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MAAREC
Mid-Atlantic Apiculture Research and Extension Consortium

BEEaware

NOTES & NEWS ON BEES & BEEKEEPING

January 2003

What's Inside:

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MAAREC, the Mid-Atlantic Apiculture Research and Extension Consortium, is an official activity of five state beekeeper associations, the state Departments of Agriculture, land grant universities and the U.S. Department of Agriculture. The following are cooperating members: University of Delaware / Newark, DE; University of Maryland / College Park, MD; Rutgers University / New Brunswick, NJ; Penn State University / University Park, PA; West Virginia University / Morgantown, WV; USDA/ARS Bee Research Lab / Beltsville, MD

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FOCUS ON:

HONEY - HERE'S TO YOUR HEALTH

There is a lot we know about honey. Honey is made from nectar, a sweet secretion produced by plants to attract insects (pollinators). Nectar is not honey. Nectars have a high moisture content, between 50-70% and predominate in the sugar sucrose, a disaccharide. Honey on the other hand has a low moisture content, around 17% on average and the predominate sugars are fructose and glucose, both monosaccharides.

Average composition of honey
17.2% moisture
38.4% fructose
30.3% glucose
1.3% sucrose
7.3% other disaccharides
other sugars, ash and nitrogen

We know bees make honey from nectar by reducing the moisture content of the nectar. This involves running air currents over nectar and stretching it in their mouthparts to increase the surface area, exposing it to the atmosphere causing moisture to be reduced. The other important thing the bees do to nectar is to add enzymes produced in their own bodies. They add several of these enzymes — two of the most important are invertase and glucose oxidase. The invertase converts the disaccharide, sucrose, in nectar, to the monosaccharides, glucose and fructose. The glucose oxidase acts on the dilute nectar leading to the production of gluconic acid and hydrogen peroxide. This hydrogen peroxide protects dilute honey (nectar in the process of becoming honey) from pathogens that would otherwise grow wild in this sugar-rich medium.

The presence of hydrogen peroxide is one of the ways that nectar and honey are naturally protected from pathogens like fungi, mold and bacteria. The high sugar/low moisture content and the acidity of honey are additional factors that make it truly anti-microbial.

PEOPLE KNOW HONEY AS A MEDICINE

For thousands of years humans in many other cultures have been using honey for medicinal purposes, particularly the treatment of wounds. There is now a growing body of scientific research demonstrating that the anti-microbial properties of honey, along with some of its other qualities, make it a truly unique healing agent.

One of the most recent examples of this research has been the discovery that Australian manuka honey has unusually potent antibacterial characteristics. This discovery has led to the coining of a new term "Medihoney." A

recent article in the Denver Business News stated that Medihoney, a high potency antibacterial made of 100% honey, is being packaged in a squeezable tube for sale on Australian supermarket shelves.

The properties of honey that make it anti-microbial and lead to medical applications such as wound healing include its high sugar/low water content, low protein content, high acidity, presence of hydrogen peroxide and antioxidants.

THE MAGIC OF ANTIOXIDANTS

Oxygen may be essential to life as we know it but is also associated with many degradative reactions that produce harmful substances known as free radicals. Free radicals have a negative effect on food quality. They cause the browning of cut fruits and vegetables and off-flavors, colors and rancidity of meats (lipid oxidation). Where human health is concerned, free radicals attack human proteins and DNA, they contribute to heart disease and cancer, and they are associated with aging and senescence. Importantly, antioxidants work against free radicals.

There are many sources of antioxidants for human intake. Some natural sources of antioxidants include vitamin C (found in citrus fruit and broccoli), vitamin E (found in raw vegetable oil, nuts and cereal), vitamin A (found in tomatoes and carrots) and compounds such as flavonoids and phenolics (found in soy, green tea, red wine, chocolate and many fruits and vegetables). But the good news for beekeepers — HONEY is also a source of antioxidants! This was reported in an article in *Science News*, September 1998. This article described work done by scientists in the Departments of Plant Science and Entomology at the University of Illinois. Since that time, food scientists at the University of Illinois and from several other major universities have continued their interesting work demonstrating the value of honey as a source of antioxidants. Such studies have revealed that the antioxidants in honey have the potential to enhance human health as well as protect foods against oxidative deterioration (the browning of cut fruits and vegetables and production of off-flavors, odors and rancidity of meats).

