WAYS TO OPTIMIZE THE TECHNOLOGICAL FLOW IN SWINE FOR RHYTHMIC OBTAINING OF BIOLOGICAL MATERIAL FOR FATTENING

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Abstract: *The constant provision of biological material for fattening, regardless of the season, requires managerial measures to optimize technological flows along the entire meat chain from production, processing, distribution, and utilization, to meet the needs of swine meat on the market. The constant obtaining, regardless the season, of the genetic material necessary for fattening, implies the implementation of the best management of reproduction, gestation, purperium and youth growth, because although sows are polyestrous animals and show estrus all year round, but its intensity is greater in the summer season cool, which means that in the warm season the planned sowings are not carried out and the delivery of youth for fattening is not linear. Regardless of the type of professional unit in which pork is produced, processed, distributed and valued, the elements that compete for the organization and optimization of technological processes, specialization on a certain type of meat, production systems, economic exploitation and processing possibilities, market and market needs.*

Key words*: swine, technological flow, optimization*

INTRODUCTION

The creation of modern systems of rhythmic production of swine meat and their inclusion in the economy of different holdings, requires the provision for farms of biological material for fattening and the improvement of indices regarding exploitation for intensive production. The production systems in modern animal husbandry represent a convenient combination of the factors and products obtained as well as the production and economic-financial results obtained. The factors that influence the choice of the production system, organization and operation are determined by:

- the structure of holdings-location, shelter type, technological system, farm management; [3]
- elements from the economic environment. [5]

The production systems and the herds owned by the holdings are very different in the traditional system. The raising and exploitation of swine is done in family farms and includes all the activities carried out up to obtaining the meat, reproduction, gestation, puerperium, growth and fattening of the youth, processes of obtaining fodder being characterized by the absence of the application of economic elements that can cause waste of fodder, waste of work, tracking the results, cost per kilo of gain, economic efficiency, daily gain in live weight or over a certain period, yield at slaughter. Modernized traditional meat production systems are characterized by raising and fattening a large number of animals, farm equipment and work processes are little mechanized and some are mechanized, for example watering.

The industrial systems for obtaining meat are characterized by the following aspects:

- feeding animals based on combined feed [1,2,10,17];
- the concentration of large herds of animals [4];
- increasing the qualification of the labor force;
- intensification of production through large investments in the material base;
- mechanization and even automation of work processes;

• the distinct organization of the different phases of the production cycle; [6,13]
• organization of production and reproduction in continuous flow with closed or open circuit;
• high labor productivity, comparable in level to the one from industry, continuity:
a. in obtaining meat;
b. meat delivery; [7,11]

The system of raising and exploiting swine for meat has different components (subsystems) with relationships between them that determine, by the way the final results are satisfied, the structure of the herds, the provision of maintenance and feeding conditions, the organization of reproduction, the optimum of herds. The sustainability of meat production, by providing biological material for fattening, can be improved by precision techniques in production systems with increased inputs providing, through the use of an automated real-time management system, genetically improved commercial breeds and hybrids with the same amount of high-quality resources necessary for maximum production efficiency, for reducing losses in terms of feed conversion indices and recovery yields in processing, distribution and utilization of waste. [8,12]

Precision nutrition, optimizing feed rations for fattening pigs, will improve the efficiency of nutrient use and reduce the environmental consequences of manure. With all these measures, the technologization of systems of breeding and exploitation of swine for meat is not available for the whole animal husbandry sector and the whole meat chain, the animals being often challenged to perform in a wide variety of exploitation conditions and maintenance environments, obtaining meat with quality differences depending on feed composition, maintenance systems and environmental conditions. [9,15]

Therefore, the sustainability of production can be improved through selection methods and breeding of swine with greater tolerance to alternative feed sources and environmental changes, and with a shift from reliance on optimally formulated feed to local feed, to obtain meat with superior organoleptic properties obtained by exploitation in the open air or in ecological systems. [10,14,16]

MATERIALS AND METHODS

Ensuring the optimal genetic material for fattening is a complex activity that, regardless of the season, requires managerial measures to optimize the flows of reproduction, gestation, puerperium, growth of youth and fattening in continuous flow. Considering these aspects, the purpose of this scientific approach was to analyze the activity of the farms and find solutions to ensure the efficient use of spaces by perfecting the organizational management in all production sectors, the production of fattening material, growth and fattening, ensuring rhythmicity of fattening pigs for the processing industry, linear meat production to meet market needs and consumer preferences.

