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GROWTH INTENSITY AND CARCASS CHARACTERISTICS OF FATTENED PHEASANT POULTS

INTENZITET RASTA I ZNAČAJKE POLOVICA TOVLJENIH PILIĆA FAZANA

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SUMMARY

The main aim of the present work was to find out whether intensive fattening of pheasant poults can provide high-quality pheasant meat. The study is a pilot work in this area because until now pheasant rearing has only produced pheasants for the purpose of hunting. In this experiment three feeding mixtures were designed; nutritional and energetic composition of the mixtures complied with the respective feeding requirements. The feeding mixtures did not contain components originating from animals in order to ensure safety of meat. The growth intensity and the state of health of pheasants reflect the quality of feeding mixtures administered. Thus, on the 90th day the female and male pheasants weighed 0.832 kg and 1.061 kg, respectively. This represents approximately 90 % of the weight of an adult pheasant in natural hunting grounds. Pheasants were in a good state of health as concluded on the basis of a very low mortality rate (4.45 %). Results concerning carcass parameters such as carcass yield and the yield of high-quality tissues (breast and thigh muscles) are very promising. Thus, carcass yields ranged from 71 % to 72 %. The yield of breast muscles at the end of the feeding was 20.43 % in females and 19.66 % in males. The yield of thigh muscles was also high, reaching the level of 20.40 % in females and 20.59 % in males. The above values of carcass yield and the yield of the most valuable muscles obtained in this experiment exceed the values observed in most broiler chickens. Importantly, the experiment showed that despite intensive fattening the pheasant poults did not accumulate abdominal fat. Accumulation of abdominal fat was detected only in some 90-day-old pheasants after slaughter.

Key words : common pheasant, growth intensity, carcass yield

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LITERATURE OVERVIEW

Before the development of agriculture, game made up a basic portion of meat consumed by man (Steinhauser et al., 2000). Intensive game farming employed over the last few years contributed to an increasing interest in game. This concerns particularly world-wide production of game in New Zealand, local production of game in Europe and USA and game rearing farms in South Africa. Suchy et al. (2003) report that the majority of feathered game is currently reared artificially on farms (pheasants, partridges, turkeys, red-legged partridges), and released after rearing into hunting grounds. Game birds in nurseries are fed complete feeding mixtures.

According to Suchy et al. (2003), not only pheasants and partridges but also red-legged partridges wild pearl hens and turkeys are currently reared mostly in nurseries for feathered game (game birds) where game birds are multiplied and new generations of game are bred. The nutrients content in feeding mixtures administered must fully respect the physiological needs of animals. As a result a number of formulae for commercial production of feeding mixtures has been developed. There are no data on the growth curve of pheasant poults in available literature. To our knowledge no experimental work has been carried out on the feeding of feathered game intended for meat production. Available literature only provides partial values concerning the weight of pheasants. For example, Beklova et al. (1989) report the weight of pheasants caught in different hunting grounds and the weight of pheasant poults released in hunting grounds for the purpose of hunting. In the case of common pheasant the authors report the average weight of a pheasant being ca. 1 200 g of males and ca. 900 g of females. Other partial results were published by Vitula et al. (2003) who monitored the growth intensity in rearing systems typically employed in the rearing of feathered game.

While data on carcass quality of broiler chickens are abundant, analogous information on pheasants is practically nonescistent. We therefore consider it important to address the problem of pheasant rearing because pheasant meat has excellent dietetic properties and may therefore be included in the assortment of currently consumed meats (Suchy et al., 2003).

An important paper providing data on pheasants slaughtered at the age of 5 months was published by Picard and Petitjean (1989). According to the paper, carcass yield was 71 % and the yield of breast muscles was 23 %. Moreover, these authors show that female pheasants exhibited a lower yield of thigh muscles and higher yield of breast muscles compared with males. They also found that the yield of pheasant carcass and the yield of breast muscles often exceeded those of broiler chickens. The effect of gender on the growth intensity and weight are discussed by Beklova et al. (1989).

