

## Effect of Age and Sex on Fattening Performance and Carcass Characteristics of Native Turkish Geese

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### Summary

The purpose of this study was to define the fattening performance, slaughter and carcass characteristics of native Turkish geese fattened under the intensive condition. It was also aimed to determine the most suitable initial age of fattening and the effect of sex on the above mentioned traits. 32 native Turkish geese was allocated into two age treatment groups named as group I (10 weeks age) and group II (14 weeks age). The experiment was completed at the end of 6 weeks. There was a significant difference between the groups in terms of weekly live weight in the weeks of 0, 1st, 2nd and 3th ( $P<0.05-0.001$ ). The highest live weight gain was observed in group 1 (2nd week, 45.6 g) while the lowest live weight gain was in group 2 (5th week, 8.0 g). Influence of initial age of fattening was found significant on foot and wing weight ( $P<0.01$ ). Sex also has a significant effect on the carcass characteristics and male geese were heavier than females in the hot and cold carcass, neck, leg, chest and back weight ( $P<0.05$ ). Overall results of the study revealed that fattening performance and feed efficiency ratio were better in younger geese but this trend was not observed in carcass. Therefore, it could be suggested that younger native Turkish geese should be preferred instead of older ones for fattening.

**Keywords:** Geese, Initial age of fattening, Sex, Fattening performance, Carcass characteristics

## Yerli Kazlarda Besi Performansı ve Karkas Özellikleri Üzerine Yaş ve Cinsiyetin Etkisi

### Özet

Bu çalışma, yerli kazlarda besi başlangıç yaşı ve cinsiyetin besi performansı, kesim ve karkas özellikleri üzerine etkisini belirlemek amacıyla yapılmıştır. Çalışmada iki gruptaki erkek ve dişi kaz sayısı eşit olacak şekilde, grup I (10 haftalık) ve grup II (14 haftalık)'de toplam 32 kaz kullanılmıştır. Çalışma 6 hafta devam etmiştir. Canlı ağırlık bakımından gruplar arasında 0, 1, 2 ve 3. haftalarda istatistiki olarak önemli farklılıklar bulunmuştur ( $P<0.05-0.001$ ). En yüksek canlı ağırlık kazancı grup I'de 2. haftada (45.6 g), en düşük canlı ağırlık kazancı ise grup II'de 5. haftada (8.0 g) görülmüştür. Besi başlangıç yaşı, ayak ve kanat ağırlığını önemli şekilde etkilemiştir ( $P<0.01$ ). Sıcak ve soğuk karkas ağırlığı, boyun, but, göğüs ve sırt ağırlığı değerleri erkek kazlarda dişi kazlardan daha yüksek belirlenmiştir ( $P<0.05$ ). Sonuç olarak, 10 haftalık yaşta besiye alınan kazlarda besi performansı ve yemden yararlanma oranı bakımından ilerlemeler elde edilmiş, fakat kesim ve karkas özellikleri bakımından 10 haftalık yaşta besiye alınan kazlarla 14 haftalık yaşta besiye alınan kazlar arasında önemli bir farklılık görülmemiştir. Bu nedenle yetiştiricilerin kazları genç yaşta besiye almaları tavsiye edilebilir.

**Anahtar sözcükler:** Kaz, Besi başlangıç yaşı, Cinsiyet, Besi performansı, Karkas özellikleri

### INTRODUCTION

Researches carried out for several years in Turkey on native geese aimed at improving muscling and dressing percentage with simultaneous decreasing of fat content of carcasses and maintaining a relatively high body weight<sup>1-6</sup>.

The geese production can be accepted as a regionally restricted livestock sector in Turkey and is mostly spread in east-, mid- and south-west parts of Turkey. The geese production is generally intensified around Kars, Ardahan, Erzurum and

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Ağrı provinces. Native Turkish geese can easily adapt to the conditions of semi intensive and intensive rearing. Goose meat is also a good quality animal protein source of local people for long winter seasons. Breeders in the province rear the birds under the traditional free range conditions (8 months in pasture); therefore there are no any results about the geese reared under the intensive system <sup>2,5</sup>.

