

Full Length Research Paper

The effect of castration age on the productivity of meat from lamb hogs

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This article contains information about influence of castration of lamb hogs at the age of 4, 5 and 6 months with Burdizzo forceps on some parameters of meat productivity. This study included 200 lamb hogs divided into 4 groups. The following criteria were studied: Pre-slaughter weight, carcass weight and fatness category of animals, which were monitored by periodical weighting at the age of 4 months before castration, and subsequently at 8, 11 and 14 months prior to control slaughter. At weighting before the slaughter at the age of 14 months animals which were castrated at the aged of 5 and 6 months had the best meat productivity – 45.1 ± 0.18 and 46 ± 0.16 kg, which, in percentage ratio in comparison to the first weighting increased by 36.4 and 34.6%, in comparison to the second weighting by 15.0 and 16.0%, and in comparison to the third weighting by 8.3 and 9.6%. It appeared that upon the attainment of the age of 11 and 14 months, lamb hogs castrated at the age of 6 months have better meat productivity than lamb hogs castrated at the age of 4 and 5 months or uncastrated animals.

Key words: Castration, live weight, carcass weight, Burdizzo forceps, lamb hogs.

INTRODUCTION

Castration of lamb hogs, alongside with good animal nutrition, is one of essential mass measures in veterinary surgery applied in sheep breeding for increase and improvement of meat productivity (Young, 2006). Many sheep breeding farms have to keep culled lamb hogs at autumn after the scheduled livestock valuation for stud purpose, and put them on feed till the age of one year or more (Nikitenko et al., 2007).

In many sheep farms, there is an opinion that it is necessary to castrate lamb hogs at the early age from 1 to 2 months. This is based on the fact that castration, which is mainly conducted in spring, is performed by open bloody method. By this method, testes of an animal are completely removed. So, at this age, lamb hogs are more tolerate to surgery interventions and reduce post-castration-complications.

In Kazakhstan, scientists and animal technicians, who work at breeding farms engaged into keeping of meat-wool breeds, start weaning and valuation of animals for stud purpose at the end of August, when the lambs attain the age of 3 to 4 months. The weather is hot at this period and it is the time of active reproduction of *Wohlfahrtia magnifica*, therefore application of any bloody methods of castration is not practical.

Many studies and observations show that the most effective ways of lamb hogs castration at this season are bloodless (percutaneous) methods (Kent et al., 1998; Wolfe et al., 1998; Stafford, 2007), which are implemented through violation of integrity of spermatic cord mainly by Burdizzo or Telyatnikov castration forceps (Bonelli et al., 2008).

Acute circulatory disorder in gonads, which occurs after this procedure, leads to atrophy and resorption of spermatic cords. After castration, sexual reflexes do not develop in males, so animals are calm (Farm Animal Welfare Council, 1994; Hosie et al., 1996) and well-fattened by feeding. Due to insufficient blood supply to

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tissues of testicles and accumulation of nutrients that cause activation of growth in percutaneously castrated animals. Under similar management conditions, such animals show higher weight gain than animals castrated by bloody methods (Brazle, 1992; ZoBell et al., 1993; Knight et al., 1999) or uncastrated animals. Remaining internal secretion in gonads has physiologically beneficial effects on growth and meat productivity of lamb hogs (Wellington et al., 2003). Therefore, the rational method of castration at this season should stimulate growth and meat productivity and destroy spermatogenesis in lamb hogs.

Taking into account the above listed difficulties and relevance of castration of defective lamb hogs in autumn, we tested the widely known and proven medium modified Italian Burdizzo castration forceps on lamb hogs of different age in breeding farm "Izdenis" located in West Kazakhstan region.

The aim of our study was to investigate the influence of castration performed by subcutaneous percutaneous method with the use of medium modified Burdizzo forceps on some parameters of meat productivity of lamb hogs of akzhaikskiy meat-wool breed born in 2009 and castrated at the age of 4, 5 and 6 months.

MATERIALS AND METHODS

This study was carried out in Taskalinskiy district of West Kazakhstan region of the Republic of Kazakhstan, in breeding farm "Izdenis" The study included 200 lamb hogs of akzhaikskiy breed culled after judging. These animals were weighted and divided into 4 groups of 50 animals in each by analogous method. All animals were subcutaneously percutaneously castrated by medium Burdizzo forceps. Study lasted for 10 months during grazing (feeding) and feedlots fattening of animals.

Lamb hogs in first group were castrated in late August at the age of 4 months. Animals in second group were castrated at the end of September at age of 5 months. Animals in third group were castrated in late October at the age of 6 months, and fourth group of animals was left uncastrated for control.