The importance of nutrition in pheasant rearing is pointed out by a number of authors, for example Doktorova (2002) and Beklova et al. (1989). The level of proteins during feeding is the major factor affecting the growth of young pheasants as documented in a paper published by Sage et al. (2002).

MATERIALS AND METHODS

Experimental monitoring was performed on 110 poults of common pheasant obtained from feathered game nursery in Jinačovice u Brna. The experiment was carried out for a period of 90 days. Both male and female pheasant poults were fed the same feeding mixtures. The poults were housed on deep bedding in an approved experimental enclosure equipped with air conditioning, light and temperature controls and with controlled zoo-hygienic and feeding regimens at the Institute of Nutrition, Dietetics, Zoo-Hygiene and Food Crop Production at the Faculty of Veterinary Hygiene and Ecology, University of Veterinary and Pharmaceutical Sciences in Bmo. Rearing conditions complied with the requirements for feeding of broiler chickens. The poults were fed and watered using plastic tube feeders and hanging drinkers for poultry (Plasson MK II) supplied by the company Pro Import Plus.s.r.o. The poults were fed ad libitum special complete feeding mixtures BR 1, BR2 and BR 3 which complied with nutritional and energetic requirements of broiler chickens. The feeding mixtures used in this experiment were prepared in Agricultural Co-operative Hlučin (Hospodafske družstvo Hlučin). Thus, the poults were fed the mixture BR1 till the 21st day of age, then the mixture BR 2 from the 22nd to the 40th day, and finally BR3 from the 41st till the 90th day (Table 1.).

Table 1. Composition of feed mixtures (components in %, individual nutrients in g/kg). The feed mixtures were administered as follows BR1 (Day 1-21), BR2 (Day 22-40), BR3 (Day 41-90)

Tablica 1. Sastav krmnih smjesa (Sastojci u %, pojedine hranjive tvari u g/kg). Krmne smjese davane su ovako: BR1 (Dan 1-21), BR2 (Dan 22-4-0), BR3 (Dan 41-90)

Components - Sastojak	BR1	BR2	BR3
BR - 1Mikrop 0,5% - BR1 - Mikrop 0.5%	0.5000	0.0500	0.4500
Wheat + ZY 68 - Pšenica + ZY 68	52.6000	57.0000	64.5281
Soya extr. meal 46% - Sojina sačma 46%	30.5000	25.0000	18.6699
Lysine - HCI 100% - Lizin HCI 100%	0.4100	0.3500	0.4077
D.L - meth. 100% - D.L. meth. 100%	0.2200	0.2200	0.1992
L –thr. 100% - L-thr 100%	0.0800	0.0700	0.0878
Monokal MCP - F - Monokal MCP - F	0.7500	0.6600	0.5139
Monosodium phosphate - Mononatrij fosfat	0.4400	0.3600	0.3694
Feeding salt - Jestiva sol	0.2000	0.2400	0.2337
Soya oil - Sojino ulje	4.3000	5.0000	4.5403
Proenergol BR (triple combination - Proenergol BR (trostruka kombinacija)	10.0000	10.0000	10.0000
Nutrients - Hranjive tvari			
N - substances - N - supstance	230.7900	210.6000	190.0000
Lysine - Lizin	13.8780	12.0590	11.0000
Methionine - Metionin	5.2350	4.9790	4.5000
Sulfur - containing AA - Sumporne AK	9.0770	8.5760	7.4870
Threonine - Treonin	8.5760	7.6920	7.0000
Tryptophan - Triptofan	2.7660	2.5060	2.2240
Arginine - Arginin	13.5580	12.0180	10.3100
Fat - Masnoća	65.9410	72.7870	68.2240
Fibre - Vlaknina	32.9950	32.1650	31.5230
ME (MJ) - ME (MJ)	12.6050	13.0090	13.2000
Ash - Pepeo	65.1710	61.5060	57.3620
Ca	10.3100	10.0400	9.6600
P	7.1000	6.5100	6.0000
Mg	1.9600	1.8400	1.7100
Linoleic acid - Linolna kiselina	32.572	36.1080	33.8490
Na	1.8200	1.8100	1.8000
K	9.5100	8.5600	7.5200