Native Turkish geese were reared due to their very good muscling and low carcass fatness <sup>1,2,6</sup>. The effect of genotype and/or origin on the quantity and quality of meat and fat in geese were pointed by Pingel <sup>7</sup>, Szwaczkowski et al. <sup>8</sup> and Wezyk et al. <sup>9</sup>. Other factors such as slaughter age, rearing condition and feeding regime largely affect the fattening performance, slaughter and carcass characteristics in geese <sup>10-12</sup>. Also, many experiments with geese showed quite wide differences in dressing percentage and slaughter value as well as in nutritive and technological value of meat as related to age and sex of geese <sup>13-15</sup>.

Value of a fattened goose is influenced not only by the yield of meat, particularly breast meat, but also by characteristics causing consumer acceptance of the carcass. Evaluation of these above mentioned traits in native Turkish geese is also not satisfactory <sup>6,16</sup>.

Current study was conducted to determine fattening performance, the slaughter and carcass characteristics of native Turkish geese fattened under the intensive condition and to determine the effects of the most suitable initial age of fattening and sex on the mentioned characteristics.

## MATERIAL and METHODS

### Animal materials

The study was conducted in the poultry unit of the research farm in Kafkas University, Turkey. According to the initial age of fattening, 32 native Turkish geese was allocated into two age treatment groups named as group I (10 weeks of age) and group II (14 weeks of age). The experiment lasted for 6 weeks. Pens were fitted and 0.4-0.8 m<sup>2</sup> floor place was allowed for each animal <sup>17</sup>. All goslings were fed a grower diet with 14.99% CP and 2846 kcal/kg (Table 1) metabolizable energy recommended by National Research Council for geese <sup>18</sup>. Food and water were offered ad libitum.

**Table 1.** Components and nutrients content of the experimental rations

**Tablo 1.** Araştırmada kullanılan rasyonun bileşimi ve besin madde miktarları

Mixture	Growing Period (%)
Corn	55.00
Barley	12.00
Sun flower meal	31.00
Limestone	1.00
DCP	0.50
Salt	0.30
Vit. Min. Prem.*	0.20
TOTAL	100.00
<b>Content</b>	<b>%</b>
Dry matter	93.08
Crude protein	14.99
Ether extract	3.49
Crude fibre	4.42
Ash	6.10
ME, kcal/kg	2846

\*: Per kg, 20 000 000 IU Vit. A, 3 000 000 IU Vit. D<sub>3</sub>, 25 g Vit. E, 4 g Vit. B<sub>1</sub>, 8 g Vit. B<sub>2</sub>, 5 g Vit. B<sub>6</sub>, 20 mg Vit. B<sub>12</sub>, 20 g Nikotinamid, 12 g Ca-D- Pantotenat, 200 g Cholin Chlorid, 50 g Mn, 50 g Fe, 50 g Zn, 10 g Cu, 0.8 g I, 0.15 g Co, 0.15 g

### Slaughter and carcass

Goose was separated according to sex (8 males and 8 females). The experiment was started after recording the live weight of geese at 10 and 14 weeks of age. After following weeks, the geese were weighted weekly until the experiment end. Birds were slaughtered at the age of 6 weeks according to fattening period. Prior to slaughter birds were not fed for 12 hours. On the slaughter process each goose with certain wing tagged was weighted and bled, and plucked by hand. After the plucking and eviscerating, carcasses were stored 24 hours at +4°C and were dissected and evaluated according to Jones <sup>19</sup>. Weights of the abdominal and intestinal fat, head, foot, liver, heart and gizzard were recorded. Additionally, carcass parts (leg, breast, back, wing, and neck) were assessed with skin. Whole carcass was weighted after removal of head and shank. Abdominal fat was gathered from the abdominal and around gizzard and liver. Intestinal fat was only gathered from mesenteries. Each obtained result was recorded for certain bird according to wing tag.

### Statistical Analyses

The General Linear Model was employed for the evaluation of both slaughter and carcass characteristics. Initial age of fattening and sex were included in the model as fixed effects. SPSS 12.0 statistical package was employed for the

analyses<sup>20</sup>. Feed consumption and conversion efficiency were not analyzed statistically since the group feeding was applied in the experiment.

## RESULTS

Weekly live weights of birds from the beginning of fattening period to at the end of it were presented in *Table 2*. There was statistical significance between the groups in term of weekly live weight in the weeks of 0, 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> ( $P < 0.05-0.001$ ).

