

AGE-RELATED CHANGES IN THE PERCENTAGE CONTENT OF CARCASS PARTS IN GEESE

ZMIANY W PROCENTOWYM UDZIALE POSZCZEGÓLNYCH ELEMENTÓW W TUSZKACH GĘSI WRAZ Z WIEKIEM PTAKÓW

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ABSTRACT

The experimental materials consisted of Koluda White geese, 128 males and 128 females, raised for 12 weeks and fed standard diets ad libitum. Starting from the second week, 28 birds (sex ratio 1:1) were slaughtered at 14-day intervals. Chilled carcasses were dissected into neck, wings, legs, breast and back. Over the experimental period, the body weights of males and females increased on average from 158 g and 112 g on the first day to 5483 g and 5045 g at 12 weeks, respectively. Sexual dimorphism was observed from 4 weeks of age, both in body weight and carcass weight. At the initial growth stage, the percentage content of wings in the carcass increased rapidly (from 5.03% at 2 weeks to 17.44% at 6 weeks), while the proportion of legs decreased (from 40.5% at 2 weeks to 25.55% at 8 weeks). Breast percentage showed a growing tendency (from 19.38% at 2 weeks to 32.70% at 12 weeks), whereas neck and back – a falling one (from 10.13 and 24.96% to 7.73 and 19.61%, respectively).

KEYWORDS: geese, carcass parts, age.

STRESZCZENIE

Celem pracy było określenie zmian w procentowym udziale poszczególnych elementów w tuszkach gęsi w okresie ich odchowu do wieku 12 tygodni. Materiał do badań stanowiły gęsi białe koludzkie (128 ♂ i 128 ♀). Ptaki odchowywano do wieku 12 tygodni. Żywiono je ad libitum standardowymi mieszankami. W okresie od 1 dnia życia, w odstępach 2 tygodniowych ptaki ważono, a poczynając od 2 tygodnia pobierano losowo po 14 samców i 14 samic, które po 10 godzinach pozbawienia dostępu do paszy poddawano ubojowi. Tuszki po wychłodzeniu dzielono na części – szyja, skrzydła, grzbiet, nogi i pierś. W opracowaniu statystycznym zebranego materiału liczbowego uwzględniono obliczenie średniej arytmetycznej (\bar{X}) i współczynnika zmienności (v) oraz ustalenie i istotności różnic między grupami wiekowymi oddzielnie w obrębie grupy samców i grupy samic i między płciami w obrębie grup wiekowych dla masy poszczególnych elementów (części tuszki). Ponadto określono zmiany w procentowym udziale poszczególnych elementów w tuszce wraz z wiekiem ptaków. W czasie odchowu masa ciała gęsiorków zwiększyła się średnio ze 158g w pierwszym dniu życia do 5483 g w wieku 12 tygodni, a gęsi odpowiednio ze 112 g do 5045 g. Od 4 tyg. życia zaczął się ujawniać dymorfizm płciowy zarówno w masie ciała jak i w masie tuszek. W okresie od 2 do 6 tygodnia najszybciej przyrastały skrzydła, a do 10 tygodnia część piersiowa. Masa skrzydeł w tym okresie w tuszkach samców powiększyła się 15,9-krotnie, a w tuszkach samic 13,1-krotnie (odpowiednio z 26,45 g i 25,8 w wieku 2 tygodni do 421,7 g i 337 g w wieku 6 tygodni). Duże przyrosty wykazała także część piersiowa; w tuszkach samców zwiększenie masy 9,6-krotnie (z 103,5 do 992g), a w tuszkach samic 9,2-krotnie (z 99,7 do 916 g w wieku 10 tyg.). Pozostałe elementy powiększyły swoją masę w granicach od około 5 do około 5,7-krotnie.

W początkowym okresie wzrostu następował bardzo szybki wzrost udziału w tuszce skrzydeł (z 5,03 % w wieku 2 tygodni do 17,44 % w wieku 6 tygodni), a zmniejszenie udziału nóg (z 40,5 w wieku 2 tygodni do 25,55% w wieku 10 tygodni). Udział części piersiowej wykazał tendencję wzrostową (z 19,38% w wieku 2 tygodni do 31,04% w wieku 12 tygodni), a udział szyi i grzbietu – tendencję malejącą (odpowiednio z 10,13 i 24,96 % do 7,73 i 18,78%).

SŁOWA KLUCZOWE : gęsi, części tuszki, wiek

INTRODUCTION

Particular carcass parts differ in their culinary and market value. The most valuable parts are breast, thigh and drumstick, while less valuable parts are back, wings and neck. One of the factors significantly affecting the proportions of carcass elements is the age of birds. As birds grow older breast content increases and leg content decreases. This trend is more noticeable in ducks [10] and geese [4] than in broiler chickens [5].