Microclimatic parameters in the experimental enclosure were as follows: air temperature ranged from 31°C to 21°C on average depending on age; average relative humidity was 70-75 %; light regimen during the whole period of feeding was set to 23 light hours and 1 hour of dark. The experiment also included laboratory analysis of the feeding mixtures performed at the Institute of Nutrition, Dietetics, Zoo-Hygiene and Food Crop Production, in order to determine the nutrients, minerals and energy content. The body weight of birds was determined by weighing on the 1^{st}, 11^{th}, 20^{th} , 29^{th} , 40^{th} , 50^{th}, 70^{th}

and 90^{lh} day. Weight gains were evaluated on the basis of live weight over the whole period of fattening. Besides evaluation of weight gains, feed consumption and feed conversion were determined on the 40th, 50th, 70th and 90th day. The state of health of young pheasants was clinically examined during the experiment (vitality, feed intake, quality of dropping, weight gains, muscle build-up),

Ten females and 10 males were randomly selected on the 40th, 50th, 70th and 90th day. Thus, the total of 80 individuals were slaughtered and the resultant carcasses were analysed for weight and the yield of processed carcass including edible organs and tissues.

Carcass characteristics were evaluated. Young pheasants were weighed before slaughter and subsequently stunned and bled. Then they were scalded (at 52 °C) and plucked. The head was separated by cutting between the back part of the scull and the first cervical vertebra. Breast muscles on the chest were separated from the shoulder joint and the sternum, pelvic limbs were separated from the trunk in the hip joint. Breast and thigh muscles were weighed and the yield of the muscles was calculated relative to live weight. Carcass, neck, heart, liver, stomach, abdominal fat, breast muscles and thighs (both skinned and unskinned) were weighed to determine the yield. In the case of thighs attention was paid to the weight and the yield of skin and bones in the upper and lower part of the thigh including thigh muscles.

The results were processed using statistical methods. The arithmetic mean (x), standard deviation (s_{n-1}), mean error of the arithmetic mean (s_x) and variation coefficient (v) were calculated. The Student test with probability factors $P < 0.05$ (*) and $P < 0.01$ (**) was used to evaluate significance of differences between mean values. Mathematical and statistical processing of the results obtained was performed using the programme STATGRAPHICS.

RESULTS AND DISCUSSION

The present work addresses the problem of whether the current system can be used in the fattening of pheasant poults in order to produce high-quality game meat.

Three special feeding mixtures (Br1, Br2, Br3) were prepared. Their nutritional composition complied with the requirements for the feeding of broiler chickens, unlike traditional industrial mixtures bžl and bz2 or a feeding mixture used for feeding pheasant poults at the age of 5 days.

The feeding mixtures used in our experiment differed from the traditional feeding mixtures used in pheasant nurseries particularly by the energy content and the level of N-substances.

From a hygienic point of view and due to safety of pheasant meat, we consider it very useful that the feed mixtures contain no components originating from animals. On 1 November 2003 the ban on the use of animal-based feed (particularly meat-and-bone meal) in animals in the Czech Republic was extended to monogastric animals. However, the ban was not in power when we were performing this experiment. Utility parameters (growth intensity, weight, mortality rate, etc.) determined during our experimental work indicate that suitably designed mixtures (particularly their protein composition) can give in very good results even without using components originating from animals. This is well documented by the growth intensity as the mean weight of pheasants during a 90-day fattening experiment increased from 0.020 kg (the 1st day) to 0.918 kg (the 90th day), i.e. 45.90 times. Moreover, pheasants showed a very good state of health and only 5 out of 110 poults (i.e. 4.54 %) died during the experimental monitoring. The experiment, however, did not confirm a conclusion drawn by Doktorova (2002) that the absence of animal-based components in feed mixtures could cause cannibalism in pheasant poults. The average values of daily weight gains ranging between 0.004 and 0.013 kg/day demonstrate that the growth intensity in pheasant poults increases with age. The highest growth intensity of pheasant poults was found in the period between the 41st and 70* day when the average daily weight gain was approximately 0.013 kg/day (Table 2).

