

THE INFLUENCE OF THE TEMPERATURE FROM THE SHELTER ON THE PERFORMANCES OF THE FAT PIGS EXPLOITED IN PROFESSIONAL FARMS

MUNTEAN MARIUS¹, TARPIAN DENISA¹, VĂDUVA LOREDANA¹,
PETROMAN IOAN*¹

¹ *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania", Faculty of Management and Rural Tourism, Timisoara*

*Corresponding author's e-mail: i_petroman@yahoo.com

Abstract

The temperature provided in the intensive fattening shelters for swine has an influence on the feed conversion rates and the average daily growth rate. The administration of food in a discretionary or standardized diet as granulated feed or in the form of flour is converted to optimal economic parameters if the microclimate factors are not respected according to the physiological needs regarding age and weight. Discretionary feeding allows obtaining a high average daily increase only at optimal ambient temperatures for weight and age in the case of fast-growing commercial hybrids with a deposition of muscle tissue in the carcass at a young age, in a balanced compound feed.

Key words: fat pigs, operating system, shelters, temperature.

INTRODUCTION

Ensuring the temperature, depending on the physiological needs of the swine category, contributes essentially to the achievement of production performance regardless of the breeding and exploitation system. [2,5,12] The temperature of the shelter having a major influence on production, it is recommended in economic exploitation its control depending on the season, category and body mass of swine, physiological state, being necessary to fall within certain limits for economic use of biological properties of the species exploits for certain productions. [1,3,16] (Table 1.)

Table 1.

Recommended temperature in different categories of swine exploited in intensive system

Age and weight of the animal	Optimal temperature (°C)	Desirable temperature limits (°C)
Piglets in labor	35.00	32.22-37.77
Infant piglets (7.15-13.60 kg)	26.66	23.88-29.44
Nursery piglets (13.60-22.67 kg)	23.88	21.11-26.66
Nursery piglets (22.67-34.01 kg)	18.33	15.55-26.66
Fat pigs	15.55	10.00-26.66
Sows with piglets	15.55	10.00-21.11
Pregnant sow	15.55	10.00-26.66

Source: [1, 3, 16]

Temperature, along with other microclimate factors, influences the profitability of production along with farm management, nutrition and human resource quality. However, special attention must be paid to the use of: [4,7,15]

- the best genetic material, resistant to exploitation conditions;

- with maximum efficiency, of the feed so that it can be transformed into a percentage as high as possible in meat and fat;
- processing, distribution and marketing management;
- environmental risk management;
- total quality management.

To achieve these goals, the nutrients from swine rations must be correlated with the physiological requirements of the animals to achieve the predicted production and with the microclimate factors in the shelter that positively or negatively influence the performance. [6,9,10,11]

The productive potential of swine exploited today in intensive and super-intensive systems for meat production has increased through: [8,13,14]

- selection and improvement of herds, obtaining specialized and adapted commercial hybrids
 - to a certain type of production;
- improving maintenance and operating conditions;
- improving the control of microclimate factors;
- reducing non-productive days and bringing the species closer to the biological limits through integrated production management;
- increase the percentage of lean meat in commercial hybrid carcasses to over 65%.

MATERIAL AND METHOD

The increase of the efficiency of swine exploitation in intensive or super intensive systems is influenced by the integrated production management, which requires the improvement of all the factors that contribute to obtaining the most efficient meat production in the case of fat pigs. In this scientific approach, following studies carried out in swine fattening farms in an intensive system, we analyzed the influence of shelter temperature on feed conversion and implicitly on growth performance and meat quality produced, because the technologies implemented can have beneficial or negative effects on some economic yields or recovery rates at processing swine for carcasses or cutting. The objectives of the research were to analyze the influence of temperature as a microclimate factor on the average daily increase in weight gain and feed conversion rates.

RESEARCH RESULTS

The temperature provided in swine fattening shelters for meat has a major influence on the following production indicators:

a. feed conversion indices;

If the technological systems of food management in the shelters of fat pigs can influence the effectiveness of its recovery, microclimate factors, temperature in this scientific approach, can contribute to the economic highlighting of performance indices depending on:

- the biological value of commercial hybrids used for meat production;
- the operating efficiency of the feed conversion.

The administration of food ad libitum or standard, with granulated feed or in the form of flour in one, two or more ratios, although specialists in the field recommend discretionary feeding if the feed is of quality is not converted to optimal economic parameters if microclimate factors are not respected depending on the age and weight of the swine.

