

THE INFLUENCE OF MAINTENANCE STAGE AND FEEDING ON THE PUERPERAL PERIOD TO SOWS INTENSIVELY EXPLOITED

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Abstract: *The normal evolution of the puerperium in sows is influenced by the quality of nutrition, microclimate factors in shelters, movement and pathogens. These factors have impact on the production performance of sows and piglets and breeding indicators by increasing the number of unproductive days due to lack of estrus manifestation. The management of lactation of sows in lactation and gestation will aim at maintaining the body condition and fat reserves from the perspective of microclimate in shelters and energy consumption to express the economic capacity of the sow's genetic value, fat supplementation of rations, stimulating feeding of sows after weaning for the manifestation of heat and the maintenance of the protein-vitamin-mineral balance at optimal parameters. Improper maintenance of lactating sows associated with failure to ensure microclimate factors and well-being has a negative effect on neuroendocrine metabolism, low production, and absence of heat in the first 10 days after separation of piglets and increased number of unproductive days with effects on use indices of sows and piglet production.*

Key words: *exploitation system, sows, puerperal period, influencing factors*

INTRODUCTION

The reproductive function of sows is determined in the puerperal period by a lot of factors, but also the reproductive cycle in turn influences the general health of sows [5,6], the manifestation of estrus after weaning and future production of piglets [11,12]. The analysis of factors which influences the reproductive function is the subject of scientific research for a long time, in order to find solutions to improve farm management. The season and the microclimate in lactating sows are perhaps the best example to illustrate the impact on the performance of intensively exploited sows and the control of productive and reproductive factors [4,15]. The conclusions reached by the researchers are that all reproductive components suggest lower performance in inadequate feeding conditions in the hot months and if the microclimate is not controlled and the exploitation technologies are not performing, the recommended solutions are the following:

- reduction of heat stress in lactating sows with effects on:
 - a. normal involution of the genital tract after parturition;
 - b. milk production of sows;
 - c. resumption of the normal heat cycle after early weaning of piglets at 25 days;
- modification of nutritional practices by:
 - a. ensuring discretionary feeding of lactating sows;
 - b. use of wet feed;
 - c. balancing rations for milk production to the detriment of the sow's own consumption;
- implementation of the most efficient management [2,7] of the puerperium with:
 - a. nutrition control according to the milk production of the sows;
 - b. ensuring the microclimate corresponding to the most efficient milk production of sows and the harmonious growth and development of piglets;
 - c. monitoring the involution of the reproductive function during breastfeeding;

- d. stimulating the early consumption of piglets for fodder, in order to reach a weight of 8-10 kg in 25 days;
- e. shortening the lactation period by modern technologies for sow exploitation in maternity wards;
- f. induction of estrus in lactation by separating piglets and stimulating reproductive function;
 - automation and control of the main activities in maternity hospitals through:
 - a. control of the health of sows and piglets;
 - b. feed automation and feed and water consumption control;
 - c. ensuring microclimate factors: temperature, humidity, air currents;
 - d. ensuring the welfare of sows and piglets by providing sufficient space for movement;
 - e. maintaining biosecurity in maternity hospitals through best prevention practices.

The influence of maternal ambient temperatures has effects on the amount of food ingested by sows and piglets [3,14] and changes in feeding behaviors of multiparous lactating sows, as daytime temperature fluctuates producing effects on the rate of voluntary ingestion of food [13,19].

The intensive exploitation system allows the swine farmer to manage the different stages of the productive life of the sows, the induction of estrus during lactation being an alternative that allows to improve the productivity of the sows [9,10], the productive cycle being shorter without diminishing the lactation duration [1,18] The correlation between the age of primiparous and the weight at mating is essential [8,16,17] as well as the weight recorded during gestation, because they give rise to the largest number of piglets, the variation in weight gain being the effect rather than the cause of the number of piglets by controlling nutrition during the period when catabolism predominates with the deposition of bodily reserves, for these reasons it is recommended to feed pregnant sows with restrictive diets that reduce the deposition and increase the efficiency of the use of feed and lactation at will to stimulate milk production and restoring the genital tract over a period of time short time and the appearance of estrus after weaning at 5-8 days.

