VETERINARSKI ARHIV 76 (Suppl.), S211-S219, 2006

Copunisation of pheasants at different age

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SEVERIN, K., T. MAŠEK, Z. JANICKI, D. KONJEVIĆ, A. SLAVICA, T. HRUPAČKI: Copunisation of pheasants at different age . Vet. arhiv 76, S211-S219, 2006.

ABSTRACT

The effects of caponisation on live weight, weight gain, carcass characteristics and blood plasma values of pheasants were examined. Eighty pheasants reared in feathered game nurserie were included in experiment. The birds were castrated at 8 or 12 weeks of age. The age of castration up to 12 weeks showed complete testicular regeneration while when castration was performed at 8 weeks of age testicular regeneration reached 25%. Pheasant capons, that were fed higher protein diet, showed lower live weights but higher dressing percentages than game pheasants. Weight and weight gain of pheasant capons were increased till December. Blood plasma values showed significantly higher levels ($P<0.01$) of Ca, total protein and albumin for pheasant capons but these differences were related to composition of feed mixtures. We concluded that pheasant capons fed higher protein diet represents better commercial product than pheasant reared as game animals but that more studies under different feeding conditions and alternative breeding systems are necessary to clarify the effects of caponisation of pheasants and to justify production.

Key words: pheasant, pheasant capons, live weight, weight gain, blood parameters

Introduction

Lately we are facing the increased market demands for more variable and quality poultry meat products. The production of capons has a long tradition in some Mediterranean countries.

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ISSN 0372-5480
Printed in Croatia

In caponisation, the surgical castration of male chickens, the testes of the male chicken are completely removed. As a result, the cockerel fails to develop secondary male characteristics or tends to lose them if they were already developed. Capons are usually quiet and docile, lacking a cockerel's disposition to fight. Caponised cockerels lack the characteristics associated with sexually mature rooster (MAST et al., 1981). The comb and wattles cease their growth after castration, so the head of a capon appears to be small. The hackle, tail and saddle feathers grow, however, unusually long (ANONYMUS, 1948). Testes removal eliminates production of male sex hormones and thusly reduces the male sex instinct and changes their behaviour (ANDREW, 1972; ANDREW and JONES, 1992). They will become less active because energy that is normally expended in fighting and territorial protection is greatly reduced, allowing more efficient conversion of feed into growth and fat deposition (YORK and MITCHELL, 1968). Caponizing produces a unique type of poultry meat that is very appreciated by consumers. The meat of roosters tends to become coarse, stringy, and tough as the birds age. This is not the case with the capon. The concentration of fat in both the light and dark meat of capons is greater than that of intact males. Some data have shown that meat from chicken capons is more tender and appreciated by consumers (WELTER, 1976).

The virtues of castrating domestic birds other than the chicken have not been extensively investigated, although some data are available for the turkey. In general, neither carcass quality nor production characteristics such as growth rate and feeding efficiency are altered by caponization of toms and, therefore, the practice has never been advocated on a commercial scale (JACOB and MATHER, 2000)

There is only few works published on the fattening of pheasants for the purpose of meat production (STRAKOVA et al., 2004; VEČEREK et al., 2004). Animals for that purpose can be selected from feathered game nurseries. Caponisation of these animals could provide meat with even better sensory and physical attributes for consummation. Caponized pheasants are much quieter, sluggish and they will grow to a slightly greater size than a standard bird, with increased body fat (ANONYMUS, 1948). There is a higher average body weight at sixteen weeks, cannibalism and other aggressive tendencies are reduced or eliminated, resistance handling is reduced, and carcass quality at slaughter is excellent with a high degree of body fat (JACOB and MATHER, 2000). Game pheasant are fed with high fat diets in order to be prepared for winter. Meat with a high degree of body fat is not suitable for market so it is necessary to change nutrition of game pheasants it order to decrease body fat and increase amount of body protein.

