

Feedbee® Balances Growth

Feeding colonies with a nutritious pollen supplement is beneficial.

A.M. Saffari^a, P.G. Kevan^b, J.K. Atkinson^c

Introduction

During the shortage or complete absence of pollen, or in the presence of only poor quality pollen, beekeepers often feed colonies of honey bees with either pollen substitute (with no pollen) or supplement (with pollen) diets. These are ideally materials that provide required nutrients to bees.

Most researchers have thought any protein source such as dried egg yolk, meat scraps, milk products e.g. whey and wheat, and soy products could be used as a substitute for pollen without considering the issues of palatability, nutritional content, nutritional requirements of bees, and biological effectiveness of the proposed materials.

Some animal feed ingredients such as, soybean products, have been so popular that even after their failure (Flores 2003, Nabors 2000, Rana *et al* 1996, Chhuneja *et al* 1993, Zaytoon *et al* 1988, Kulincervic 1982) to be of any benefit to honeybees. Investigators and beekeepers still use them simply because they are the most cheaply available feedstuffs.

Pollen supplements or substitutes can be evaluated by a variety of means, the relationships between which are often obscure. To be of nutritional value for animals and insects, the diet must be a collection of various potential feed ingredients as alternative sources of required

nutrients similar to their natural food sources, have proper texture and consistency, and then be accepted by the animal. Once ingested, the diet must be digestible by that particular animal or insect, be free or freed from any toxins or anti-nutritional factors, have a long shelf life in various conditions, be easily available, and be economical. Considering all these issues Feedbee® was formulated to accommodate balanced nutrition, palatability, and low cost.

Materials and Methods

28 colonies were selected at the University of Guelph apiary. All queens in the colonies were two year old sisters and all the colonies were located in one apiary. The colonies were given equal areas of capped brood, three frames of honey, and three to four empty drawn combs (depending on the number of brood frames), and equal weight of bees. Out of 28 equalized colonies 24 of them were randomly selected and divided into four experimental groups. These groups received only one of the three feeds (Feedbee®, Bee-Pro®, or pollen) in patty form and the fourth control group did not receive any feed other than what they obtained themselves from their routine foraging throughout the experiment. The feeding trial was made in early Spring 2004 for a period of 30 days and feed intake data were collected over three 10 day periods. The

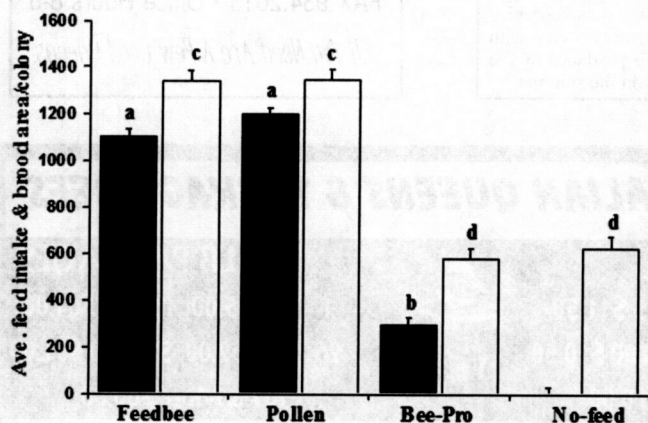


Fig. 1 – Total mean feed intake ■ and total mean capped brood area □ of 23 equalized honey bee colonies that received Feedbee®, pollen, Bee-Pro®, or no-feed (control) in Spring 2004 fatty feeding trial. Different letters denote a significant statistical difference at $p < 0.05$.

