

Bee-Pro® and Feedbee®: A comparison of Capped Brood Areas

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Abstract

The 2009 Pollen Supplement Study investigated the capped brood area in hives being fed Feedbee® and Bee-Pro® pollen supplements, as well as hives receiving no pollen supplement. For the 2009 Pollen Supplement Study, it was hypothesized that Feedbee® would demonstrate a higher average area of capped brood per hive, than would Bee-Pro® by the end of the study. The 2009 Pollen Supplement Study involved 13 hives, of which five were fed Feedbee®, five were fed Bee-Pro® and three were control hives and received no pollen supplement. The hives were measured three times, and measurements were used to calculate the average area of capped brood for each hive. The 2009 Pollen Supplement Study supported the hypothesis that Feedbee® would demonstrate a higher average area of capped brood per hive, than would Bee-Pro® by the end of the study.

Recent research has seen the emergence of various different studies directed at exploring the effect of feeding pollen supplements to honeybees in order to stimulate hive growth. These studies are vitally important to beekeepers seeking to increase their bee stocks and colony strengths in order to provide the greatest efficacy in pollination as well as extracting the maximum yield from the honey flow. For beekeepers, the awareness of recent studies as well as the knowledge of pollen supplements that will maximize colony performance help equip the beekeepers with a powerful tool in rearing healthy hives. A study presented at the 2006 American Bee Research Conference in Louisiana demonstrated that between Bee-Pro® and Feedbee®, bees that were fed the Feedbee® supplement demonstrated greater longevity and had higher hemolymph protein levels than bees on the Bee-Pro® diet (Gregory, 2006). Additionally, the bees on the Feedbee® diet weighed more than the bees on the Bee-Pro® diet at the end of the study (Gregory, 2006). Therefore, by evaluating worker bees in a closed cage, the Feedbee® protein supplement demonstrated superiority to the Bee-Pro® supplement in increasing protein levels in worker bees and in providing a diet that increased longevity and weight in worker bees.

Although in comparison to Bee-Pro®, the Feedbee® supplement demonstrated itself as a superior alternative pollen supplement for worker bees, the study presented at the ABRC in 2006 did not measure the overall hive performance and growth. In order to address the effects of various pollen supplements on overall colony strengths, Saffari, Kevan and Atkinson (2006) measured the food consumption in hives fed Feedbee®, Bee-Pro®, natural pollen, and control hives which received only the pollen that the hives gathered by natural means. Together with feed consumption, Saffari et al. (2006) also measured the honey production, overall brood area and total weights of the bees from the hives involved in the studies. In their study, Saffari et al. (2006) demonstrated that Feedbee® was superior to Bee-Pro® in consumption, honey

production, capped brood production, and in overall bee weights. Nonetheless, although Saffari et al. (2006) demonstrated the superiority of Feedbee® in relation to Bee-Pro®, a cautionary note should be expressed in that Saffari was directly involved in the creation of the Feedbee® pollen supplement, and therefore, the 2000 Pollen Supplement Study sought to replicate at least some parts of the study conducted by Saffari et al. (2006) to see if Saffari's results could be duplicated in a neutral setting.

As in a previous study done by Hofer at Keystone Honeyhouse (2008), hives were selected and fed the different pollen supplements Feedbee®, and Bee-Pro® with 4% Pro Len (henceforth referred to as Bee-Pro®). The total capped brood areas of the hives in the study were measured at three different times over a span of seven weeks. The brood area was calculated using the horizontal diameter of the brood area and by applying the formula for the area of a circle to find the area of capped brood. The study involved five hives being fed each of the two pollen supplements: Feedbee®, and Bee-Pro®, and three control hives that did not receive any pollen supplement. In light of the previous study on pollen supplements completed by Hofer (2008), it was hypothesized that Feedbee® would demonstrate a higher average area of capped brood per hive, than would Bee-Pro® by the end of the study.

