

SHORT REPORT

A comparison of slaughter value of intensively fattened ram lambs and meat-type male kids

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Slaughter indicators of synthetic Whiteheaded Mutton line ram lambs (RLs) were compared to those of 75% Boer and 25% White Improved crossbred male kids (MKs), both groups fattened to the age of 100 days. Considered was body weight (BW) at slaughter, individual organs and tissues content of BW, carcass quality indicators and carcass tissue composition. At the age of 100 days RLs reached higher BW and dressing percentage than MKs, and share of valuable cuts in their carcasses appeared higher. Carcasses of RLs showed better conformation (a wider thorax, wider rump, bigger leg circumference, higher leg rounding index), but their subcutaneous fat layer was thicker than that of MKs. Meat per cent of RLs carcasses was found similar to that of MKs carcasses, but the former contained more fat and less bone than carcasses of MKs.

KEY WORDS: carcass / fattening / kids / lambs / slaughter value

The production of lamb meat is at present the main purpose of sheep breeding in Poland, while goats are kept mainly for milk production. However, keeping dairy goats is accompanied with the production of male meat-producing kids [Ryniewicz 1995, Pieniak-Lendzion 2001]. In order to improve meat deposition in fattening kids, goats of dairy breeds are mated, with increasing frequency, to Boer meat-type bucks [Bidwell-

Porębska *et al.* 1995, Piotrowski 1995, Kalinowska *et al.* 1997, Stanisz *et al.* 2004].

Slaughter value of mutton-type sheep and their suitability for the production of slaughter lambs are commonly known, while much less is known on the slaughter value of meat-type kids, especially in comparison with mutton lambs.

The aim of this study was to compare the meat production potential of meat-type ram lambs with that of meat-type male kids both fattened intensively to the age of 100 days, in terms of their slaughter traits.

Material and methods

Investigations were conducted at the Experimental Station of the Department of Sheep and Goat Breeding, Agricultural University of Poznań, Złotniki, on 30 Whiteheaded Mutton Sheep [Gut 1994] ram lambs (RLs) and 28 male kids (MKs) crossbreds containing 75% Boer and 25% Polish White Improved genes [Stanisz and Gut 2004]. The animals considered were sired by at least two sires, came from twin births, were weaned at the age of about 60 days and after a 10-day transition period were fattened *ad libitum* with individually given all-mash. In the transition period the CJ compound feed, rolled oats and hay were gradually replaced by pelleted balanced feed. One kg pelleted feed contained 155 g crude protein and 6.9 MJ net energy. In both groups fattening was conducted in individual pens to the age of 100±5 days. Immediately before slaughter the animals were weighed with the accuracy to 0.1 kg and their pre-slaughter body weight (BW) was recorded. Slaughter and assessment of slaughter value were conducted according to the methods developed for sheep at the National Research Institute of Animal Production [Nawara *et al.* 1963]. Directly after slaughter the carcasses were weighed and hot carcass dressing percentage, while after 24 h chilling at 2-4°C cold carcass dressing percentage were determined. Weight of the carcass, weight of individual organs and of primary cuts as well as tissue composition were determined with the accuracy to 1 g. The *longissimus dorsi* muscle (LD) cross-section area and backfat thickness over the LD were measured in the posterior part of the best end of the neck (behind 13 th thoracic vertebra) by scanning to a computer with the resolution of 800 ppi, at 32 bit colour depth. Images were collected in disc files (bit map) and analysed using the MultiScan ver. 8.08 software [MULTISCAN 2001]. The percentages of the muscle, fat and bone in the right half-carcass were estimated on the basis of complete dissection. The effect of the main factor (species) on the level of investigated traits was estimated using the analysis of variance according to the least square method with the SAS ver. 6.12 software package [SAS/STAT 1989].