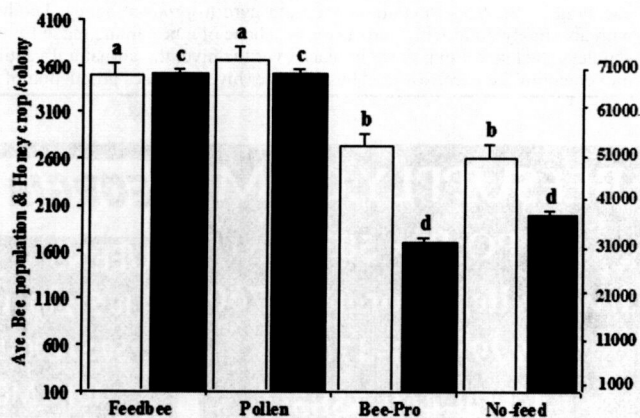


Table 6 – Total mean bee population □ and total mean honey production ■ of 23 equalized honey bee colonies that received Feedbee®, pollen, Bee-Pro®, or no-feed (control) in Spring 2004 fatty feeding trial. Different letters denote a significant statistical difference at $p < 0.05$ by Tukey's test (GLM Process of SAS program).

brood area and bee population data were collected in three months (May, June, & July). The honey production data was collected at the end of the honey harvest season.

Results

Feed Intake

The total mean feed intake (g/colony) is presented in black columns in Fig. 1. For Feedbee[®], the feed intake was 1103 g ± 51.02 and for pollen it was 1194 g ± 36.37 which were not significantly ($p < 0.05$) different. These values were significantly ($p < 0.05$) higher than the feed intake for Bee-Pro[®] (295 g ± 80.78).

Capped Brood Area

The capped brood area (cm²/colony) is presented in white columns in Fig. 1. The mean capped brood area of colonies treated with Feedbee[®] was 1338.11 cm² ± 85.80 and for pollen it was 1344.43 cm² ± 129.50 which were significantly ($p < 0.05$) higher than for colonies fed Bee-Pro[®] (577.86 cm² ± 67.71) and control (unfed) group (627.17 cm² ± 52.17).

Bee Population

The total mean bee population is presented by weight (g/colony) in white columns in Fig. 2. The weight of bee population for Feedbee[®] was 3.49 kg ± 0.07 and for pollen it was 3.66 kg ± 0.08 which were significantly ($p < 0.05$) higher than for Bee-Pro[®] (2.73 kg ± 0.10) and control (unfed) group (2.61 kg ± 0.16).

Honey production

The mean honey production (kg/colony) is presented in black columns in Fig. 2. The colonies received Feedbee[®] and pollen produced 71 kg ± 5.45 and 71 kg ± 6.30 of honey respectively which were significantly ($p < 0.05$) higher than honey produced by Bee-Pro[®] (33 kg ± 4.35) and control (unfed) (39 kg ± 4.37) groups.

Discussion

The results indicate that consumption of Feedbee[®] was statistically similar to that of pollen in all experimental colonies when presented in patty form, and also these two diets were equally superior to Bee-Pro[®]. This is consistent with the results of the previous feeding trials (Saffari *et al.* 2004, Saffari *et al.* 2006), where pollen and Feedbee[®] in both patty and powder forms were equally accepted by bees. This clearly indicates that Feedbee[®] is highly palatable and is easily accepted by bees in absence of pollen. The results also indicated that feeding the colonies with Feedbee[®] and pollen equally enhanced brood rearing which was attributed to the higher nutritive quality of these diets. The proper nourishment of brood in Feedbee[®] and pollen treated groups resulted in greater bee populations. These diets were nutritious enough for young bees to gain weight and grow to the foraging stage; thus leading to higher honey production than was seen in two groups.

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The evidence from all of the experiments and analyzed parameters (feed intake, capped brood area, bee population and honey yield) in this study indicates that in order to promote brood rearing and to increase colony population at a time of pollen dearth, feeding honey bee colonies with extra pollen or a pollen substitute diet is beneficial. However feeding honey bee colonies with bee collected pollen raises the risk of spreading diseases and could also be a costly practice. Thus, it is economical and beneficial to substitute pollen with an equally palatable and nutritionally balanced pollen substitute diet such as Feedbee[®], which can be fed in both patty and powder forms all year round. **BC**

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