The study confirmed a well-known fact that female and male pheasants differ in growth intensity and therefore in live weight at the end of fattening (on the 90th day) when the gender of poults could be unambiguously recognized. Thus, pheasant males weighed 1.061 kg on average, while the average weight of pheasant females was only 0.832 kg. The mean live weight of males

exceeded that of females by 21.58 %. The weight of pheasant males exceeding that of females by 13.6-16.6 % has been reported by Beklova et al. (1989). An increased difference in live weight between pheasant males and females which we observed in this experiment, may be related to intensive fattening which enabled inherent growth intensity to be expressed.

Beklova et al. (1989) reported the average live weight of 1 200 g for males and 900 g for females (at the age of 1 year). Our experiment shows that the average live weights of males and females on the 90th day were 1.061 kg and 0.832 kg, respectively, i.e. the live weight of male and female pheasants was 88.42 % and 92.44 % of that of adult male and female pheasants reported by Beklova et al (1989). It follows from the results that during intensive fattening the weight of a 90-day-old pheasant reaches ca 90 % of the live weight of an adult individual.

Table 2. Live weight and average daily weight gains in pheasant poults from hatching till the age of 90 days (n - number of animals, m- mortality rate, x - arithmetic mean, Sn-standard deviation. Sx - mean error of arithmetic mean, v - variation coefficient. I - growth index, P<0.05*. P<0.01. F - females. M - males)**

Tablica 2. Živa vaga i prosječan dnevni prirast težine pilića fazana od valjenja do dobi od 90 dana (n - broj životinja, m - stopa smrtnosti, x - aritmetička sredina, Sn - standardna devijacija, Sx - srednja greška aritmetičke sredine, v - koeficijent varijacije, I - indeks rasta, P<0.05. P<0.01 . F - ženke, M - mužjaci

Live weight of pheasant poults (kg) - Živa vaga pilića fazana (kg)							
Day	n (m)	x	Sn	Sx	v	P	I
1	110	0.020	0.005	0.0005	25.00		1.00
11	109 (1)	0.061	0.008	0.0007	13.11	47.662**	3.05
20	107 (2)	0.130	0.018	0.0017	13.85	37.531**	6.50
29	107	0.229	0.032	0.0032	13.97	27.321**	11.45
40	107	0.354	0.053	0.0052	14.97	20.473**	17.70
50	87	0.472	0.083	0.0090	17.58	11.352**	23.60
70	66 (1)	0.720	0.117	0.0146	16.25	14.460**	36.00
90	45 (1)	0.918	0.149	0.0230	16.23	7.268**	45.90
90	10 F	0.832	0.086	0.0270	10.34		41.60
	10M	1.061	0.123	0.0390	11.59	4.828**	53.05
Average daily wight gains in pheasant poults (kg)							
1-11	109	0.004	0.001	0.0001	25.00		
12-20	107	0.008	0.001	0.0001	12.50	28.284**	
21-29	107	0.011	0.002	0.0002	18.18	13.416**	
30-40	107	0.011	0.002	0.0002	18.18	0.000	
41-50	87	0.013	0.004	0.0004	30.77	4.472**	
51-70	66	0.013	0.006	0.0008	46.15	0.000	
71-90	45	0.010	0.004	0.0006	40.00	3.000**	
1-50	87	0.009	0.002	0.0002	22.22		
1-70	66	0.010	0.002	0.0003	20.00	2.774*	
1-90	45	0.010	0.002	0.0003	20.00	0.000	
1-90	10F	0.009	0.001	0.0003	11.11		
	10M	0.012	0.001	0.0003	8.33	7.071**	

Table 3. Body weight and the weight of edible tissues and organs in pheasant poults on the 40*, 50th, 70th and 90th day of fattening (F - females. M - males)