In a nutshell, the researchers found that the antioxidant levels in honey, while highly variable, compared favorably to many of the natural sources of antioxidants mentioned above. They learned that the antioxidant components of honey include enzymes (glucose oxidase) vitamin C, and phenolic and flavonid compounds. They also found that, in general, the darker the honey the higher the level of antioxidants.

WHAT THIS MEANS

Research on the potential use of honey as a natural food preservative in now underway. There are a number of exciting studies on the potential use of honey to enhance human health. Honey is being considered as a dietary source of antioxidants that could reduce heart disease. Lab studies have shown honey to slow the oxidation of low density lipoproteins, a process that can lead to artherosclerotic plaque build up, the condition know as hardening of the arteries. Other research is ongoing to determine the long-term antioxidant protection from honey as a food additive.

In another promising development, recent research has shown that honey does have the potential to improve athletic performance. For some time sports nutritionists and trainers have know that consuming carbohydrates before, during and after a workout can have a positive affect on an athlete's performance and recovery, thus the development of products like Gatorade™ and PowerGel™. A series of recent studies at the University of Memphis has shown that honey performed as well as commercially available carbohydrate gels. More studies are ongoing in this area but results point toward honey serving as a natural alternative.

All this good news could be just the tip of the iceberg. These recent findings have resulted in many new questions and have definitely piqued the interest of other researchers in the areas of nutrition, human health, and sports nutrition. The National Honey Board is funding a significant number of the current studies on honey. For more detailed information on honey and health see the publication *Honey – Health and Therapeutic Qualities* published by the National Honey Board.

- Maryann Frazier

Provided by the National Honey Board

Introduction

Honey is a popular sweetener throughout the world. According to an Associated Marketing survey conducted for the National Honey Board in 1997, almost 77 percent of U.S. households use honey along with other sweeteners and syrups and 45 percent of them consider honey a good value because it is "natural/good for you/better for you than sugar." Overall, honey has a positive profile with nearly 62 percent of users "especially liking" it for its taste and flavor, 24 percent because it is natural and 16 percent because it is good for you.[1]

From ancient times, honey was not only used as a natural sweetener but also as a healing agent. Many health-promoting and curative properties attributed to it are the basis for some traditional folk medicine treatments throughout the world today. Of the consumers who use honey, 93 percent consider honey a healthful product, recognizing it as a pure, natural product. Fifteen percent think of it as a good home remedy.[1]

From ancient times, honey was not only used as a natural sweetener but also as a healing agent.

History of honey as medicine

Stone age paintings in several locations dating to 6000 BC or earlier depict honey hunting, documenting human use of honey for at least 8000 years. References to honey as a medicine are found in ancient scrolls, tablets and books—Sumarian clay tablets estimated to be 6200 BC, Egyptian papyri dated from 1900-1250 BC, Veda (Hindu scripture) about 5000 years old,[2] the Holy Koran,[3,4] the Talmud, both the old and new testaments of the Bible, sacred books of India, China, Persia and Egypt[3,4] and Hippocrates 460-357 BC.[2] Clearly, honey was ubiquitous and our ancestors' use of it for medicinal purposes was universal.

Honey was prescribed for a variety of uses including baldness, contraception and as a wound treatment. Frequently, honey was mixed with herbs, grains and other botanicals from the geographic area. Table 1 summarizes some of the ways honey has been used through the ages. Uses that have continued into modern folk medicine include treatment for coughs and sore throats, lotus honey for eye diseases in India, infected leg ulcers in Ghana, earaches in Nigeria, topical treatment of measles in the eyes to prevent corneal scarring, gastric ulcers and constipation.[5]

20th Century practices and research

Much of the literature in the early part of the 20th Century contains reports of antimicrobial and wound healing properties of honey. In 1919, Sackett reported that antibacterial activity increased in diluted honey.[11] Russian soldiers during World War I used honey to prevent infections in wounds and to accelerate healing.[12] Germans used honey and cod liver oil for ulcerations, burns, fistulas and boils in addition to a honey salve (mixed with egg yolk and flour) for boils and sores.[8]

