

HONEY VARIATION 1992-1993

Treatment	1991	1993
Small Cell	74.9 kg (165 lbs)	62.2 kg (137 lbs)
Large Cell	69.9 kg (154 lbs)	49.9 kg (110 lbs)
Other Apiaries	75.4 kg (166 lbs)	53.6 kg (118 lbs)
Difference of Small Cell to Large Cell in lbs	+ 11 lbs	+ 27 lbs
Difference of Small Cell to Other Apiaries in lbs	-1 lb	+ 19 lbs

(Information taken from Table 2, Erickson et al., May 1996 *ABJ* article)

ter foundation with our own honey bees now acclimatized for more than 10 years without the use of chemical controls. (Note - We have personally had HBTM for more than 10 years now and Varroa mites for 5 years officially). It is interesting to note that no data was presented here for crop years 1994 and 1995, although honey bee tracheal mite infestation levels were reported for both these years. Based on the 1993 and 1992 data figures presented in the study, the following information should be of importance to all serious beekeepers (see "Honey Variation" table).

As the 5.44 mm/cell diameter size comb foundation represents the current size now popularly sold to many U.S. commercial beekeepers, and many must maintain 1,000 or more honey bee colonies to make a living, *at the current price of approximately \$.80 per lb., the difference in production takes on real economic meaning.* At 27 lbs. average difference per hive, this would equate to an extra 27,000 lbs. per 1,000 colonies maintained carrying approximately the same mite load. Extrapolated this would equate as shown in the "Market Price Variation" table.

We believe that the data presented in the above table must be of economic concern to all seriously minded beekeepers experiencing tight profit margins. Since we believe that we must live in a real world, and we know that many beekeepers in the past several years have bred through their tracheal mite problems, all that we can hope for is to maintain our honey bee colonies in an economically profitable sound manner and learn to coexist with mites if we are to avoid eventual pitfalls of product contamination.

Going further, this study should be carried forward and salvaged by the addition of more apiaries this time containing a more true representation of how honey bees live and adapt to the various comb foundation sizes. Small caste honey bees naturally prefer small natural comb foundation, while large caste honey bees naturally prefer comb foundations that fit their

specific body-size needs. Requeening should be confined to within each specific caste group. This must be done because eventually mite loads must be measured allowing for combined parasitic infestations of both Varroa mites and Tracheal mites. Noted at the past annual American Honey Producers Meeting in Corpus Christi, Texas, Dr. Erickson gave a rendition of a Varroa experiment that was run

by him in Arizona. To wit, Ed and Dee Lusby told him to place 10 hives on large cell comb foundation and 10 hives on small cell comb foundation. After 14 months of observation with no treatments of any kind, only four colonies were left alive. All the colonies on large comb foundation were dead. The four remaining colonies were on small comb foundation. Not even Terramycin was used.

In the real world one must look at a whole problem. Today we are faced with more than one type of parasitic mite to contend with to maintain healthy colonies. We know that honey bees, like other insects, are capable of adaptation to problems encountered. In the end chemicals contaminate and destroy. We know that from personal experience here in Arizona that honey bees will come through HBTM problems within 3-5 years in most commercial operations if survivalist breeding pressure is maintained. We also know from Dr. Erickson's Varroa experiment that 40% of colonies maintained on small cell comb foundation can survive Varroa mites. These could be survivalist bred also. However, as the field management must be developed by commercial beekeepers, we must have verifiable lab work and correlation by trained scientists. One

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MARKET PRICE VARIATION CURRENT PRICING

No. Colonies Maintained	Mkt Price	Lbs Honey Difference	Total Price Difference
1,000	\$.80	+27	\$21,600.00
	\$.80	+19	\$15,200.00
	\$.80	+ 11	\$8800.00
3,000	\$.80	+27	\$64,800.00
	\$.80	+19	\$45,600.00
	\$.80	+11	\$26,400.00
5,000	\$.80	+27	\$108,000.00
	\$.80	+19	\$76,000.00
	\$.80	+11	\$44,000.00
10,000	\$.80	+27	\$216,000.00
	\$.80	+19	\$152,000.00
	\$.80	+11	\$88,000.00
25,000	\$.80	+27	\$540,000.00
	\$.80	+19	\$380,000.00
	\$.80	+11	\$220,000.00
50,000	\$.80	+27	\$1,080,000.00
	\$.80	+19	\$760,000.00
	\$.80	+11	\$440,000.00

Table 2. Average weight of honey produced per colony: 1989-1994

Treatment	1989	1990	1991	1992	1993
Small Cell	26.8 kg (59 lbs)	83.5 kg (184 lbs)	88.1 kg (194 lbs)	74.9 kg (165 lbs)	62.2 kg (137 lbs)
Large Cell	29.5 kg (65 lbs)	90.3 kg (199 lbs)	91.7 kg (202 lbs)	69.9 kg (154 lbs)	49.9 kg (110 lbs)
Other Apiaries	34.5 kg (75 lbs)	84.9 kg (187 lbs)	87.6 kg (193 lbs)	75.4 kg (166 lbs)	53.6 kg (118 lbs)

(Erickson, et al., May 1996 *ABJ*)

must be a partner to the other.

