

Producing Pollen¹

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Beekeepers can be seduced by schemes that appear to be foolproof at the outset, but when closely investigated, are fraught with problems. In the 1950s, Professor Frank Robinson, now retired, from the University of Florida, saw firsthand the effects of one of these phenomena. At that time, the royal jelly market appeared to explode with possibilities. Profits were high and many beekeepers in search of quick gain borrowed money and converted large portions of their operations to jelly production. The result; the jelly market collapsed, putting many beekeepers out of business and forcing others deep into debt.

Now comes the pollen boom, touted as a can't lose proposition by its promoters. After all, they say, not only is the demand for pollen as human food at an all time high, but also trapping pollen from a colony is beneficial to the bees, reducing swarming while at the same time increasing honey production. Is all of this too good to be true? That's for the beekeeper to decide, but more and more facts come to the fore each day, and all should be carefully studied before a decision is made to go for broke producing bee collected pollen.

BEE POLLEN AS FOOD -- THE FDA'S POSITION

"Bee Pollen Great Food -- For Bees," sums up the Food and Drug Administration's position on bee pollen: "Under the law, since the pollen has not been shown to be harmful other than to those suffering allergy, bee pollen may be marketed as a food, provided no nutrition or therapeutic claims are made or implied regarding it. Thus, if the labeling (including pamphlets or advertising associated with the product) does not suggest that it is intended for use other than food, bee pollen marketed as a food need only meet the same general labeling requirements as other foods, and be prepared, packed and held in a sanitary manner." Those who claim bee pollen cures or alleviates any illness or produces therapeutic benefit are promoting the product as a drug. Recently FDA asked that all shipments of a particular product and its promotional literature, advocating use of pollen in this sense, be recalled by the manufacturer. Other steps may also be taken, including seizure, injunction and criminal prosecution.

With reference to bee pollen's value for humans, the FDA debunks some claims made by many

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1. This document is ENY118, one of a series of the Entomology and Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date November 1, 1994. Revised February 1, 1995. Reviewed May 1, 2003. Visit the EDIS Web Site at <http://edis.ifas.ufl.edu>.
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promoters: (1) pollen is not a giant germ killer in which bacteria do not exist; it is rapidly attacked by bacteria, yeast and other fungi, (2) pollen cannot be called nature's most perfect food; it isn't even perfect for bees which require supplementary carbohydrates (nectar or honey) to survive, (3) pollen doesn't retard aging by peoples in the Caucasus region of Soviet Georgia; a study of eating habits there doesn't even mention pollen, (4) pollen is not the richest source of protein known to science; the major constituent of pollen is carbohydrate, not protein, and the (5) bee pollen does not relieve allergy, asthma and hay fever; no scientific studies support this. On the contrary, persons eating pollen must be on the lookout for potential allergic reactions, (6) pollen improves athletic performance; extensive study at Louisiana State University reveals no significant improvement in either training or performance.

POLLEN UTILIZATION

Although usefulness of pollen as a human nutrient is still an enigma, a recent study does show that pollen from at least one species of plant is digestible by mice. J. O. Schmidt and Patricia J. Schmidt in "Pollen Digestibility and Its Potential Nutritional Value," *Gleanings in Bee Culture*, Vol. 115 (6), June, 1984, pp. 320-322, show that velvet mesquite (*Prosopis velutina*) pollen is digested and supports mice growth. There is one caveat, however. It appears to take greater consumption of mesquite pollen by mice to equal weight gain provided by comparable milk and egg protein-based diets. The authors conclude: "Pollen can be considered either a potential food or a nutrient supplement. Whatever it is considered, potential consumers should be aware that the levels present in half a dozen tablets, or about 3 g, does (sic) not provide nutrients to equal those present in an otherwise unbalanced diet. This is not to suggest that pollen cannot be of any value, only that if pollen is treated as food, more than 6 tablets may be needed to accrue real benefit. When compared to supplements such as vitamin/mineral tablets, pollen contains much lower levels of these micronutrients than the supplements. This...does not imply that pollen has no potential benefit, only that it should not replace good dietary and health practices. Pollen in addition to a good diet could conceivably be beneficial, but to date there is little evidence to

support or refute this." It should be emphasized that the above study was done on bee collected pollen from only one species of plant. Most pollen trapped by beekeepers over time will be a mixture from several plant species. According to Dr. P. Witherell, "Other Products of the Hive," Chapter XVIII, *The Hive and the Honey Bee*, Dadant & Sons, Inc., Hamilton, IL, 1975, pollen can vary greatly in its nutritional content from as low as seven percent protein (pine) to over thirty-five percent (date palm). Thus, even for bees, a mixture of pollens is necessary to achieve a well balanced diet.

The 1992 edition, P. 935, of *The Hive and the Honey Bee*, published by Dadant & Sons, Inc. devotes a good deal of space to pollen collection, processing and use in human diets. The authors, Drs. Stephen Buchman and Justin Schmidt conclude: "In summary, pollen is deficient in several of the lipid soluble vitamins, but otherwise has a nutritional composition that surpasses that of virtually any food typically eaten. It remains to be seen whether the nutritional component of pollen will be achieved and if pollen can become a competitive food item in the human diet, or be developed as a cottage industry protein and nutritional supplement for developing nations." Something addressed by few is nutritional loss in stored pollen. Study by Dr. A. Dietz at the University of Georgia has shown that stored pollen (especially dried pollen) loses some of its nutritional value for bees over time. Studies of this sort for bee collected pollen in human nutrition might be extremely revealing, but none have been done so far.