In a 1992 review by Molan, it was noted that in 1937, Dold, et al. began intensive study on the antimicrobial activity of honey and called it "inhibine".[11] In 1963, White, et al, identified "inhibine" as hydrogen perox-

This publication is available in PDF format at the National Honey Board Web Site - http://www.nhb.org

Honey Bees and GM Crops

Bees have an essential but subtle relationship to crops and the environment. Genetically modified (GM) crops incorporate novel changes in the genetics of plants. Although there is resistance in Europe, Africa and elsewhere, GM crops are predicted to be the 'wave of the future'. Can GM crops negatively effect bees directly or indirectly through flowering and pollen production? If commercial GM crops are found to injure bees then should those crops be removed from production?

A good deal of effort has been directed toward evaluating the impact of GM crops, particularly those crops genetically engineered to contain insect or fungal toxins which have components such as chitin, common to both fungi and insects. The results of such studies have uncovered important potential dangers to bees; however, such evidence has not yet seemed to influence the release of crops capable of injuring bees.

Studies on the impact of GM crops on bees include both behavior and toxicity studies of the GM crops themselves and studies of the purified toxins produced in GM crops. Three recent reviews of studies of the impact of GM crops or their toxins are listed below and the recent Apimondia meeting featured talks by these authors. The early results of the studies show that GM crops modified with *Bacillus thuringiensis* toxins have little or no effect on bees, nor do GM crops that feature the enzyme chitinase, but protease inhibitors, on the other hand, have consistently been discovered to have detrimental impacts on bees and the glucanase enzyme modification (to resist fungi) also has been found to negatively effect bees.

The *Bacillus thuringiensis* toxin gene modifications are designated Cry, but there are numerous alleles and these have distinct characteristics. Cry 1 alleles have been studied, along with Cry 9C and Cry 3B (Cry II and CryV alleles have not yet been examined); so far the Cry genes have not proven detrimental to bees. In contrast, the protease inhibitors have been shown to be detrimental to the longevity and behavior of bees while the enzyme glucanase effects conditioned responses in bees. The GM crops with protease inhibitors released for commercial production included potato, canola (rapeseed) and creeping bentgrass.

The impact of all GM releases on bees needs to be carefully studied prior to release. At the very least, crops injuring bees should not be widely released for production. Therefore, should we recommend those crops released for commercial production containing the protease inhibitor gene be withdrawn?

Reviews

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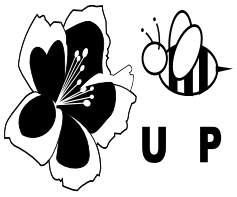
Picard-Nizou, A, Grison, R, Olsen, L, Pioche, C, Arnold, G and Pham-Delegue, M. 2001. Impact of proteins used in plant genetic engineering: toxicity and behavioral study in the honey bee. *Jour. Econ. Entomology* 90:1710-16.



UPCOMING EVENTS

February 1 - New Jersey Winter Meeting, Columbus Grange, Columbus, NJ. Contact Dave - dwasitowski@yahoo.com, Tel 908 806-7611

February 22 - Maryland Winter Meeting, Howard County Fairgrounds, Friendship, MD. Contact Barry Thompson - Tel 301 947-4652

April 12 - Delaware Beekeeping Short Course, Dover, DE Contact Dewey - dmcaron@udel.edu, Tel 302-831-8883

Aug. 4-8 - EAS Meetings, Bowden College, Brunswick, ME - See website - www.easternapiculture.org

February 15 - Beginning and Advanced Beekeeping Seminars (concurrent), Westtown School, Chester Co. Contact George Biles, beavercreekbyard@aol.com, 610-873-4599, or Jarl Mork, jwmork@earthlink.net, 610-793-2564.