A small corral was built for 20 to 30 animals inside the main enclosure at the beginning of mass castration. Animals were placed into this corral by groups from the main herd. Before castration, the animals were fixed in side or in dorsal position. Veterinary specialist assured appropriate fixation of vascular cone and spermatic cord by fingers of left and right hands so that the vascular cone covered by skin near scrotum neck is laterally as possible.

After moving palpable excretory duct of seminal vesicle to vascular cone, forceps jaws were placed on vascular cone closely to the head of epididymis and at last impose forceps jaws were closed to the head of the epididymis. Spermatic cord was captured by middle part of forceps jaws and operator hold handles of medium Burdizzo forceps with both hands and keeps them in such state for at least 5 to 10 s.

Burdizzo forceps were designed so that after compression of forceps, operator needs both hands in order to return handles into the primary position. This operation is performed with the second testis in the same manner.

The growth of test lamb hogs was monitored by periodical weighing at the age of 4 months before castration and subsequently at 8, 11 and 14 months prior to slaughter.

In order to determine meat productivity, 5 test animals had been

taken from each group every 2 to 6 months. Last slaughters were performed in all groups when lamb hogs were at the age of 14 months. Live-animal estimate of meet productivity of slaughter lambs was carried out by evaluation of pre-slaughter weight of animal according to the average life weight after 24 h period. Carcase weight was evaluated immediately after slaughter. The quality of the carcase was determined on the basis of the development of lean tissue and extent of fat deposition.

Most important meat productivity parameters including, pre-slaughter weight, carcass weight and fatness category of animals were recorded as mentioned by Aripov et al. (1990).

Statistical analysis

All obtained results were calculated by analysis of variance (Lakin, 1990) and analyzed by SPSS, 12.0 release for OC Windows.

RESULTS AND DISCUSSION

Pre-slaughter live weight data of the experimental animal was presented in Table 1. The result clearly indicated that the highest live body weight at 8 months was in group with uncastrated lamb hogs (39.9 ± 0.07 kg). In percentage ratio, this index was increased by 26.9% in comparison with the beginning of the test. Low level of live body weight was in group with animals, which were castrated at the age of 4 months where average live body weight was 36.8 ± 0.04 kg. In comparison with primary weight of animals, it increased by 21%. This gap can be explained by the fact that during this season, castrated animals grow slowly due to the poor pasture and watering. Spermatic cords of 30% of lamb hogs, which were castrated at this time, can not be crushed by forceps because testes of animals have not been completely formed. Therefore one (commonly) or two (less commonly) testes, in case of poor fixation of spermatic cords, recover again after castration.

In compliance with the results of control weighting at 8 months, live body weight of animals castrated at the age of 5 and 6 months were 37.9 ± 0.10 and 39.1 ± 0.12 kg, respectively. So, live body weight increased by 22.2 and 25.1% in comparison with primary data.

Table 2 shows that carcass weight of lamb hogs at the age of 4 month and similar record was obtained, 11.6 ± 0.20 , 11.7 ± 0.13 , 11.5 ± 0.14 and 11.5 ± 0.10 kg from first to fourth group respectively. During the control slaughter at the age of 8 months the highest carcass weight was in the control group with uncastrated lamb hogs. It was 19.7 ± 0.30 kg, which in percentage ratio was 41.1% higher than carcass weight at the slaughter at 4 months.

At the winter-spring season during slaughter at the age of 11 months the highest carcass weight was in group with animals percutaneously castrated at 6 months: 22.9 ± 0.22 kg, which were 49.8% higher in comparison with first weighting and 16.6% higher in comparison with second weighting.

Last slaughters were conducted in all groups during the

Table 1. Live body weight of percutaneously castrated lamb hogs divided into age of castration.

Age of castration (months)	Live body weight at the age of 4 month before the test (kg)			Live body weight at the age of 8 month before the slaughter (kg)			Live body weight at the age of 11 month before the slaughter (kg)			Live body weight at the age of 14 month before the slaughter (kg)		
	n	Lim	$\bar{x} \pm S\bar{x}$	n	Lim	$\bar{x} \pm S\bar{x}$	n	Lim	$\bar{x} \pm S\bar{x}$	n	Lim	$\bar{x} \pm S\bar{x}$
4	50	28.2 - 30	29.1 ± 0.01	42	36 - 37.2	36.8 ± 0.04	37	38.6 - 40.3	39.8 ± 0.06	32	41.5 - 43.1	42.8 ± 0.05
5	50	29 - 30.5	29.5 ± 0.11	45	37 - 38.7	37.9 ± 0.10	40	40 - 41.2	40.8 ± 0.20	35	43 - 45.7	45.1 ± 0.18
6	50	28 - 30	29.3 ± 0.24	45	38 - 40.1	39.1 ± 0.12	40	41 - 42.5	42.2 ± 0.12	35	44 - 46.8	46 ± 0.16
Control	50	28.5 - 31	29.2 ± 0.06	43	38.5 - 40.5	39.9 ± 0.07	38	40 - 41.5	41.1 ± 0.03	33	42.6 - 43.5	43.1 ± 0.06

Table 2. Carcass weight of percutaneously castrated lamb hogs divided into age of castration.

