EAS JOURNAL

EASTERN APICULTURAL SOCIETY OF NORTH AMERICA, INC.

APRIL, 1974

Earl Cochran (center) gives a sigh of relief as he introduces the new President Hugh MacLeod and our First Lady Mrs. Doris MacLeod.

RESEARCH NEEDED TO MEET NEW THREAT TO HONEY MARKET

Recent world-wide recognition of the desirable values of honey, its status as a world commodity combined with crop shortages in various countries have raised honey prices so that for the first time in at least thirty years a fair rate of return is being experienced in relation to other farm and commercial enterprises. This has provided incentive for wide spread introduction of substitute materials, promoted as replacements for honey in bulk markets (baking, confectionery, pharamaceutical, food). This appearance of replacements and extender when labelled and promoted legally, is generally recognized by The Honey Industry as fair competition, to be met in the market place by appropriate promotional and marketing efforts.

Unfortunately illegal sale of such materials labelled as honey is taking place and constitutes a fraud upon the consumer. Existing laws, and tests to discover and prove adultration have until recently been adequate to meet this threat to the integrity of The Honey Industry. Until very recently, sugar products used to adulterate honey have been easily detected by established methods developed earlier by U. S. Department of Agriculture Research. Tested and accepted by The Association of Official Analytical Chemists, these methods of detection are by Federal and State Food and Drug Officials and are accepted for use in legal prosecution where necessary.

Within the past year or so a new kind of sirup derived from corn starch has been developed and is available in large quantities. This sirup consists largely of dextrose and levulose, the principal sugars found in honey. It is called an isomerized sirup, since the levulose present has been changed from dextrose by enzyme action. Since this low priced sirup is highly refined, it can be added to honey in considerable proportion without being detectable by the tests presently known and used for this purpose. Inquiry directed to the two manufacturers of these sirups has not yielded any information on compositional characteristics which might be used to demonstrate their presence when mixed with honey.

(continued on page 2)

SECOND CLASS PRIVILEGE
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POLLEN AND COLONY CONTAMINATION

Dr. T. A. Gochnauer has recently found, in collaboration with Mr. J. Corner of British Columbia, that a sample of pollen produced in that province contained enough spores of Bacillus larvae to allow its detection in the laboratory and to produce American foulbrood when fed to a small colony. This contamination can presently be controlled by feeding antibiotics with the pollen, or by fumigation with ethylene oxide, for example, but a better approach will be to increase vigilance over the production and the testing of pollen produced for the beekeeping market.

Chalkbrood disease has become evident in a number of areas in eastern and central Canada, and studies are underway on potential methods for control of this infection. Scanning electron microscopy of Ascosphaera apis, the causative fungus, has clearly differentiated it from another fungus, Ascosphaera major, which has probably erroneously - been reported to be present in chalkbrood infections in North America.

The persistence of the tetracycline group of antibiotic in hive environment has importance from the standpoint of treatment of disease and of contamination of market honey. Studies in package bee colonies, in collaboration with Mr. S.E. Bland, Saskatchewan, have shown that oxytetracycline persists for only a very short time in package bee colonies when fed in late srping.

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*Of which $2.00 is subscription to Journal.

Vol. 2, No. 2, April 1974

Threat to Honey Market

(continued from page 1)

It is urgently necessary that a concentrated research effort be mounted to find ways to detect this type of adulteration and to carry out the interlaboratory testing required to permit acceptance of such new methods by regulatory authorities as suitable for official use. Such a program normally requires two years of testing after a suitable method is developed.

Because research directed to finding and perfecting these tests requires access to highly sophisticated and expensive instruments and to scientific expertise in several disciplines, it is beyond the capability of The Honey Industry to meet and overcome this threat without assistance from the Federal research establishment.

