGORJE TURKEY

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Original scientific paper

### SUMMARY

*Production of turkeys in the region of Hrvatsko zagorje began in second half of 16<sup>th</sup> century, when there was a little influence of other turkey breeds from other region. Recently, interest for protection and preservation of autochthonous poultry breeds in Croatia is growing and in that sense this investigation was set to determine the phenotypic traits of Zagorje turkey. One hundred 10-month old turkeys (5 males and 20 females of four strains (bronze, black, grey and pale) were measured, while egg production data were collected by a poll among the breeders. Average body weight of bronze, black, grey and pale strain males were 7.08, 6.88, 6.10 and 6.09 kg, respectively, while in females the average values were 4.02, 4.07, 3.63, and 3.68 kg. Generally, according to body measures of male birds, other than body weight, of all of the strains of Zagorje turkey, the black one is the biggest, as it had the highest values for body length, length of sternum, length of drumstick, length of shank, depth of chest and head measures. At the same time, the bronze strain had the highest value for carcass width. Body measures mentioned previously were not so different in females. Number of reared chicks was lowest in the pale strain. From the body measures assessed it is possible to conclude that Zagorje turkeys are rather uniform within the strain but differences in most of the breed traits are present between the strains, especially in males of bronze and black strain, when compared to grey and pale strain.*

*Key-words: phenotype, traits, Zagorje turkeys*

### INTRODUCTION

Production of turkeys in the region of Hrvatsko zagorje began in second half of 16<sup>th</sup> century, when there was little influence of other turkey breeds from other region. Specific production in small flocks, where turkeys most lived feeding outdoor resulted in particular morphological and physiological characteristics determining the meat quality and making the breed known in other parts of our country and abroad. Data on productive traits of Zagorje turkey is less than scarce. First record of body measures of Zagorje turkey was published by Kodinetz (1940). Based on weight of slaughtered birds he concluded that male birds reached average body weight of 6.01kg at 28 weeks, while females at the same age weighed 3.95kg. Mužic et al. (1999) measured zagorje turkeys at 9-11 months of age in the area of Krapinsko-zagorska and Varaždinska counties.

Average body weights were 6.87kg for males and 3.97kg for females. Kodinetz (1940) in his paper published values of body measures of Zagorje turkeys, which were almost identical to those reported by Mužic et al. (1999), for 28 week-old birds.

That fact is in accordance with conclusions published by Jaap et al. (1939), stating that development of bones in domestic turkey males ceases at the age of 24-26 weeks and in females at 22 weeks. Recently, the interest for protection and preservation of autochthonous poultry breeds in Croatia is growing and in that sense this investigation was set to determine the phenotypic traits of Zagorje turkey.

### MATERIAL AND METHODS

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The research was carried out on the area of Krapinsko-zagorska and Varaždinska County. There are four strains of Zagorje turkey present in the area of Krapinsko-zagorska and Varaždinska counties: bronze, black, grey and pale. Bronze strain has a wide, elongated head, with a compact and slightly bent horny grayish to muddy-pink beak. Ear lobes, snood, caruncles and otheg parts of skin without feathering are red to blue-grey. Neck, breasts and back are black with green glaze. Thighs and belly are completely black without a glaze, while in crinkles feathers are black-brown-sallow. Male turkeys have a characteristic black-green wad called beard. Wings are covered with sallow-black feathers with white stripes and black edge. Tail feathers are black-brown with pale brown stripes and white edge. Shanks are pink-grey with four toes with sharp claws. Grey strain of Zagorje turkey has characteristic color of neck, back and breast feathers with alternating black and white tips giving an impression of a grey color, while tail feathers are similar to bronze strain. Pale strain has predominantly white feathers, with pale brown, black and grey feathers that lie between. Black strain has all black feathers. Their feather has no glaze and the head, snood and beard are much smaller. From the population of 1000 birds from 200 family farms supervised by Croatian Livestock Center four farms were randomly selected for measurement of birds. One hundred 10-month old turkeys (5 males and 20 females of four strains (bronze, black, grey and pale) were measured, while data on number of eggs and poults were collected from previously mentioned farms during the spring breeding season (March-June). Body measures were taken by a compass (0.3 cm accuracy), while measurements of head were done by a vernier caliper (0.1 mm accuracy), taking into account measurement standards described by Kodinetz (1940). A hanging scale took body weight of measured birds with accuracy of  $\pm 20$ g. Statistical analysis was done by using STAT module, SAS package (SAS Institute, 1996). We used PROC MEANS procedure for descriptive analysis and PROC GLM (SAS Institute, 1996) for model testing.

