

POSSIBILITY OF USING THE NATIVE BREED OF POPIELNO WHITE RABBITS FOR MEAT PRODUCTION

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ABSTRACT

Popielno White rabbits are a native breed created from the no longer existing Polish Albino breed. Research on the creation of the breed began in 1950. In 1989, Popielno White rabbits were included in the farm animal genetic resources conservation programme, financed by the Ministry of Agriculture and Rural Development. The aim of the study was to determine the possibility of using the native breed of rabbits for the production of carcasses of high culinary value. Twenty female and 4 male Popielno White and New Zealand White rabbits were studied. Females of the foundation stock were kept on litter in pens in a closed facility. Reproductive and growth performances and carcass parameters of Popielno White and New Zealand White rabbits were evaluated. The slaughter was carried out when rabbits were 90 days of age old. The study showed the high prolificacy of Popielno White rabbits. Growth parameters were lower in Popielno White than in New Zealand White rabbits, but they were compensated by better reproductive performance. The most valuable cuts (loin, hind part) of Popielno White rabbits were comparable in size with those of New Zealand White, which is a typically meat breed. Overall sensory quality also confirmed the culinary value of meat from Popielno White rabbits.

Key words: Rabbits, Native breed, Growth, Meat quality.

INTRODUCTION

Popielno White rabbits are a native breed created from the no longer existing Polish Albino breed. Research on the creation of the breed was initiated and supervised in 1950 by Prof. Z. Kaminski. The initial work was carried out at the Experimental Station of the National Research Institute of Animal Production in Chorzelow, and since 1955 the work has been continued at the Experimental Station of the Polish Academy of Sciences in Popielno, which lent its name to the breed.

Breeding work was based on 20 Polish albino rabbits purchased at a market in Myslenice and 20 rabbits taken from the closed-down Experimental Station in Brzezine. The average weight of these rabbits was 2.5 kg. Some of these rabbits were used in the late 1950s to create a herd, which was crossed once with Belgian Giant Grey rabbits to increase body weight. Polish White females were crossed with Belgian Giant Grey males, and Belgian Giant Grey females were crossed with Polish White males. Heterospermy was used and each female was successively mated to two males. The resulting crossbreds had grey coat colour and were mated to one another. In the second generation, rabbits with albino coat colour were obtained in addition to rabbits with grey coat colour. The albino rabbits were used as a basis of further breeding. Albino crossbreds were mated to one another. Litters were limited to two rabbits to ensure better growth and development of the pups. For several years, pregnant females were kept in semi-open conditions to improve hair coat in the offspring. Animals were kept in outdoor wooden cages, which provided rough rearing conditions in the winter. As a result, a herd of rabbits characterized by uniform, albino coat colour was obtained in Popielno in 1964.

The work on the Popielno White rabbit was continued by Dr W. Karłowicz. Thanks to his efforts, in 1965 the rabbit farm was moved from Popielno to the Institute of Animal Genetics and Breeding in

Jastrzebiec. The Popielno White rabbit was further improved in Jastrzebiec by a team from the Selection Methods Laboratory, led by Dr Karłowicz. The long-term research and selection work resulted in the consolidation of phenotypic traits and of the major production traits (Gebler and Jezierski, 1997). The breed is characterized by very good adaptability to adverse environmental conditions, which is of particular important in backyard systems (Krupinski *et al.*, 2006). It has been possible to test the performance and breeding value of the Popielno White rabbits since 1989, when the Ministry of Agriculture and Food Economy approved the pattern of the breed.

The aim of the study was to determine the possibility of using the only native breed of rabbits for the commercial production of breeding and slaughter material.

MATERIALS AND METHODS

Twenty female and four male Popielno White (PW) and New Zealand White (NZW) rabbits were studied. Females of the foundation stock were kept on litter in pens in a closed facility. After weaning at 35 days of age, young rabbits were moved to spot-welded cages. All animals had constant access to complete pelleted feed and water. The complete standard diet contained dried meadow grass, soybean meal, wheat bran, ground maize, milk replacer, NaCl, and a mineral and vitamin supplement. There was 16.0% crude protein, 3.0% crude fat and 11.5% crude fibre.