Because of the group feeding process feed intake and feed conversion ratio could not be calculated for both sexes. Daily feed intake and feed conversion ratio were displayed according to fattening starting weight groups as can be seen in *Table 4*.

The average slaughter and carcass characteristics and standard errors of native Turkish geese were presented according to initial age of fattening and sex in *Table 5* and *6*. Significant influence of initial

**Table 2.** Effects of initial age of fattening and sex on live weights (g) of geese (Mean±SE)

**Tablo 2.** Kazlarda canlı ağırlık (g) üzerine besi başlangıç yaşı ve cinsiyetin etkisi (Ortalama±Standart hata)

GROUPS	n	WEEKS						
		0	1	2	3	4	5	6
<b>Overall</b>	<b>32</b>	3210±40.6	3359±40.1	3600±42.8	376±46.7	3867±45.3	3952±42.8	4038±46.7
<b>Age</b>		***	***	*	*	ns	ns	ns
Group I	16	3019±60.3	3171±61.2	3491±64.1	3655±67.5	3785±68.2	3896±76.6	3996±79.7
Group II	16	3401±59.5	3547±62.7	3710±70.3	3875±87.5	3952±90.7	4008±88.8	4080±96.6
<b>Sex</b>		*	**	**	***	***	***	***
Male	16	3294±84.3	3470±73.2	3724±52.9	3939±63.2	4066±58.9	4179±54.1	4275±63.7
Female	16	3126±63.1	3249±73.4	3477±76.3	3591±76.1	3671±71.7	3726±66.3	3800±65.9

ns:  $P > 0.05$ , \*:  $P < 0.05$ , \*\*:  $P < 0.01$ , \*\*\*:  $P < 0.001$

**Table 3.** Effects of initial age of fattening and sex on daily live weight gain (g) of geese (Mean±SE)

**Tablo 3.** Kazlarda canlı ağırlık artışı (g) üzerine besi başlangıç yaşı ve cinsiyetin etkisi (Ortalama±Standart hata)

GROUPS	n	WEEKS					
		1	2	3	4	5	6
<b>Overall</b>	<b>32</b>	21.3±3.14	34.5±2.68	23.5±2.98	14.8±1.66	11.9±1.92	12.2±4.05
<b>Age</b>		ns	***	ns	*	*	ns
Group I	16	21.7±6.08	45.6±3.96	23.4±3.76	18.6±2.67	15.9±3.71	14.2±2.97
Group II	16	21.3±4.59	23.3±3.55	23.5±5.24	11.1±2.30	8.0±1.98	10.3±7.38
<b>Sex</b>		ns	ns	*	ns	*	ns
Male	16	25.0±3.72	36.3±5.35	30.7±4.15	18.2±2.74	16.1±3.69	13.8±3.74
Female	16	17.5±5.27	32.6±3.98	16.2±4.16	11.5±2.29	7.8±1.96	10.7±7.03

ns:  $P > 0.05$ , \*:  $P < 0.05$ , \*\*\*:  $P < 0.001$

But this statistical significance disappeared in the weeks of 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> ( $P > 0.05$ ). Effect of sex has influenced the weekly weights from beginning to end ( $P < 0.05-0.001$ ).

The highest live weight gain was observed in group 1 geese (2<sup>nd</sup> weeks, 45.6 g) while the lowest live weight gain was in group 2 geese (5<sup>th</sup> weeks, 8.0 g) as can be seen in *Table 3*. It also was detected that group 2 geese have statistically low live weight gain than group 1 geese in the weeks of 2<sup>nd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> ( $P < 0.05-0.001$ ). Daily live weight gain was higher in male geese than females in all weeks.