Method

Participants

The 2009 study on pollen supplements involved 13 hives. Five hives were fed Feedbee® supplied by A.M. Saffari at Bee Processing Enterprises Ltd., and five hives were fed patties of Bee-Pro® with 4% Pro Len supplied by Mann Lake Ltd. Three hives were control hives and received no pollen supplement. Jonathan Hofer conducted the study on pollen supplements, and performed all measurements and calculations.

Apparatus

For the 2009 study on pollen supplements, Hofer used a standard measuring tape with the imperial system of measurement. All measurements were conducted in inches, and the calculations were also done in inches. The horizontal diameter of the capped brood area for each frame with capped brood was recorded, and Hofer used the formula for the area of a circle ($3.14159 \times r^2$) to calculate the area of capped brood for each hive.

Since Feedbee® is only available in powdered form, Hofer mixed the initial Feedbee® patties according to the formula provided by the makers of Feedbee®: 2 Kg Feedbee® mixed with 1.2 L of 1:1 sugar syrup in addition to 400 ml water. The later batches of Feedbee® included slightly more of the Feedbee® powder (2.1 Kg) in order to make a firmer and more workable patty. Both formulations of Feedbee® were consumed equally well by the bees. For feeding, both the Feedbee® and Bee-Pro® patties were placed on the top of brood chambers in single story hives. The study on pollen supplements was done at Keystone Honeyhouse near Warren, Manitoba, Canada and lasted from March 14, 2009 until May 6, 2009.

Procedure

The 2009 Study on Pollen Supplements started with the initial assessment of colony strengths on March 14, 2009. The strength of each colony was recorded by noting the number of frames covered with bees and the hives were designated so that the average strength of colonies to be fed Bee-Pro®, Feedbee®, and the control hives were equal. It was assumed that none of the hives had started brood rearing prior to this point. On March 21, 2009, the pollen supplements were given to each of the hives, with the exception of the control hives, which received no pollen supplements. Hives were initially given one 600g Feedbee® patty, or two 454g Bee-Pro® patties. From March 21 onward, hives were continually provided a supply of

their designated pollen supplements until near the end of the study. The Feedbee® patties were mixed according to the previously mentioned formula, and surplus patties of Feedbee® and Bee-Pro® were frozen to maintain freshness.

The first measurement of capped brood occurred on April 4, 2009. All 13 hives were measured, and measurements were recorded. Later measurements were made on April 23, 2009, and May 6, 2009. It was observed that the first natural pollen for 2009 was brought in by the hives on May 4, 2009.

Results

An analysis of the data collected by Hofer in the 2009 Pollen Supplement Study allowed him to calculate the average brood area and the standard deviation for the control hives as well as for the hives being fed Feedbee® and Bee-Pro® pollen supplements. For the first measurement, the control hives showed an average capped brood area of 32.99 square inches with a standard deviation of 29.43. The hives being fed Feedbee® had an average capped brood area of 75.08 square inches with a standard deviation of 26.20. The hives being fed Bee-Pro had an average capped brood area of 82.15 square inches with a standard deviation of 42.84.

For the second measurement, the control hives had an average capped brood area of 260.22 square inches with a standard deviation of 122.02. The hives being fed Feedbee® had an average capped brood area of 366.78 square inches with a standard deviation of 177.32 and the hives being fed Bee-Pro® had an average capped brood area of 373.38 square inches with a standard deviation of 118.04.

For the third measurement, the control hives had an average capped brood area of 176.72 square inches with a standard deviation of 119.06. The hives being fed Feedbee® had an average capped brood area of 540.20 square inches with a standard deviation of 157.01. The hives being

fed Bee-Pro® had an average capped brood area of 494.80 square inches with a standard deviation of 130.54.