Tablica 3. Tjelesna težina i težina jestivog tkiva i organa pilića fazana 40., 50., 70., i 90.dan tova (F - ženke, M - mužjaci)

U	F	%	M	%	M - F	%	Days - Dana
LW (g)	357.80	100.00	406.00	100.00	48.20	11.87	40
	392.30	109.64	546.50	134.61	154.20	28.22	50
	670.70	187.45	797.90	196.53	127.20	15.94	70
	831.90	232.50	1061.40	261.43	229.50	21.62	90
CW (g)	246.80	100.00	281.20	100.00	34.40	12.23	40
	266.30	107.90	371.80	132.22	105.50	28.38	50
	479.90	194.45	566.90	201.60	87.00	15.35	70
	593.00	240.28	761.30	270.73	168.30	22.11	90
WN (g)	9.90	100.00	11.11	100.00	1.21	10.89	40
	10.70	108.08	9.57	86.14	-1.13	-11.81	50
	13.30	134.34	18.27	164.45	4.97	27.20	70
	11.12	112.32	18.80	169.22	7.68	40.85	90
WH (g)	2.30	100.00	2.71	100.00	0.41	15.13	40
	3.40	147.83	4.06	149.82	0.66	16.26	50
	5.00	217.39	6.36	234.69	1.36	21.38	70
	5.58	242.61	8.25	304.43	2.67	32.36	90
WL (g)	6.60	100.00	8.31	100.00	1.71	20.58	40
	8.70	131.82	11.99	144.28	3.29	27.44	50
	14.20	215.15	17.56	211.31	3.36	19.13	70
	15.89	240.76	20.96	252.23	5.07	24.19	90
WS (g)	8.10	100.00	8.42	100.00	0.32	3.80	40
	8.60	106.17	12.64	150.12	4.04	31.96	50
	12.60	155.56	15.62	185.51	3.02	19.33	70
	17.19	212.22	19.77	234.80	2.58	13.05	90
WAF (g)	0.00		0.00		0.00		40
	0.00		0.00		0.00		50
	0.00		0.00		0.00		70
	6.13		3.60		-2.53	-70.28	90
WBM (g)	59.80	100.00	67.80	100.00	8.00	11.80	40
	67.80	113.38	96.80	142.77	29.00	29.96	50
	126.00	210.70	141.80	209.14	15.80	11.14	70
	170.00	284.28	208.60	307.67	38.60	18.50	90
WUT (g)	67.40	100.00	77.80	100.00	10.40	13.37	40
	77.20	114.54	112.60	144.73	35.40	31.44	50
	137.00	203.26	164.20	211.05	27.20	16.57	70
	156.20	231.75	213.40	274.29	57.20	26.80	90
WST (g)	63.40	100.00	73.00	100.00	9.60	13.15	40
	71.40	112.62	104.20	142.74	32.80	31.48	50
	128.40	202.52	154.80	212.05	26.40	17.05	70
	147.20	232.18	201.00	275.34	53.80	26.77	90

