

BEEKEEPING IN THE LEGAL AMAZON: ROYAL JELLY PRODUCTION IN ARAGUAÍNA-TO

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Abstract: This experiment aimed to evaluate the production of royal jelly in swarms of bees of the species *Apis mellifera* in a transitional environment Savannah Amazonia, in a quantitative way, aiming at the development of beekeeping in the region. The method used to evaluate was the orphaned recreated hive. The evaluation lasted two months. With the analysis of the data, an average production of royal jelly was noted in the months of May and June, being 1.12g and 0.45g, respectively, with a need to change the methodology and management when carrying out the work. However, from this study, it was concluded that the results obtained prove the possibility of producing royal jelly in the state of Tocantins.

Keywords: Africanized honey bee, *Apis mellifera*, royal jelly, Savannah

INTRODUCTION

Predominantly explored on an amateur basis and as a source of complementary income, beekeeping is dependent on local flora and requires natural resources to be preserved, largely meeting the three requirements of sustainability: economic, by generating income for rural producers; social, because it uses family labor, keeping men in the countryside and reducing migration to the urban area. Ecological, as it does not deforest, encouraging the restoration of native vegetation in order to meet the requirements for bee maintenance and production (Wiese, 2005).

In the North region in general, family farming is of great importance in the production base. Among the main agricultural activities, beekeeping represents a still incipient portion, but with potential for development. In addition to honey, it is possible to rationally produce other products such as: pollen, royal jelly, wax, propolis and apitoxin if used in an organized way and with appropriate technologies (Wiese, 1995).

For the development and production of honey bees, adequate management is necessary to make the colonies strong so that they reach the strong and productive flowering period. Despite the development of techniques and management, the loss of colonies is common even during the flowering period, being even more significant during the period of food scarcity, a fact generally observed in Brazilian beekeeping and which is striking in this region of the country (Ramalho -Sousa et al., 2017).

Another factor that influences bee productivity is certainly the biome in which the activity is located. Brazil, with continental dimensions, has several biomes that are suitable for beekeeping activities with high productivity. The Savannah is already configured as a region suitable for beekeeping, with the frequent occurrence of the Africanized honey bee, producing honey and acting in the pollination of several species of native plants, guaranteeing the perpetuation of the species (Mendonça et al., 2008; Abadio Finco et al., 2010). For the Savannah Amazônia ecotone, recent work points out the difficulty of maintaining bees during the rainy period of the year, however, they demonstrate the possibility of production during the low rainfall season (Rosa et al., 2014; Sousa et al., 2014; Tavares et al., 2014; Ramalho-Sousa et al., 2017). Among bee products, royal jelly has reached interest all over the world, due to its importance in bee nutrition and use as a food supplement for humans. Its therapeutic properties are associated with longevity, healthy life and treatment of many diseases, being used as a food supplement and component of cosmetics (Martos et al., 2008; Toledo et al., 2010).

MATERIAL AND METHODS

The experiment was carried out in the Legal Amazon area, in the apiary of the School of Veterinary Medicine and Zootechnics (EMVZ) – ‘‘Universidade Federal do Norte do Tocantins’’ UFNT), municipality of Araguaína, Northern region of Tocantins, 07°11’28’’ South Latitude, and 48°12’26’’ West Longitude, 400 km from the capital, Palmas.

To carry out the research work, it was necessary to prepare and adapt the colonies for collection, continuing the work started in 2021, so that the royal jelly production trial could be carried out during the 2022/2023 bee harvest period, between the months of August 2022 to August 2023.

The Recreate Orfanada method, described by Silveira Neto (2011), and adapted by Silveira Neto et al., (2020) was used. A hive is used as a breeding hive for the production of royal jelly, together with the breeding hive, four hives are chosen from the apiary to serve as support.

In the method described, the rearing hive has the queen removed (orphaned). This management suspends laying and as a consequence there is a reduction in the population and a decrease in the queen’s pheromone (Winston, 1991), causing an increase in the stimulus for the creation of queen cells by the colony. This management requires replacement of frames with offspring originating in support hives, at different stages of development, to maintain a high population level.