POLLEN CONTAMINANTS AND STANDARDS

Beyond immediate benefit to humans, there are other questions that have yet to be answered concerning bee collected pollen as food. Among these are potential contamination with heavy metals or pesticides. And, as noted elsewhere, pollen from some plants may be responsible for severe allergic reactions. Many pollen product labels instruct the user to begin with small doses just in case potential for allergic reaction exists.

The lack of standards in processing bee collected pollen could be a time bomb. As mentioned above, of

prime importance to the Food and Drug Administration is that pollen, "... be prepared, packed and held in a sanitary manner." Details as to what this means have not been spelled out, but at any moment FDA could institute specific regulations regarding pollen preparation. An article by K. Benson of El Toro, California in *The Speedy Bee*, Vol. 13 (5), May 1984, pp. 14-20 deals with this important question. The author emphatically states: "...collecting pollen commercially is an expensive and labor intensive enterprise that requires mechanization, special training and constant attention. Frequent collection and processing are needed to produce quality pollen. It must be collected, cleaned and frozen quickly before it becomes too dry, too wet, mildewed, ruined by insects, or overflows the pollen drawer. There are no vacations during the pollen season." Of primary concern, the article states, is cleanliness of bee collected pollen. The kinds of debris and foreign matter that can be found in pollen is remarkable. A partial listing includes: (1) lost bee parts; (2) bits of plants like leaves and straw; (3) pollinia or stamens from certain plants that stick to bees and pollen; (4) hair-like threads; (5) various insects, some invisible to the human eye and (6) mummies and scales from bee diseases. Wax moths also find the pollen drawer a marvelous haven; their droppings, webs and cocoons must be removed. In addition, a few mouse droppings will render the entire pollen batch unusable and spilled pollen should never be run through a cleaning machine. Competent buyers will not touch pollen that has any beekeeper dirt in it. Mr. Benson has developed a pollen cleaning machine (write Mr. "B", Box 1066, El Toro, CA 92630), but suggests that some hand sorting is invariably necessary in producing a quality product. He also cautions that bee collected pollen must be picked up at regular intervals from traps and protected from moisture; if it becomes wet, it is not salvageable.

Stored pollen is a marvelous medium for growth of fungi and bacteria. Of major concern in moist environments is the ever present threat of aflatoxin, produced by fungi of the *Aspergillus* genus. Stored products, such as soybeans, peanuts, and corn, in Florida, are carefully monitored for presence of aflatoxin. Bee collected pollen is not usually consumed in as great a quantity as other stored products and is generally quickly dried to below

twenty-five percent moisture, optimum for *Aspergillus* growth, so that danger from this is minimized. However, it is a quality factor that cannot be ignored at present, and one ripe for bureaucratic regulation in the future.

POLLEN TRAPPING

Some promoters have suggested pollen trapping to be beneficial to a bee colony. This is debatable at best. Dr. Dietz, at the University of Georgia in his studies of honey bee-marsh interactions, believes that constant trapping of pollen decreases population potential by as much as one-third in some colonies. Steve Taber, retired from the Tucson Bee Laboratory, in "Pollen and Pollen Trapping," *American Bee Journal*, Vol. 124 (7), July 1984, pp. 512-513, says: "If you put on pollen traps, you should expect certain hive problems that you don't have without them. Don't hurt your bees. Don't force the bees into a pollen deficient diet...My suggestion is that after trapping pollen for two weeks, you should remove the traps for a week." Finally, there is the question of the efficiency of trapping pollen from bees. This varies considerably. A study by Canadians A. Tellier and U. Soehngen, reported in the Cook-Dupage Beekeepers' Association Newsletter, Vol. 39 (5), June 1984, evaluates several traps. According to the authors: "The efficiency of pollen traps varies from approximately 10% to 50%. Efficiency is influenced by the uniformity of the openings in the trap, differences in body sizes of the foragers (which may be considerable both between and within colonies), and by the sizes of the pollen loads. In addition, the number of openings in a trap influences the degree of crowding within the trap, and consequently, its efficiency in collecting pollen. It is apparent, therefore, that each colony-trap combination is unique and that an accurate determination of the efficiency of trap design, derived from observations made on one colony-trap combination is impossible." Their preliminary results (research is continuing) suggest the bottom mounted Barrhead pollen trap (manufactured in Canada) to be superior in most trials, providing the greatest quantity of clean pollen. The OAC (Ontario Agricultural College) trap was rated poorest in pollen cleanliness. The front mounted USDA pollen trap was second best in terms of pollen production. In general, cleanliness of resulting pollen

is not as good in bottom mounted traps, which tend to collect all hive debris, but this is offset by other advantages such as rear drawer removal, protection of collected pollen from the weather and provision for escape of drones and queens.

POLLEN MARKETING

Too often marketing is one of the last considerations thought about in the beekeeping business. The lesson of the jelly market collapse of the 1950s should not be lost. Existence of a reliable market is paramount before thinking of diverting resources to pollen production. Last, but certainly not least, the beekeeper must be sure a potential to make a profit exists. If one doesn't know how much it costs to produce a pound of pollen, how can a profitable price be determined?