Materials and methods

Eighty male pheasants were used in the trial. Animals were selected from feathered

game nursery Zelendvor. The experiment was carried out for a period of 20 weeks. In the pre-treatment period all animals received exactly the same diet. Birds were divided into two groups according to age: first was 12 weeks and second was 8 weeks old. In both groups half of the animals were castrated. During the experiment each group was kept in separate part of the feathered game nursery. All animals received ad libitum amount of feed mixture. Capons were fed with the same diet during whole experiment. Non castrated pheasant were fed according to usual game pheasant nutrition procedure that included high energy diet during last 8 weeks. The chemical composition of the diet is provided in Table 1.

Table 1. Chemical composition of the feed[1]

Week	Dry matter	Crude protein	Crude fiber	Ca	P	ME
Capons						
1^{st} – 20^{th}	87.0	24.1	5.6	1.4	1.0	10.8 MJ/kg
Pheasants						
1^{st} – 12^{th}	87.0	24.1	5.6	1.4	1.0	10.8 MJ/kg
12^{th} – 20^{th}	87.2	21.0	4.8	0.9	0.7	12.5 MJ/kg

[1]Premix for pheasants comprising per kg: vitamin A, 30 000 IU; vitamin D3, 4000 IU; vitamin E, 60 mg; Fe, 25 mg; Mn, 80 mg; I, 1,5 mg; Co, 0,2 mg; Zn, 50 mg; Se, 0,15 mg; BHT antioxidant, 200 mg.

Samples of the feed mixture were collected throughout the experimental period for chemical composition analyses. The samples were ground and analysed for dry matter, crude protein, crude fiber, Ca, P and ME according to AOAC procedures (ASSOCIATION OF OFFICIAL ANALYTICAL CHEMISTS (AOAC), 1995).

Blood was collected weekly prior to morning feeding from the jugular vein into heparinized centrifuge tubes. Plasma was separated from corpuscular elements of blood with centrifuge and was stored at -20 ºC until analysis.

Pheasants were caponized at 8 and 12 weeks of age. They were taken off feed and water 12 hours prior to surgery. The birds were fastened on a surface on its left side with the wings held together above the body. The legs were also fastened together and the bird was stretched out to its full length in order to expose the rib cage area. Feathers in this rib area were removed and the skin was disinfected with 70% ethanol. One-inch incision was made through the skin and other tissues between the two posterior ribs. The skin was moved to one side before making the incision so that skin cut and muscle cut were not

aligned afterwards. The abdominal air sack was punctured with a sharp hook. The testicles were located on the dorsal wall at the anterior end of the kidneys, posterior to the lungs. The testicles of a twelve-week-old pheasant were about the size of a large wheat kernel and yellowish in colour, while the testes of an eight-week-old pheasant were little smaller and brown in colour. The testis was grasped with forceps, twisted and removed. The rib spreader was removed allowing the skin and thigh muscle to slip back into place. Sutures or bandages were not used. Air under the skin (windpuffs) was carefully punctured with a sharp instrument when necessary.

The absence of testicular regeneration in pheasant capons was determined on live birds by visual assessment and confirmed later after slaughtering.

Results

In animal castrated at 8 weeks of age testicular regeneration reached 25% while in animals castrated at 12 weeks of age we found regeneration of testes in all animals. Bilateral regeneration (Fig. 1) was dominant but we also found unilateral regeneration (Fig. 2). Because of that all animals castrated at 12 weeks of age were excluded from experiment concerning production results. They were kept till spring for additional histological research of the regenerated testes.

Fig. 1. Bilateral regeneration of testes.

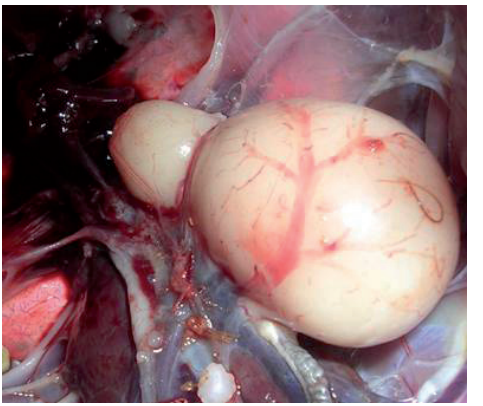


Fig. 2. Unilateral regeneration of testes.

