

EXTENSIVE SYSTEMS OF SWINE MEAT PRODUCTION BASED ON PASTURES

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Abstract: *The distinction between intensive versus extensive system is based on the functional and spatial relationships between production efficiency, market orientation, cultural practices and management of resource use. The two production systems cannot co-exist because the extensive ones use low inputs, are small-scale, subsistence and mixed, vegetable and animal production. We have identified in the researched area the following extensive systems for obtaining additional swine meat for self-consumption and for the market, which ensures the well-being of animals, these being agro-pastoral and pastoral systems, mixed crop-livestock systems, organic ecological systems and systems of small farmers who produce only for self-consumption. Ensuring the minimum conditions of well-being and biosecurity of farms can contribute to obtaining good meat productions at low cost and efficient use of pasture resources.*

Key words: *swine, production systems, pasture, meat*

INTRODUCTION

The most common characterizations of swine rearing and exploitation systems for meat production distinguish between: [11,12,19]

- intensive systems with a high level of inputs for their economy;

- low-input extensive systems – noting that data on intensification, meat production efficiency, market orientation, cultural practices or marketing management practices – may vary considerably from one region to another depending on resources. [13,17] However, the distinction between intensive and extensive production systems is based on the relationships:

- functional between the growth and exploitation systems;

- spaces between specialized swine farms for meat production.

Intensive and extensive production systems cannot coexist [6,8,10,15] because the last ones are systems with low inputs, of small size, of mixed subsistence production, instead the intensive ones are geographically concentrated systems, of large sizes with specialized production, swine meat and swine products and commercially oriented to market needs and trends. Some researchers [4,9,20,21] have identified the following main types of rearing and exploitation systems for swine for meat production:

- agro-pastoral and pastoral systems where natural resources are limited and humans and animals adopt adaptation strategies to cope with these constraints;

- mixed crop-livestock systems of small farmers:

- are systems in which natural resources are managed to increase the productivity of the system;

- are "intensive" systems in fertile areas with suitable growing conditions and relatively low population densities;

- industrial animal husbandry systems, which are very intensive and tend not to be as linked to the local natural resource base as are agro-pastoral systems and mixed systems of smallholders [2,3,9,14].

Comparing the number and proportion of swine raised in different intensive production systems in the world shows that 41.9% of the area is used for grazing, which is a good thing [1,5,7,16] from the point of view of:

- the welfare of the swine exploited in this production system;[18]
- the preferences of consumers who want to consume meat produced under conditions more natural and healthier. [21]

However, the largest herd of swine worldwide are operated in mixed rainfed production systems, which involve lower costs as shown in the data presented in Table 1.

Table 1

Proportion of swine raised in different intensive production systems worldwide

Animal production system	Area (%)	Swine	
		Livestock numbers (millions of heads)	%
GRASSLAND	41.9	7.7	1.4
Only animals, on pastures, in hyper-arid areas	2.8	0.2	0.0
Animals only, on pastures, in the tropics and sub-tropics in arid and semi-arid areas	23.2	2.8	0.5
Animals only, on grasslands, in the tropics and sub-tropics in humid and sub-humid areas	2.5	1.4	0.2
Animals only, on pastures, in temperate and tropical mountain area	13.4	3.3	0.6
Mixed with precipitation	17.9	215.2	38.7
Mixed plant-animal production, with precipitation, in the tropics and sub-tropics in hyper-arid areas	0.0	0.4	0.1
Mixed plant-animal production, with precipitation, in the tropics and sub-tropics in arid and semi-arid zones	5,6	11.6	2.1
Mixed plant-animal production, with precipitation, in the tropics and sub-tropics in humid and sub-humid areas	6.1	84.9	15.3
Mixed plant-animal production, with rainfall, in temperate and tropical mountainous areas	6.2	118.3	21.3
Mixed irrigated	2.7	110.9	20.0
Mixed plant-animal production, irrigated, in the tropics and sub-tropics in hyper-arid areas	0.0	0.1	0.0
Mixed plant-animal production, irrigated, in the tropics and sub-tropics in arid and semi-arid areas	1,2	3,4	0.6
Mixed plant-animal production, irrigated, in the tropics and sub-tropics in humid and sub-humid areas	0.6	38.3	6.9
Mixed plant-animal production, irrigated, in temperate and tropical mountainous areas	0.9	69.0	12.4
Urban areas	1.9	74.8	13.5
Other areas	34.6	16.8	26.4
Total	100	555,4	100