Results and discussion

On the day of slaughter (day 100 of age) RLs were by 22% heavier than MKs

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($P \leq 0.01$) – Table 1. Such a high difference in body weight results from the differences in growth rate found between the investigated species [El Khidir *et al.* 1998, Sen *et al.* 2004]. The observed higher share of head in the pre-slaughter BW in MKs ($P \leq 0.01$) was a consequence of their having horns as was also reported by Tshabalala *et al.* [2003] for male Boer kids compared to Dorper lambs. On the other hand, the skin content of BW (Tab. 1) in RLs was higher than that found in MKs ($P \leq 0.01$), which was connected with the considerable weight of wool fibres found in lambs at that age [Sen *et al.* 2004]. A higher contents of legs and liver as well as of snowball, ruffle and perinephric fat ($P \leq 0.01$) were found in MKs than in RLs (Tab. 1). The higher content of fat in the abdominal cavity in MKs resulted primarily from the specific nature of fat deposition in this species – in goats about 45% of all body fat is deposited in the abdominal cavity [Piotrowski 1995 – a review, Dhanda *et al.* 2003, Marichal *et al.* 2003]. The contents of blood, lungs with the windpipe and the diaphragm, kidneys, the heart, spleen and testes (Tab. 1) in IRLs were similar to those found in MKs ($P > 0.05$). The per cent of valuable offals (the liver and heart) in MKs was similar to the figures found for this species by Mahgoub and Lodge [1996], El Khidir *et al.* [1998] and Sen *et al.* [2004].

RLs reached higher hot carcass dressing percentage (by 2.03 per cent points – $P \leq 0.05$) and cold carcass dressing percentage (by 2.12 per cent points – $P \leq 0.01$) than MKs (Tab. 2). Moreover, a higher carcass weight loss was found in MKs kids after 24 h chilling ($P \leq 0.05$). Sen *et al.* [2004] pointed out a higher weight loss in goat

Table 1. Body weight at slaughter and percent of individual internal organs and tissues in ram lambs and male kids

Item	Ram lamb		Male kid		Significance of inter-group difference
	LSM	SE	LSM	SE	
Body weight before slaughter (kg)	32.44	0.58	25.32	0.74	**
Content of body weight at slaughter (%)					
head	4.04	0.07	5.31	0.09	**
skin	10.53	0.23	7.43	0.31	**
leg	2.47	0.05	3.05	0.05	**
blood	4.95	0.11	4.78	0.14	ns
liver	2.05	0.14	2.28	0.04	**
lung with windpipe and diaphragm	2.01	0.04	1.92	0.04	ns
heart	0.47	0.01	0.45	0.02	ns
kidneys	0.18	0.01	0.17	0.01	ns
spleen	0.18	0.01	0.18	0.01	ns
testes	0.44	0.05	0.34	0.07	ns
snowball and ruffle fat	0.79	0.12	1.25	0.14	**
perinephric fat	0.87	0.08	1.15	0.10	**
full alimentary tract	20.44	0.44	23.10	0.61	**

** $P \leq 0.01$; ns – not significant.

carcasses during chilling and storage, indicating that the layer of subcutaneous fat has a considerable effect on the carcass weight loss. This is confirmed by a much thinner fat layer over the LD ($P \leq 0.01$), in MKs than in RLs (Tab. 3).

The contents of less valuable cuts, *i.e.* the neck, fore and hind shanks, the flank with ribs and sternum ($P \leq 0.01$) and cuts of medium value, *i.e.* best of neck and the shoulder,

Table 2 Carcass weight, chilling percentage and raw contents of carcass in rear legs and middle legs

Item	Rear legs		Middle legs		Significance of inter-group differences
	LSM	SE	LSM	SE	
Hair carcass weight (kg)	16.63	0.47	12.49	0.62	**
Cold carcass weight (kg)	16.22	0.45	12.11	0.60	**
Hair carcass chilling percentage (%)	51.32	0.58	49.29	0.77	*
Cold carcass chilling percentage (%)	50.06	0.58	47.94	0.77	**
Carcass weight loss after 24 h (%)	2.46	0.12	3.04	0.11	*
Carcass oil belt contents (%)					
neck	6.42	0.15	7.54	0.31	**
fore shank	4.49	0.10	5.52	0.13	**
best of neck	11.03	0.12	12.47	0.24	*
shoulder	14.46	0.10	15.10	0.26	*
flank with ribs and sternum	16.37	0.32	17.01	0.44	**
flank	1.38	0.03	1.17	0.03	**
best end of neck	7.16	0.12	5.82	0.23	**
ribs	7.45	0.16	6.61	0.21	**
leg	26.41	0.20	23.14	0.29	**
hind shank	4.93	0.12	5.62	0.17	**
Valuable cuts (%)	41.37	0.35	35.63	0.48	**

* $P \leq 0.05$, ** $P \leq 0.01$, = non significant.