U	F	%	M	%	M - F	%	Days - Dana
WSK (g)	4.00	100.00	4.80	100.00	0.80	16.67	40
	5.80	145.00	8.40	175.00	2.60	30.95	50
	8.60	215.00	9.40	195.83	0.80	8.51	70
	9.00	225.00	12.40	258.33	3.40	27.42	90
WB (g)	17.60	100.00	19.80	100.00	2.20	11.11	40
	18.80	106.82	27.80	140.40	9.00	32.37	50
	34.00	193.18	43.80	221.21	9.80	22.37	70
	31.80	180.68	46.60	235.35	14.80	31.76	90
WUPT (g)	33.80	100.00	39.20	100.00	5.40	13.78	40
	38.40	113.61	56.00	142.86	17.60	31.43	50
	68.40	202.37	81.80	208.67	13.40	16.38	70
	80.40	237.87	110.20	281.12	29.80	27.04	90
WLOT (g)	30.20	100.00	35.20	100.00	5.00	14.20	40
	33.60	111.26	49.60	140.91	16.00	32.26	50
	60.20	199.34	74.60	211.93	14.40	19.30	70
	67.20	222.52	91.80	260.80	24.60	26.80	90
WUTM (g)	26.40	100.00	30.80	100.00	4.40	14.29	40
	30.60	115.91	44.60	144.81	14.00	31.39	50
	54.80	207.58	63.80	207.14	9.00	14.11	70
	68-20	258.33	92.60	300.65	24.40	26.35	90
WLTM (g)	20.00	100.00	23.80	100.00	3.80	15.97	40
	22.60	113.00	33.20	139.50	10.60	31.93	50
	39.80	199.00	48.80	205.04	9.00	18.44	70
	47.60	238.00	62.80	263.87	15.20	24.20	90
WTM (g)	46.40	100.00	54.60	100.00	8.20	15.02	40
	53.20	114.66	77.80	142.49	24.60	31.62	50
	94.60	203.88	112.60	206.23	18.00	15.99	70
	115.80	249.57	155.40	284.62	39.60	25.48	90
WUTB (g)	7.40	100.00	8.40	100.00	1.00	11.90	40
	7.80	105.41	11.40	135.71	3.60	31.58	50
	13.60	183.78	18.00	214.29	4.40	24.44	70
	12.20	164.86	17.60	209.52	5.40	30.68	90
WLTB (g)	10.20	100.00	11.40	100.00	1.20	10.53	40
	11.00	107.84	16.40	143.86	5.40	32.93	50
	20.40	200.00	25.80	226.32	5.40	20.93	70
	19.60	192.16	29.00	254.39	9.40	32.41	90

Footnotes:

LW - live weight. CW - carcass weight. WN - weight of the neck. WH - weight of the heart. WL - weight of the liver. WS - weight of the stomach. WAF - weight of abdominal fat. WBM - weight of breast muscles. WUT - weight of unskinned thighs. WST - veight of skinned thighs. WSK - weight of the skin. WB - voeight of bones. WUPT - weight of upper thighs. WLOT - weight of lower thighs. WUTM - weight of muscles in upper thighs. WLTM - weight of muscles in lower thighs. WTM - weight of thigh muscles. WUTB - weight of bones in upper thigs. WLTB - weight of bones in lower thigs.

Bilješka:

LW - živa vaga, CW - težina polovica, WN - težina vrata, WH - težina srca, WL - težina jetre, WS - težina želuca, WAF - težina trbušne masnoće, WBM - težina prsnih mišica, WUT - težina bataka s kožom, WST - težina bataka bez kože, WSK - težina kože, WB - težina kosti, WUPT - težina batka, WLOT - težina podbatka, WUTM - težina mišića batka, WLTM - težina mišića podbatka, WTM - težina mišića bataka, WUTB - težina kosti u batku, WLTB - težina kosti u podbatku.

Weight gains observed in live pheasant poults appear to be closely related to the changes in both the weight of carcass and the weight of edible organs and tissues in males and females.

Scientific literature provides no detailed information on the characteristics of pheasant carcass at individual developmental stages. Table 3 shows how live weight, carcass weight and the weight of individual edible tissues and organs varied in pheasant poults aged 40-90 days.

According to Table 3 the live weight, carcass weight and the weight of individual edible tissues and organs were higher in male pheasants than in females. Between the 40th and 90th day of feeding the live weight of females and males increased to 232.50 % and 261.43%, respectively, while the weight of carcass increased to 240.28% in females and 270.73% in males. Obviously, the weight of carcass (i.e. edible parts of pheasant body) increases significantly with the age of poults. It follows from the carcass parameters analysed (Table 3) that the weight gains observed for individual tissues and organs during feeding quite differ and do not always correspond with gains in live weight or carcass weight . Edible organs and tissues monitored can be divided into three groups: 1) organs and tissues whose weight increases from the 40th to 90th day of fattening slowly in comparison with live weight; 2) organs and tissues whose weight increases as fast as live weight, and finally 3) organs whose weight increases faster than live weight. The ratio between the average live weight of pheasants on the 90th day and that on the 40th day, expressed in percentage was used as a criterion to classify the monitored organs and tissues in particular groups within ± 10%. According to this criterion the following ranges were established: 220% - 240% for females and 251% - 271% for males. The weight gains observed for monitored organs and tissues which lay within these ranges were considered to be parallel to those of live weight obtained for poults.