Source: processing by different authors

MATERIALS AND METHODS

In the current market conditions when the demand for swine meat is increasing and the classic intensive systems can no longer satisfy the demand due to the restrictions regarding the use of resources and the environmental risk from the farm area, an important role belongs to the extensive and alternative exploitation systems with use of local food resources. Within this scientific approach, based on the studies undertaken, consulting the opinions of other specialists in the field, solutions are sought to cover a market niche with swine meat highly demanded by consumers, obtained from pigs exploited in "natural" conditions or according to the specification of "ecological farming", presenting for the researched area some "conventional" farm models of growth and exploitation using the food resources available from the pasture. In this scientific approach, we analyzed the local resources in Timiș county that can support extensive production systems to ensure increased quantities of swine meat. Following the research, we come up with recommendations regarding the implementation of other alternative production systems specific to the studied area. The proposed production systems represent an alternative to the classic systems that abound in the analyzed area and differ from the classic structures, in that the exploitation of swine is extensive on pasture, by ensuring welfare conditions, using natural environmental factors depending on the degree of adaptation of biological material to the exploitation system, with nutrition control, without the use of closed shelters.

RESEARCH RESULTS

To ensure increased quantities of swine meat produced in extensive production systems using local food resources, we propose the following production systems for the analyzed area:

- pastoral, which correspond to the researched area of Timis County, the low and high plain area, which correspond to the three categories based on pastures of the livestock production systems map, covered by agricultural crops:

- only swine, on existing pastures, meadows, where exploitation is done small family farms where the climate is temperate, and meat is produced for self-consumption and the local market;

- only swine, on pastures, in the lowland area with a temperate climate with Mediterranean influences, in small family farms that produce for the local market;

- only swine, on pastures, in the wet area of the Satchinez Swamps and the meadows of the Timis and Bega rivers, where meat is produced in medium-sized family farms that produce for the local and regional market;

- agro-pastoral for the hill area of Timis County for the production of swine meat for self-consumption and market that correspond to the three pasture-based categories of the livestock production systems map, with the additional constraint that less than 10% of the total area of the land is covered by crops:

- only swine on pasture, and meat is produced for self-consumption;

- swine and ruminants, in the agroforestry area and meat is produced in small farms for the local market;

- only swine on pastures and forest land, where meat is produced in medium-sized farms for the regional and national market.

- amalgam of systems that include the exploitation of swine for meat production:

- without the existence of land, exploitation being done in shelters with three walls, where concentrated feed and concentrated fodder are purchased from fodder producing companies. Meat is produced in medium-sized farms, which distribute it on the local and regional market;

- using forest nutritional reserves, producing meat in small farms, which is capitalized on the regional market;
- using family resources for meat production in non-professional family farms for self-consumption and the local market;
- mixed crop-livestock in which the existing natural resources with resource management to intensify the productivity of the system:
 - correspond to the following four mixed rainfed and irrigated categories of livestock production systems:
 - vegetable-animal production, with precipitation, in the low plain and meadow area of Timis County;
 - vegetable-animal production, with irrigation, in the plain area of Timis County;
 - vegetable-animal production, with precipitation, in the hill area;
 - vegetable-animal production, irrigated, in the high plain and hill area;
 - is characterized by the following elements:
 - good market access of non-professional and professional small and medium farms;
 - a high agricultural and animal husbandry potential due to fodder resources, the period to reach the optimal slaughter weight is 165 days.
- mixed crop-livestock in which resources are extensively managed, correspond to the 3 rainfed and irrigated mixed categories for swine meat production:
 - vegetable-animal production, with precipitation in plain areas, where the amount of resources is variable and swine meat production is not constant;
 - vegetable-animal production, with precipitation, in hilly and forest areas, where production differs depending on resources and the degree of fruiting in beech and oak, which determines the obtaining of fluctuating productions;
 - mixed vegetable-animal production, with rainfall and irrigation, in the plain and hill areas of Timis County, which ensures constant meat production for the regional and national market.
- combined alternatives considered as production systems different from the contemporary structures prevailing in Timis County, meaning without raising swine in closed shelters and on grills or concrete.

We recommend for the researched area the implementation of other systems specific to the area of alternative meat production in Timis County, which will efficiently use local resources and from the pastures;

1. the ecological growth system;
2. outdoor growing system;
3. the 3-wall improvised shelter growing system on straw bedding;
4. the silvopastoral system in the hill area of Timis County.

These swine meat production systems to cover the needs of the market, proposed use local resources, being open-air exploitation systems on pasture and litter systems from local resources, being oriented to ensure the well-being of pigs and obtain a quality meat requested by consumers of on market. Extensive exploitation on pasture, or using local resources, allows swine access to the open air and contact with the earth and growing plants, contributing to obtaining quality meat and preserving biodiversity, through the sustainable development of the areas in the vicinity of the farms, without problems of risk of natural environmental factors.