RESEARCH RESULTS

The provision of fat pigs for the processing industry, regardless of the season, requires the implementation of managerial measures to optimize technological flows along the entire meat supply chain from:

a. production of biological material:
- the organization of reproductive processes;
- control of gestation and reproduction indices;
- the organization of the puerperium;
- weaning and raising the young.

b. fattening the youth;
c. processing and obtaining carcasses;

d. distribution of meat and meat products
e. capitalization on the market.

The constant obtaining of the genetic material necessary for fattening, implies the implementation in industrial breeding farms of the best reproduction management, because although sows are polyestrous animals and show estrus all year round, the intensity is greater in spring and autumn, which makes it as in the season hot, the number of planned sowings may not be achieved and the delivery of youth for fattening may not be linear. In order to achieve the predicted number of artificial inseminations, the following will be pursued:

- ensuring the necessary number of sows;
- achieving the optimum sowing using gilts;
- stimulation of estrus by controlling nutrition;
- stimulation of hormonal estrus during periods of silent heat;
- maintaining the reproductive condition of sows after weaning;
- reduction of non-productive days through managerial measures to intensify reproduction;
- stimulation of estrus by maintaining waiting sows in common stalls and increasing the useful surface;
- detection of estrus 4 days after weaning with test calves.

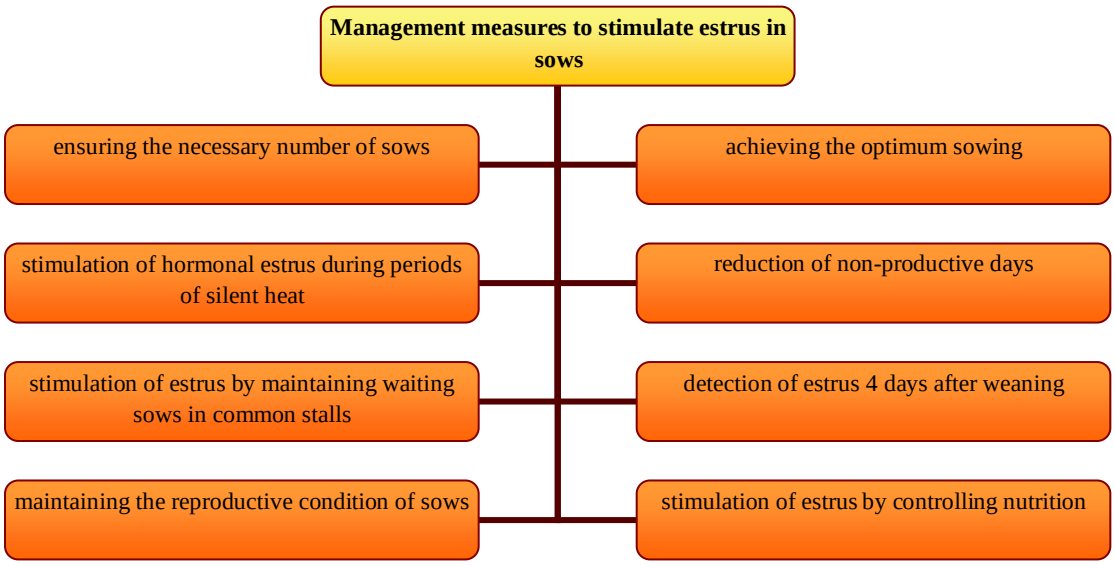

Figure 1. Management measures to stimulate estrus in sows

During gestation, the organizational management of production will consider the reduction of embryonic and fetal mortality in sows, which is 20-25%, through technical operations:

-maintenance in individual or shared booths until ultrasound confirmation of pregnancy;

- detection of sows that repeat oestrus from 17 days after insemination;
- feeding according to physiological conditions to avoid the accumulation of body mass over 35 kg;
- preparation of sows for parturition;
- delivery to maternity hospitals at 110 days of gestation and preparation for parturition.

