



## ПРОУЧВАНЕ ВЪРХУ ПРОДУКТИВНОСТТА И КАЧЕСТВОТО НА МЕСОТО НА ПОРОДАТА МАНГАЛИЦА RESEARCH ON PRODUCTION AND MEAT QUALITY IN BREED MANGALICA

Габриел Василе Хоха\*, Елена Костаческу, Ленута Фотеа, Дойна Леонте, Адриан Грубер, Беноне Пасарин  
Gabriel Vasile Hoha\*, Elena Costăchescu, Lenuța Fotea, Doina Leonte, Adrian Gruber, Benone Păsărin

Университет по аграрни науки и ветеринарна медицина, 3, Алея Михаил Садовану, Яш, 700490 Румъния  
University of Agricultural Sciences and Veterinary Medicine in Iasi, 3, Mihail Sadoveanu Alley, Iași, 700490, Romania

\*E-mail: gabihoha@yahoo.com

### Резюме

Целта на настоящата работа е да се установят продуктивните признаци и качеството на месото на свине от червения сорт на породата Мангалица в условията на интензивна производствена система. В проучването са включени 25 женски и кастрирани мъжки прасета. Животните от двете партии са проучвани от отбиване до достигане на 100 kg жива маса. Данните за живата маса показват, че при интензивно отглеждане свинете от породата Мангалица достигат жива маса 100 kg приблизително 2 месеца по-рано в сравнение с отглеждането при традиционни условия. Среднодневният прираст (298 g) и разходът на фураж (4,4 kg) при интензивно отглеждане са по-добри от съответните показатели на отглежданите по традиционен начин. За установяване на кланичните характеристики и качеството на месото са направени измервания на тялото, анализирани са общата маса и относителния дял на отделните части на тялото, проучен е строежът и е направен химичен анализ на месото на м. Longissimus dorsi. Резултатите от изследването показват, че Мангалицата е типична порода за мас (трупът съдържа около 35% месо и 65% сланина), но съдържанието на холестерин е ниско (61,82 mg).

### Abstract

Through this paper, we proposed to establish the production performances and meat quality of Mangalica races, red variety exploited in intensive system. He was taken to study a batch of 25 individuals, male castrated and female, fully respecting the protocol of growth from farm. Individuals from both batches were followed from weaning and up to the weight of 100 kg. Data on body weight, indicating more rapid achievement of 100 kg by weight Mangalica pigs reared in intensive system than those grown in traditional system about 2 months. Values recorded for average daily gains (298 g) and consumer index (4.4 kg) show a superiority for pigs reared in intensive system than in traditional system. For a complete characterization of the quality Mangalica carcass were performed measurements on carcasses from the individuals analyzed, and research on the total weight and on various body regions and the amount of muscle tissue and gross chemical composition of Longissimus dorsi muscle. The results obtained from research shows that Mangalica is a typical breed fat (carcass containing approx. 35% meat and 65% fat) but low in cholesterol (61.82 mg).

**Ключови думи:** свине, Мангалица, продуктивност, качество на месото.

**Key words:** pigs, Mangalica, production, meat quality.

### INTRODUCTION

Mangalica breed is one of the oldest breeds in Europe, in Romania it was imported from 1830 to 1835. Mangalica breed distinguish the following varieties: blond Mangalica, black Mangalica, red Mangalica, black with white belly and variety Wolves. Blond Mangalica is the most populous because it has the best productivity indices (Păsărin and Stan, 2007).

Mangalica is characterized by rusticity and great resistance to diseases, cold, sunlight and grazing on wetlands. The food is not pretentious, and in semi-intensive

farming conditions do not require animal protein (Stan and Păsărin, 2001). It is a fat-type, curly-haired swine with relatively low reproductive performance, but strong motherliness and good adaptability to extensive housing conditions (Egerszegi et al., 2003).

