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BENEFITS OF ARTIFICIAL INSEMINATION MANAGEMENT IN SMALL RURAL PROPERTY IN THE MUNICIPALITY OF DOURADINA-MS

BENEFÍCIOS DO MANEJO DA INSEMINAÇÃO ARTIFICIAL EM PEQUENA PROPRIEDADE RURAL NO MUNICÍPIO DE DOURADINA-MS

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Abstract: The extension actions developed in small properties help in the development of properties by implementing technology in the process as a whole. In this sense, the objective of this work was to evaluate a university extension action, inserting the technique of artificial insemination in a small rural property in the state of Mato Grosso do Sul, through the completion of a course. This project started to be developed in 2018, at Nossa Senhora da Abadia, in the municipality of Douradina. With the accomplishment of this activity, it was initially expected to improve milk production on the property, also influencing the academic training of the students involved in the project, so that the

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knowledge acquired in the universities was passed on to the population through extension actions. Artificial insemination promoted the genetic improvement of the herd in a shorter time, since more than 80% of the heifers and calves on the farm are daughters of bulls proven for milk production, in addition to improving the control of communicable diseases through the natural mating process, the which made it possible to cross breeds and increase milk production in more than 30% of the herd. To the students, the development of this action provided practical learning about the technique of artificial insemination in cattle, allowing them to approach the reality of many producers. Such learning has a positive impact on the ethical and moral training of future professionals, in addition to encouraging them to disseminate knowledge through participation in extension projects.

Keywords: genetic improvement, milk production, reproduction.

Resumo: As ações de extensão desenvolvidas em pequenas propriedades auxiliam no desenvolvimento das propriedades por meio da implementação de tecnologia no processo como um todo. Nesse sentido, objetivou-se com este trabalho avaliar uma ação de extensão universitária, inserindo a técnica de inseminação artificial em uma pequena propriedade rural no estado de Mato Grosso do Sul, por meio da realização de um curso. Este projeto começou a ser desenvolvido em 2018, no sítio Nossa Senhora da Abadia, no município de Douradina. Com a realização dessa atividade, esperava-se, inicialmente, melhorar a produção de leite na propriedade, influenciando também na formação acadêmica dos alunos envolvidos no projeto, de modo que o conhecimento adquirido nas universidades fosse repassado à população por meio de ações extensionistas. A inseminação artificial promoveu o melhoramento genético do rebanho em menor tempo, visto que mais de 80% das novilhas e bezerras na fazenda são filhas de touros comprovadas para produção de leite, além de melhorar o controle de doenças transmissíveis pelo processo de monta natural, o que possibilitou a realização de cruzamento entre raças e aumento da produção de leite em mais de 30% do rebanho. Aos discentes, o desenvolvimento dessa ação proporcionou aprendizado prático sobre a técnica de inseminação artificial em bovinos, permitindo aproximação com a realidade de muitos produtores. Tal aprendizado impacta positivamente na formação ética e moral dos futuros profissionais, além de estimulá-los quanto à difusão de conhecimentos através da participação em projetos de extensão.

Palavras-chave: melhoramento genético, produção de leite, reprodução.

INTRODUCTION

The introduction of technologies in the country's agricultural sector provides expansion in properties, which, in turn, leads to growth in rural development. Brazilian producers are increasingly seeking technologies to facilitate animal management on the property, combined with increased production without losing quality (DE OLIVEIRA et al., 2020).

Bezerra et al. (2011), when developing studies at the Federal Institute of Education, Science and Technology of Rio Grande do Sul – Sertão Campus, through rural extension projects in the area of artificial insemination (AI), found that AI is an important way to educate about technologies and disseminate them, since reproductive management, from a technical point of view, has rates below ideal, compromising the productive performance of cows and heifers at reproductive age. According to the authors, these factors occur due to lack of knowledge and qualified labor, ranging from the process of heat identification to the correct handling of animals, materials and equipment during AI.

The AI technology in cattle began to be used in the country in the 1940s, aiming to accelerate genetic gain and obtain a genetically uniform herd, with high accuracy, through the use of semen from good quality breeders (CUNHA et al., 2021).

AI in cattle consists of depositing the bull's semen in the cow's uterus, so that the sperm can find oocytes, resulting in fertilization (Figure 1). However, for this process to occur, there is a logistics focused on the development of products for semen conservation, seeking the selection and use of the best animals for milk and/or meat production (QADEER et al., 2015).