The average capped brood areas for the two treatments and the control hives over the 2009 Pollen Supplement Study time period are represented in Figure 1. The dark blue line indicates the average capped brood area for the control hives, the pink line represents the average capped brood area for the Feedbee® hives, and the yellow line represents the average capped brood area for the Bee-Pro® hives. Initially, the control hives had the lowest amount of capped brood area, while the hives being fed Bee-Pro® showed the largest area of capped brood. The hives being fed Feedbee® were lagging slightly behind the hives being fed Bee-Pro® in capped brood area in the first two measurements. Nonetheless, by the end of the study, the final measurement indicated that the hives being fed Feedbee® had the largest area of capped brood, the control hives had the lowest area of capped brood, and the hives being fed Bee-Pro® on average measured smaller areas of capped brood than the hives being fed Feedbee®. Thus, the 2009 Pollen Supplement Study supported the hypothesis that by the end of the study, the hives being fed Feedbee® would demonstrate a higher average area of capped brood per hive, than would the hives being fed Bee-Pro®.

(Insert figure one here)

Discussion

The results from the 2009 Pollen Supplement Study clearly supported the hypothesis that by the end of the study, hives being fed Feedbee® would demonstrate a higher average area of capped brood per hive than would the hives being fed Bee-Pro®. As such, the 2009 Pollen Supplement Study replicated the results obtained by Hofer (2008) in the previous pollen supplement study. Similarly, the 2009 Pollen Supplement Study also supported the claim put

forth by Saffari, Kevan and Atkinson (2006), that feeding Feedbee® resulted in higher areas of capped brood than the feeding of Bee-Pro®. As such, beekeepers should be aware of the long-term effects that feeding various pollen supplements has on increasing bee populations and honey yields in hives.

Although the 2009 Pollen Supplement Study only measured the overall area of capped brood in the hives, it did not take into consideration the economical side between feeding Feedbee® and Bee-Pro®. A suggestion for further studies would be to investigate whether it is economically beneficial to feed a more expensive and labor intensive pollen supplements in order to obtain greater brood build-up (in this case, an average of 9% more brood). Also, it would be worthwhile to investigate why in both the previous study on pollen supplements done by Hofer (2008), and in the 2009 Pollen Supplement Study, the hives being fed Bee-Pro® initially had higher brood areas than the hives being fed Feedbee®, but by the end of the study, the hives being fed Feedbee® had surpassed those being fed Bee-Pro® in brood build-up.

A word of caution should be expressed in that this study was done at a very small scale with the involvement of only 13 hives. Therefore, this study should not be taken as the complete authority on the evaluation of the two aforementioned pollen supplements. Although there was an attempt to minimize variables, the study included different queen lines of different ages, and this should also be taken into consideration when reading the results of the study.

As recommended in the previous study on pollen supplements done by Hofer (2008), the recommendation for the makers of Feedbee® to explore the possibility of incorporating their pollen supplement into patty form is worth repeating. Selling Feedbee® in a ready to use patty format would decrease the amount of labor involved in preparing Feedbee® for feed in the hives and would thereby increase Feedbee®'s attractiveness to beekeepers. Although selling

Feedbee® in patty form would decrease labor for the beekeeper, it would also allow for an easier cost comparison with other brands of pollen supplement patties. In addition to decreasing labor for the beekeeper, selling Feedbee® in patty form would give the manufacturers of Feedbee® greater control in delivering a consistent product that is attractive for bee consumption (Hofer 2008).

On a small scale, the 2009 Pollen Supplement Study raised a few questions in relation to the pollen supplements being evaluated. Firstly, it was very remarkable that Feedbee® should have lagged behind the Bee-Pro® supplements for the beginning of the study in both 2008 and 2009, but then in the final measurement, shown more capped brood area than the hives being fed Bee-Pro®. Is this because Feedbee® shows a greater long-term benefit for bee hives? This question has to remain unanswered at this point pending further research.

A thanks is extended to Mann Lake Ltd. and Mr. Abdolreza Saffari of Bee Processing Enterprises Ltd. for providing samples of their product for evaluation. The author of this study welcomes all comments, questions and inquiries about the 2009 Pollen Supplement Study and they can be forwarded to:

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Figure Captions

Figure 1: Average capped brood areas for the two treatments and the control hives over the 2009 Pollen Supplement Study time period.