Should adulteration of honey by unscrupulous individuals go undetected over a period of time in the absence of efforts to defend against it, consumer confidence in the purity and integrity of natural honey will be lost - with - disastrous consequences to the current market position. Loss of bulk markets could erode retail prices; should returns to the beekeeper fall greatly as a result, the continuing slow decline in numbers of honeybee colonies would sharply accellerate, with grave consequences to production of the six billion dollars of agricultural crops requiring honeybee pollination.

DR. R. BOCH PREPARING PUBLICATION

Dr. R Boch, the first winner of the E.A.S. James I. Hambleton award, has been continuing work along the lines he described at the Morgantown meeting last summer. He is preparing a publication at present on the response of drone bees to the presence of pure 9-oxodecenoic acid, the primary drone attractant in queen scent, and to queen extracts which contain the 9-oxo acid in addition to other components.

As is usual with bees, the story gets "curiouser and curiouser" and the whole picture of how the virgin queen extracts drones during her mating flight is beginning to be seen as an exceedingly complex interplay of factors.

He is also continuing work following up his pioneering discovery of attractive odors associated with plant pollens. Their general properties and characteristics, if not their identity, are becoming more clear. A very slight change in the method of preparing the extracts from the pollens is beginning to yield information that has eluded him over the past 5-6 years of work in this field.

HONE PRODUCTION

by E. Oertel, Er

Pollinating insec production of white cl principally bumble bee white clover (Trifolium is small. Honey bees (the most numerous p number in an area c colonies to the field.

Large fields of c pollination. An acre o from 1 to 3 million op flowering season, whic mainly in March, April, clover is attractive to hc pollen and nectar.

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20TH ANNUAL CON

HONEY BEES IN PRODUCTION OF WHITE CLOVER

by E. Oertel, Entomology Research Div.

Pollinating insects are necessary for the production of white clover seed. Certain wild bees, principally bumble bees and solitary bees, pollinate white clover (Trifolium repens L.), but their number is small. Honey bees (Apis mellifera L.) are by far the most numerous pollinating agents, and their number in an area can be increased by moving colonies to the field.

Large fields of clover present a big job of pollination. An acre of white clover may contain from 1 to 3 million open florets per day during the flowering season, which, in the Southern States, is mainly in March, April, and May. Fortunately, white clover is attractive to honey bees as a source of both pollen and nectar.

Some honey bees gather only pollen from white clover, some only nectar, and many gather both. The nectar gatherers perform an important pollinating service, since they crawl over the pollen-bearing stigmas in order to reach the nectar at the base of the floret. Pollen grains cling to the finely branched hairs that cover the bee's body and are carried from one floret to another, thus effecting cross-pollination.

White clover is also an important pasture plant in parts of most Southern States, and its importance is likely to increase if the present program of pasture improvement expands. Here the seed producers have more flexibility in handling their clover fields than in the Northern States. Because of the mild weather, grazing may continue until late in the winter months. Fields that are to be reserved for seed production must have the animals removed about 8 weeks before the usual harvesttime. Clipping the fields immediately after animals are removed controls weeds and favors uniform blossoming. If the seed set and the weather at harvesttime justify it, the field can be harvested for seed. If not, the field can be cut for silage or returned to pasture. In the event that the grower does not own harvesting machinery, he may get a custom operator to mow and combine the crop on a share basis.

This report is concerned only with pollination in the production of white clover seed. Plants should be dense enough so that at harvesttime the field averages at least 500 seed heads per square yard. Harvesting machinery that is suitable for the crop must be used correctly; otherwise much seed will remain in the field. Although most of the information was obtained in Louisiana, it is believed that the recommendations given are generally applicable to all Southern States where white clover seed is produced.