## RESULTS AND DISCUSSION

Average body measures of Zagorje turkey toms of all strains are shown in Table 1 and the average body measures and reproductive traits of Zagorje turkey hens of all strains are given in Table 2.

As it could be seen in Table 1 average body measures of toms vary between the strains. Bronze toms were on the average 1 kg heavier than grey and pale strain (14 %), while black toms had lower body weights by 0.20 kg (3 %) than bronze ones. Hens of black and bronze strain (Table 2), were 10 % heavier than grey and pale. Measured body weight of toms and hens are somewhat lower than those reported by Kodinetz (1940), but, at the same time, almost identical to data reported by Mužic et al. (1999). Measured values indicate that Zagorje turkey is among the smallest European breeds (Roberts, 1997). Generally, according to body measures of male birds, other than body weight, of all of the strains of Zagorje turkey, the black one is the biggest, as it had the highest values for body length, length of sternum, length of drumstick, length of shank, depth of chest and head measures. At the same time, the bronze strain had the highest value for carcass width. Body measures mentioned previously were not so different in females. Number of eggs laid by hens monitored in this project is lower than the average reported by Mužic et al. (1999), who stated that during the spring season hens lay 21 eggs. Number of reared poults is the highest in pale strain.

**Table 1. Average body measures of all Zagorje turkey**

Measure	N=5	Bronze	Black	Grey	Pale
Body weight, kg	$\bar{x}$	7.08 <sup>a</sup>	6.88 <sup>a</sup>	6.10 <sup>b</sup>	6.09 <sup>b</sup>
	$s \bar{x}$	0.72	1.44	0.16	0.62
	s	0.32	0.64	0.07	0.28
	cv	10.15	20.95	2.62	10.26
Body length, cm	$\bar{x}$	29.80 <sup>a</sup>	30.80 <sup>a</sup>	30.40 <sup>a</sup>	28.70 <sup>b</sup>
	$s \bar{x}$	0.45	0.84	1.52	2.64
	s	0.20	0.37	0.68	1.18
	cv	1.50	2.72	4.99	9.19

Sternum length, cm	$\bar{x}$	16.70 <sup>a</sup>	17.10 <sup>a</sup>	15.80 <sup>b</sup>	15.50 <sup>b</sup>
	$s \bar{x}$	1.30	2.48	0.76	1.58
	s	0.58	1.11	0.34	0.71
	cv	7.81	14.53	4.80	10.20
Leg length, cm	$\bar{x}$	20.76 <sup>b</sup>	23.00 <sup>a</sup>	22.26 <sup>a</sup>	22.70 <sup>a</sup>
	$s \bar{x}$	4.46	0.71	0.49	0.45
	s	1.99	0.32	0.22	0.20
	cv	21.47	3.07	2.19	1.97
Shank length, cm	$\bar{x}$	15.60 <sup>a</sup>	16.40 <sup>a</sup>	15.00 <sup>b</sup>	15.80 <sup>a</sup>
	$s \bar{x}$	0.42	0.55	0.61	0.76
	s	0.19	0.24	0.27	0.34
	cv	2.68	3.34	4.08	4.80
Head length, cm	$\bar{x}$	11.84 <sup>b</sup>	12.50 <sup>a</sup>	11.88 <sup>a</sup>	11.72 <sup>b</sup>
	$s \bar{x}$	0.99	0.35	0.86	0.58
	s	0.44	0.16	0.39	0.26
	cv	8.37	2.83	7.28	4.99
Beak length, cm	$\bar{x}$	3.66	3.68	3.66	3.56
	$s \bar{x}$	0.36	0.35	0.23	0.35
	s	0.16	0.16	0.10	0.16
	cv	9.96	9.49	6.29	9.85
Head width, cm	$\bar{x}$	4.14 <sup>b</sup>	4.48 <sup>a</sup>	4.22 <sup>b</sup>	4.08 <sup>b</sup>
	$s \bar{x}$	0.25	0.15	0.36	0.19
	s	0.11	0.07	0.16	0.09
	cv	6.06	3.31	8.44	4.71
Body width, cm	$\bar{x}$	10.20 <sup>a</sup>	9.90 <sup>a</sup>	9.90 <sup>a</sup>	9.20 <sup>b</sup>
	$s \bar{x}$	0.27	0.82	0.55	0.91
	s	0.12	0.37	0.24	0.41
	cv	2.68	8.30	5.53	9.87
Breast depth, cm	$\bar{x}$	20.60 <sup>b</sup>	21.30 <sup>a</sup>	20.10 <sup>b</sup>	18.90 <sup>c</sup>
	$s \bar{x}$	0.55	1.64	0.55	1.88
	s	0.24	0.73	0.24	0.84
	cv	2.66	7.71	2.72	9.97

