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TRANSLATION OF A CHAPTER FROM A BEEKEEPING DICTIONARY: TECHNOLOGICAL ADVANCES IN BEEKEEPING

TRADUÇÃO DE CAPÍTULO DE DICIONÁRIO DE APICULTURA: AVANÇOS TECNOLÓGICOS NA APICULTURA

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Abstract: Translation of the First Chapter of the *Beekeeping Dictionary*, entitled *Technological Advances in Beekeeping*, published through Legal Deposit at the National Library with ISBN 978-65-01-29420-9 and the following descriptors: 1. Beekeeping 2. Dictionary 3. Linguistics.

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Studies prove that beekeeping is as old as human coexistence in organized society. Its evolution occurred gradually, allowing for the current exploitation not only of honey, through the rational breeding of bees, but also of various other products derived from beekeeping (SEBRAE, 2006).

Before the emergence of humans on Earth, approximately 20 million years ago, bees were already capable of producing and storing honey. This has been confirmed through archaeological research. Due to a lack of knowledge, primitive humans hunted bees and ended up consuming the honeycomb with a mixture of honey, pollen, wax, and larvae. To confirm the time of existence of bees on Earth, there is a fossil of a honeybee, considered the oldest in the world and dated to 12 million years ago, from the now-extinct species *Apis ambruster* (EMBRAPA, 2003).

The 17th century became a landmark in the history of beekeeping evolution, as it saw the first significant recorded advances in this field as a science. A key historical milestone was the discovery of the microscope, which enabled the identification of the queen bee's sex—until then, it was believed to be a king. However, it was only in the 19th century that beekeeping truly gained importance when Lorenzo Lorain Langstroth discovered the "bee space," a gap between combs that varies between 6 and 9 mm (SANTOS, 2009).

The true beekeeping technique emerged in 1841 when a radical and revolutionary modification was made to beehives: the abandonment of fixed hives in favor of movable hives. Honeybees are raised in areas where there is an abundance of nectar-producing plants, such as orange and apple trees. Most honey producers place their hives in agricultural zones, particularly on properties with a large number of plants, providing a greater diversity of flora and a larger amount of nectar through flowers (WIESS, 1984).

INTRODUCTION OF AGRICAN BEES

In the early 1950s, Brazil's annual honey production did not exceed five thousand tons, while Argentina's production had already surpassed thirty thousand tons per year. The country's low productivity led the Federal Government authorities to encourage Professor Warwick Estevam Kerr, a renowned Brazilian geneticist, to focus on Brazil's tropical climate and flora to find ways to boost the development of beekeeping and intensify honey production for commercial-scale supply (PERUCHI, 2009).

Initially, the lack of literature on beekeeping was one of the main obstacles Kerr encountered, leading him to rely on foreign studies about bee work and productivity. He then brought from Africa several specimens of a breed called *Apis mellifera scutellata*, known for its high aggressiveness, adaptability, high productivity, and swarming tendency. The researcher aimed to develop a less aggressive and more productive bee through genetic improvement in the laboratory so that he could later provide queen bee matrices with these traits to beekeepers across the country (PERUCHI, 2009).

In 1956, an accident at the experimental quarantine apiary in the Camacuã Forest Nursery in Rio Claro, São Paulo, caused the involuntary release of the specimens brought from Africa, leading to swarming and, consequently, the Africanization of apiaries in Brazil. This event also resulted in the deaths of some animals and people before the intended genetic improvement program could be completed. The African bee began to mate almost freely in nature with the European bees already present in Brazil, giving rise to a new bee resulting from

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the hybridization of *Apis mellifera linguistica* (Italian) and *Apis mellifera mellifera* (German). This event marked the beginning of the second phase of beekeeping in Brazil (VIDAL, 2013).

The term "Africanized bee," introduced by Gonçalves (1974), was specifically adopted to name these hybrid bees, which resulted from natural crossbreeding between the European *Apis* and the African *Apis*. This designation was chosen over the terms widely publicized by the North American press: "killer bee," which has a distinctly negative connotation, and "Brazilian bee," which was deemed inappropriate, as this term should be reserved for native Brazilian bees recorded since colonial times (MATOSO, 1999; DANIEL, 1872; SÁA, 2015).

At that time, the scientific community, technicians, and beekeepers decided to work together to study and improve the *Apis mellifera* hybrid that was already present in nature and in many apiaries across the country. This marked the beginning of the third phase: the phase of knowledge, recovery, and expansion of Brazilian beekeeping.