There had been two housing methods for Mangalica. In estates pigs were kept in large herds grouped by age and sex, and supervised by herdsmen. The animals had been fed throughout the year on pasture and in the oak-beech forest. Sows were introduced only for farrowing. Small-farmers kept their pigs during night time at home in special

cages and in the day time all pigs of the village were shepherded on communal pastures (Ciobanu et al., 2001).

Generally the farrowing season was in spring and the sows gave birth 6-8 piglets usually. After the suckling period of 4-6 weeks the piglets were kept together and by the age of 4 months boars and gilts were separated (Pop et al., 1993). The breeding gilts were kept in droves on pasture and wasteland till the first mating at 12 – 14 month of age and reaching a body weight of 80 – 100 kg. Animals were slaughtered at the weight of 120-150 kg (Egerszegi et al., 2003).

Mangalica is a typical fat pig breed, it has in carcass sides 65-70% of fat and approx. 30-35% meat (Hollo et al., 2003) compared to over 50% in modern breeds. Slightly lower values for average content of fat and muscle tissue with bones were established by many authors (Lugas et al., 2006), (Petrovic et al., 2007). Results of the investigation from recent years (Szabo, 2006; Zăhan et al., 2009<sup>ab</sup>; Joop de Boer et al., 2009) show that there is less than 40% of lean meat in carcass sides but sufficient for production of high quality and valuable ham. Meat obtained from animals Mangalica is tasty, juicy and lends itself well to prepare sausages (Banu, 2002).

Through this paper, we proposed to establish the breeding performances and meat quality of Mangalita breeds, red variety.

## MATERIALS AND METHODS

Research on productive performance were conducted in a breeding farm and meat quality measurements were made in the slaughterhouse where animals were slaughtered.

To calculate the productive performance of Mangalica breeds we studied a group of 25 individuals, castrated males and females, which were followed the following parameters: - Dynamic weight gain; - Average daily gain; - Food consumption; - Feed conversion rate; - Pigs mortality.

Weight gain, on periods of growth, was determined in farm in experiences compartments.

To determine dynamic weight gain and average daily gain were conducted individual animals weighing from experience, at weaning, at nursery exit and at the end of the growing and fattening period.

Feed conversion rate is obtained by dividing the total amount of the gain realized fodder throughout fattening, or a shorter period.

After determining the productive performance, the 25 pigs Mangalica were killed and were analyzed qualitatively determining the following parameters: - Slaughter yield; - Percentage of meat in the carcass; - Dimensions of carcasses; - Determining the back fat thickness; - Chemical composition of Longissimus Dorssi muscle.

In the slaughterhouse was determined live weight of pigs and carcass weight. Carcasses obtained after slaughter were weighed before and after chilling (for 24 hours at temperature of 0 + 4°C).

The data obtained from carcasses weighing was calculated slaughter yield, expressed as the ratio of hot carcass weight and cold and live weight multiplied by 100 to express the percentage.

Percentage of meat in the carcass was determined with Fat-o-Meater device.

Dimensions of carcasses were determined zoometer device.

The back fat thickness was determined with calipers.

Using necropsy technique, Longissimus dorsi muscles were harvested for chemical analysis.

Collected data were subjected to statistical computation, using ANOVA single factor algorithm, to find out any significant differences.

## RESULTS AND DISCUSSION

### Productive performance of Mangalica breeds

#### Dynamic weight gain

Weight gain is a factor that influenced the meat production to be obtained from pigs. Weight gain is an ascending line, rapidly evolving during growth, then growth slows greatly, deposits of body mass being in favor fat body mass.

From the data presented in Table 1 it is noted that Mangalica pigs, although they received intensive technology had outstanding results compared with modern breeds or hybrids of high productivity performance, reaching a weight of 97 kg at the age of 330 days.

As a general reference on the evolution of body weight in individuals in the experimental group, it may give the idea that the values resulting from experimental research are similar to those recorded in the literature (Egerszegi et al., 2003; Petrovic et al., 2007; Affentranger et al., 1996).