Table 3 Carcass dimensions in rear legs and middle legs

Item	Rear legs		Middle legs		Significance of inter-group differences
	LSM	SE	LSM	SE	
External length of carcass (cm)	55.93	0.99	56.44	0.72	*
Depth of shank (cm)	24.73	0.30	24.93	0.41	*
Width of shank (cm)	16.93	0.26	14.25	0.35	**
Width of rib cage (cm)	23.64	0.26	20.12	0.35	**
External length of leg (cm)	37.00	0.39	31.06	0.54	**
Leg (measuring index)	1.15	0.01	0.95	0.01	**
Fore shank to rear shank (cm)	1.75	0.20	1.65	0.20	**
Fore shank to rear shank (cm)	3.05	0.43	1.82	0.40	**
LD carcass-scapula width (cm ²)	14.21	0.43	9.41	0.38	**

* $P \leq 0.01$, = non significant.

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were higher in MKs ($P \leq 0.05$). On the other hand, the per cent of valuable cuts in RLs was by 5.7 per cent points ($P \leq 0.01$) higher than that found in MKs. A similar share of valuable cuts in the carcass of mutton lambs was reported by Gut [1994] and for male kids of meat type – by Stanisz and Gut [2003].

Carcass length and depth of the thorax were found similar in both groups ($P > 0.05$). However, carcasses of RLs had wider thorax, wider rump, larger leg circumference and higher leg rounding indexs ($P \leq 0.01$). The LD cross-section area in RLs was by 33% bigger than in MKs ($P \leq 0.01$) – Table 3.

In the carcasses of RLs and MKs similar contents of muscle tissue (lean) were found ($P > 0.05$) – Table 4. On the other hand, RLs carcasses contained by 24% more fat ($P \leq 0.01$) and by 30% less bone ($P \leq 0.01$) than carcasses of MKs. The lower share of fat and the higher share of bone in goat than in lamb carcasses was fund, among others, by El Khidir *et al.* [1998], Tshabalala *et al.* [2003] and Sen *et al.* [2004].

The conducted testing of the slaughter value of meat-type ram lambs with meat-type male kids both fattened to the age of 100 days indicates that the latter, crosses with a high share of the Boer breed, are equal to meat-type ram lambs in terms of their basic slaughter traits. This result should encourage breeders of dairy goats to

Table 4. Carcass tissue composition in ram lambs and male kids

Tissue content of carcass	Ram lamb		Male kid		Significance of inter-group difference
	LSE	SE	LSE	SE	
Muscle	65.12	0.84	63.24	0.98	*
Fat	17.85	0.48	13.47	0.44	**
Bone	17.03	0.73	22.27	0.05	**

** $P \leq 0.01$; * – not significant.

commercial crossing of their does with the Boer bucks, while those who run farms with no means to keep dairy goats – to rear meat-type goats.

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Porównanie wartości rzeźnej intensywnie tuczonych tryczków i koziołków mięsnego typu użytkowego

S t r e s z c z e n i e

Badano masę ciała i udział w niej poszczególnych narządów i tkanek oraz wskaźniki użytkowości rzeźnej tryczków białogłównej owcy mięsnej i koziołków mieszańcowych (75% rasa burska, 25% rasa polska biała uszlachetniona), tuczonych do wieku 100 dni. Tryczki osiągnęły wyższą masę ciała i wydajność rzeźną, a tusze ich miały większy udział wyrobów wartościowych. Tusze tryczków charakteryzowała lepsza budowa (szersza klatka piersiowa, szerszy zad, większy obwód udźca, wyższy wskaźnik wypełnienia udźca), jednak były one pokryte istotnie grubszą warstwą tłuszczu podskórnego niż tusze koziołków. W tuszach tryczków i koziołków podobny był udział tkanki mięśniowej, jednak tusze tryczków zawierały więcej tkanki tłuszczowej, a mniej kości.