Role of Honey Bees in Setting Clover Seed

Counts were made of the number of bees per square yard visiting the clover blossoms during 5-minute periods. These counts were made in different fields, at different times during the season, and over several years. Most of the bee activity took place between 9 a.m. and 5 p.m. Within one 5-minute period 11 bees per square yard were noted. The usual number under favorable conditions was 2 or 3. A bee sometimes visited up to 18 florets of a single head, but usually from 4 to 8. The seed set of white clover, calculated from samples in the fields, at different locations in Louisiana is given in table 1. In 1958 near Watson additional clover was growing in nearby pastures. In 1959 in two fields at Avoyelles Parish the number of colonies and the acres pollinated were not counted, but the grower estimated that there were 3 or more acres of clover to 1 colony of bees.

Factors Influencing Bee Activity on White Clover

The activity of bees on white clover blossoms is affected by the weather, colony strength, and competition from other plants within flight range of the colony.

In Louisiana honey bees work best on white clover under the following conditions: temperature between 80 degrees and 90 degrees f., light to no wind, clear to partly cloudy sky, and relative humidity below 60 percent. Usually there is enough favorable weather during clover bloom so that bees can adequately pollinate it. Bumble bees are active under a wider range of weather conditions than honey bees; they visit blossoms even on cool, misty days.

Strong colonies--that is, those with a population of about 50,000 bees by April 1 -- are best for pollination. Such colonies will require hives that are about four stories high. A strong colony sends a higher percentage of its total force to the field than a weak one. So that the colony can keep a large population, swarming must be prevented by proper management. An experienced beekeeper is needed to maintain colonies at effective pollination strength when clover is in bloom.

Nectar-collecting honey bees may reduce their visits to white clover if other plants are in bloom. The following plants provide easily accessible nectar and bloom concurrently with white clover:

Crimson clover (Trifolium incarnatum L.)
Blackberry (Rubus sp.)
American holly (Ilex opaca Ait.)
Honeylocust (Gleditsia sp.)
Wild grape (Vitis sp.)
Persian clover (Trifolium resupinatum L.)
Rattan vine (Berchemia scandens (Hill) K.

Koch)

White sweetclover (Melilotus alba Desr.)

Vervain (Verbena sp.)

There is no practicable way for the seed producer to keep pollinating bees working his clover blossoms if other attractive species are in bloom. However, there are periods during the spring when competition is of no consequence, and a satisfactory seed set may be obtained.

Other white clover growing in the area probably provides the greatest competition for bees placed for pollination of a seed field. The solution of this problem is to increase the number of colonies so there are enough bees to visit all the blossoms within flight range of the apiary.

When white clover was first grown for seed at the Rice Experiment Station at Crowley, there were no other known clover fields nearby. Consequently most of the bees provided for pollination probably worked the blossoms of the seed field. Within 5 years considerable clover was present in both the station pastures and nearby fields. This illustrates how conditions may change within a few years. There was no known source of pollen or nectar within a mile or more of the field near Elton. It is believed that the bees confined their activity to the clover field.

Competition from clover growing near seed fields has been a factor in the lower Mississippi valley for many years. In the rice-growing area, where white clover seed production is a recent enterprise, there has been practically no competition from nearby fields. However, the recommended rotation of white clover in pastures followed by rice is rapidly increasing the clover acreage. This practice provides heavy competition for the work of the bees introduced for the pollination of particular fields. Clover in adjacent fields is in bloom during the entire spring season unless it is mowed. Even then, blossoms may soon appear.

Nectar Production by White Clover

Nectar production by clover florets is an important factor in attracting insect pollinators. Louisiana common white clover in pastures yielded 4.8 microliters of nectar per blossom in 1952 and 3.2 microliters in 1955 (Oertel 4). Louisiana S-1 strain from field plots produced 8.6 microliters per blossom compared to 8.1, 7.3, and 4.6 microliters from other strains. These results indicate that better nectar-yielding strains of white clover can be selected, which should improve the attractiveness of seed fields to honey bees.

Bailey et al. (1) found that in 1952 there was a general increase in nectar production per blossom as the season progressed, maximum production being reached on June 6. Little is known about the factors that affect nectar production. When several blossoms of about the same age were taken from a plant, it was not unusual to find that at least one contained no nectar.

