

Effect of free-choice feeding and feed restriction on the performance of free-range Zagorje turkeys

Z. Janječić^{1}, S. Mužić¹ and D. Županić², ¹Faculty of Agriculture, 10 000 Zagreb, Svetošimunska 25, Croatia, ²Veterina d.o.o., 10 436 Rakov Potok, Svetonedjeljska 2, Croatia. E-mail: zjanjecic@agr.hr*

Abstract

The aim of this research was to investigate the effect of free-choice feeding and feed restriction on the performance of 302 free-range Zagorje turkeys, divided into two control (male C₁ and female C₂) and two experimental (male E₁ and female E₂) groups. First four weeks turkeys were fed a starter diet (24.2% CP) and the next four weeks grower (21.8% CP). In the following 4-month period turkeys were grazing on pastures with supplemental free-choice corn and soybean meal with vitamin-mineral premix. The level of nutrition of the experimental groups was 30% lower than in groups C₁ and C₂. The body weight of turkeys on the end of experiment was: C₁-5853.8, C₂-3391.9, E₁-6010.6 and E₂-3323.4 g. FCR over the whole 4-month period was 6.53, 7.50, 5.05 and 6.40. Ratio of corn: soybean meal consumed was similar, ranging from 1:0.46-1:0.48. Mortality was 3.84, 0.00, 2.56 and 3.84 %. Dressing percentage was 73.2, 70.5, 72.4 and 71.4 %.

Introduction

Zagorje turkey became known in Europe in the thirties of the 20th century when it was exported to many European countries and annual export was 50000-70000 birds that were traditionally produced in the outdoor system. Auckland et al. (1969) examined the effect of under-nutrition of turkeys during the period up to 6 weeks of age on the finishing body weights at 20 weeks. In this research authors established that the lowered body weight in turkeys at the age of 6 months, as a consequence of under-nutrition, disappears at 20 weeks of age. Revington and Moran (1990) investigated the effect of lowered dietary nutrient levels on the productive performance on the heavy hybrids of turkeys. Underfed birds had lower body weights and worse FCR at 16 weeks, with less adipose tissue than the birds fed according to the NCR Requirements. Those differences were lowered by the week 28 and completely disappeared by the week 57. Ferket and Sell (1990) examined a 30 % reduction in protein and 10 % in energy to the NRC Requirements in the diet of Nicholas turkeys between day 10 and week 6. They found that this restricted nutrition resulted in lowered daily gain and poorer FCR. Ability of poultry to balance its nutritional requirements increases the efficiency of nutrient utilization, especially protein (Cumming and Mastika, 1987). Mužić et al. (2004) investigated the influence of free-choice feeding, with supplementation of Kostovit[®] vitamin-mineral premix on the production performance of free-range Zagorje turkey. Results showed that free-range production of Zagorje turkeys until the age of 6 months in a grassed pen, with the supplemental free choice of corn seed (two forms: whole and grounded), soybean meal and "Kostovit" premix is successful, especially concerning finishing body weights and dressing percentage. Observations made during this research suggest that a change in the traditional nutrition of Zagorje turkeys could lead to a new technology of their production. The aim of this research was to investigate effect of free-choice feedings and feed restriction on the performance of free-range Zagorje turkeys.

Materials and Methods

302 day-old Zagorje turkeys were divided into two control (male C₁ and female C₂) and two experimental (male E₁ and female E₂) groups. For the first 8 weeks turkey chicks were kept under the regulated microclimate conditions on the Faculty of Agriculture in

Zagreb and then were transferred to Glina, where they had access to a fenced natural pasture of 0.5 ha per group, connecting to a poultry house with 0.5 m² of littered floor per bird. Each pasture had a shed of 6 m². Water and feed were given to the birds outside, under a shed and inside the poultry house. Nutritional treatment consisted of three basic periods. Four weeks turkeys were fed with starter diet (24.2% CP) then four weeks with developer diets (21.8% CP). In the following 4-month period turkeys were grazing on pastures, with supplemental free-choice feeding between corn and soybean meal with vitamin-mineral premix. Experimental groups were fed with 30% restriction in relation on C₁ and C₂ groups. Weighing of birds and feed consumed was done on day 1, week 4 and 8 and after that, once a month until the end of the trial. At the end of month 6, five of birds from each group were randomly selected and sacrificed for slaughtering and process, according to the method of Hahn and Spinder (2002). Following record was taken: live weight, carcass weight and dressing percentage. All the data were processed by using statistical package SAS (1996, GLM procedure-Adjustment for multiple Comparisons: Tukey-Kramer.

