

**UNIVERSITY EXTENSION ALLIED WITH THE BREEDING OF NATIVE BEES AS
AN INCOME-PROMOTING ACTIVITY FOR SMALL PRODUCERS AND ITS
ENVIRONMENTAL IMPORTANCE**

EXTENSÃO UNIVERSITÁRIA ALIADA COM A CRIAÇÃO DE ABELHAS NATIVAS
COMO ATIVIDADE PROMOTORA DE RENDA PARA PEQUENOS PRODUTORES E
SUA IMPORTÂNCIA AMBIENTAL

EXTENSIÓN UNIVERSITARIA ALIADA CON LA CRIA DE ABEJAS NATIVOS COMO
ACTIVIDAD PROMOTORA DE INGRESOS PARA PEQUEÑOS PRODUCTORES Y SU
IMPORTANCIA AMBIENTAL

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Abstract: The objective of this work was to integrate the academic community with rural producers in Mato Grosso do Sul, through the development of a demonstration unit for the sustainable breeding of stingless bees, to preserve native species, assisting in the academic and professional development of students. This extension work is being carried out in

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partnership with teachers and students from the Federal University of Grande Dourados, with the Technological Vocational Center in Agroecology and Organic Production, in Mato Grosso do Sul and the Center for Participatory Construction of Knowledge in Agroecology and Organic Production in Mato Grosso do Sul. UFGD, with rural producers and various groups of settlers. The work has been carried out since 2022, with the production of bait, capture, and breeding of stingless bees. The creation of native bee species is essential to guarantee the conservation of these species, in addition to influencing environmental conservation, which can also be an extra source of income for producers, indirectly benefiting other crops on the property. This action has allowed a greater supply of sites for the multiplication of stingless bees, directly contributing to the conservation of local biodiversity and ecological balance, in addition to promoting a better quality of life for small rural producers.

Keywords: Stingless bees, Agroecology, environmental conservation, pet baits.

Resumo: Objetivou-se por meio deste trabalho, a integração da comunidade acadêmica, com produtores rurais do Mato Grosso do Sul, por meio do desenvolvimento de uma unidade demonstrativa de criação sustentável de abelhas-sem-ferrão, com a finalidade de preservação das espécies nativas, e auxiliando no desenvolvimento acadêmico e profissional dos alunos. Este trabalho de extensão está sendo realizado, mediante parceria com professores e alunos da Universidade Federal da Grande Dourados, com Centro Vocacional Tecnológico em Agroecologia e Produção Orgânica, em Mato Grosso do Sul e do Núcleo de construção Participativa do Conhecimento em Agroecologia e Produção Orgânica da UFGD, com produtores rurais e diversos grupos de assentados. O Trabalho vem sendo realizado desde o ano de 2022, com produção de iscas, captura e criação de abelhas-sem-ferrão. A criação de espécies de abelhas nativas são fundamentais para garantir a conservação destas espécies, além de influenciar a conservação ambiental, que ainda pode ser fonte extra de renda para os produtores, beneficiando indiretamente outras culturas na propriedade. Esta ação vem permitindo que se tenha maior oferta de sítios para multiplicação de abelhas-sem-ferrão, contribuindo diretamente para conservação da biodiversidade local e equilíbrio ecológico, além de promover uma melhor qualidade de vida para pequenos produtores rurais.

Palavras-chave: Abelhas-sem-ferrão, Agroecologia, conservação ambiental, iscas pet.

Resumen: El objetivo de este trabajo fue integrar a la comunidad académica con productores rurales de Mato Grosso do Sul, a través del desarrollo de una unidad demostrativa para la cría sustentable de abejas sin aguijón, con el fin de preservar las especies nativas, está ayudando en el desarrollo académico y profesional de los estudiantes. Este trabajo de extensión se realiza en colaboración con profesores y estudiantes de la Universidad Federal de Grande Dourados, con el Centro Profesional Tecnológico en Agroecología y Producción Orgánica, en Mato Grosso do Sul y el Centro de Construcción Participativa del Conocimiento en Agroecología y Producción Orgánica en Mato Grosso do Sul. UFGD, con productores rurales y diversos grupos de colonos. El trabajo se realiza desde 2022, con la producción de cebo, captura y cría de abejas sin aguijón. La creación de especies de abejas nativas es fundamental para garantizar la conservación de estas especies, además de influir en la conservación ambiental, lo que también puede ser una fuente extra de ingresos para los productores, beneficiando indirectamente a otros cultivos de la propiedad. Esta acción ha permitido una mayor oferta de sitios para la multiplicación de abejas sin aguijón, contribuyendo directamente a la conservación de la biodiversidad local y el equilibrio ecológico, además de promover una mejor calidad de vida de los pequeños productores rurales.