**Table 4.** Means of daily feed intake (g) and feed conversion ratio (%) according to initial age of fattening

**Tablo 4.** Besi başlangıç yaşına göre günlük yem tüketimi (g) ve yemden yararlanma oranları (%)

Weeks	Group I (n=16)		Group II (n=16)	
	Daily feed intake (g)	Feed conversion ratio (%)	Daily feed intake (g)	Feed conversion ratio (%)
1.	419.82	19.34	361.61	17.33
2.	319.49	7.00	276.34	11.87
3.	271.47	11.59	288.09	12.24
4.	244.38	13.15	225.36	20.36
5.	260.63	16.40	257.50	32.23
6.	256.24	18.05	267.38	26.06
Overall	295.34	14.25	279.38	20.01

**Table 5.** The average slaughter and carcass characteristics and standard errors of geese according to initial age of fattening  
**Tablo 5.** Besi başlangıç yaşına göre ortalama kesim ve karkas özellikleri ve standart hataları

Characteristics	Group I (n=16)		Group II (n=16)	
	Weight (g)	%	Weight (g)	%
<b>Slaughter weight</b>	3996±79.67		4080±96.59	
<b>Head</b>	132.7±2.22	3.22±0.27	134.7±2.75	3.44±0.28
<b>Foot</b>	103.4±1.79 <sup>a</sup>	2.58±0.25 <sup>A</sup>	113.3±3.01 <sup>b</sup>	2.80±0.23 <sup>B</sup>
<b>Heart</b>	26.5±1.15	0.64±0.10	25.3±0.83	0.64±0.08
<b>Liver</b>	101.1±5.32	2.74±0.56	107.5±8.27	2.40±0.53
<b>Gizzard</b>	135.6±5.95	3.18±0.50	133.5±4.22	3.52±0.51
<b>Abdominal + intestinal fat</b>	273.3±14.65	10.36±0.51	288.7±17.25	10.61±0.52
<b>Abdominal fat</b>	168.6±10.75	6.37±0.35	175.5±9.63	6.45±0.29
<b>Intestinal fat</b>	104.7±8.99	3.99±0.35	113.3±10.91	4.16±0.37
<b>Hot carcass</b>	2640.8±60.25	66.11±0.81	2710.7±58.90	66.55±0.71
<b>Cold carcass</b>	2582.5±60.15	64.65±0.80	2655.3±58.67	65.18±0.70
<b>Neck</b>	242.8±5.08	9.42±0.11 <sup>A</sup>	235.0±5.50	8.86±0.11 <sup>B</sup>
<b>Leg</b>	655.9±17.60	25.40±0.29	686.7±16.63	25.85±0.20
<b>Chest</b>	772.2±16.18	29.93±0.19 <sup>A</sup>	773.1±19.45	29.10±0.24 <sup>B</sup>
<b>Back</b>	555.9±24.18	21.40±0.54	559.1±17.21	21.02±0.26
<b>Wing</b>	355.6± 4.10 <sup>a</sup>	13.85±0.25 <sup>A</sup>	401.6± 6.40 <sup>b</sup>	15.18±0.26 <sup>B</sup>

Differences between average weights (a, b) and percentages (A, B) are shown by different letters on the same line (P<0.05)

**Table 6.** The average slaughter and carcass characteristics, and standard errors of geese according to sex  
**Tablo 6.** Cinsiyete göre ortalama kesim ve karkas özellikleri ve standart hataları

Characteristics	Male geese (n=16)		Female geese (n=16)	
	Weight (g)	%	Weight (g)	%
<b>Slaughter weight</b>	4275±63.65 <sup>a</sup>		3800±65.88 <sup>b</sup>	
<b>Head</b>	137.2±2.70 <sup>a</sup>	3.34±0.34	130.2±1.92 <sup>b</sup>	3.31±0.25
<b>Foot</b>	110.3±2.87	2.60±0.22 <sup>A</sup>	106.4±2.60	2.79±0.28 <sup>B</sup>
<b>Heart</b>	27.4±1.09 <sup>a</sup>	0.66±0.10	24.5±0.77 <sup>b</sup>	0.62±0.08
<b>Liver</b>	117.6±6.97 <sup>a</sup>	2.52±0.48	90.9±5.08 <sup>b</sup>	2.62±0.66
<b>Gizzard</b>	135.4±5.07	3.39±0.51	133.7±5.26	3.30±0.51
<b>Abdominal + intestinal fat</b>	297.7±17.65	10.36±0.51	264.4±13.10	10.61±0.52
<b>Abdominal fat</b>	185.4±10.58	6.37±0.35	158.6±8.60	6.45±0.29
<b>Intestinal fat</b>	112.2±10.73	3.99±0.35	105.7±9.27	4.16±0.37
<b>Hot carcass</b>	2818.9±53.30 <sup>a</sup>	66.11±0.81	2532.6±40.84 <sup>b</sup>	66.55±0.71
<b>Cold carcass</b>	2761.6±53.29 <sup>a</sup>	64.65±0.80	2476.3±41.04	65.18±0.70
<b>Neck</b>	249.7±5.11 <sup>a</sup>	9.42±0.11	228.1±4.05 <sup>b</sup>	8.86±0.11
<b>Leg</b>	707.8±17.75 <sup>a</sup>	25.40±0.29	634.7±11.16 <sup>b</sup>	25.85±0.20
<b>Chest</b>	815.6±15.54 <sup>a</sup>	29.93±0.19	729.7±12.35 <sup>b</sup>	29.10±0.24
<b>Back</b>	604.1±19.52 <sup>a</sup>	21.40±0.54 <sup>A</sup>	510.9±14.52 <sup>b</sup>	21.02±0.26 <sup>B</sup>
<b>Wing</b>	384.4±8.62	13.85±0.25 <sup>A</sup>	372.8±7.03	15.18±0.26 <sup>B</sup>