The level of feeding affects the results of fattening if the temperature of 14.0 - 16.0°C is maintained throughout the fattening period: (Table 2.)

Table .2.

Swine performance in shelters with controlled temperature

Item	Feeding level	Performance	Improvement measures
Specific consume	Moderate	Minimum	Low or very high feeding regime
Average daily increase	Picked up	Maxim	Optimal consumption at a temperature of 14.0-16.0 °C

Source: own data

The following conclusions can be drawn from the analysis of the results obtained:

- the amount of meat in the carcass is reduced to a high level of feeding, if the temperature of 14.0-16.0 ° C is maintained during the fattening period but can be increased by restricted feeding of fat pigs;

- the best conversion rates are obtained in the case of moderate feeding regime, but can increase at low or very high feeding levels;

- the average daily increase is the highest for high feed consumption.

It turns out that the discretionary diet allows obtaining a high average daily increase only at optimal ambient temperatures for weight and age in the case of fast-growing commercial hybrids with a deposition of muscle tissue in the carcass at a young age, a balanced compound feed.

Up to the average slaughter weight of between 105 and 108 kg, the specific consumption does not deteriorate when controlling the temperature of the shelter according to age and weight, and the protein deposition remains higher than the lipid deposition. Regardless of the technological system of food management, discretionary feeding should only be done for commercial meat hybrids, only if the best nutrition management and the best management of information on conversion rates expected at certain temperature variations are implemented on shelters.

b. average daily gain: Shelters used in professional swine fattening farms must be organized to allow a continuous flow of production taking into account the requirements of the species and must ensure the achievement of:

- microclimate indices;
- conditions of maintenance, nutrition, watering;
- the functioning of the technological systems that contribute to the realization of the production;
- environmental protection in the area of farms.

Important in ensuring the microclimate in shelters is the provision of ventilation that can be natural or provided by mechanical means, the fattening boxes must have:

- a rest area;
- a feeding and drinking area;
- an area for physiological needs.

The maintenance system, the density of the animals in the boxes, the microclimate in the shelter, the temperature can affect the quality of the carcass and the pork meat. When the microclimate elements come out of the optimal parameters, the stress of adapting to the offered maintenance conditions appears which leads to agitation and implicitly to weight loss. Swine strive for self-defense and adaptation to excessive or low temperature limits manifested by: financial losses by increasing consumption, energy consumption to ensure an optimal microclimate, hormonal imbalance, mortality by suffocation in fat swine. Research conducted in professional farms with temperature control performed the following indicators during the fattening period:

- the average daily increase per series recorded in the 78 days of fattening 767 ± 2.8 grams;

- the specific consumption per kg of weight gain was 2.93 ± 0.46 kg of feed to obtain one kg of weight gain;
- the temperature of 14.0-16.0°C in the shelter, had a positive influence on the increase in weight gain and ensured the achievement of good feed conversion rates

We conclude that if commercial hybrids of fattened swine on professional farms are provided with an optimal temperature in the shelter depending on age and weight, a balanced feed, a standard diet, they express their hereditary dowry at optimal parameters, which requires meat producers at:

- investments in biological material used for fattening;
- investments in feed technologies, microclimate, environment;
- integrated production management, in order to improve performance, reduce the fattening period that will have a positive impact on the payback period of the financial effort for the implementation of production technologies and regulation of microclimate factors.

CONCLUSIONS

The slaughter of fat pigs at economic weights does not deteriorate, the specific consumption of feed to achieve a kilogram of weight gain, if optimal temperatures are ensured in the shelters of professional fattening farms, and protein deposition in the body remains superior to fat deposition. Swine which have been fattened in shelters with a controlled temperature of 14-16°C and a high potential for protein deposition in the carcass after the standard age of slaughter, at discretionary feeding there is an increase in fat deposition and capping of growth due to growth specific consumption to achieve weight gain. Therefore, regardless of the technological system of food management, discretionary feeding should only be done until the standard age of slaughter respecting the nutrition management of the information on conversion indices, at different temperatures depending on the integrated production management implemented on the farm. When the microclimate elements go out of the optimal parameters, the stress of adaptation to the offered maintenance conditions appears, which leads to agitation and implicitly to weight loss forcing fat swine to make efforts for self-defense and adaptation to excessive or low temperature limits manifested through: financial losses by increasing consumption, energy consumption to ensure an optimal microclimate, hormonal imbalance, mortality by suffocation in fat swine. Fat swine fattened on professional farms at controlled temperatures according to weight and age achieved high increases with low specific consumption per kilogram of increase.