Means with the same letter are not significantly different ( $p > 0.05$ )

**Table 2. Average body measures and reproductive traits of Zagorje turkey hens of all strains**

Measure	n=20	Bronze	Black	Grey	Pale
Body weight, kg	$\bar{x}$	4.02 <sup>a</sup>	4.07 <sup>a</sup>	3.63 <sup>b</sup>	3.68 <sup>b</sup>
	$s \bar{x}$	0.32	0.47	0.44	0.55
	s	0.07	0.11	0.10	0.12
	cv	8.06	11.64	11.98	14.94
Body length, cm	$\bar{x}$	24.40 <sup>a</sup>	24.98 <sup>a</sup>	23.11 <sup>b</sup>	24.33 <sup>a</sup>
	$s \bar{x}$	1.11	0.82	1.61	1.18
	s	0.25	0.18	0.37	0.26
	cv	4.55	3.28	6.98	4.87
Sternum length, cm	$\bar{x}$	12.74	12.60	12.12	12.39
	$s \bar{x}$	0.52	0.58	0.65	0.42
	s	0.12	0.13	0.15	0.09
	cv	4.07	4.57	5.36	3.38
Leg length, cm	$\bar{x}$	18.53 <sup>a</sup>	18.65 <sup>a</sup>	17.55 <sup>b</sup>	18.38 <sup>a</sup>
	$s \bar{x}$	0.77	0.69	1.01	0.51

	s	0.17	0.15	0.23	0.11
	cv	4.15	3.70	5.77	2.77
Shank length, cm	$\bar{x}$	12.89 <sup>a</sup>	12.83 <sup>a</sup>	12.11 <sup>b</sup>	12.58 <sup>a</sup>
	s $\bar{x}$	0.56	0.67	0.86	0.65
	s	0.13	0.15	0.20	0.15
	cv	4.35	5.26	7.10	5.17
Head length, cm	$\bar{x}$	9.94	10.14	10.18	9.76
	s $\bar{x}$	0.46	0.47	0.55	1.44
	s	0.10	0.11	0.13	0.32
	cv	4.64	4.65	5.38	14.80
Beak length, cm	$\bar{x}$	3.19 <sup>b</sup>	3.40 <sup>a</sup>	3.34 <sup>a</sup>	3.30 <sup>a</sup>
	s $\bar{x}$	0.16	0.20	0.20	0.22
	s	0.04	0.04	0.05	0.05
	cv	5.08	5.80	6.09	6.64
Head width, cm	$\bar{x}$	3.45	3.53	3.54	3.52
	s $\bar{x}$	0.10	0.15	0.15	0.13
	s	0.02	0.08	0.04	0.03
	cv	2.90	4.30	4.34	3.84
Body width, cm	$\bar{x}$	8.77	8.95	8.87	8.61
	s $\bar{x}$	0.45	0.54	0.46	0.65
	s	0.10	0.12	0.11	0.15
	cv	5.15	5.98	5.16	7.59
Breast depth, cm	$\bar{x}$	15.70	16.10	15.24	15.55
	s $\bar{x}$	0.52	0.60	0.79	0.78
	s	0.12	0.13	0.18	0.17
	cv	3.33	3.72	5.17	4.99
Number of eggs	$\bar{x}$	16.40	15.50	16.11	15.50
	s $\bar{x}$	4.31	2.70	5.37	2.89
	s	0.96	0.60	1.23	0.65
	cv	26.28	17.45	33.37	18.66
Number of poults reared	$\bar{x}$	14.05 <sup>a</sup>	13.53 <sup>a</sup>	14.05 <sup>a</sup>	12.50 <sup>b</sup>
	s $\bar{x}$	2.84	3.08	4.84	3.10
	s	0.63	0.71	1.11	0.69
	cv	20.19	22.76	34.41	24.83

Means with the same letter are not significantly different ( $p > 0.05$ )

## CONCLUSION

From the body measures assessed it is possible to conclude that Zagorje turkeys are rather uniform within the strain but differences in most of the breed traits are present between the strains, especially in males of bronze and black strain, when compared to gray and pale strain.

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(Received on 27 April 2007; accepted on 4 June 2007)