According to the above criteria, the following organs and tissues in females grew slowly in comparison with live weight: the neck, stomach and thigh bones including bones of upper and lower thighs. The following organs and tissues grew as fast as live weight: heart, liver, both skinned and unskinned thigh, skin on thighs, lower parts of thighs and muscles of upper thighs. The organs which developed faster than the live weight are the following: breast muscles, thigh muscles, particularly upper thigh muscles.

In the case of male pheasants the group of organs and tissues which grew slowly include stomach and thigh bones, particularly upper thigh bone. The following organs and tissues grew at the same rate as live weight: neck, liver, skin, lower thighs, lower thighs muscles and lower thighs bones. Heart, breast muscles, skinned and unskinned thighs, particularly upper thighs, thigh muscles and upper thigh muscles belong to a group of tissues and organs that develop more intensively compared with live weight.

It is obvious that females and males significantly differ in growth intensity of individual tissues and organs.

Evaluation of carcass characteristics in pheasant poults also included the evaluation of carcass yield and the yield of edible organs and tissues. One of the most significant carcass parameters is carcass yield which reflects carcass utility in respect to the live weight of pheasant.

The highest carcass yield in females (71.40%) and males (71.71%) was obtained on the 70th day and the 90th day of fattening, respectively. The results show that pheasant carcass yield (females and males) is as good as in broiler chickens for which carcass yield ranges between 60% and 70% (Lazar, 1990, Novakova, 1991). As with pheasants the carcass yield in broiler chickens also varied with the duration of fattening as observed by Zelenka et al. (1989) in broilers.

Ricard et Petitjean (1989) who performed similar experiments in pheasants obtained comparable results reporting the value of 71% for carcass yield.

A positive finding is that the poults did not accumulate abdominal fat during fattening and that only some of the animals (females as well as males) began to accumulate abdominal fat at the end of fattening (on the 90th day). However, accumulation of fat was not as significant as in chickens.

Female pheasants showed an increased accumulation of abdominal fat. The average weight of abdominal fat in pheasant females and males on

the 90th day was 6.13 g and 3.60 g, respectively. Differential gender- dependent accumulation of abdominal fat in broiler chickens was also reported by Ingr (1991), Skrivan (2000), Skrivan and Tumova (1990).

The high yields of the most valuable tissues and organs, particularly breast and thigh muscles (the yield of thigh muscles) are promising results.

The highest yield of breast muscles (females: 20.43%, males: 19.66%) was obtained on the 90th day of fattening. These yields exceed those published by Oplt (2001) who reported the yield of breast muscles in chickens being 19.3 %, 18.47 %, and 18.45 % (depending on the particular hybrid). Our results in pheasants are somewhat lower than those reported by Ricardo et Petitjean (1989) who demonstrated the yield of breast muscles as high as 23 %. Higher yields of breast muscles reported by these authors are due to the fact that the experiment was performed on adult pheasants. Another promising result is the high yield of unskinned thighs (18.79% in females and 20.11% in males). Both values are comparable, exceeding commonly observed yields of thighs in broiler chickens. For the purpose of comparison, the yield of thighs in broiler chickens reported by Fort and Chaloupkova (1998) ranged from 20.30% to 20.90% in males and from 19.50% to 20.20% in females.

CONCLUSIONS

The main aim of the present work was to find out whether intensive feeding of pheasant poults could provide high-quality pheasant meat. This study is a pilot work in this area because until now pheasant rearing has only produced pheasants for the purpose of hunting. In the experiment three feeding mixtures were formulated; nutritional and energetic composition of the mixtures complied with the respective feeding requirements. The feeding mixtures did not contain components originating from animals in order to ensure safety of game meat.