BIBLIOGRAPHY

- [1]. DELGADO C., ROSEGRANT M., STEINFELD H., EHUI S., COURBOIS C., 1999, *Livestock to 2020: The Next Food Revolution*. Washington, DC – Rome – Nairobi: IFPRI – FAO – ILRI.
- [2]. DERNER J. D., HUNT L., FILHO K. E., RITTEN J., CAPPER JUDITH HAN G., 2017, *Livestock Production Systems*. în D. D. Briske (ed.), *Rangeland Systems: Processes, Management and Challenges*, New York, NY: Springer International Publishing, 347-372.
- [3]. 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 Biotechnology* 280, S37.

- [4]. **FRASER A. F.**, 1990, Farm Animal Behaviour and Welfare. 3rd Edition Wallingford:CAB International.
- [5]. **GODYŃ DOROTA, NOWICKI J., HERBUT P.**, 2019, Effects of Environmental Enrichment on Pig Welfare – A Review. *Animals*, 9, 1-17.
- [6]. **HEBER LOREDANA, PETROMAN CORNELIA, PETROMAN I., BĂLAN I., MARIN DIANA, IVAȘCU GABRIELA, POPOVICI C.**, 2010, Pork and carcasses quality in swine exploited in family farm, *Scientific Papers Animal Sciences and Biotechnologies* 43(2).
- [7]. **MARIN DIANA, PĂCALĂ N., PETROMAN I., PETROMAN I., UNTARU RAMONA, DRAGOȘ LAURA, ȘANDRU O.**, 2011, Study regarding the favourable factors that influence swine production, *Lucrări Științifice Seria I, Vol. XII(2) Management Agricol*, 217-222.
- [8]. **MARIN DIANA, PĂCALĂ N., PETROMAN I., PETROMAN CORNELIA, FRAIU GIANINA, UNTARU RAMONA, CIOLAC RAMONA**, 2012, Nursing management and its impact on weaned piglet weight, *Porcine Research*, Vol.2(1), 23-26.
- [9]. **PETROMAN CORNELIA**, 2010, *Procesarea materiilor prime agricole*, Editura, Eurostampa, Timișoara.
- [10]. **PETROMAN CORNELIA, PETROMAN I., PĂCALĂ N., UNTARU RAMONA, MARIN DIANA, FRAIU GIANINA, AVRAMESCU DANIELA**, 2012, Management of sow replacement rate, *Porcine Research*, Vol.2(1), 16-18.
- [11]. **PETROMAN I., CULEA C., NICOLAE M., PETROMAN CORNELIA**, 2002, *Creșterea porcinelor*, Editura Mirton, Timișoara.
- [12]. **PETROMAN I., UNTARU RAMONA CALIOPI, PETROMAN CORNELIA, ORBOI DORA MANUELA, BĂNEȘ A., MARIN DIANA, BĂLAN IOANA, NEGRUȚ V.**, 2011, The influence of differentiates feeding during the early gestation status on sows prolificacy and stillborns, *Journal of Food, Agriculture & Environment* 9(2 part 1), 223-224.
- [13]. **REESE D. E., THALER R. C., BRUMM M. C., LEWIS A. J., MILLER P. S., LIBAL G. W.**, 2000, *Swine Nutrition Guide*. Lincoln, NE: University of Nebraska.
- [14]. **SALAZAR LAURA C., KOC H.-L., YANG C.-H., LLONCH LOURDES, MANTECA X., CAMERLINK IRENE LLONCH, P.**, 2018, Early Socialisation as a Strategy to Increase Piglets' Social Skills în Intensive Farming Conditions. *Applied Animal Behaviour Science*, 206, 25-31.
- [15]. **STOICA MARIA ANGELA, PETROMAN CORNELIA, PETROMAN I.**, 1998, *Rezultate practice privind valorile unor indici de reproducție la scroafe*, Editura Mirton, Timișoara.
- [16]. **VĂDUVA LOREDANA, PETROMAN CORNELIA, PETROMAN I., MARIN DIANA**, 2013, The influence of endogenous and exogenous factors on meat quality of pigs, *Scientific Papers Animal Science and Biotechnologies* 46(1), 404-406.