Palabras clave: Abejas sin aguijón, Agroecología, conservación ambiental, cebos para mascotas.

INTRODUCTION

University extension, through a set of actions with the community, seeks to share teaching and technology with the external public, seeking to solve the needs of the community where the university is located (FACCO et al., 2021).

By placing students in front of real situations, common in a producer's life, it is possible to increase the knowledge acquired, strengthening future professionals, as well as making them more flexible, adapting better to the reality of rural people (FACCO et al., 2021).

Rural extension, focused on agricultural sciences, influences the training of students, through interrelationships, in addition to generating rural development in a sustainable way,

resulting in changes in the quality of life of the entire rural population, whether directly or indirectly (CASALINHO; CUNHA, 2016).

The state of Mato Grosso do Sul (MS) is characterized by having three biomes in its territory, the Cerrado biome, Atlantic forest and Pantanal. In MS, the Cerrado biome occupies around 61% of the state's total area, followed by Pantanal 25% and Atlantic Forest 14% (DE BRITO, 2020). Thus, the predominant biome in the state is the Cerrado, presenting great floristic richness, and characteristics such as adaptation to fire, thick bark, and trees with thick trunks, and underground systems, reaching up to 20 meters in height (BUENO, 2018).

The biomes found in the state of MS are home to several species of fauna and flora, some of which are rare and others threatened with extinction. Among the many species sheltered in the biomes, native bees, also known as stingless bees, are of great importance for the homeostasis, recovery and preservation of these areas, as they are an insect native to Brazil, responsible for the pollination of several species present. of plants present in the state (DE BRITO, 2020).

Bees are the most important pollinators, which play a recognized role in the preservation and diversity of floral resources. Stingless bees (family Apidae, tribe Meliponini), have a perennial behavior can to explore a variety of flowers throughout the year, in some cases having the possibility of preferring groups of flowers, being the main species of pollinators involved in the conservation of native trees in Brazil (KERR, 1997).

Brazil has more than 400 recognized species of stingless bees. Being considered the country with the greatest diversity in the world for this type of bee, despite being known as stingless bees, these bees have an atrophied stinger, with no defense function (SILVEIRA et al. 2002). They are also known as native bees or indigenous bees (RODRIGUES 2005), among the best known are the jataí (*Tetragonisca angustula*), mandaguari (*Scaptotrigona depilis*), jandaíra (*Melipona subnitida*), mandaçaia (*Melipona quadrifasciata*), and tiúba (*Melipona fasciculata*) (KERR and FILHO, 1999), whose behavioral pattern is to fix its colonies in nests on tree trunks, aerial nests on branches or walls (LOPES, FERREIRA AND DOS SANTOS, 2005).

In addition to being important agents that promote the pollination of angiosperms, stingless bees produce products such as honey, propolis, pollen and geopropolis, which are well-valued in the market, especially about products from stinging bees (FREITAS, 2009; MARTINI, PFULLER, MARTINS, 2015).

Mato Grosso do Sul, known for its rich flora, has a great little explored potential for meliponiculture, both in the forest, savannah and pantanal regions, where there are many native species of stingless bees (DE BRITO, 2020).

However, because the Cerrado biome occupies most of the state, it presents characteristics suitable for grain production and livestock farming, such practices result in loss of vegetation cover, causing great damage to fauna and flora and a reduction in trees for growth. and development of native bees (DE BRITO, 2020).

With the reduction of the natural habitat, mainly due to deforestation, a reduction in the number of colonies and the size of swarms, consequently less pollination by these bees and a reduction in the production of typical fruits and flowers in the region (MARTINI, PFULLER, MARTINS, 2015).

Seeking the practice of agroecology, aligning indigenous knowledge, low-input technology, use of local resources and also the search for the preservation of native fauna and flora, in addition to the search for production diversification, an extension action is being developed, connecting the community academic initiative to small producers, seeking to increase the preservation and number of stingless bees.

