EFFECT OF SUPPLEMENTARY FEEDING ON BUILD–UP OF HONEYBEE COLONIES

By

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B.Sc. Agric. Sc. (Economic Entomology), Ain Shams University, 2009

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INTRODUCTION

Honey bees require protein, carbohydrates and water together with a wide range of micronutrients (Vitamins, minerals, enzymes) in order to produce a healthy colony. A correct artificial diet will improve the nutritional balance and the well-being of the colony. It is necessary to establish different nutritional strategies for different regions, different categories of colonies and different hive products. The importance of pollen in the diet must not be underestimated, with the sowing of plant species that can maximize the nutritional quality of the colony. The brood rearing activity and nutritional state of the colony, the quantity and quality of incoming pollen grains, nectar and the food reserves in the hive will determine whether the bees need supplemental foods or not **(Standifer *et al.*, 1977 and El-Sherif *et al.*, 1994a)**. There are many studies regarding supplementary feeding of honey bee colonies with different formulae consisting of glucidic acid and vitaminic mixtures, but there are fewer studies made on the use of different plant extracts in supplementary feeding of bee colonies, especially in different stages of their biological development **(Marghitas *et al.*, 2010).** Beekeepers often do not have much choice during periods of pollen dearth and feed their colonies any kind of pollen substitute or plain sugar aiming to produce highly rate of broods, stronger and healthy colonies **(Atallah *et al.*, 1979 and El-Banby and El-sherif, 1987a,b).** Feeding colonies on either inadequate amount of natural pollen **(Hussein, 1981 and Lehnar, 1983)** or inferior pollen grains substitute **(Wahl and Ulm, 1983)** were both cause losses in bee colonies. Colonies fed on diets free from pollen did not rear brood to the sealed stage **(Omar and Mateescu, 1985).** Feeding colonies on extracts of certain medicinal plants have been mainly directed towards improving quality of the produced honey, as it had antimicrobial activity **(Mishref *et al.*, 1989)** and contained antioxidants **(Rosenblat *et al.*, 1997).** Less attention has been given to their effects on brood rearing rates and adult Longevity **(Raj *et al.*, 1993 and watanable, 1993).**

INTRODUCTION

Feeding colonies with 20% of the four medicinal plant extracts (Carob, *Ceratonia silique*; Tamarind, *Tamarindus indica;* Karkade, *Hibiscus sabdariffa and* Pepper-mint, *Mentha piperita)* mixed with sugar syrup significantly increased the brood rearing rates and the longevity of emerged workers in both Carniolan and hybrid colonies together **(El-Sherif, 2002).** Dearth periods are a critical problem for beekeeping; colonies dwindle and are inadequate for honey production and pollination services. Pollen substitutes can overcome a lack of natural food and reduce weakening and loss of colonies during critical periods. Protein supplementation is a key management tool to maintain the strength of bee colonies during period of pollen shortage. Adequate protein supplementation help maintain the health of the colonies **(Moja *et al.*, 2015)**.

The aim of the present work is to study the effect of supplementary feeding on build-up of honeybee colonies for autumn and spring division and good wintering.

REVIEW OF LITERATURE

Doull (1973) found that the rate of consumption of pollen or pollen supplements was a direct reflection of the rate of brood rearing in the colony, and bees in normal colonies will not initiate or maintain.

Atallah (1975) showed that the chemical composition of dried Brewer's yeast was as follows: humidity 9.5%, crude protein 40.5%, other extracts 1.5% and ash 6.25% in addition to traces of vitamins B1, B2 and nicotinic acid.

Dietz and Stevenson (1975) found that pollen like other protein rich foods, loses its nutritional value rapidly when stored incorrectly. Fresh pollen stored at room temperature loses its quality within a few days. Fresh pollen stored in a freezer loses much of its nutritive value after one year.

Dietz and Stevenson (1980) found that pollen can be kept at room temperature for a several months, refrigerated at 5 °C for at least a year or frozen to -15 °C for many years without quality loss when tested by feeding to honeybee colonies and recorded an increase in brood rearing rate.

Cook and Wilkinson (1986) found that the feeding of artificial pollen supplements was found to give variable results and did not always stimulate brood rearing. A quick, simple and cheap method of feeding colonies with pure bee-collected pollen was devised. Frozen pollen (collected in pollen traps during the previous summer) was allowed to thaw overnight; 0.5lb (222g) of pellets were poured from a jar into an empty honey comb laid horizontally and the pollen was pressed into the cells with the fingertips. Five similar colonies were each given 2 such combs of pollen in mid-March, and after one week more pollen was given so that total amount in each colony had been made up to 1lb. After 5 weeks each colony had, on average, 2.5 combs of well fed brood at all