#### Average daily gain

Average daily gain is an important indicator of production, the possibility of expressing the performance of growing and fattening swine, being in close contact with other productivity indicators (feed conversion rate, precocity etc.).

Piglets from the experimental group was followed on distinct periods, from weaning until slaughter, the results showed an upward trend for average daily gain. Average daily gain was closely related to the evolution of body weight, with values ranging between 270g and 330g with an average growing-fattening period of 298g, value that can be considered good, given that Mangalica it is a late breed (Table 2).



**Таблица 1.** Показатели на растежа при породата Мангалица  
**Table 1.** Indices of growth to Mangalica breed

Specification Показател	Weight to weaning (30 days) Тегло при отбиване (30 дни)	Weight at entry to the fattening (100 days) Тегло в началото на уговането (100 дни)	Weight at slaughter (330 days) Тегло при клане (330 дни)
Average Средно, kg	7.49	26.56	97.12
V%	8.54	10.12	9.54

**Таблица 2.** Среднодневен прираст в периода растеж-уговане  
**Table 2.** Average daily gain during the period growing – fattening

Specification Показател	Period / Период		
	30-100 days/дни	100-330 days/дни	30-330 days/дни
Average, kg/day Средно, kg/ден	0.270	0.330	0.298
V%	9.12	10.23	10.05

#### *Food consumption and Feed conversion rate*

It is well known correlation between average daily gain and feed conversion rate is known that animals with better growth performance have lower food consumption, and vice versa.

Throughout the rearing and fattening, feeding was done „ad libitum” fodder presenting flours.

Analyzing the data recorded in Table 3 we conclude that the entire experimental period Mangalica group consumed an average of 454.3 kg mixed fodder/capita to achieve an average weight of 97.12 kg (Table 3). The feed conversion rate has different values depending on the period of growth being between 3.14 kg on nursery period and 4.40 kg on the fattening period.

#### *Pigs mortality*

At lot of Mangalica breed studied, no mortality was recorded throughout the experiment, which shows very good resistance to organic breed. During the experiment has been some diseases, the main causes being diarrhea and respiratory syndrome.

#### **Quality of Mangalica carcass**

Mangalica individuals who participated in the experiment were slaughtered at an age of about 11 months

and weighing about 97 kg. For the most accurate characterization slaughter traits, the 25 individuals were divided into two groups according to sex, the batch L1 that was composed of 14 males castrated and the batch L2 which was composed of 11 females.

Slaughter yield values were near in both groups, being 71.41% to the batch L1 and 69.94% to the batch L2 (Table 4). Data obtained in connection with slaughter yield of this experiment revealed similar values with the results presented in the literature (Lugasi et al., 2003; Oliver et al., 1997; Petrovic et al., 2007).

For a more complete image of quality carcasses from Mangalica breed were performed measurements on carcasses from the pigs analyzed (table 5), research on the average percentage of muscle tissue (%) in the carcass and on four body regions (table 6), and gross chemical composition of Longissimus dorsi muscle (table 7).

Data presented in Table 5 indicate very good value on carcasses along with the pulp. Back fat thickness of nearly 4.3 cm, is lower than the results presented in the literature that indicating about 6 cm. This can be explained by the slaughter weight of about 100 kg of pigs from

**Таблица 3.** Консумация и оползотворяване на фуража при породата Мангалица  
**Table 3.** Food consumption and feed conversion rate to Mangalica breed

Specification Показател	Period / Период	
	30-100 days/дни	100-330 days/дни
Food consumption (kg/capita) Консумация на фураж (kg/глава)	60,0	394.3
Average weight gain (kg) Среден абсолютен прираст (kg)	19.07	89.63
Feed conversion rate (kg) Оползотворяване на фуража (kg за kg прираст)	3.14	4,40