At the age of 90 days, rabbits were subjected to experimental slaughter. Twelve animals (six females and six males) were slaughtered from each experimental group. Reproductive, growth and slaughter performance was analysed according to the method of Niedzwiadek *et al.* (1996). After 24-h chilling, carcasses were dissected according to Niedzwiadek *et al.* (1996). The sensory analysis of meat was performed on the *musculus longissimus dorsi*. The muscle was matured at 4°C for 3 days. The samples were heated to mild boiling in water (0.6% NaCl solution) at one part muscle to two parts water until the internal sample temperature reached 85°C. Heat-treated meat was chilled to room temperature, sliced and evaluated by experts. Sensory analysis included the evaluation of aroma intensity, aroma quality, tenderness, juiciness, taste intensity and taste quality on a scale of 1 to 5 points. The overall sensory quality was calculated based on the results of sensory evaluation (Tilgner, 1957).

The results were analysed statistically by analysis of variance and Duncan's test, using Statgraphics Plus 4.0 software.

RESULTS AND DISCUSSION

The highest number of rabbits born and weaned was characteristic of Popielno White rabbits (Table 1).

Popielno White rabbits were considered to be suitable for amateur breeding in backyards (Krupinski *et al.*, 2006). Studies by Piotrowicz (1967) showed that this breed had 7.2 young per litter at birth and only 4.6 rabbits at 1 month of age. Studies carried out 40 years later confirm the high prolificacy of the breed under commercial farm conditions. A disadvantage of the breed is considerable mortality of young rabbits during rearing with mothers. According to Piotrowicz (1967), it exceeds 60%. The result obtained in the present study is much lower (23%), but still exceeds the mortality of New Zealand White rabbits (approximately 10%).

The body weight gains of Popielno White rabbits were lower and their weight at 90 days was approx 2500 g. However, the dressing percentage of these animals was similar to the level reported by Piotrowicz (1967) and slightly higher than that reported for New Zealand White rabbits. The native Carmagnola Grey breed, which was introduced in Italy into "natural" breeding, is characterized by markedly lower production parameters (Lazzaroni and Biagnini, 2002).

Table 1: Reproductive and growth performance of the Popielno White (PW) and New Zealand White (NZW) rabbits

Parameters	Experimental group			
	PW		NZW	
	means	se	means	se
Conception rate (%)	92 A	6,51	78 B	8,96
Mean number of rabbits born alive per litter (head)	8.54 A	0,48	6.27 B	0,38
Litter weight at birth (g)	420.2 A	20,23	350.3 B	16,36
Mean number of rabbits per litter at 21 days of age (head)	7.98 A	0,36	5.62 B	0,35
Mean weight of 1 rabbit at 21 days of age (g)	261.4 b	4,63	317.5 a	6,55
Mean number rabbits per litter at weaning at 35 d of age (head)	6.12 a	0,37	5.54 b	0,34
Mean weight of 1 rabbit at 35 days of age (g)	610.3 B	19,52	742.5 A	13,81
Mortality from birth to 21 days of age (%)	6.55 B	0,43	10.36 A	0,76
Mortality from 21 to 35 days of age (%)	23.30 A	3,11	1.42 B	0,92
Mortality from birth to 35 days of age (%)	28.33 A	5,22	11.64 B	7,13
Rabbit weight at 90 days of age (g)	2402.1 B	49,06	2655.8 A	66,55
Daily weight gains from 35 to 90 days of age (g)	26.90 b	3,23	27.82 a	6,86

a,b – means with different letters differ significantly at $P \leq 0.05$

A,B – means with different letters differ significantly at $P \leq 0.01$

With a lower weight at 90 days, Popielno White rabbits had very high dressing percentage (Table 2).