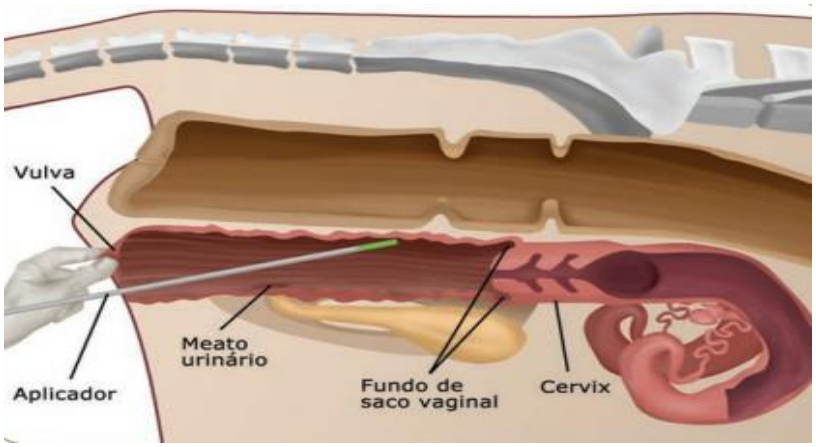

Figure 1. Semen deposition site in ruminants.
Adapted from Fonseca and Simplício (2008).

AI has been used in dairy cattle farming, allowing the use of imported bulls of great genetic value and specific breeds for milk production. However, this technique is not widely used by producers due to lack of information and the fact that Brazilian livestock is still quite conservative, generating resistance to change and hindering the widespread dissemination of new technologies (MORAIS et al., 2020).

Insufficient property structure, whether material, facilities or equipment, and the absence of qualified labor are limiting factors for the widespread use of the technique. Another major difficulty in implementing artificial insemination programs is the scarcity of adequate zootechnical records on properties, such as lack of records of reproductive and productive data for each animal (DE OLIVEIRA et al., 2017).

Due to the lack of equipment and zootechnical records on properties, to implement this technology, especially on small properties, some initial investments are necessary, making it difficult to introduce AI in these places. Furthermore, it is noticed that the lack of information on small rural properties is the main difficulty encountered by extension technicians, since it prevents the adoption of new techniques.

The standardization of the genetic quality of the herd, through artificial insemination, drives the development of the country's agricultural sector. It is a viable and relatively cheap alternative for producers, which generates genetic advancement and increases milk production, allowing the producer to provide for his family on the property, improving their quality of life (MENEGAT, et al., 2019; MORAIS et al., 2020).

In light of these considerations, the objective of this work was to evaluate a university extension action, inserting the AI technique in a small rural property in the state of Mato Grosso do Sul, through the realization of a course.

MATERIALS AND METHODS

This extension project was implemented in 2018 at the Nossa Senhora da Abadia farm, located in the municipality of Douradina, in the state of Mato Grosso do Sul. The property has 60 hectares, located in a tropical climate region with latitude 22° 13′ 18″ South and longitude 54° 48′ 23″ West.

The property where the action was developed has milk production as its main activity, in which the animals are kept in a confinement system known as Compost Barn (Figure 2). On average, 40 Holstein crossbred lactating cows were kept in the barn.

Previously, the animals were raised on pasture and reproduction was carried out by natural mating, where the bull remained with the cows throughout the year. However, through technical consultancies carried out by professors from the Federal University of Grande Dourados (UFGD), the producer felt the need to improve the genetics of the animals on the farm, adopting the artificial insemination method.

After meetings and conversations, the UFGD professors and the producer decided to implement the AI technology on the property through courses, which would be held periodically, aiming to propagate the technology to producers in the region and students of the Zootechnics and Agronomy course.

Figure 2. Lactating cow confinement barn in a Compost Barn system.

To implement AI on the property and conduct the course, the producer, under the guidance of university professors, purchased the necessary equipment to perform the technique: liquid nitrogen tank (Figure 3), semen, palpation gloves, disposable insemination sheaths, universal semen applicator, thermometer, scissors or straw cutter, tweezers, boiler, Styrofoam box, paper towel or toilet paper (Figure 4).

Figure 3. Semen tank.
Source: Adapted from SENAR, 2011.

Figure 4. Equipment needed for artificial insemination**.**

After acquiring the necessary materials and equipment to implement AI, the preparation and offering of courses on the technique at the property took place. Regarding dissemination, students from the UFGD Zootechnics course, the Agrarian Development and Rural Extension Agency (AGRAER), and the rural union participated as logistical support.

The initial activities were developed by a university professor, with theoretical and practical explanations about the reproductive apparatus of cows. All stages of the act of inseminating were demonstrated. In the practical part, using the animals, the course participants were able to follow and have daily contact for a week. This course was offered periodically, with intervals of ninety days. Vacancies were limited to six people, mixing producers, students, and property employees. Regarding students, the criterion used for their selection was the order of course registration. In each course, three vacancies were allocated to students.

The first classes offered had full assistance from the responsible professor until the moment the producer and students from previous classes were trained and able to carry out all the necessary processes for insemination. After some time, when properly trained, the university students who took the course also began to inseminate the animals, whenever possible. This action occurred during their visit to the property, when developing experimental activities at the location.