MATERIALS AND METHODS

Because the most important factors influencing the puerperium are nutrition, microclimate, animal welfare and pathogens, to obtain competitive production in the exploitation of sows in intensive systems, in this scientific approach we have analyzed these factors in order to develop managerial measures to improve exploitation technologies, to improve breeding rates and to use at higher parameters the reproductive capacity of sows by reducing non-productive days. The objectives of the research were:

- improving the most important factor of production, nutrition due to high demands during lactation and pregnancy.
- the optimal state of maintenance when the best economic results are obtained in order to find solutions that reduce the negative effect of lactation on neuroendocrine metabolism, absence of heat and prolongation of anestrus;
- control of microclimate factors and ensuring optimal welfare conditions;
- safety of exploited animals by improving the sanitary-veterinary management;

RESULTS AND DISCUSSIONS

The evolution of the puerperal period in sows and the resumption of a new reproductive cycle is influenced by the following factors:

A. Nutrition is one of the most important factors influencing the way the puerperium evolves in lactating sows because the incidence of metabolic diseases is the

non-expression of production at the value of biological properties of animals due to technological errors that cause high demands during lactation and gestation. For these reasons, the management of nutrition in these two critical phases of the productive life of sows, lactation and gestation will aim at developing solutions for:

- maintaining the body condition and fat reserves from the perspective of the microclimate in shelters and energy consumption for the expression at economic capacity of the sow's genetic value;
- fat supplementation of lactating sows;
- stimulating feeding of sows after weaning for the manifestation of estrus in the first 7-8 days after separation from piglets;
- maintaining the optimal parameters of quality proteins in rations;
- maintaining the balance of ration components through food supplements and vitamins.

We consider that the nutrition components that must be monitored through the best nutrition management in the puerperal period are:

1. The amount of food that must ensure the maintenance of a state of balance. Malnutrition leads to reproductive disorders that depend on:

- a. duration of the imbalance;
- b. the period in which this condition occurs during lactation;
- c. the type of imbalance.

Overeating during lactation causes the following reproductive disorders:

- a. lack of heat or silent heat after weaning the piglets;
- b. fatty infiltration of the ovaries;
- c. Decreasing the process of folliculogenesis.

2. The level of energy intake can register imbalances in minus or in addition the energy deficit leading to unproductive days, the repetition of heat. The high intake of energy feed in rations leads to:

- a. fattening sows;
- b. reducing the elasticity of uterine tissue;
- c. postpartum disorders;
- d. placental retention;
- e. agalaxis.

3. The level of proteins that have the role of defense, biocatalyst and plastic in deficient states determines:

- a. mobilization of muscle proteins in the form of amino acids necessary to maintain metabolism protein;
- b. negative impact on the involution of the reproductive function;
- c. reducing the amount of milk in sows;
- d. increase of unproductive days after weaning piglets.

Protein deficiency due to their defending role leads to decreased resistance to infections and increased incidence of inflammation of the uterine lining and a pathological puerperium with influences on current milk production of sows and future production of piglets.

4. The level of mineral substances may register imbalances:

- minus contribution:
 - calcium deficiency, followed by uterine under involution and retention of fetal appendages;
 - phosphorus deficiency leads to anaphrodisiacs, prolonged heat and ovulation disorders;
 - iodine deficiency leads to the formation of follicular cysts;

- manganese deficiency leads to abortions, postpartum uterine hypotonia and neonatal mortality;
- sodium deficiency leads to irregular estrous cycles.
 - plus contribution:
- excess of potassium leads to irregular estrous cycles after weaning piglets;
- excess of phosphorus leads to genital catarrh at parturition;
- excess of manganese leads to prolonged heat after weaning;
- excess of sodium leads to puerperal endometritis and placental retention at parturition.