In the puerperium, management measures must be oriented to ensure different conditions for parturition and piglets by achieving:

- a microclimate specific to the two categories;
- the use of discretionary feeding for lactating sows;
- sow watering systems;
- feeding and watering systems for piglets;
- heated space for piglets to rest.

The most pressing problems to be solved by management in maternity hospitals is the antagonism of optimal temperatures, nutrition and well-being:

- 18-20ºC during the first 5 days of puerperium in sows;
- 30-32 ºC during the first 7 days of piglet life.

After a nursing period of 25-27 days, the weaned piglets are transferred to the nursery for fattening or are raised until they reach 25-30 kg in the youth halls and will be sold to fattening farms with which contracts are concluded. Through the managerial measures undertaken in the youth breeding sector, this difficult period can be easily overcome, the transition from the dairy and forage regime to the regime exclusively based on forage. The measures taken and the methods used to reduce the stress of separation from the sow are intended to:

- reduction of adaptation stress;
- reducing the effects of the "weaning crisis";
- nutrition control;
- restoration of the intestinal mucosa;
- reducing sensitivity to nutritional diseases;

Obtaining healthy genetic material determines the normal development of the fattening and finishing period through the implemented farm management that provides for the correlation of fattening spaces with:

- weaned youth heads intended for fattening;
- speaker capacity;
- the fattening period;
- delivery weight.

The technicality degree of these farm activities does not require large investments compared to the breeding sector, but we believe that it is necessary for the management of fattening pigs to ensure (Figure 2.):

- valuable genetic material for fattening;
- the health of fattened pigs;
- maintenance in common booths;
- arrangements that ensure bliss;
- useful surface variable depending on weight;
- good maintenance conditions to ensure the feeding and watering front;
- microclimate control possibilities;
- good fodder level to express the productive potential;
- correlation of body mass accumulation with economic profitability.

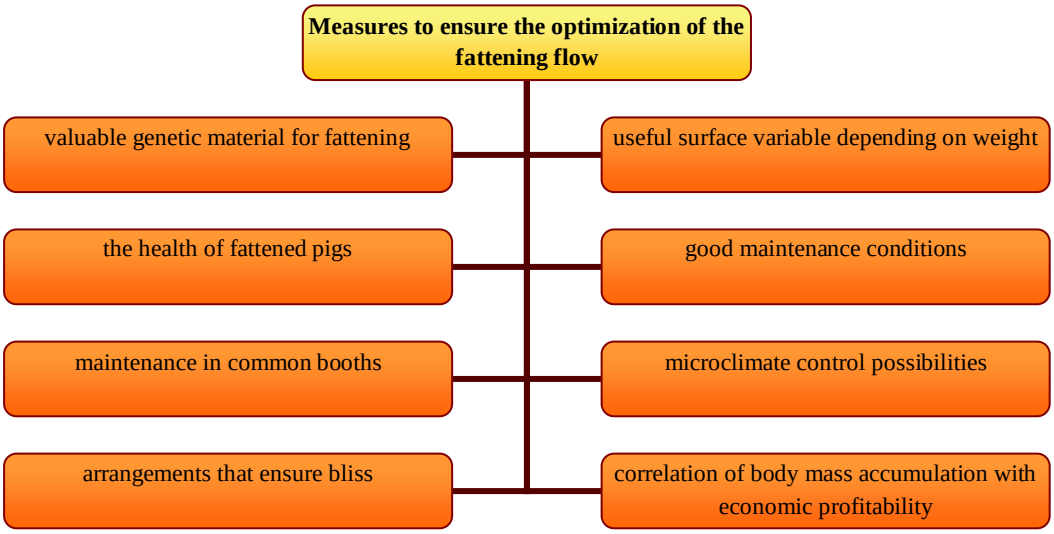

Figure 2. Measures to ensure the optimization of the fattening flow

The implementation of the best management for provision of genetic material and the best management for fattening, contributes to the constant provision of fat pigs for the processing industry, a good distribution and capitalization and the achievement of constant production parameters without effects on the rhythmicity of the supply of the market with swine meat and swine meat products.