Seed Production by White Clover

Two methods of obtaining seed-set values from fields were used-- 100 dry heads with dry stems, taken at random; and the total heads per square yard. Samples were taken at differet times during the growing season over several years.

The samples from fields containing colonies of bees gave an average of 0.25 ounce of seed per 100 heads. Samples from fields where there were no known bee colonies yielded 0.18 ounce. In these fields honey bees were seen on blossoms, but there were no colonies known to be near. It was impossible to establish the number of bee trees within flight distance. A yield of 0.25 ounce per 100 heads indicates a potential yield of 387 pounds per acre, whereas, 0.18 ounce per 100 heads indicates 267 pounds per acre.

Samples containing the clover in square-yard areas were taken from fields where colonies of bees provided pollination. Such samples contained an average of 500 heads, consisting of blossoms, green and dry heads, and partly shattered old heads. An average of 0.70 ounce of seed was threshed from these samples.

The apparent discrepancy between the weight of seeds obtained by the two methods is probably accounted for by the blossoms which contained no seeds, the green heads which contained partly developed seed, and shattered heads which were only partly harvested.

Methods of Estimating Effective Pollination

Pollen is needed by bees to provide protein for the developing larvae. Large amounts are used in the spring when brood rearing is at its height. In previous studies (Oertel 3) from 1 to 3 ounces of clover pollen was collected per day in a trap at the entrance of a hive. An unknown additional amount was carried through the trap. A clover floret produced about 3,000 pollen grains, and a clover pollen pellet contained about 388,000 pollen grains. Calculations based on these figures indicate that one pollen-collecting trip by one honey bee might result in the formation of 260 to 3,640 seeds.

The possible seed set per acre has been estimated in a different manner in table 2. It may be considered that the calculated seed set cannot be reached. With improvements in both field and pollination management the evidence indicates that such a set could be approached. The largest seed set per square-yard sample was taken at Crowley in 1956. It contained 744 dry heads that produced 2.17 ounces of seed, a rate of 656 pounds per acre. There are 900,000 to 1,000,000 Louisiana white clover seeds in a pound. The b dry heads gave a yield of 0.51 o percent more per head then wa best square-yard samples. Erith single white clover floret is ca seven seeds. Probably such pr reached in the field. A comm should not be satisfied with a se per floret (100-140 per head) a least 4 per floret. Blossoms earl an average of 70 florets whereas late had 50.

Relation Between Se and Seed Harve

Under ideal conditions a would be expected between the the amount harvested. The concerned with the amount beekeeper who furnishes bees mostly concerned with the amou beekeeper believes that if seed i have done their job, and it is u harvest the crop. A grower know weather may greatly reduce the harvested or even prevent har example, in 1957 tropical storm some fields with nearly a foot of v seed was harvested from fields th but in other fields the crop appe recovery. Another example occurr vicinity of Baton Rouge. From M the usual seed-harvest period, rai thus harvesting was prevented.

The effect of unfavorable v amount of seed harvested is indic the lower yields of the Southern yields were roughly 10 to 20 calculated yields, based on sampl set. Failure to use harvesting m accounts for heavy seed losse rethreshing of material that had combine showed a recovery of 5(per acre. In other tests from 1 to 6 of the material that passed thro consisted of clover seed. Equip successful Louisiana seed grower 11 pounds of seed per ton of dry r that showed a calculated set of acre.

The combine should be care save all the seed even though con material must be cleaned out la speed should be slow, probably not hour, unless the swath is rat particularly important that the swa Under some conditions Louisiana employ a chemical defoliant to

TEN TIPS FOR SUBURBAN HOBBY BEEKEEPERS

by Dewey M. Caron
Dept. of Entomology, Univ. of Maryland
Edited for EAS Journal

1. A successful bee hobbyist's bee colonies do not interfere with or bother the neighbors. Evaluate every hive manipulation and the natural biology of honey bees with your neighbors foremost in mind. Make it your objective to insure that your neighbors have no reasons to complain. In most instances where neighbors complain, bee colonies must be relocated.