5. Vitamin levels can cause the following imbalances in sows:

a. hypovitaminosis causes embryonic mortality, by disrupting the function of the pituitary gland and ovaries as well as decreasing the milk production of sows, the mortality of piglets;

Dietary deficiencies may adversely affect the following aspects in lactating sows:

- phosphorus deficiency on the hypothalamic-gonadal axis;
- lack of macro elements on cellular metabolism;
- protein deficiency, on estrus;
- deficiency of vitamin A and manganese, on the production performance of piglets and the appearance of estrus after weaning.

We do not recommend in intensive exploitation systems the excessive feeding of pregnant sows for the formation of reserves that will be used in lactation than the feeding with balanced rations in the puerperium. During the preparation period for sowing, we recommend feeding with energy-rich feed according to the following model:

- in the 7 days preceding estrus with large amounts of energy feed because they favor:

- a. the reappearance of estrus in the next 2-3 days in 90-95% of sows;
- b. increasing the number of products obtained;

- on days 8-10 restrictive feeding with 2.8-3.5 kg feed per head to reduce embryonic mortality;

- during the gestation period, feeding on physiological conditions in the first two months and stimulating until the end of the gestation, avoiding the fattening of the sows.

In order to avoid fattening suckling or pregnant sows, the management of nutrition in gestation will respect the parameters that must ensure a weight gain of:

- 255 grams in the last 42 days of gestation;
- 150 grams in the last 7 days of breastfeeding

B. Improper maintenance at the end of lactation has a negative effect on:

- a. neuroendocrine metabolism;
- b. hypocrine installation of anterohypophyseal gonadotropins;
- c. absence of heat in the first 10 days after the separation of the piglets;
- d. increasing the number of unproductive days;
- e. prolonged anesthesia and indices of use of lower sows.

C. Microclimate factors have a negative impact on the reproductive function of sows.

- biological factors determine: increasing the level of sanitation, well-being disorder, causes irritation of the mucous membranes and cause respiratory infections.

- chemical factors produce: increasing the incidence of respiratory diseases, discomfort for animals, loss of nutritional appetite, behavior change.

- physical factors have an important role: in the function of thermoregulation of the organism, stimulating consumption, synthesis and release of pituitary gonadotropic hormones, on ovarian function and estrus, the appearance of puerperal uterine infections,

lead to MMA syndrome - mastitis, metritis and agalaxis in sows in the puerperium, disrupts the normal activity of the reproductive function.

D. Welfare and pathogens. By ensuring the well-being of sows and piglets, the following functions are activated; blood circulation; increases muscle tone; the neurovegetative tone improves; the function of the neuroendocrine system is activated.

Failure to ensure the well-being of lactating sows leads to postpartum uterine atony, puerperal endometritis, placental retention, delayed heat after weaning piglets. As the genital tract of sows have a good bactericidal capacity, the implementation of the best management of the puerperium and gestation must take into account the following aspects:

- ensuring nutritional levels according to the planned production and the physiological needs of sows;
- ensuring good maintenance without fattening pregnant sows and using their own reserves for milk production;
- feeding in preparation for sowing with energy-fed fodder;
- regulation of the amount of feed in gestation by physiological conditions;
- control of microclimate factors, temperature, humidity, air currents and dusts for the expression at economic parameters of the genetic characteristics of sows;
- ensuring the appropriate conditions of well-being, useful areas, movement;
- reducing puerperal diseases and ensuring farm biosecurity.

CONCLUSIONS

Nutrition influences the evolution of the puerperium in lactating sows because the incidence of metabolic diseases is the non-expression of production at the value of biological properties of animals due to technological errors that cause high demands during lactation and gestation. To improve the management of sow nutrition we do not recommend intensive feeding excessive supply of pregnant sows for the formation of reserves that will be used in lactation but forage at discretion with balanced rations in the puerperium to increase piglet production. To avoid fattening suckling or pregnant sows, nutrition management will follow parameters that must ensure an average daily weight gain of 150 grams in the last 7 days of lactation and 255 grams in the last 42 days of gestation. Improper maintenance and failure to ensure microclimate, welfare and biosecurity factors, lead to inadequate production and prolongation of the anestrus for these reasons requires the implementation in intensive farms of the best management of puerprum to ensure nutritional levels according to planned production good maintenance without fattening pregnant sows and using their own reserves for milk production, reducing puerperal diseases, feeding sows in preparation for sowing with energy-fed fodder, automating the control of microclimate factors, welfare and biosecurity for expression at economic parameters of biological properties of sows.