With the hive assembled, a central frame is removed and replaced by a dome holder frame made up of two transverse wooden rulers on which 20 domes made of natural wax were fixed.

Frames containing new offspring approximately one to two days old were removed from the support hives. This material was transported to a location intended for

transferring the larvae to the domes with the aid of a grafting needle, lamp and base. The transfer consists of removing the larva from the alveolus along with a small amount of royal jelly and placing it in the dome. After this process, the frame is reintroduced into the rearing hive. After 48 hours, the frame was removed and taken to the laboratory to collect the jelly produced. The collected material was weighed on an analytical balance, with an accuracy of 0.001g. Weighing was carried out individually for each ruler of the removed frame. The samples were placed in plastic bottles, duly identified and frozen for subsequent bromatological analysis.

The entire grafting process is repeated with the reintroduction of the graft to accumulate the jelly again, with a frequency of 3 times a week in the months of May and July.

RESULTS AND DISCUSSION

The work carried out was a continuation of the 2021/2022 project, even with the results obtained, some adjustments to the apiary and management were necessary to improve the production of royal jelly, such as reducing the working hours from 72h to 48h, in attempt to expand production. According to the data obtained and described in table 1, in the month of May, among the 8 possible grafting dates, collections were observed in only 4 periods with a total sample weight of 4.50g/collection and an average of 1.12g, in the month of July with 11 possible dates for collections, success was only achieved on 7 different dates with a total production of 3.12g/collection and an average of 0.45g. These values do not present a significant difference in terms of comparison of means ($p < 0.05$).

Even with the uniformity in the management of the hives, it is clear that production and yield vary between them, being in the same location as the beginning of the study. These variations may be associated

with technology, genetics, management and practical experience (Martinez and Soares 2012). The average values in the month of May have a similar weight to those found in the literature (MOURO E TOLEDO, 2005; GARCIA E NOGUEIRA-COUTO 2005). For the month of July, however, a reduction in values was observed, confirming a variation in royal jelly production for Africanized honey bees with averages of 1.8 to 7.96 g/collection.

Observing the biome variable, Silveira Neto (2011) in a semi-arid region obtained an average of 0.1641g in the state of Ceará and Queiroz (2001) obtained an average of 0.118g in the rural region of Pernambuco, values that are lower than those in the Savannah Amazonia ecotone, found in this experiment.

The different Brazilian biomes also significantly interfere with activities, taking into consideration, the short productive periods throughout the year, such as four months in the caatinga region and six months in the savannah and/or Savannah Amazon transition, long periods of rainfall, as well as the monthly variation in the supply of pollen and nectar, are relevant factors that must be considered when planning this beekeeping activity (QUEIROZ et al., 2001; RAMALHO-SOUZA et al., 2017).

Date	Ruler 1	Ruler 2	Total
May			
Day 15	0.41	1.35	1.76
Day 17	0.00	0.25	0.25
19th day	0.33	0.62	0.95
Day 22	0.64	0.89	1.53
Day 24	0.00	0.00	
Day 26	0.00	0.00	
Day 29	0.00	0.00	
Day 31	0.00	0.00	
Average*	0.17	0.39	1.12
Total			4.50
July			
Day 3	0.00	0.00	
Day 5	0.13	0.00	0.13
Day 7	1.11	0.37	1.48
Day 10	0.12	0.11	0.23
Day 12	0.22	0.34	0.56
Day 14	0.15	0.13	0.29
Day 17	0.00	0.00	
19th day	0.12	0.13	0.25
Day 21	0.19	0.00	0.19
Day 24	0.00	0.00	
Day 26	0.00	0.00	
Average *	0.18	0.10	0.45
Total			3.12

Table 1 – Test on royal jelly production, in grams, in Africanized honey bee colonies subjected to the introduction of a dome frame for 48 hours, located in the Savannah Amazon transition region. Araguaína, TO. 2023

*(p > 0.05)

The results obtained prove the possibility of producing royal jelly in the state of Tocantins.

With the variations in results obtained in productions in the two study periods, they demonstrate the need to adjust the methodology and management to obtain more significant results.

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