Results and Discussion

Average body weight of 6 months old male and female is shown in Table 1.

Table 1. Body weight of 6 months old turkeys, g

Group	C ₁	E ₁	C ₂	E ₂
n	75	68	78	78
Mean	*5853,77 ^a	6010,58 ^a	3391,94 ^a	3323,40 ^a
SD	474,73	478,08	207,28	285,30

*Means bearing the similar superscript within a column do not differ significantly (p>0.05)

There were no statistically significant differences between sexes (p>0.05) found in the experimental groups of 6 months old Zagorje turkeys caused by differences in nutrition. In the trial carried out by Mužic et al. (2004) turkeys fed *ad libitum* with the same feedstuffs as in our trial, under the same conditions, achieved a bit lower finishing body weights.

During the second phase, feed conversion was calculated based on corn and soybean consumption and bodyweights at the age of 6 months. Values of feed conversion are given in Table 2.

Table 2. Feed conversion in turkeys aged 2-6 months (kg/kg)

Feedstuff	FCR, kg/kg			
	C ₁	E ₁	C ₂	E ₂
Soybean meal + Kostovit [®]	2.08	1.88	2.45	2.02
Corn	4.45	4.07	5.05	4.38
Total	6.53	5.95	7.50	6.40

During the period between 2 and 6 months of age birds in group C₁ consumed corn grain and soybean meal in ratio 1:0.47 and those in group E₁ 1:0.46. In the same time birds from group C₂ consumed corn grain and soybean meal in ratio of 1:0.48, while this ratio in group E₂ was 1:0.46. As shown, restrictive nutrition had no significant impact on ratio of feedstuffs consumed. In the research of Mužic et al. (2004) conversion in turkeys fed *ad libitum* with ratio between corn grain and soybean meal of 1:0.52 for two sexes together was 7.27 and 7.18. Such a high consumption of feeds during the later phase authors assign to

unusually high daily temperatures, long period without rain and little grass in fenced pens (poor grazing).

Mortality of turkeys aged 2-6 months is given in Table 3.

Table 3. Mortality of turkeys aged 2-6 months

Group	C₁	E₁	C₂	E₂
%	3.84	0.00	2.56	3.84

As shown in previous table, mortality of turkeys aged 2-6 months was acceptable, as a result of adequate zoo-hygienic conditions and sufficient area of grassed pens available to turkeys throughout a day.

Live weight, carcass weight and dressing percentage per group are given in Table 4.

Table 4. Live weight, carcass weight and dressing percentage per experimental group

Group	Live weight, g	Carcass weight, g	Dressing %
C ₁	5900.0	4326.2	73.3
E ₁	5970.0	4322.2	72.4
C ₂	3400.0	2397.7	70.5
E ₂	3320.0	2369.4	71.4

Results of the trial show no difference within sexes, i.e. way of feeding did not caused differences in dressing percentage between sacrificed birds from control and experimental groups of Zagorje turkeys.

Considering non-significant differences in finishing body weights within sexes of experimental groups, significantly better feed conversion in control groups and almost identical dressing percentage between sexes, we can conclude that restrictive feeding of turkeys was justified and this way of feeding could be recommended in feeding free-range Zagorje turkeys utilizing sufficient grazing area.

References

- AUCKLAND J.N., MORISS T.R. and JENNINGS R.C. (1969) Compensatory growth under-nutrition in market turkeys. *British poultry Science* 10: 293-302.
- CUMMING. R. B. and MASTIKA. I.M. (1987) Why choice feeding trials have failed? *Proceedings of the Poultry Husbandry Research Foundation Symposium*. The University of Sydney 23-28.
- FERKET. P.R. and SELL. J.L. (1990) Effect of early protein and energy restriction of large turkey toms fed high-fat or low-fat realimentation diets. 1. Performance characteristic. *Poultry Science* 69: 1974-1981.
- HAHN. G. And SPINDLER. M. (2002) Method of dissection of turkey carcasses. *World's Poultry Science Journal* 58: 179-197.

MUŽIC. S., JANJEČIĆ. Z., KIŠ. G., ĐIKIĆ. M. and ŽUPANIĆ. D. (2004) Slobodan izbor krmiva u hranidbi zagorskih purana. Praxis veterinaria 52: 101-109.
REVINGTON. W.H. and MORAN. E.T. (1990) Effect of nutrient level and feed form on the performance on heavy breeder turkey toms. Ani. Feed Sci. and Technology 29: 321-331.
SAS INSTITUTE (1996): SAS/STAT. SAS Institute Inc.. Cary. NC.