RATIONAL BEEKEEPING

Today, beekeeping is considered a branch of animal science that deals specifically with bees, being both a science and an art, as well as a skill that humans have developed to breed bees rationally. The goal is to produce higher-quality products in less time, at lower costs, and with greater profitability (ROCHA, 2008).

Rational beekeeping is a technical or scientific activity that applies methods already proven through experience and research. It offers several advantages, as it does not require significant investments from beekeepers, since the bees themselves provide for their needs, feed, and protect their offspring (BRAGA, 1998).

The progressive development of Rational Beekeeping has brought significant profitability to Brazil. Since it is an activity practiced throughout the country, it produces approximately 50 thousand tons of honey per year, generating export revenues of around US$98.6 million. The production of bee-related products has also driven the development of the heavy apicultural equipment industry. Previously imported, all tools and equipment are now developed and manufactured in Brazil (GONÇALVES, 2004; ABMEL, 2014; LIMA, 2006).

Table 1 presents definitions of the main products that beekeeping activity can provide to humans.

PRODUCT	DEFINITION
HONEY	A sugary, viscous fluid with a brownish-yellow color, produced by various species of bees from the nectar of different flowers, used as food.
WAX	A secretion from certain glands in the bees' abdomen, used by them to produce honeycombs.
CONCENTRATED POLLEN	A product derived from pollen, which serves as the protein-rich food for bees from their larval stage. It is highly nutritious, possesses therapeutic and prophylactic properties, is rich in essential amino acids that promote growth, and has significant regulatory properties for vital processes. This product is also rich in factor R, which stimulates growth, and is used as a human medicine to regulate metabolism.
ROYAL JELLY	The food of the queen bee; a secretion or substance secreted by worker bees through their hypopharyngeal glands, produced during a period ranging from four to fifteen days of their lives.
PROPOLIS	A resinous material produced by bees to seal the hive; also known as bee glue.
CONCENTRATED APITOXIN	A product obtained from the venom extract of most female bee species, using their sting (ovipositor) as the primary means of defense against predators and intruding bees. It is used in the production of anti-rheumatic and anti-inflammatory medications.utilizado para fabricação de medicamentos antirreumáticos e anti-inflamatórios.

Source: Freitas (2003); Ferreira (2015).

It is noted that, currently, honey commercialization is among the factors that represent the greatest economic prospects in beekeeping. Over the past decades, this activity has experienced growth and expansion worldwide, driven by the increasing demand for healthy food.

BEEKEEPING AND SUSTAINABILITY

Beekeeping is an activity that has been developed in almost all geographic regions, requiring favorable conditions for its practice, such as suitable soil, favorable climate, and abundant vegetation with rich flowering (SANTOS, 2009).

In addition to contributing to the conservation of various species, beekeeping is an activity that has a positive impact in economic, environmental, and social aspects. It serves as a source of income for many rural workers while also meeting all the criteria established for sustainability (KHAN; MATOS; LIMA, 2009).

Table 2 presents specific definitions related to Beekeeping and Sustainability.

Table 2 – Beekeeping and Sustainability Terminology

NOMENCLATURE	**DEFINITION**
BEEKEEPING	A branch of animal production dedicated to the rational and economic breeding of bees. It is a specialized activity that can be practiced for various purposes. It is not a solitary activity; it requires at least two people for safety reasons and is generally carried out within associations or cooperatives.
SUSTAINABILITY	The management of the environment and its resources in a way that allows for continuous use without depletion in the future. It is closely related to economic issues, social responsibility, and environmental preservation.

Source: Santos (2009); Ferreira (2015).

From a sustainability perspective, beekeeping, as an income-generating activity throughout the year, contributes to keeping people in rural areas and establishing extensive production chains. This activity also plays a crucial role in maintaining and preserving the environment, as bees act as natural pollinators of native species, helping to protect and sustain the balance of ecosystems (FREITAS, 2003).

In economic terms, since it requires low investment and operational costs, beekeeping enhances crop productivity, given that bees are natural pollination agents. Beekeeping does not consume forage or require pasture formation, allowing it to be integrated with any other agricultural activity without competing with grazing animals (SANTOS, 2009).

Currently, beekeeping stands out as an excellent sustainable alternative. In addition to not competing with existing rural activities, it serves as a complementary source of income for farmers (INABA; PASIN, 1998).

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