On the 90th day the female and male pheasants weighed 0.832 kg and 1.061 kg, respectively. This represents approximately 90 % of the weight of an adult pheasant in natural hunting grounds. Pheasants were in a good state of health as concluded on the basis of a very low mortality rate (4.45 %). From an economic point of view it is necessary to address the problem of a relatively high consumption of feed per 1 kg of live weight gain, particularly in pheasants older than 40 days. In our view this problem can be tackled by optimizing the composition of feeding mixtures (nutrients, energy) and by using a wide range of feeding mixtures (at least 5) during fattening in order to meet specific physiological requirements of young pheasants at individual stages of their development.

Very promising results were obtained in the case of carcass characteristics. Carcass yield was high, ranging from 71 % to 72 %. This value is comparable with that obtained in hybrid broiler chickens,. The yield of the most valuable tissues such as breast muscles was 20.43 % in females and 19.66 % in males at the end of the fattening. In the case of thigh muscles, the yield was 20.40 % in females and 20.59 % in males. The above results are comparable with those obtained in hybrid broiler chickens. However, in the case of carcass yield and the yield of the most valuable muscles the values obtained in this experiment exceed those observed in most broiler chickens. Importantly, the experiment showed that despite intensive feeding the pheasant poults do not accumulate abdominal fat. Accumulation of abdominal fat was detected only in some of the slaughtered 90-day-old pheasants.

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SAŽETAK

Cilj ovog rada bio je razmatranje mogućnosti intezivnog tova pilića fazana u svrhu proizvodnje mesa visoke kakvoće. Rad se može smatrati pilot projektom u ovoj problematici, jer uzgoj fazana bio je dosad usmjeren samo za potrebe lova. Za ostvarenje ovog rada sastavljena su tri različita tipa stočne hrane, koji svojim sadržajem hranjivih tvari i eneregetskih vrijednosti ispunjavaju zahtjeve za tov fazana. U pogledu sigurnosti i zdravstvene besprijekornosti proizvodnje mesa, korišteni tipovi stočne hrane pripremljeni su bez životinjskoih sastojaka. Dobiveni rezultati inteziteta rasta te zdravstvenog stanja fazana postignuti su zahvaljujući dobroj kakvoći korištene stočne hrane. Ovim intenzivnim tovom kod pilića fazana starih 90 dana postignuta je prosječna težina od 0,832 kg (ženke), te 1,061 kg (mužjaci), što predstavlja otprilike 90% težine odraslih fazana postignute u prirodnim prostorima za uzgoj. Njihovo zdravstveno stanje može se smatratii dobrim i zbog niskog postotka uginulih fazana - 4.45 %. Veoma pozitivni su rezultati mjerenja korisne mase tijela fazana. Radi se posebno o visokom postotku korisne mase tijela fazana, koji se kreće od 71 % do 72 %. Do sličnih zaključaka došlo se i vrednovanjem postotka korisne mase najkvalitetnijih dijelova tijela fazana, kao što je prsna mišicna masa, čiji je korisni postotak na kraju tova 20.43 % (ženke), te 19.66 % (mužjaci). Gotovo isti rezultati su dobiveni i mjerenjem postotka korisne mase bataka fazana, gdje su dobiveni rezultati kod tovljenih pilića fazana 20.40 % (ženke), te 20.59 % (mužjaci). Gore navedeni parametri postotka korisne mase tijela i najvrednijih dijelova tijela, koji su postignuti ovim pokusom kod fazana namijenjenih za tov, predstavljaju vrijednosti, koje nisu postignute niti kod tovljenih pilića brojlera. Veoma pozitivan rezultat predstavlja činjenica da kod pilića fazana nije dolazilo do taloženja abdominalne masti čak i kod intenzivnog tova. Abdominalna mast počela se javljati tek u 90. danu starosti pilića fazana, i to ne kod svih žrtvovanih pilića.

Ključne riječi: obični *fazan,* intenzitet rasta, postotak korisne mase.