Pollination Rental Colony Assessments

The cranberry industry in New Jersey has begun to evaluate the way the growers pay beekeepers for pollination services. They are moving toward payment fee being based on an assessment of colony strength. In 2002, the largest cranberry grower hired Jack Mathenius, retired NJ Apiary Inspector, and Alex Berlin to evaluate nearly 2000 colonies rented to pollinate the berries. Jack reported in the Aug./Sept. 2002 *New Jersey Beekeepers News* that 17% of the colonies they inspected were below their evaluation criteria. They reported finding "small hive beetles, chalkbrood and roaches in many colonies." They also found coumphos strips in colonies and "evidence of applications of chemicals not registered" for mite control. Jack stated "We saw about 500 colonies with equipment in such bad shape that would not even qualify as junk. Shallow supers with no foundation, mice nests, old feeders full of comb, rotten hives with bees coming out from all over, front, back, sides, tops and bottoms. We saw whole operations with hives that had bottom boards made of pressure treated wood still bearing the warning labels that read: "Caution: Arsenic is in the Pesticide applied to this wood…. Do not use treated wood for mulch, cutting boards, counter tops, beehives, animal bedding or structures or containers for storing animal feed or human food…." They also found colonies infested with American Foulbrood being robbed by other colonies, some of which had been moved to the cranberry bogs from other states.

Another major eastern pollination crop, blueberry, has used colony assessments as a determinant of rental price for a number of years. The two major Maine blueberry companies rent thousands of hives every year that are moved from as far away as Texas and Florida to Maine expressly for pollination service. One company inspects 10% of the hives while the other inspects a mere 3% of the colonies. The payment fee, totally based on hive strength evaluated by a consultant, are as follows:

Standard hive (6 frames of brood/8 frames of bees) = base fee $48 or $50
0-3 frames of bees and brood = $0 per hive
4-5 frames of bees and brood = 20% less base rate
8+ frames of brood and full of bees = 20% above base rate

In addition, one company pays a premium for hives that are situated on trailers and for hives moved to remote fields. Tony Jadczak, Maine State Apiarist, says the quality of bee colonies moved to Maine "has remained high since the beekeepers know in advance they will be paid for quality." Poor bees means lower payments.

In other rental situations does the lack of quality tend to mirror the results discovered by the cranberry growers in NJ? In a survey of colonies moved to watermelon pollination locations on Delmarva I conducted several years ago, 30.6%

of the bee colonies were found to be below desired pollination strength of 5 or more frames of brood, but I also found 11.3% of the colonies with 8 or more frames of bees, well above the recommendation. I included 14 large, medium and smaller local beekeepers in my analysis and randomly inspected 10% of their colonies. As Jack and Alex discovered for the NJ cranberry rentals, I found at least one supplier of bees in each of the three categories was sending deadouts and undersized colonies to the growers' fields while other beekeepers consistently had units that were uniformly excellent.

In the only other published survey of pollinator colony strength, McGregor and Rowe (1979) examined 2248 colonies used in alfalfa seed pollination in Nevada. One third of the colonies moved to the fields in June had less than 6 combs of brood, considered to be the minimum colony size; 30.5% of the colonies had 8 or more combs with sealed brood. While alfalfa seed growers have considered payment by colony strength, only a minority pay their bee rental suppliers on quality.

- Dewey M. Caron

Literature Cited

McGregor, S.E. & James B. Rowe. 1979. Honey bee colony quality for alfalfa pollination. Amer Bee Jour 107:700-703, 761-765.

Mathenius, J.C. 2002. Beehive evaluation report New Jersey Beekeepers Assoc. News Aug/Sept 2002:6.

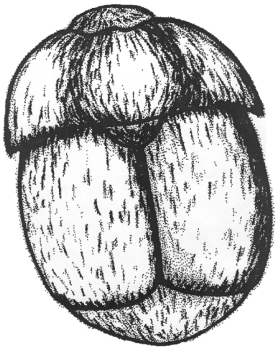
Caron, Dewey M. 1988. Pollination Colony strength. Proc. Mid-Atlantic Veg. Workers

NOTE: AAPA has reprinted "The Value of Honey Bees as Pollinators of U.S. Crops in 2000" (a reprint of Morse and Calderone article that appeared in *BeeCulture* Magazine - contact Dewey Caron if you lack a copy) and see the MAAREC website for additional sources on pollination.

