

## **SUMMARY**

Summary of the doctoral dissertation of msc eng. Dariusz Pomykała

### **DETERMINANTS OF THE EFFICIENCY AND FATTENING OF HEREFORD CATTLE AND HEREFORD X LIMOUSINE CROSSBREEDS IN ORGANIC FARMING**

Supervisor: dr hab. Piotr Wójcik prof. IZ PIB

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The production of high-quality beef largely depends on the awareness of producers, their level of knowledge also in the field of ecological production methods. The research conducted so far shows that commercial crossbreeding contributes to increasing the profitability and scale of production of young slaughter cattle, especially in regions with a large share of permanent grasslands or those falling out of intensive dairy production. Hybrids from commercial crossbreeding are characterized by better (by about 15%) fattening efficiency, expressed by higher body weight gains, increased slaughter efficiency, improved muscle shape and meat content in the carcass, without additional feed and labor inputs.

The scientific goal of the research was to determine the technological limitations in organic fattening of beef cattle that affect its efficiency.

The utilitarian goal was to analyze the optimized technological conditions of fattening beef cattle in organic farming conditions to improve its profitability.

The research was carried out in two subtasks. In the first subtask entitled "Determination of technological conditions limiting the efficiency of cattle fattening on domestic organic farms" in 2022-2023, the research covered a total of 34 randomly selected farms keeping beef cattle, located in different regions of the country. A specialist interview was conducted on the farms by ODR and IZ PIB employees based on a detailed survey developed for this purpose at the National Research Institute of Animal Production. Information was obtained on the conducted breeding and veterinary work, production data, including, among others, factors influencing production, such as: selection of breeding material, maintenance system - technologies and breeding techniques, treatment, reproduction and grazing. In the second subtask entitled "Efficiency of fattening of Hereford, Limousine and crossbred cattle", the

subject of the research was to determine the performance effects of beef cattle kept in organic breeding conditions using a pasture-based maintenance and feeding system. The experimental material consisted of 66 Limousine, Hereford and crossbred bulls kept in accordance with the principles of organic breeding.

Based on the conducted surveys and analyses of dissection data, 13 conclusions were formulated. It was found that the average area of organic farms, including the area of organic crops, is decreasing further, which also results in changes in the number of herds of organic cows and the breed structure. To a large extent, these changes may result from difficulties in obtaining labor, changing economic conditions and breeders' preferences. An increase in interest in local breeds, such as the Polish Red, was noted in the breed structure of organic farms, which may be related to the availability of subsidies and adaptation to specific climatic and environmental conditions. In 2023, a change in preferences was observed in the scope of cattle management systems, including the increased popularity of the pasture system, which indicates a growing interest in more sustainable breeding methods, which are less expensive and more beneficial for animal health. Such activities also result in changes in feeding systems and working time management, which indicates the optimization of animal handling processes and a greater understanding of the need to ensure animal welfare and improve hygiene conditions.

Based on analyses of detailed dissections of Limousin, Hereford and crossbred bulls, significant differences were found between breeds in terms of post-slaughter parameters and fattening efficiency. Limousine cattle were characterized by the highest slaughter yield, averaging 57.61%, which was the result of both a higher body weight before slaughter (an average of 543.72 kg) and a higher carcass weight after slaughter (316.72 kg). Crossbreeds achieved similar yield (55.92%), while the lowest slaughter yield was observed in Hereford animals (53%). Cattle of this breed were also characterized by the highest degree of carcass fatness (2.42 points), while crossbreeds showed the lowest level of fatness (1.67 points). The research showed that the Limousine breed also had the highest share of valuable carcass parts, such as sirloin, entrecote and roast beef, compared to other breeds studied. Based on the conducted research, it should be stated that interbreed crossbreeds turned out to be very competitive with purebred breeds in terms of muscle mass, fatness and slaughter yield. The lowest fat content and production parameters similar to Limousine suggest that breeding hybrids may be a beneficial solution for organic farms.