In ducks aged 2 weeks breast proportion was 18.81%, and it increased to reach about 31% at 8 weeks. The opposite trend was observed in leg percentage in the carcass, which decreased from approximately 36% at 2 weeks of age to approximately 25% at 8 weeks [10]. Similar age-related changes occur also in geese [3; 4]. In broiler chickens breast content was reported to increase from 28.25% at 2 weeks of age to 34.9% at 12 weeks. Leg content remained at a stable level over this period (28.4 and 29.7% respectively; [5]). The proportions of back and neck in the carcasses of chickens and ducks were found to decrease slightly with age. The percentage of wings reduced in chickens [5], and increased rapidly in ducks (from approx. 3% at 2 weeks of age to approx. to 11% at 7 weeks).

The aim of the present study was to determine age-related changes in the percentage content of carcass parts in geese raised to 12 weeks of age.

MATERIALS AND METHODS

The experimental materials consisted of 256 White Koluda geese, 128 males and 128 females. Day-old goslings were weighed, marked and put into 16 pens (8 pens of females and 8 pens of males, 16 birds per pen; the area of each pen was 7.2 m²). The lighting program and temperature were consistent with the universally accepted standards. The birds were fed standard diets ad libitum: starter diet R-201 (to 5 weeks of age) and grower/finisher diet R-203 (from 6 weeks), containing 20.16 and 19.14% of crude protein and 12.34 and 12.10 MJ of metabolizable energy, respectively. The geese were reared to 12 weeks of age.

From one day of age, the birds were weighed at two-week intervals. Starting from the 2nd week, 14 males and 14 females selected randomly (stratified sampling [12]) were fasted for 10 h and sacrificed. After bleeding the carcasses were scalded (approx. 1 min, temp. approx. 63°C), plucked and eviscerated. The heads, shanks and wing-tips were cut off. Chilled carcasses were divided into neck, wings, back, legs and breast [13].

A statistical analysis of the numerical material included:

1. calculation of arithmetic means (\bar{x}) and coefficients of variation (v), and determination of the significance of differences between age groups and sex groups (Table 1) with respect to the weight of particular carcass parts (an analysis of variance in a factorial design),
2. determination of age-related changes in the percentage content of particular carcass parts (Fig. 2).

RESULTS

Over the experimental period, the body weights of males and females increased on average from 158 g and 112 g on the first day to 5483 g and 5045 g at 12 weeks, respectively. Sexual dimorphism was observed from 4 weeks of age, both in body weight and carcass weight (Fig. 1). The birds attained their definitive (adult) plumage at the age of 10 weeks.

The weights of particular carcass parts are presented in Table 1. The fastest growth rate was observed in the wings from 2 to 6 weeks, and in the breast to 10 weeks. During this period the weight of wings in the carcass increased 15.9-fold in males (from 26.45 g at 2 weeks to 421.7 g at 6 weeks), and 13.1-fold in females (from 25.8 to 337 g respectively). Breast weight increased considerably as well, 9.6-fold in males (from 103.5 to 992 g) and 9.2-fold in females (from 99.7 to 916 g at 10 weeks). The weights of the other carcass parts increased about 5- to 5.7-fold. In the last two weeks (11 – 12) the weights of all cuts increased to a relatively low, statistically non-significant, degree.

Figure 2 shows the percentages of particular carcass parts in both sexes, since the patterns of age-related changes observed in males and females were similar. Breast proportion increased at the highest rate between 6 and 10 weeks, from 21.33% to 30.32%. The proportion of wings increased even faster, from 5.03% to 17.44% at 6 weeks. The content of the other carcass parts decreased with age. Particular attention should be paid to a significant reduction in the percentage of legs (thigh + drumstick) in the carcass – from 40.5% at 2 weeks to 25.86% at 10 weeks. The proportion of back decreased from 24.96% at 2 weeks to 18.78% at 12 weeks. In the case of neck the respective values were 10.13% and 8.47%.