Table 2: Slaughter performance of the Popielno White (PW) and New Zealand White (NZW) rabbits

	Experimental group			
	PW		NZW	
	means	se	means	se
Body weight at 90 days (g)	2402 b	156,7	2656 a	207,01
Hot carcass weight with head (g)	1326.4 b	71,7	1445.8 a	93,5
Hot carcass weight without head (%)	1162.9 b	66,47	1260.8 a	80,80
Dressing percentage (1) (%)	55.21	2,39	54.43	2,51
Dressing percentage (2) (%)	48.40	2,37	47.47	2,47

Explanation – see table 1

The results of carcass dissection and sensory analysis of meat according to experimental rabbit groups are showed, respectively, in the Tables 3 and 4.

The present study showed that in absolute terms, the differences in the meat content of the most valuable cuts (loin, hind part) in relation to the most popular breed of rabbits (New Zealand White) were more favourable for the native breed. Carcasses from Popielno White rabbits were characterized by a higher proportion of intermuscular fat. A study by Piotrowicz (1967) showed the fat content to range from 8 to 10%.

The sensory evaluation, which determines the suitability of carcasses for culinary treatment, showed that the meat had poorer aroma quality but markedly greater juiciness compared to the meat of New Zealand White rabbits. Aroma quality had a negative effect on taste quality, but overall sensory quality was at the same level in both experimental groups.

CONCLUSIONS

The results showed that Popielno White rabbits can be used for backyard keeping as purebred animals or for production of meat crossbreds. Carcasses from Popielno White rabbits fed complete pelleted diets were similar in terms of sensory traits to the meat of the most popular breed, New Zealand White.

Table 3: Results of carcass dissection of the Popielno White (PW) and New Zealand White (NZW) rabbits slaughtered at 90 day-olds

	Experimental group			
	PW		NZW	
	means	se	means	se
Carcass weight after chilling (g)	1134.3 b	59.92	1243.3 a	51.3
Tissue composition of front part:				
- muscle weight (g)	303.3	15.3	282.8	9.39
- proportion of muscles (%)	68.4	3.46	71.4	2.37
- bone weight (g)	106.7	3.82	92.8	2.81
- proportion of bones (%)	23.6	0.84	23.9	0.72
- fat weight (g)	36.7 a	1.3	18.6 b	0.53
- proportion of fat (%)	8.1 A	0.29	4.7 B	0.13
Tissue composition of loin:				
- muscle weight (g)	266.7	14.17	257.1	9.51
- proportion of muscles (%)	76.9	4.08	83.5	3.08
- bone weight (g)	56.7 a	2.21	41.4 b	1.03
- proportion of bones (%)	16.7	0.65	13.6	0.34
- fat weight (g)	23.3 A	1.13	8.6 B	0.28
- proportion of fat (%)	6.5 A	0.32	2.9 B	0.09
Tissue composition of hind part:				
Muscle weight (g)	371.7	13.30	344.3	9.64
- proportion of muscles (%)	82.9	2.97	79.6	2.23
- bone weight (g)	73.3	2.01	88.6	2.20
- proportion of bones (%)	16.0	0.44	20.4	0.51
- fat weight (g)	5.0 A	0.24	0 B	0
- proportion of fat (%)	1.1 A	0.05	0 B	0
Muscle weight in carcass (g)	941.7	44.58	878.6	26.12
Proportion of muscles in carcass (%)	75.7	3.59	77.2	2.29
Bone weight in carcass (g)	236.7	8.61	228.6	5.41
Proportion of bones in carcass (%)	19.0	0.69	20.3	0.48
Fat weight in carcass (g)	65.0 a	2.85	27.1 b	0.88
Proportion of fat in carcass (%)	5.2 a	0.23	2.4 b	0.07

Explanation – see table 1

Table 4: Meat sensory evaluation of the Popielno White (PW) and New Zealand White (NZW) rabbits slaughtered at 90 day-olds

	Experimental group	
	PW	NZW
pH after slaughter	5.68	5.39
pH after 24-h chilling	5.61	5.20
Thermal loss (%)	22.45	22.68
Aroma intensity	4.6	4.6
Aroma quality	4.4	4.6
Tenderness	4.4	4.4
Juiciness	4.6	4.0
Taste intensity	4.0	4.0
Taste quality	4.2	4.8
Overall sensory quality	4.37	4.40

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