RESULTS AND DISCUSSION

Currently, on the property, the natural mating system has been replaced by artificial insemination, using bulls suitable for each animal, according to their size, hoof conformation, and udder characteristics, always seeking good production, healthy animals with a prolonged lifespan.

Through the developed activity, students of the Zootechnics course had the opportunity for theoretical and practical learning of the artificial insemination technique, handling the semen tank, observing heat, as well as contact with the reality of the rural producer, enriching their worldview and providing the exercise of the Teaching, Research, and Extension triad. It is worth emphasizing that all participants completed the course.

During the four years of introducing the insemination technology, more than 250 animals have already been inseminated, producing 96 heifers sired by Holstein bulls. However, due to the COVID-19 pandemic, the course was suspended in 2020, returning to be held in July 2021 with a reduced number of participants. So far, five editions of the course have been held, with a total of 30 participants.

With the birth of the heifers (Figure 5) resulting from the AI program, an improvement in the genetics of the animals can be noted, using genetic crosses directed towards 5/8 Holstein animals compared to heifers resulting from natural mating, a reason

for satisfaction for the producer, as the heifers are becoming good replacement matrices in the herd.

Figure 5. 5/8 Holstein heifers, in individual hutch rearing system, from artificial insemination, born at Nossa Senhora da Abadia Farm.

An increase of 33% in milk production was observed on the property, where first-calf heifers from natural mating averaged ten liters/day of milk, while first-calf heifers from AI averaged 15 liters/day, a value higher than that produced by the animals on the property.

Thus, with the realization of the course, it is expected as a response, over time, to improve milk production on the property and influence the academic formation of the students involved in the extension activity, as shown in figure 6, added to the importance of the relationship of being one of the ways to pass on the knowledge acquired in universities, through the realization of scientific works offered to the population, through these actions (MENEGAT et al., 2019).

Figure 6. Student practicing artificial insemination.

In addition to the focus described in the previous paragraph, emphasis is placed on the relationship between social equality and the dissemination of technologies that seek to improve the lives of the population, generating social equality and contributing to collective well-being. In this sense, the use of extension actions that allow academics to put into practice the theoretical knowledge acquired in the classroom is reinforced, allowing them to learn and implement new technologies, such as artificial insemination, to be used in places that, due to lack of access to such technologies, do not have this type of information (SILVA et al., 2019).

Bezerra et al. (2011), when studying work in the area of rural extension focused on artificial insemination, report the importance of rural extension courses in the training of inseminators in dairy cattle farming, in order to improve the genetic quality of the herd; improve pregnancy rates; reduce costs per conception; and provide greater competitiveness to Brazilian milk production.

With the adoption of the AI technique, the producer began to monitor the animals more frequently for heat detection, improving herd control. Faced with this, the producer began to record zootechnical data of the herd such as: number of lactating cows, daily milk production, age/weight of heifer covering, dry period, presence of mastitis, obtaining accurate information about reproduction, production, disease incidence, facilitating the selection of the best animals in the herd, influencing adequate management for each animal.

Artificial insemination allowed the producer access to good dairy breeders, reducing feed costs (R$6.90/day), vaccination, labor – due to not needing to keep breeders on the property – totaling a reduction of approximately R$8.00/day per animal. With the technique, accidents with employees and family members on the property can also be prevented, given the aggressive behavior of some bulls (CUNHA et al., 2021).

The extension actions developed on the property assist in milk production due to the implementation of technology in the process as a whole. From the results observed in a study with dairy cattle, the importance of extension in the management of family farms can be highlighted, ensuring production in a sustainable and economic way, contributing to the preservation of resources and the settlement of people in the countryside (SILVA et al., 2021).

In cattle farming, reproduction is of great importance, as it favors an increase in the profitability of the activity, corroborating with genetic selection programs. Animals of high genetic value contribute to the increase in production, promoting production sustainability, thus making the use of techniques that improve reproductive performance and provide genetic improvement of the herd essential (MORAIS et al., 2020).

Universities have a fundamental role in the training of academics, concerned with the generation of knowledge acquired through research, and in the dissemination of this knowledge through extension projects. In this context, it is essential to adopt actions that allow students to develop the theoretical knowledge acquired in the classroom, so that they can positively interfere in the community.

CONCLUSIONS

The use of artificial insemination was an efficient method and provided positive results in the reproduction and production of the property's herd. The implementation of the technology at the Nossa Senhora da Abadia farm has enabled the genetic improvement of the farm's dairy herd, in addition to reducing costs and the risks of accidents and disease transmission associated with animal reproduction.

For students, the development of this extension project provided practical learning of the artificial insemination technique in cattle, as well as brought them closer to the reality of many producers, influencing their ethical and moral formation, a fact observed through the students' participation in the project.

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