DISCUSSION

The growth rate of geese (Fig. 1; [4]) and ducks [10; 8] is fast at the initial stage of their life, but later on it becomes much slower. Broiler chickens grow slower in the first weeks of their life [2], and then faster than ducks and geese. The above differences are caused by different

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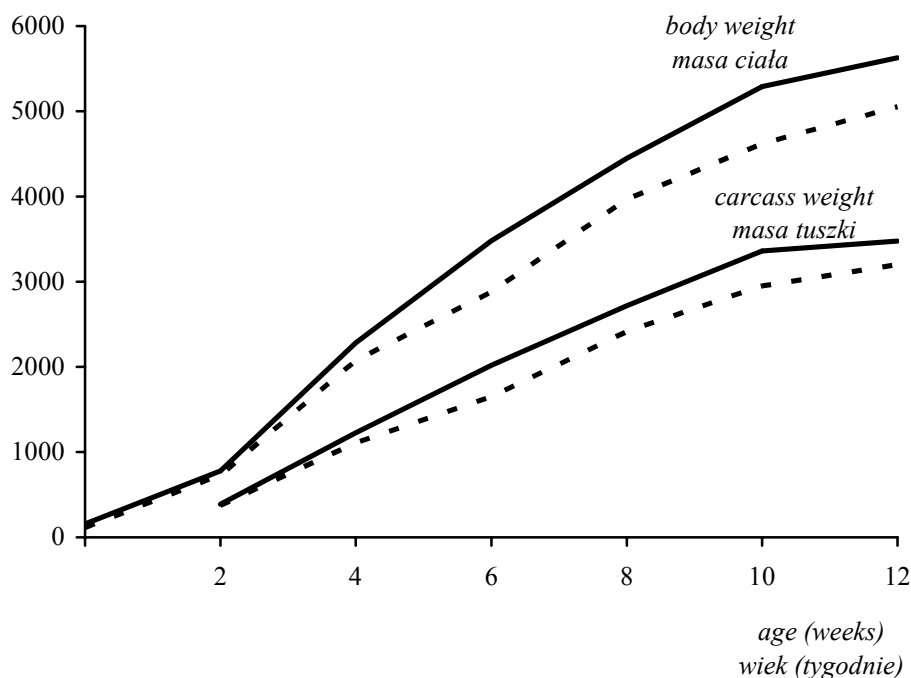


Fig. 1. Body weight and carcass weight
Rys. 1. Masa ciała i masa tuszki

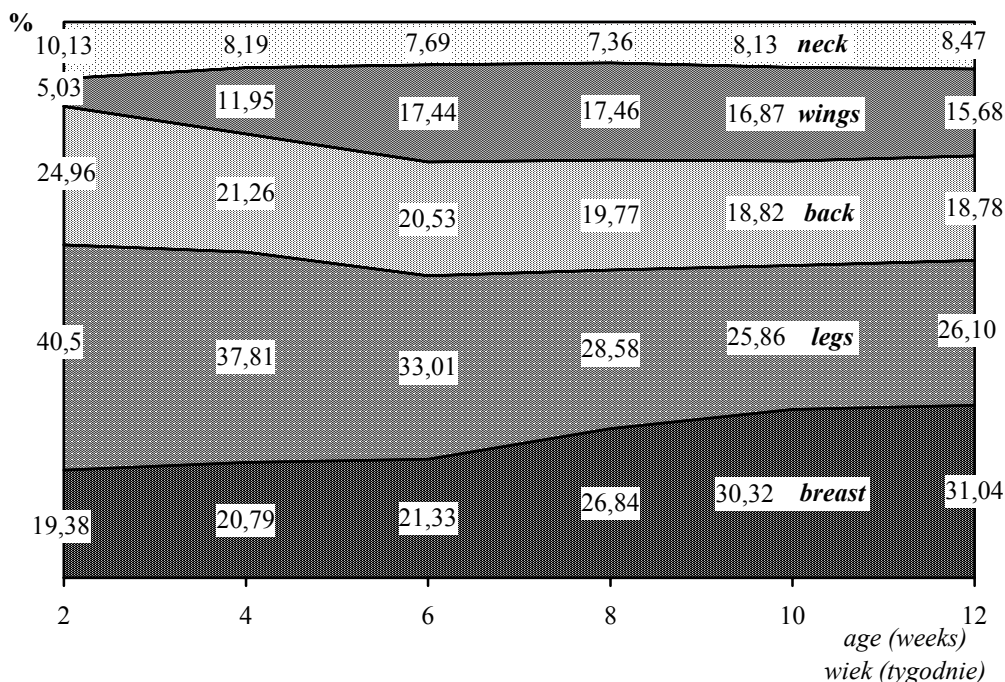


Fig. 2. Percentage content of carcass parts (♂♀)
Rys. 2. Procentowy udział poszczególnych części w tuszce (♂♀)

Table 1. Arithmetic means and coefficients of variation (v) for the weight of particular carcass parts
Tabela 1. Średnie arytmetyczne (\bar{X}) i współczynniki zmienności (v) dla masy poszczególnych części tuszki