Age of castration (months)	Carcass weight of lamb hogs slaughtered at the age of 4 month before the test (kg)			Carcass weight of lamb hogs slaughtered at the age of 8 month (kg)			Carcass weight of lamb hogs slaughtered at the age of 11 month (kg)			Carcass weight of lamb hogs slaughtered at the age of 14 month (kg)		
	n	Lim	$\bar{x} \pm S\bar{x}$	n	Lim	$\bar{x} \pm S\bar{x}$	n	Lim	$\bar{x} \pm S\bar{x}$	n	Lim	$\bar{x} \pm S\bar{x}$
4	5	10.3 - 12.9	11.6 ± 0.20	5	16 - 17.3	16.9 ± 0.12	5	18.9 - 20.1	19.6 ± 0.23	5	22.2 - 23.4	22.9 ± 0.32
5	5	10.2 - 13	11.7 ± 0.13	5	17 - 18.8	18.2 ± 0.15	5	20 - 22.3	21.8 ± 0.10	5	22.8 - 24.7	24.1 ± 0.03
6	5	10.4 - 12.8	11.5 ± 0.14	5	18 - 19.7	19.1 ± 0.02	5	21.5 - 23.8	22.9 ± 0.22	5	23.7 - 26.0	25.4 ± 0.08
Control	5	10.1 - 12.8	11.5 ± 0.10	5	18.5 - 20.2	19.7 ± 0.30	5	20.1 - 21.9	21.4 ± 0.03	5	22.4 - 23.5	22.1 ± 0.01

summer when age of all animals reached 14 months.

This season is characterized by excellent pasture feeding. Weighing at 14 months showed that the highest live body weight was animals castrated in 5 and 6 months with 45.1 ± 0.18 and 46 ± 0.16 kg, which was 34.6 and 36.4% higher in comparison with first weighting, 15.0 and 16.0% in comparison with second weighting and 8.3 and 9.6% in comparison with third weighting respectively.

During the control slaughter, the highest carcass weight was in the third group. It was 25.4 ± 0.08 kg on average. Carcasses of castrated animals killed at the age of 8 and 11 months were classified as medium category of fatness. These animals had satisfactory musculature with

moderately performed hip. Spine of dorsal was slightly well defined and formed. Type of subcutis was the same in all groups of animals. Subcutis on the back and loin was in the form of layer. Its thickness was 0.2 to 0.3 cm, at the edges it was in the form of narrow and very thin strips. Meat carcasses of the third group of animals, classified to the highest category of fatness, had well developed muscles and roundish shape of hip. Subcutis covered the whole carcass from the root of tail to back edges of blade. It was in the form of layer. Its thickness on crupper was 0.8 to 1.0 cm, thickness on back was 0.5 to 0.6 cm and thickness on back and edges was 0.2 to 0.4 cm. Carcasses received from uncastrated lamb hogs (control) and classified to the highest category of fatness were organoleptically more compact with

well-developed muscles, short and thick neck. But the extent of fat deposits was lower in comparison with castrated animals, that is, subcutis covered carcass as a layer, thickness of which did not exceed 0.5 cm.

Conclusion

This study indicated that lamb hogs castrated by subcutaneous percutaneous method at the age of 6 months have higher live weight and slaughter weight than lamb hogs castrated at the age of 4 months. Whereas noncastrated lamb hogs have higher live weight and slaughter weight than lamb hogs castrated at the age of 4 and 5 months, but their fat yield is less. Besides, according to the

results of the second and third control slaughter, lamb hogs castrated by subcutaneous percutaneous method at the age of 6 months have better meat productivity than those castrated at the age of 4 and 5 months upon the attainment of the age of 11 and 14 months. Thus, it may be said that it is economically sound to castrate meat-wool lamb hogs kept after scheduled breed valuation for store till the age of one year and more, for improvement of meat productivity, by subcutaneous percutaneous method with medium modified Burdizzo forceps at the age of 6 months.

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