Airing Out Small Hive Beetle Problems in the Honey House

First identified in 1998 from honey bee colonies in Florida, small hive beetles (SHB) have now spread to 13 states. As the small hive beetle continues to spread in the Mid-Atlantic region, beekeepers may first notice beetle problems in the honey house. It has become quite clear that honey awaiting extraction can be subject to small hive beetle attack and beetle problems can develop rapidly in the honey house. Once honey supers are pulled and thus removed from the protection of worker bees, small hive beetles larvae develop quickly. If honey is held for more than five days, larval development – and damage to the honey - is likely, especially if pollen and/or brood are present in the combs. Beekeepers, already dealing with numerous management problems, are being forced to learn about and combat yet another problem. Although treatments are available for both adult beetles in the colony and for treating the ground around infested hives, a means of reducing the impact of small hive beetles in the honey house is most critical.

At the USDA Bee Research Laboratory in Beltsville, Maryland we believe we have found a simple technique to reduce or eliminate beetle damage to stored honey awaiting extraction. During our studies on the basic biology of small hive beetles, we observed that beetle eggs did not hatch when the relative humidity was below 50%. While this observation did not seem to be useful in controlling beetles in the apiary, it did seem to hold promise in the honey house. Subsequently, we have tested - and are confident -that it is possible to reduce or eliminate beetle damage in stored honey by simply circulating air through the supers. This air movement reduces the relative humidity within stored honey and in turn, leads to egg desiccation (drying out).



Adult small hive beetle

Trials were conducted in Florida to test our ideas about protecting honey from beetle damage. In three honey houses, stacks of three medium-depth supers were stored “closed” (migratory covers, top and bottom), “open” (no covers), or “open with a fan” (air circulating up through the stacks.) Adult small hive beetles were introduced into all stacks. The study results were encouraging. In one location, more than 4000 larvae developed in the “closed” stack, about 40 larvae in the open stack*, but no larvae in the open stack with a fan*. The open stack with a fan at this location had no larvae present even on the one comb containing brood. At the second location, overall development was low in the open stacks – with and without the fan. Interestingly, the third location had no development in any of the stacks even though adult beetles were present. Upon further observation, we found the combs at this location contained no pollen or brood, demonstrating the importance of brood or pollen for larval development. Small hive beetles should cause little damage in combs of pure honey.

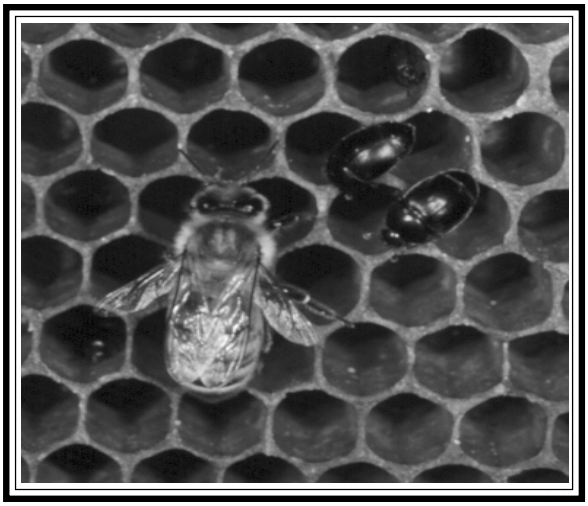
Based on these results we established a larger study consisting of stacks of six medium-depth honey supers in each of three honey houses in Palm Beach, Florida. We established both closed and open stacks, and adult beetles were added to all stacks. All open honey supers had air forced down through the stacks by a box window fan set on the lowest setting. Additionally, open stacks were raised off floor pallets by two-inch wooden blocks, which allowed for airflow down and out of the stacks. The honey combs used in this study were from colonies infested with adult beetles and some combs contained brood and/or pollen.

Thirteen days following this setup stacks, and honey combs were examined for larval development. The results were dramatic. The movement of air down through stored honey *resulted in complete or nearly complete protection* from small hive beetle damage. The first location was quite dramatic with more than 50% of the combs from the closed stack having thousands of larvae, while NO combs in the open stack were infested. The other two locations yielded similar results, though a few developing larvae were found in open stacks. Live, adult beetles were still present on day 13 at all locations.

The use of circulating air across stored honey prior to extraction provides the beekeeper with an inexpensive and chemical-free method to protect honey from small hive beetle damage. Moving air over stored honey, even with brood and adult beetles present, provided protection from the beetles. One of the commercial beekeepers we worked with was so impressed with our results that he has mounted window fans in his storage area and simply places pallets of honey beneath the fans if he can’t extract the honey immediately. He has also modified his pallets to raise the supers two inches off the base of the pallet to facilitate airflow.