In this context, the aim of this work was to integrate the academic community with rural producers in Mato Grosso do Sul, through the development of a demonstration unit for the sustainable creation of stingless bees, with the purpose of preserving the native species, assisting in the academic and professional development of students.

MATERIAL AND METHODS

The extension work began in 2022, on a commercial farm in the municipality of Douradina — MS, focused on raising dairy cattle and grain production. o Setting up a

demonstration unit for the creation and conservation of stingless bees, with the aim of encouraging new producers to join the action.

On the property, some swarms of native bees were identified in unfavorable conditions, such as in tree trunks close to crops, small trunks close to the house or in small spaces in bricks or in the residence (figure 1).



Figure 1. Stingless bees in unfavorable locations for swarm development.

The Farm has a reserve area, and is characterized by the existence of streams at the ends of the legal reserve, therefore, the riparian forests are large. At this juncture, it stands out as being a place with a high floristic incidence, which allows a high number of stingless bees to be found. When developing the activity with these bees, they will have a vast area of exploration and conservation, in this location and in the places, later, intended for the extension of the work.

Initially, the swarms, found in an area considered at risk, or that limited the growth of the swarm, were captured by placing baits made of plastic bottles, and a rational production box, placed close to the nests. Secondly, with the swarms already installed, he used the examination division technique to produce new hives.

Preparing the bait is relatively simple, first an attractive solution is made from one liter of 70% alcohol, 150 grams of propolis and 150 grams of native beeswax. This solution was stored for about a month, being shaken at least once a day, so that good homogenization occurs and the alcohol absorbs the smell.

The manufacture of the baits involved the participation of all members of the group, from producers, teachers and undergraduate and postgraduate students at the Federal University of Grande Dourados. Where everyone collaborated in collecting, cleaning pet bottles, and effectively preparing the baits, methodology used, so that everyone actively participated in the different stages.

After cleaning and drying, the bottles were covered with black canvas and newspaper sheets and fixed with adhesive tape, with the aim of imitating tree trunks. The attractive solution was then applied to the pet baits, removing excess material and distributing it close to the stingless bee swarms. The rational wooden boxes were also used as bait to capture new swarms.

This extension action is being extended to other locations such as the settlements: Guassu and Santa Rosa in Itaquirai; Areias in Nioaque; Amparo in Dourados and Cabeceira do Iguatemi in Paranhos, all located in the state of Mato Grosso do Sul.

In rural settlements, academics carry out activities that explain the differences between bees of the genus *Apis* and Meliponines, the history and importance of meliponiculture, their biology, life habits and organization of these insects, production, productivity, errors and limitations of the entire process. And at the end of the activities, a conversation circle is held where, with the help of the teachers, doubts are resolved.

In settlements, this action combines the conversation of biodiversity, plus income generation, from the sale of honey and propolis. The group of producers from several settlements, in addition to working together in collective efforts, also articulate politically to bring benefits to the settlement as a whole.

To increase production, an exchange between the production of selected queens and the availability of stingless swarms to family farmers.

The guidelines will be accompanied by UFGD professors and a professional in the field, through theoretical and practical explanations, carried out monthly, with the aim of facilitating the understanding of the creation of stingless bees. During the visits, topics such as: rational box production, honey supers and complementary materials for the creation of stingless bees and carpentry work are covered. A beekeeping calendar is being developed with the harvest period, off-season, flowering, swarming and capture and division times, where the apiaries should be located, and how to carry out cleaning and maintenance.

Embryonic Project

To capture the swarms, diet traps are used with PET bottles with attractant. After a period of at least 15 days, the swarms migrate to the traps, are transferred to appropriate rational production boxes and placed in a suitable location. When possible, swarms are kept in the same place, as long as there is food available and there is no risk to them.

However, when not necessary, the swarms are transferred to settlements, always prioritizing the health and development of the bees.

RESULTS AND DISCUSSION

The creation of a demonstration unit is important because together with the community, it is possible to demonstrate techniques for capturing and breeding native bees. According to Ramos et al. (2023), the creation of demonstration units facilitates the transfer of technology to rural communities, being able to demonstrate agricultural techniques, with the aim of improving the community's production.

To date, more than ten swarms of the Jataí bee have been multiplied, distributed in the Santa Rosa settlements; Sands; Amparo, where the continuity of the work is being developed.

This action is changing the view on the principles of agroecology, and mainly on the importance of conserving native species of meliponines, on properties, as they are part of an

ecosystem set of paramount importance in the pollination of native plant species, contributing to production of food and maintenance of native flora and fauna.