Specification Wyszczególnienie	Statistical Statystyki	Sex Płeć	Age (weeks) Wiek (tygodnie)									
			2	4	6	8	10	12				
Weight of carcass parts (g): Masa elementów tuszki (g):t												
Neck	\bar{X}	♂	52,07 ^A	130,58 ^B	182,53 ^{C*}	208,80 ^D	252,67 ^E	281,50 ^{F*}				
Szyja	v		14,76	8,46	9,08	9,29	16,08	8,37				
Wings	\bar{X}	♀	53,02 ^A	122,15 ^B	151,17 ^C	192,55 ^D	258,45 ^E	255,33 ^E				
Skrzydła	v		14,37	13,07	14,50	8,60	9,33	5,35				
	\bar{X}	♂	26,45 ^A	188,67 ^B	421,70 ^{C**}	512,18 ^D	562,33 ^E	549,28 ^{DE**}				
	v		11,09	7,78	7,62	12,30	13,83	6,66				
Back	\bar{X}	♀	25,80 ^A	181,73 ^B	337,10 ^C	443,73 ^D	503,23 ^E	459,35 ^{DE}				
Grzbiet	v		9,61	14,55	13,44	11,04	9,21	9,07				
	\bar{X}	♂	134,05 ^A	340,1 ^B	507,2 ^{C**}	583,87 ^{Da**}	620,75 ^{DEb}	619,63 ^E				
	v		10,99	8,75	5,69	9,20	2,46	10,07				
	\bar{X}	♀	125,85 ^A	319,95 ^B	388,78 ^C	496,80 ^{Da}	564,70 ^{DEb}	587,88 ^E				
	v		12,41	15,15	15,22	15,58	9,41	9,63				
Legs	\bar{X}	♂	209,32 ^A	592,77 ^B	785,57 ^{C*}	795,10 ^{CD}	832,07 ^D	854,48 ^D				
Nogi	v		7,45	10,90	8,13	11,54	9,50	6,26				
	\bar{X}	♀	211,08 ^A	580,00 ^B	650,38 ^C	764,73 ^{CD}	798,45 ^D	819,9 ^D				
	v		7,24	13,23	16,27	9,29	8,90	6,20				
Breast	\bar{X}	♂	103,50 ^A	337,0 ^B	558,07 ^{C**}	752,68 ^D	997,37 ^E	1033,57 ^E				
część piersiowa	v		20,41	13,06	6,81	19,91	6,38	10,13				
	\bar{X}	♀	99,65 ^A	312,07 ^B	384,33 ^C	721,08 ^D	916,08 ^E	961,03 ^E				
	v		22,07	24,09	22,90	14,75	11,74	7,33				

Means followed by superscript letters (age) or * (sex) are significantly different capital letters or ** - differences significant at P<0.01 small letters or * - differences significant at P<0.05

growth rates of particular carcass tissue components in the above species. In ducks meat weight increases fast to about 9 weeks of age, whereas bone weight – to about 6 weeks only [1]. Moreover, such organs as liver, heart and digestive tract develop faster in ducks [7] than in chickens [5] or turkeys [6].

As already stated, the main purpose of this study was to determine age-related changes in the proportions of carcass parts in geese. Two-week-old geese have relatively well-developed legs, in contrast to breast. Starting from 2 weeks of age, the percentage of legs in the carcass decreases, while breast content increases fast to 10 weeks (Fig. 2). Similar trends can be observed in ducks to about 10 weeks of age [10]. Also in chickens [5] a slight increase in the proportion of breast in the carcass is accompanied by a decrease in leg content.

The wings grow rapidly in geese to about 6 weeks of age (Fig. 2). The growth rate of this body part is also fast in ducks [10]. According to Pingel [11], a high growth rate of wings, combined with intensive development of breast muscles over this period, is related to the flying ability, achieved by wild ducks at 7 to 8 weeks of age. In broiler chicken the proportion of wings in the carcass decreases gradually [5].

It should be stressed once again that in geese (Fig. 2; [4]), just like in ducks [10], substantial age-related changes take place in the percentages of two most valuable carcass parts, i.e. breast (increase) and legs (decrease), as well as in the proportion of wings (increase), whose market value is lower. In geese low-value parts, i.e. back, wings and neck, have a relative high contribution to the total weight of a whole carcass (42.93% at 12 weeks of age; Fig. 2), compared with high-values ones, i.e. breast, thighs and drumsticks (57.14%). This concerns also ducks [10]. In broiler chickens this proportion is much more desirable (37 and 63% respectively; [5]).

It may be concluded that the proportions of particular parts in the carcass undergo considerable changes in growing geese. It follows that in the case of young slaughter geese rearing period duration should be determined based on production costs (feed consumption), as well as on the percentages of carcass elements.

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