We provide this information and recommend beekeepers find their own way to modify and adapt these findings to their operations. Small hive beetles will likely force us to maintain clean efficient honey house operations. What we have shown is that regardless of the presence of adult beetles on combs, the movement of air across stored honey provides protection against small hive beetle damage.

-Jeff Pettis USDA-ARS Bee Research Lab, Beltsville, MD



POLLEN

Pollen is a secondary product of the beehive that has become more popular for beekeepers as consumers continue to seek healthier foods. Pollen has been called nature's only 'perfect' food. This issue has led to many suggestive claims and abuses on some labels creating misleading hopes and expectations in the general public. It is important for the beekeeper to be as truthful and factual as possible. Beekeepers selling pollen need to understand what pollen is, what are its medicinal qualities and why people should be using it, and how to encourage greater sale/use of it.

Pollen are small grains carrying the male genetic material and protein that is formed in the anthers of flowering plants. Bees play a major role in transfer of pollen from anther to flower stigma, but it has to be remembered that they are not the only agents of pollination and that they are capable of transferring pollen in all plants. Pollen comes in all sizes and colors. Color, size and shape of the silicate shell are usually sufficient to identify pollen plant source. The outer shell is very durable being found in the fossil records millions of years old. Although it is hard, it is not complete and has pores thru which germination and extraction of nutrients can occur.

So what exactly is pollen? Pollen consists of a variety of compounds and the amounts can vary from species to species of plants. Protein content can be as high as 40% but usually is between 7.5 to 35%; sugar content ranges from 15 to 50%, with much of the sugar bound up in starch. All the amino acids that are essential to humans can be found in pollen with proline being the most abundant. The most important fatty acid that has been identified currently is palmitic acid.

The average composition of dried pollen

	Bee collected %(a)	Bee collected %(b)	Hand collected %(b)
Water (air dried)	7	11	10
Crude Protein	20	21	20
Ash	3	3	4
Ether extracts (crude fat)	5	5	5
Carbohydrate			
Reducing sugars	36	26	3
Non-reducing sugars	1	3	3
Starch	-	3	8
Undetermined	28	29	43

(a) As reported by Tabio et al., 1998; (b) As reported by Crane, 1990

One popular misconception by the general public when buying pollen is that it will help with their "hay fever" type allergy. A common question is "Will this pollen help me with my allergies?" It is a hard question for the beekeeper to answer. A proper determination should factor in whether the consumer is allergic to plants, and if so, is the buyer allergic to plants that the bees have foraged on. It would be helpful to know what percentage of the pollen in the package is from those plants that an individual might be allergic to.

Some plant allergies are caused by a reaction of the human body to the shape of the pollen's silicate shell. Therefore, if a customer asks the beekeeper for pollen for their allergy to Goldenrod, is it proper to sell them pollen that was collected in the spring? It is important to know that the pollen from each kind of plant is different and the pollen from any given plant may not contain all the characteristics that have been ascribed to pollen in general.

Minor components of bee collected pollen (Crane, 1990)

Flavonoids	At least 8, characteristic for each pollen type
Carotenoids	At least 11
Vitamins	C, E, B complex (including, niacin, biotin, pantothenic acid, riboflavin (B2), and pyridoxine (B6).
Minerals	Principal minerals: K, Na, Ca, Mg, P, S. Trace elements: Al, B, Cl, Cu, I, Fe, Mn, Ni, Si, Ti and Zn
Organic acids	At least 6, including phenolic acid
Free amino acids	All
Nucleic acids and nucleosides	DNA, RNA, and others
Enzymes	More than 100
Growth regulators	Auxins, brassins, gibberellins, kinins and growth inhibitors

Many of the cures and benefits claimed from pollen consumption come from unfounded sources. Most of these so-called benefits have not been substantiated by scientific research. The disappearance of problems or cures could still be the result of something else the person had done or was doing in conjunction with the consumption of pollen (ex. living a healthier life style) and not from the pollen itself.