The rhythmicity of production must be the biggest problem of farm management, because the continuous flow of providing youth for fattening, economic fattening, determines a linear processing, a safe distribution and capitalization and:

- rhythmic income achieved on the entire meat chain;
- economy of production space by optimizing technological flows;
- the formation of a stable and qualified human resource;
- good integration of meat production.

CONCLUSIONS

The constant obtaining of the genetic material necessary for fattening, implies the implementation of the best production management system on the entire chain of obtaining meat, reproduction, gestation, growth of youth, fattening, processing, distribution and capitalization on the market.

Obtaining genetic material with high and healthy biological potential, determines the normal development of the fattening period and the effective correlation of spaces with youth flocks, accommodation capacity, duration and weight of delivery to the slaughterhouse.

Through the conditions ensured by production management, the exploitation season for obtaining biological material must not influence the rhythmicity of production, the delivery of meat must be linear. The rhythmicity of the youth production from the breeding farms, the health and the number of fat pigs arriving for processing, must constitute the biggest issue of production management, because the continuous flow of obtaining genetic material, efficient fattening determines a linear safe processing, distribution and capitalization of swine meat.

The rhythmicity of obtaining the production of carcasses and quality meat from swine, is an action of great significance for the integrated management of production, due to the involvement of those who participate in their production, producers of genetic material for fattening, producers of fat swine, the transporters that bring the animals for slaughter and the processors that prepare the animals antemortem.

REFERENCES

[1]. ANDRICIUC R., 2008, Managementul protecţiei infrastructurii critice, Editura Psihomedia, Sibiu

[2]. CĂPEȚ V. A., VĂDUVA LOREDANA, PETROMAN CORNELIA, 2021, Business improvement in swine meat processing units, Lucrări Științifice Management Agricol, 23(3)

[3]. DANCIU G., PANICI G., PETROMAN C., MARIN DIANA, DUMITRESCU CARMEN, PETROMAN I., 2018, The role of farm management in reducing the interval from weaning piglets to conception, Journal of Biotechnolohgies, 280, S37

[4]. GRUIA R., 2006, Integronic management and informational connections, HAICTA – International Conference on Information Systems in Sustainable Agriculture. Agroenvironment and Food Technology, University of Thessaly, Volos, Grecia;

[5]. HARRIS D. L., 2000, Multi-site Pig Production, Iowa State University Press

[6]. HEBER LOREDANA, PETROMAN CORNELIA, PETROMAN I., BĂLAN IOANA, MARIN DIANA, IVAȘCU GABRIELA, POPOVICI C., 2010, Pork and carcasses quality in swine exploited in family farms, Animal Science and Biotechnologies, 43(2)

[7]. 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

[8]. MARIN DIANA, PĂCALĂ N., PETROMAN I., PETROMAN C., UNTARU RAMONA, DRAGOȘ LAURA, ȘANDRU O., 2011, Study regarding the favourable factors that influence swine production, Lucrări ştiinţifice Management Agricol, 13(2)

[9]. 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 ştiinţifice Management Agricol, 14(4), 453-458

[10]. NEAGU IULIANA, CULEA C., PETROMAN I., 2007, Creșterea animalelor, Editura Eurostampa, Timișoara

[11]. NUTHAL P.L., 2010, Farm Business Management: The Human Factor. Wallingford - Cambridge: CABI

[12]. PETROMAN CORNELIA, PETROMAN I., 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(1)

[13]. 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

[14]. PETROMAN CORNELIA, MIREA AMELIA, LOZICI ANA, CONSTANTIN ELENA CLAUDIA, MARIN DIANA, MERCE IULIANA, 2016, The rural educational tourism at the farm, Procedia Economics and Finance, 39, 88-93

[15]. PETROMAN CORNELIA, 2016, Procesarea materiilor prime agricole, Editura Eurostampa, Timișoara

[16]. PETROMAN I., CULEA C., NICOLAE M., PETROMAN CORNELIA, 2002, Creșterea porcinelor, Editura Mirton, Timișoara

[17]. 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

[18]. 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