The mortality induced by castration was around 2%. Final live weights and carcass characteristics of pheasant capons and pheasants are shown in Table 2. At the time of

slaughter (20th week of experiment) pheasants were significantly heavier (P<0.05) than pheasant capons but with lower dressing percentage (P<0.05).

Table 2. Weight, weight gain and carcass characteristics of pheasants and pheasant capons at 20th week1 of experiment

	P[2]	PC	p
Live weight 20th week (g)	1512 ± 61.84	1311.8 ± 46.97	**[3]
Eviscerated weight (g)	1070.2 ± 20.42	995.5 ± 24.83	**
Dressing percentage (%)	70.9 ± 1.65	75.9 ± 1.44	*
Liver weight (g)	24.9 ± 2.7	22.6 ± 1.43	NS

[1]Values represent means ± standard deviation, [2]P = pheasants; PC = pheasant capons, [3]NS = non significant; significant at *P<0.05 or ** P<0.01

Significant difference was recorded in blood components between experimental groups (Table 3). Pheasant capons showed higher plasma levels of total protein (P<0.05), albumin (P<0.05) and calcium (P<0.01). All other values concerning blood plasma components did not differ between treatment groups (Table 3).

Table 3. Values of blood plasma components[1]

Item	P[2]	PC	p
Glucose (mmol/L)	19.845 ± 3.01	20.583 ± 2.99	NS[3]
Urea (mmol/L)	0.866 ± 0.39	1.013 ± 0.77	NS
Creatinine (μmol/L)	32.000 ± 4.63	32.333 ± 3.38	NS
Total protein (g/L)	30.400 ± 4.03	35.500 ± 3.83	*
Albumin (g/L)	11.094 ± 1.66	14.513 ± 2.43	*
Triglycerides (mmol/L)	0.612 ± 0.22	0.530 ± 0.17	NS
Cholesterol (mmol/L)	2.936 ± 0.62	3.012 ± 0.43	NS
Ca (mmol/L)	2.072 ± 0.18	2.582 ± 0.10	**
P (mmol/L)	1.336 ± 0.28	1.553 ± 0.40	NS

[1]Values represent means ± standard deviation, [2]P = pheasants; PC = pheasant capons, [3]NS = non significant ; significant at *P<0.05 or ** P<0.01

Discussion

In our investigation there was no difference in general appearance of birds. In pheasant capons that were castrated at 12 weeks of age we observed aggressive behaviour, especially in the spring. On the contrary pheasant castrated at the age of 8 weeks showed

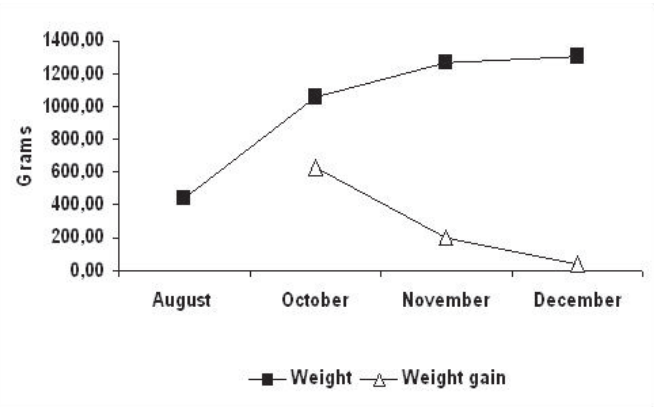
testicular regeneration in only 25% which is consistent with results that could be found in chicken capons (TOR et al., 2002). These birds showed no aggressive behaviour. According to literature chicken capons are less aggressive than roosters (BALDWIN, 1926; JACOB and MATHER, 2000). Complete removal of both testicles is necessary since any fragments that remain will grow and produce enough male hormones to create a "slip." While a "slip" will result in normally functioning cockerel, it will also not have desirable meat qualities of a good capon. MAST et al. (1981) found that when only one testicle as removed, the other one doubled in size so that the testicular weight was equivalent to that of roosters. Depending upon the growth and activity of the remaining testicular material, birds develop characteristics between roosters and capons and it can be noted that as the size of regenerated organ increased, the size of the comb and wattles also increased (ANONYMOUS, 1948). The size and shape of the head give the chicken capon a feminine appearance.