**Таблица 4.** Кланичен рандеман при породата Мангалица  
**Table 4.** Slaughter yield to Mangalica breed

Pig (head) Брой	Sex Пол	Age (days) Възраст (дни)	Live weight Живо тегло (kg)	Carcass weight Кланично тегло (kg)	Slaughter yield Кланичен рандеман (%)
14	M	330	99.7	71.2	71.41
11	F	330	96.5	67.5	69.94

**Таблица 5.** Основни характеристики на трупа при породата Мангалица  
**Table 5.** The main characteristics of carcasses from Mangalica breed

Specification / Показатели	Sex / Пол	N	Average / Средно	V%
Live weight Жива маса (kg)	M / M	14	99.7	9.17
	F / Ж	11	96.5	9.44
Carcass weight Кланично тегло (kg)	M / M	14	71.2	10.66
	F / Ж	11	67.5	10.11
Great length of carcass Голяма дължина на трупа (cm)	M / M	14	100.2	10.27
	F / Ж	11	94.31	10.35
Small length of carcass (cm) Малка дължина на трупа (cm)	M / M	14	79.41	11.83
	F / Ж	11	73.46	11.57
Width of carcass (cm) Тегло на трупа (cm)	M / M	14	40.12	10.32
	F / Ж	11	35.22	10.51
Thigh length (cm) Дължина на бут (cm)	M / M	14	49.33	10.88
	F / Ж	11	46.52	10.64
Back fat thickness (cm) Дебелина на гръбната сланина (cm)	M / M	14	4.32	16.55
	F / Ж	11	4.28	18.21

**Таблица 6.** Среден процент мускулатура (%) в трупа и в четири части на трупа при породата Мангалица  
**Table 6.** The average percentage of muscle tissue (%) in the carcass and on four body regions to Mangalica breed

Body regions/Части на трупа	Results/Стойности
Carcass/Труп	36.15
Leg/Бут	43.43
Loin/Филе	23.23
Shoulder/Плешка	48.47
Ribs/Рибра	21.82

**Таблица 7.** Химичен състав на m. longissimus dorsi при породата Мангалица  
**Table 7.** Chemical composition at Longissimus Dorsi muscle to Mangalica breed

Specification/Показатели	Results/Стойности
Water/Вода (%)	64.38
Protein/Протеин (%)	21.35
Fat/Мазнини (%)	13.31
Crude ash/Сурова пепел (%)	0.96
Cholesterol/Холестерол (mg/100g)	61.82



experience versus conventional slaughter weight of about 150kg of Mangalica breed (Davenel et al., 1999; Dikić et al., 2002).

From data presented in Table 6. we can conclude that Mangalica is a typical fat breed, the carcasses containing approx. 36% meat and 64% fat, confirming literature data showing this breed a percentage of meat of 30-35% and 65-70% fat (Hallo et al., 2003; Petrovic et al., 2010; Zăhan et al., 2009<sup>b</sup>; Zăhan et al., 2009<sup>c</sup>; Wood, 1984).

The data presented in Table 7 are near to those in the literature (23.87% protein (Csapo, 1999) being lower probably due to a feeding system and slaughter age. The results of research reveals that muscle obtained from Mangalica breed has a very low cholesterol content (61.82 mg/100g) than modern breeds like Large White (76.9 mg/100g), which is a great asset for the growth of this breed.

### CONCLUSIONS

1. After many years when the breed was neglected, due to the exceptional qualities of meat, Mangalica race was again attractive to farmers.
2. After the investigations we can draw the following conclusions:
3. Production characteristics demonstrate the potential of Mangalica breed to harness intensive growth conditions, but remain inferior to breeds improved.
4. Slaughter yield and carcass traits fall in performances achieved by Mangalica breed.
5. Meat quality indices motivates their value to guide consumers towards products obtained from this breed.
6. Morphological characteristics, production and slaughter indices show the qualities of this breed, which together with very good organic resistance is a plea for maintaining and promoting the breed Mangalica in zootechny XXI century.

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Рецензент – доц. д-р Оксана Совинок  
E-mail: savoksamit@mail.ru*