**a, b:** Differences between average weights (a, b) and percentages (A, B) are shown by different letters on the same line (P<0.05)

age of fattening was observed on foot and wing weight, and foot, neck, chest and wing percentage (P<0.05). Sex also has a significant effect on the characteristics and male geese were heavier than females in the head, heart, liver, hot and cold carcass, neck, leg, chest and back weight, and head, foot, back and wing percentage (P<0.05).

## DISCUSSION

Obtained results from the corresponding study provided additional information on the growth

pattern of native Turkish geese reared under the intensive condition. More specifically, study evaluated the effects of initial age of fattening and sex on fattening performance, slaughter and carcass characteristics.

Live weights were not significantly affected by initial age in the weeks of 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup>, but they were affected by sex significantly. Final live weights in the group I and group II were similar and amounted to 3996±79.7 and 4080±96.6 g, respectively. Naturally, group II had the heavier final live weight than group I. But differences

between the mean values of weekly live weights in the groups decreased from beginning (382 g) to the end (84 g). However, significant difference was found in final live weights between males and females. During the rearing period, males produced higher or significantly higher live weights than females. Final live weights of geese were lower than reported values for geese by Butler et al.<sup>13</sup> and Cave et al.<sup>16</sup>, Biesiada-Drzazga et al.<sup>21</sup>.

High live weight gain determined in the earlier weeks (1-3), later a decrease was observed until at the last weeks of the period. Daily feed intake in group I was slightly higher than group II, but feed conversion ratios in group I was lower than group II. Daily feed consumption and feed conversion efficiency were found to be higher than those of Tilki and Inal<sup>3</sup> and was similar to the reported values by Kirchgebner<sup>22</sup>.

Hot and cold dressing percentage was not significantly affected by the initial age. The results are comparable with findings of Şahin et al.<sup>2</sup> and Tilki et al.<sup>6</sup>. Some of the percentages of carcass parts were affected by the initial age of fattening. The significant effects of initial age of fattening were defined on foot, neck, chest and wing percentage. But, there was no any significant effect of initial age of fattening (group I and II) on other slaughter and carcass characteristics. Similar results were reported by Butler et al.<sup>13</sup>, Grunder et al.<sup>14</sup>, Cave et al.<sup>16</sup> and Fortin et al.<sup>23</sup>.

Although actual weights of some carcass parts were differed between sexes, there were significant effects of sex on only foot, back and wing percentages. Male geese produced greater percents on this certain measurements. Percent of neck, chest and back were greater in males than females, but percent of hot and cold carcass, leg and wing were greater in female geese. Generally acquired slaughter and carcass characteristics were in agreement with the literature reports but the results from large type geese like Embden, Bohemian, Synthetic, and Pilgrim considerably heavier than the studied geese<sup>11,14,16,23</sup>.

Overall results of the study revealed that influence of initial age should be taken into account for goose fattening. Fattening performance and feed conversion ratio of native Turkish geese were improved by lower ages. Therefore, it can be easily said that younger geese can generate more suitable fattening result.

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