According to the report of one of the producers who is part of the group, since he was a child he has collected in nature and consumed honey from Jataí and other native bees, bringing with him cultural values and medical beliefs in relation to honey from these bees, however only now with the development of these extension works, you are learning about the behavior and biology of these bees, as well as the importance of their preservation and their creation in a conscious way, through monthly visits that train you in a technical and practical way.

The development of activities with meliponids is allowing the entire family, from children, adolescents, adults and the elderly, to participate in management. Teaching children from an early age the importance of environmental conservation and preservation, and the respect they should have for fauna and flora, making adults more aware of environmental issues.

As the swarms are still developing, in this first year of project development, it was not possible to collect honey from all the swarms, as the development of the swarms is being prioritized. However, as a positive point, there was no need to supplement any of the captured, divided swarms. This shows that they are adapting well to the location where they were installed.

According to Martini, Pfuller, Martins (2015), the production of meliponids, especially in the first year of installation, requires special evaluation in the food reserve such as: honey, nectar and pollen, to ensure that there is a sufficient quantity for the bees to pass mainly in the winter period, where there is a shortage of flowers.

Because swarms are natural in the region, they are already adapted to the local vegetation, and the flowers of many trees in the forest serve as grazing areas for bees. However, producers are advised to pay attention to the flowers most visited by bees, preserving them, and enriching their region with the best species, to prevent bees from abandoning their nests, in addition to increasing production (RAMALHO et al. 2007).

In the future, producers will be able to count on the production of honey from all swarms, which can be used both for their own consumption and sale of surplus, being a source of extra income, as it is a valued product on the market.

Each species of meliponids has unique characteristics of flavor, texture and acidity, characteristics that differentiate the type of honey. Popularly, meliponid honey has medicinal value, which makes this type of product more valued in relation to stinging bees (MARTINI, PFULLER, MARTINS, 2015).

Although the honey production of meliponids is lower than that of *Apis mellifera*, native bees are better adapted to our forests, managing to collect food from a large number of trees present in the region. Another advantage in relation to honey is that it is considered a special, rare and organic product, which, combined with medicinal plants, adds even more value (VENTURIERI, 2008).

As the boxes are produced by the settlers themselves, only one box pattern is being used to create the swarms for all settlements (figure 2). The Jataí species (*Tetragonisca angustula*), is the species of stingless bee, most bred for honey production, and is being bred in various models of rational boxes, by the producer groups of the Corumbá Family Farming Beekeepers Association, with satisfactory answers (CONCEAÇÃO, 2022).



Figure 2. Boxes produced are used by participants in the extension project to raise stingless bees.

Rural extension actions, aimed at environmental preservation, which aim to provide rural communities with knowledge about the importance of native bees, are of great importance in maintaining plant diversity and native flora, generating benefits for the local ecosystem. According to Martini, Pfuller, Martins (2015), the creation of native bees is a sustainable and ecologically correct activity, as production and environmental conservation go hand in hand, generating new spaces for social interaction, exchange of experiences and ideas, generating a extra income, for families, increasing the fixation of men in the countryside, and indirectly as natural pollinators.

The purpose of breeding stingless bees in a rational way is to preserve and diversify these species, due to the importance of these insects in preserving local and regional biodiversity, marketing their products, and preserving culture. The growing volume of actions aimed at meliponids in recent years may be a contributing factor to the rise of rational bee breeders, whether organized or not, but who seek to improve their knowledge in relation to creation, management, commercialization of products and preservation. environmental (DANTAS, 2019).

CONCLUSION

It made rural producers aware of the importance of environmental preservation, and how preservation can influence the increase in family income.

Most people who have some of the native bee species in their homes are motivated to carry out this breeding due to the quality of the honey, and its action as a medicinal product, which facilitates adherence to activities.

This has allowed a greater number of producers to be interested in participating, which increases the availability of sites for the multiplication of stingless bees, directly contributing to the conservation of local biodiversity and ecological balance.

The rational breeding of native bees, whether or not aimed at profit and/or environmental purposes, contributes significantly to the increase in the populations of these

bees, in the state of Mato Grosso do Sul, and to the preservation of these species in relation to environmental preservation.

Students are able to apply the knowledge acquired in the classroom in practice, in addition to developing their interpersonal relationships, due to direct contact with producers.

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