We can say that these extensive production systems that use local resources, well managed in terms of biosecurity, ensure a good state of health for the animals and the safety of obtaining quality meat. Ensuring natural well-being gives swine farmed in these systems a good psychological state and the following freedoms through absence:

- anxiety, fear and stress;
- diseases, pain and injuries;
- discomfort regarding growth and exploitation;
- hunger and thirst;
- the freedom to express a natural behavior.

The welfare status of swine reared in this production system can be expressed as follows:

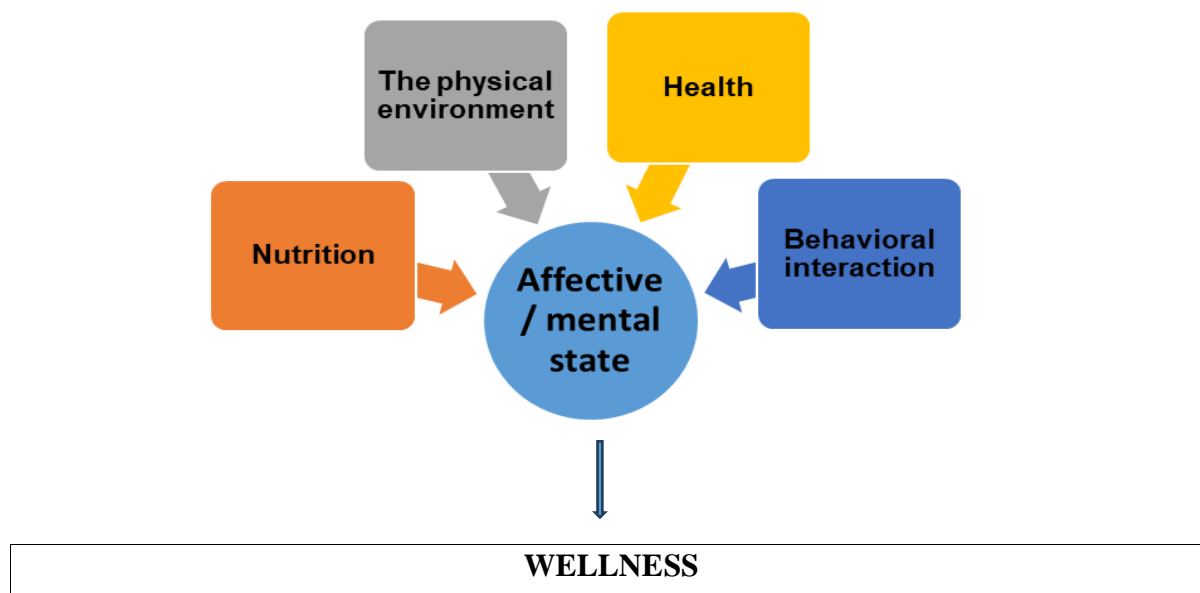


Figure 1. Elements impacting swine welfare

Source: own creation

CONCLUSIONS

To cover the shortage of swine meat from the market, extensive systems that use local food resources can be a viable alternative, which can satisfy the needs of consumers through the organoleptic and physicochemical qualities of the meat. Thanks to the great variety of local feed resources, meat can be produced in pastoral systems, agro-pastoral, amalgam of systems, mixed crop-livestock with resource management or their extensive use but also in combined systems to improve the efficiency of swine exploitation for meat production.

Depending on the quality of the resources for the cleared area, it is also recommended to implement new ecological growth systems, in the open air, in improvised shelter on straw bedding and in the silvo-pastoral system in the high plain and hill area. These systems allow the expression of a wider ethogram of the pigs and offer them comfort and the straw bedding a better expression of the production characteristics and the maintenance of health, by ensuring improved environmental conditions.

Extensive exploitation with the use of resources from the pasture, allows swine access to the open air and contact with the earth and growing plants, contributing to obtaining quality meat, without risk problems of natural environmental factors, being the system that can meet society's expectations regarding meat quality, in terms of animal welfare.