To do a total mite experiment necessary for our industry to survive, this survey which we are field reviewing must be carried forward. It must be even expanded to allow for true testing of honey bees found within our U.S. borders. This should include small caste honey bees and large caste honey bees, but there should be no hedging against either group. Further, the survey must run for the duration of time it would take to measure mite loads of both Varroa and Tracheal mites as is currently happening in the real world. Further, no chemicals must be used. If this can be done, then we can solve our parasitic problems.

Dee A. Lusby
Arizona Rangeland Honey
3832 East Golf Links Road
Tucson, Arizona 85713

SMALL CELL SIZE FOUNDATION FOR MITE CONTROL

I find myself in a position of having to write a field review showing the economic importance of a research article "Natural Suppression of Honey Bee Tracheal Mites in North Dakota: A Five Year Study" which was recently published in the May 1996, *American Bee Journal*, written by Erickson, et al., 1996.

Having made and supplied the small diameter foundation used in this five year study, my husband and I were naturally drawn to reading the finished research article that appeared in the May 1996 issue. However, upon reading the article, several questions were raised in our minds that dictate further work required in the field.

While we ourselves do not believe that this was a true test study to determine the long-term effect of small vs. large comb cell diameter foundation on the incidence and population dynamics of honey-bee tracheal mites (HBTM) in commercially managed colonies per se, which I will expand upon shortly, we do indeed believe that this study is of MAJOR ECONOMIC FIELD IMPORTANCE for commercial beekeepers trying to make a living during hard times, where profit margins are tight.

We do not believe that this was a true test study to determine HBTM infestation

differences between varying small and large cell diameter foundations because:

1. During the course of the study, replacement queens were incorporated into the treatment groups by the beekeepers, requeening queenless colonies using daughter queens reared from superior stock from their "other apiaries". This means that the colonies on the small brood comb cell diameter were at a disadvantage, by having to periodically acclimatize their bees to reaccommodate the small diameter comb.

2. During the course of the study only, weak colonies were simply united with medium strength colonies for over-wintering and both treatment groups were kept in the same beeyards. In the spring, the colonies from the different treatment groups were split apart again and requeened. This means that new colonies were constantly being created and replaced and mite-loads were being equalized to some extent. Again the disadvantage is to the honey bees kept upon the small diameter cell foundation which would be in periodic stages of re-acclimatizing throughout the study.

We believe that both of the above practices by the beekeepers throughout the study raise questions as to the accuracy and dependability of the outcome presented, relative to the incidence of true HBTM infestation levels, throughout the course of the five-year study concerning the long-term effect of small vs. large brood cell diameter foundation, with their accompanying honey bees, on the incidence and population dynamics of HBTM in commercially managed colonies. We believe that a more accurate study upon the incidence of HBTM infestation levels concerning small vs. large brood comb cell diameter foundation on the incidence and population dynamics of the mites in commercially managed colonies would have been better served using true small caste honey bees along with the small diameter brood comb foundation vs. large caste honey bees along with the large diameter brood comb foundation, with requeening accomplished with queens indicative to each group.

We do, however, believe that this is the

best research article that we have seen published in many years that gives an answer to an old question. "DO BIGGER HONEY BEES MAKE MORE HONEY?" For many decades, since the first invention of comb foundation by Mehring and the idea by Professor Baudoux that honey bees could be made bigger and improved upon, contrary to the laws of God and Nature, to make more honey, this fact that bigger makes more honey has never truly been proven.

The data presented by this study would seem to substantiate that indeed, honey bees on naturally sized small comb foundation, even with periodical acclimatizing problems due to requeening with larger caste queens and carrying HBTM loads in commercial operations, do indeed make more honey.

We believe that the data presented in Table 2. Average weight of honey produced per colony: 1989-1994, shows highly significant trend differences that merit further investigation of HIGH ECONOMIC IMPORTANCE TO SERIOUSLY MINDED BEEKEEPERS OPERATING ON TIGHT PROFIT MARGINS.

To wit, reference Table 2 reproduced here again to review.

We believe that the data presented in Table 2 shows that after three major years of acclimatizing, though not a specific planned goal during this study, the honey bees maintained on the smaller comb cell diameter foundation were shown to out-produce honey-bee colonies maintained on the large cell diameter comb foundation of 5.44 mm/cell, while pulling almost even with those honey bees maintained as "other apiaries", representing to us, a cross-section of combs every commercial beekeeper might have within their operations. Further, after four years of acclimatizing, the honey bees maintained on the smaller comb cell diameter foundation were shown to out-produce both those colonies maintained on the large cell diameter comb foundation of 5.44 mm/cell and those maintained in "other apiaries".

We assume that the spread increased in honey production in subsequent years, based on what actual experience we have in the field working with small cell diame-