Non-scientific claims and reports of benefits, cures or improvements derived from the use or consumption of bee collected pollen

Improvements	Cures or Benefits
Athletic performance	Cancer in animals
Digestive assimilation	Colds
Rejuvenation	Acne
General vitality	Male sterility (a)
Skin vitality	Anemia (b)
Appetite	High blood pressure (b)
Haemoglobin content (b)	Nervous and endocrine disorders (b)
Sexual prowess	Ulcers
Performance (of race horses)	

(a) Ridi et al., 1960; (b) Sharma and Singh, 1980

Scientifically demonstrated medicinal effects of pollen relate to male prostrate problems and allergies. The consumption of pollen has also been proven to protect both humans and animals from the effects of X-rays in radiation treatments. The supplementation of non-human animal diets with pollen has shown beneficial effects in weight gains for many animals and insects in the laboratory. Certain bacteriostatic effects of pollen are actually derived from the honey bee itself since the worker mixes pollen with enzymes in regurgitated honey and is more effective with the consumption of bee bread.

Beekeepers should make every effort to report only proven facts when selling honey or pollen. Most of the labels on pollen for sale that I have seen do not carry any information on what pollen is, what it contains, what it can scientifically be proven to do for the consumer, or has misleading information. It would be useful to print some of the above materials on pollen labels instead of letting myth and conjecture be the ruling elements in the market transaction.

- Mike Embrey, Wye Research and Extension Center, MD

Information for this article from information in the FAO Agricultural Bulletin #124, Value Added Products from Beekeeping by R. Krell, Rome 1996

results!

Better Service to Beekeepers & the Industry

MID-ATLANTIC WINTER LOSSES

2000-2002 SURVEY RESULTS

A total of 125 beekeepers owning a total of 3,207 colonies completed a *BeeAware* survey in 2001 and 54 (owning 942 colonies) did so this past season. Combined, the survey respondents said they lost a total of 1,492 colonies in 2001- 42% of the total while this past year (2002) losses were 1/4th the level at 9.6%. I have been surveying Delmarva beekeepers in the *NewsyBee* newsletter and I combine both surveys to show the results:

2001: 2202 colonies lost of 6121 total = 36% total loss rate
2002: 272 colonies lost of 2208 total = 12.3% total loss rate

Beekeepers participating in both survey were asked about the specific tactics they used to control mites and diseases. We isolated the different treatments and then compared number of colonies that survived versus colony number not surviving for that individual control tactic alone. Results we found were:

Control used (% beekeepers)	% winter loss of those who Used		Did not Use	
2001 2002	2001	2002	2001	2002
Apistan (91 - 73% beekeepers - 1978 colonies)	45%	13%	32%	10%
Coumaphos (29 - 23% beekeepers - 1099 colonies)	26%	7%	48%	11%
Menthol (40 - 32% beekeepers - 1129 colonies)	37%	14.5%	42%	11%
Grease patties (38 - 30.5% beekeepers - 507 colonies)	40%	8%	40%	16%
Fumidil-B (31 - 25% beekeepers - 493 colonies)	43%	11%	37%	14%
IPM tactics (53 - 43% beekeepers - 1656 colonies)	43%	8.5%	37%	12%
Screen bottom boards (28 - 22% beekeepers - 344 colonies)	37%	14%	41%	10%

We consider Varroa mites to be the most important malady for beekeepers to control to increase overwintering success. This survey points out that our standard treatment of Apistan was not entirely an effective treatment either season as losses were heavier for those using it compared to those not electing to use the miticide. Those who elected to use coumaphos had lower overwinter losses compared to beekeepers not using this miticide. Some of this ineffectiveness with both compounds could be due in part to inappropriate timing of the application. The other survey finding illustrated that use of grease patties apparently helped increase colony survival this past season but not during the previous season when overall losses were much heavier. We are not encouraged by the survey pointing out lowering use of IPM techniques (which are labor intensive) and feel this could be due to the heavier losses reported by those who did employ such management.

We would like to take this opportunity to sincerely thank all of you who participated in the survey. Because each winter season appears to be different from the last, we would like to continue this winter with another similar survey and strongly encourage your continued participation. Please consider filling out and returning the survey included in this *BeeAware Newsletter,* using information you find on colony survival along with your 2002 control tactics following your first March or April 2003 inspection. Thank you in advance for participating.