REFERENCES

- [1]. **DANCIU G., PANICI G., PETROMAN CORNELIA, MARIN DIANA, DUMITRESCU CARMEN, PETROMAN I.**, 2018, The role of farm management in reducing the interval from weaning piglets to conception, *Journal of Biotechnologies*, 280, S37
- [2]. **HARRIS D. L.**, 2000, *Multi-site Pig Production*, Iowa State University Press
- [3]. **HEBER LOREDANA, PETROMAN CORNELIA, PETROMAN I., BĂLAN IOANA, MARIN DIANA, IVAȘCU GABRIELA, POPOVICI C.**, 2011, Pork and carcasses quality in swine exploited in family farms, *Scientific Papers Animal Science and Biotechnologies*, 43, 406-408
- [4]. **HERMANSEN J. E., AARESTRUP LARSEN VIVI, ANDERSEN BENT HINDRUP**, 2002, Development of organic pig production systems, *Perspectives in Pig Science*. Loughborough: University of Nottingham
- [5]. **ENGEL J. K., BLACKWELL R. D., MINIARD P. W.**, 1990, *Consumer Behaviour*, Sixth Edition, The Dryden Press
- [6]. **KATSUMATA M., KAJI Y., SAITOH, M.**, 1996, Growth and carcass fatness responses of finishing pigs to dietary fat supplementation at a high ambient temperature. *Animal Science*, 62, 591-598
- [7]. **MARIN DIANA, PĂCALĂ N., PETROMAN I., PETROMAN CORNELIA, UNTARU RAMONA, DRAGOȘ LAURA, ȘANDRU O.**, 2011, Study regarding the favourable factors that influence swine production, *Lucrări științifice Management Agricol*, 13(2)
- [8]. **MARIN DIANA, PĂCALĂ N., PETROMAN I., PETROMAN CORNELIA, UNTARU RAMONA, CIOLAC RAMONA**, 2012, Influence of age and weight at slaughter over meat quality in conditions of optimum ambient temperature, *Lucrări științifice Management Agricol*, 14(4), 453-458
- [9]. **MARIN DIANA, PETROMAN CORNELIA, PETROMAN I., BĂLAN IOANA, TOADER COSMINA, CIOLAC RAMONA, HEBER LOREDANA, FURDUI. I.**, 2010, Distribution of pig livestock by development region in Romania, *Scientific Papers: Animal Science and Biotechnologies*, 43(2), 416-419
- [10]. **NEAGU IULIANA, CULEA C., PETROMAN I.**, 2007, *Creșterea animalelor*, Editura Eurostampa, Timișoara
- [11]. **PANICI G., PETROMAN I., PETROMAN CORNELIA, MERCE IULIANA, CIOLAC RAMONA, MARIN DIANA**, 2017, Management practices used to reduce the impact of seasonal infertility on sow productivity in Romania, *Journal of Biotechnology* 256, S49
- [12]. **PETROMAN CORNELIA, PANICI G, PANDURU E., MARIN DIANA, VĂDUVA LOREDANA, PETROMAN I.**, 2019, New possibilities for improving the environmental management risk in swine farms. *Journal of Biotechnology*, 305, S74
- [13]. **PETROMAN CORNELIA, PETROMAN I., NEGRUȚ V., MARIN DIANA, CIOLAC RAMONA, VĂDUVA LOREDANA**, 2013, Frequency of consumption of meat and meat products in Timis county, *Scientific Papers Animal Science and Biotechnologies*, 46(2)
- [14]. **PETROMAN CORNELIA**, 2016, *Procesarea materiilor prime agricole*, Editura Eurostampa, Timișoara
- [15]. **PETROMAN I., CULEA C., NICOLAE M., PETROMAN CORNELIA**, 2002, *Creșterea porcinelor*, Editura Mirton, Timișoara
- [16]. **PETROMAN I.**, 2007, *Managementul sistemelor de creștere și exploatare a animalelor*, Editura Eurostampa, Timișoara

- [17]. **PETROMAN I., UNTARU RAMONA CALIOPI, MARIN DIANA**, 2013, Breeding season influence of sows gestation loss, *Journal of Food Agriculture and Environment*, 11(2), 305-307
- [18]. **PETROMAN I., VARGA MELANIA, CONSTANTIN ELENA CLAUDIA, PETROMAN CORNELIA, MOMIR B., TURC B., MERCE IULIANA**, 2016, Agrotourism: An Educational Tool for the Students with Agro-Food Profile, *Procedia Economics and Finance*, 39, 87
- [19]. **ROMANIAN PORK PATRONATE** - Informative Bulletin, no. 15-32
- [20]. **VĂDUVA LOREDANA**, 2013, The influence of endogenous and exogenous factors on meat quality of pigs, *Scientific Papers Animal Science and Biotechnologies*, 46(1), 404-406
- [21]. **VĂDUVA LOREDANA**, 2013, The influence of operating system on food and water consumption of fat pigs, *Scientific Papers Animal Science and Biotechnologies*, 46(2), 428-430