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 Biotechnology*, 280, S37
- [2]. **DEKANY A.T., HUZĂU G., PANDURU ELISABETA BIANACA, VĂDUVA LOREDANA, PETROMAN I.**, 2019, Implementing measures to improve the reproduction management in swine, *Lucrări Științifice Management Agricol*, 21(3), 38-44
- [3]. **GOGYN DAROTA, NOWICKI J., HERBUT P.**, 2019, Effects of Environmental Enrichment on Pig Welfare – A review, *Animals*, 9, 1-17

- [4]. **MABRY J.W., CULBERTSON M.S., REEVES D**, 1996, Effects of lactation length on weaning-to-fist-service interval, first-service farrowing rate, and subsequent litter size, *Swine Health and Production* 4(4), 185-189
- [5]. **MARIN DIANA, PĂCALĂ N., PETROMAN I., PETROMAN CORNELIA, UNTARU RAMONA, ȘANDRU O., ZAPPE E.**,2011, The role of endogenous factors upon swine production, *Lucrări științifice, Management Agricol*, 13
- [6]. **NUTHALL P.L.**, 2010, *Farm Business Management: The Human Factor*. Wallingford - Cambridge: CABI
- [7]. **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
- [8]. **PANICI G., DANCIU G., PANDURU ELISABETA BIANCA, MARIN DIANA, PETROMAN CORNELIA, VĂDUVA LOREDANA, PETROMAN I.**, 2019, Possibility to improve the insemination management at sows, *Lucrări Științifice Management Agricol*, 20(3)
- [9]. **PETROMAN CORNELIA, PETROMAN I., MATIUȚI M.**, 1999, Obținerea și procesarea cărnii de porc, Mirton, Timișoara
- [10]. **PETROMAN CORNELIA, STOICA ANGELA, PETROMAN I.**, 1998, Mortalitatea embrionară la scroafe, Mirton, Timișoara
- [11]. **PETROMAN I.**, 1997, Reproducția suinelor, Mirton, Timișoara
- [12]. **PETROMAN I., STOICA MARIA, ANGELA, PETROMAN CORNELIA**, 1998, Perioada puerperală la scroafă, Mirton, Timișoara
- [13]. **QUINIOU N., RENAUDEAU D., DUBOIS S., NOBLET J.**, 2000, Influence of high ambient temperatures on food intake and feeding behaviour of multiparous sows, *Animal Science* 70, 471-479
- [14]. **SALAZAR LAURA, KOC H.L., YANG C.H., LLONCH LOURDES, MANECA X., CAMERLINK IRENE, LLONCH P.**, 2018, Early Socialisation as a Strategy to Increase Piglets Social Skills in Intensive Farming Conditions, *Applied Animal Behaviour Science*, 206, 25-31
- [15]. **SKORJANC D., HOHLER M., BURS M.**, 2008, Effect of Backfat Loss During Lactation on Weaning-to-Oestrus Interval of Sows at Gonadotropin Application, *Animal Breeding* 51(6), 560-571
- [16]. **STOICA MARIA ANGELA, PETROMAN CORNELIA, PETROMAN I.**, 1998, Rezultate practice privind valorile unor indici de reproducție la scroafe, Mirton, Timișoara
- [17]. **UNTARU RAMONA CALIOPI, PĂCALĂ N., PETROMAN I.**, 2011, Impact of environmental temperature on estrus induction in gilts, *Journal of Food, Agriculture and Environment* 9(2 part 1), 230-231
- [18]. **VALROS ANNA, HEINONEM MARI**, 2015, Save the Pig Trail, *Porcine Health Management*, 1(2), 1-7
- [19]. **VOLPELLI LUISA ANTONELLA**, 2017, *Manual of Good Practices in Pig Farming*. Pristina: NGO Reggio Terzo Mondo