In our experiment pheasant capons had lower live weight but better dressing percentage. The effects of caponisation on live weight of chicken capons are not clear. Some studies reported a positive effect (WELTER, 1976; MAST et al., 1981), while others did not find any effect (YORK and MITCHEL, 1968) or even found that cocks were heavier than capons (CASON et al., 1988). YORK and MITCHEL (1968) reported that chicken capons caponised at 4 weeks of age weighted less and had poorer feed efficiency than control birds. However, capons did have higher dressing percentage and better flavour. According to MARION (1972) caponised turkeys weighted less than normal turkeys. FENNELL and SCANES (1992) concluded that androgens are androgenic but are not anabolic in chicken. Further investigation is still necessary to clarify effects of caponisation on live weight especially in pheasant capons.

The whole fattening period lasted for five months (from August till December). Live weights and weight gains of pheasant capons were increasing till November (Graph 1). These data showed that fattening of pheasant capons in opened feathered game nurseries should be finished before winter. Alternative is to keep pheasant capons indoors for the whole or part of the fattening period. A lot of attention has been focused on diets for growing chicken capons in such a way to produce rapid early growth and retard excess deposits of fat as the birds nears market age. Birds with stronger legs and better balance are better choice for chicken capons because more time spent on their feet and exercising tends to reduce breasts damage (JACOB and MATHER, 2000). Our trial showed that nutrition of game pheasants is not suitable for pheasant capons because of large fat deposition.

Blood plasma values showed significantly increased levels of calcium, total protein and albumin for pheasant capons. Differences were related to increased levels of these

components in feed mixtures. Nevertheless, values could be used as a reference values for all further investigations.



Graph 1. Weight and weight gain of the pheasant capons

Conclusion

We concluded that pheasant capons fed high protein diet represents better commercial product than pheasant reared as game animals. Breeding lasted 5 months and a product is of high quality. In our investigation pheasant capons were lighter than game pheasants but with better dressing percentage and meat quality. More studies under different feeding conditions and alternative breeding systems are necessary to clarify the effects of caponisation on pheasant growth and meat quality and to justify production.

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Received: 15 August 2005
Accepted: 4 April 2006

SEVERIN K., T. MAŠEK, Z. JANICKI, D. KONJEVIĆ, A. SLAVICA, T. HRUPAČKI: Kopunizacija fazana u različitoj dobi. Vet. arhiv 76 (Suppl.), S211-S219, 2006.

SAŽETAK

Istražen je utjecaj kopunizacije na tjelesnu masu, prirast i sastav trupova fazana. U pokus je uključeno četrdeset fazana, porijeklom iz uzgajališta fazanske divljači. Ptice su kastrirane u dobi od 8 i 12 tjedana. Pri kastraciji u dobi od 12 tjedana došlo je do potpunog obnavljanja spolnih žlijezda dok dok je pri kastraciji u dobi od 8 tjedana obnavljanje bilo prisutno u 25% kopuniziranih fazana. Fazanski kopuni su imali nižu tjelesnu masu, ali bolji randman nego fazani. Težina i prirast fazanskih kopuna je bila u porastu do prosinca. Kod fazanskih kopuna utvrđene su značajno više razine Ca, ukupnih proteina i albumina ($P<0,01$) u krvnom serumu što je izravna posljedica hranidbenih razlika. Zaključili smo da fazanski kopuni hranjeni krmnom smjesom s visokom količinom bjelančevina predstavljaju bolji komercijalni proizvod od fazana uzgajanih kao divljač.

Potrebna su daljnja istraživanja u različitim hranidbenim uvjetima i zamjenskim uzgojnim sustavima da bi se pojasnio učinak kopunizacije na fazane i opravdala proizvodnja fazanskih kopuna.

Ključne riječi: fazan, fazanski kopun, tjelesna težina, prirast, krvni pokazatelji