2. In populated areas, it is imperative to maintain gentle colonies. Mean colonies, colonies that attempt to sting each time examined or that have bees that hover repeatedly around the bee veil even after the colony is closed are better in the open country. If a colony becomes mean for any reason, a new queen of gentle stock will usually change the temperament. To insure gentle bees year round, select hybrid bee varieties for suburban areas.

3. The suburban bee hobbyist must have a better-than-average knowledge of apicultural practices. Since bees and beekeeping are so complex, keep a reference book close at hand. A subscription to a bee journal will help. Membership in a state or local beekeeping organization is another source of information as well as enjoyment; enrollment in a correspondence course or short course will be extremely helpful.

4. Although swarming bees are quite gentle and little inclined to sting, always practice good swarm prevention to keep your colonies intact and insure that they do not swarm. Although not all factors of swarming biology are known or understood, sufficient room in the brood chambers and adequate honey storage area will keep swarming at a low level. The reversal of brood hive bodies every 10 days during swarming season is an excellent method of insuring sufficient brood rearing room. For colonies that persist in queen rearing, dividing the colony is the best means of avoiding swarming. Know how to capture swarms--this is a civic contribution.

5. Keep a water source close to the colonies. When water is not close or provided by the beekeeper, bees may visit swimming pools, bird baths, hanging wash, etc. Bees need water to dilute honey when nectar is scarce and to aid in hive ventilation when temperatures get too high. When using open containers to supply water, place floating blocks, wire or some structure for bees to stand on while gathering water.

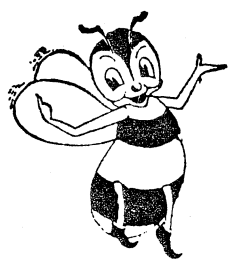
6. Put a hedge and/or fence around the back lot colonies. This will remove the colonies from view, cut down on vandalism, and most important, cause the bees to fly upwards and over people's heads when foraging from the hive. Shrubs and trees attractive to honey bees can be planted when constructing such hedges and thereby increase bee pasturage.

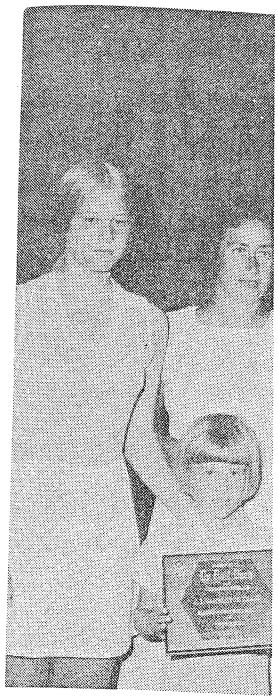
7. When manipulating and examining hives keep robbing at a minimum. A robbing condition produces aggravated bees and greatly increases searching behavior when little food is available; this often produces mean colonies. To prevent robbing, spare equipment stored outside should be bee tight. When examining hive, cover honey supers. Do not leave honey supers open or examine for very long when robbing is prevalent.

8. If you don't have the proper equipment, arrange to get together with other beekeepers or a bigger operator to extract honey. The proper equipment can be too great an investment for the starting individual and other methods of honey removal and wax rendering are messy and seldom worth the time and effort. A group going together on equipment or paying a small fee to a beekeeper with the proper equipment will get the honey extracted sanitarily and efficiently.

9. See that you have access to sufficient equipment for the size of operation you want to maintain. It is best to use equipment of standard dimensions and to keep the equipment painted and in good shape. Few suburban locations can support more than 5 colonies without affecting individual colony yields. The hobbyist too often finds he has too little equipment and too many colonies for the backyard and time available.

10. Register your bee colonies with the appropriate state agency so that they can be inspected for disease. Most states require colony registration. Write to: Apiary Inspection, State Dept. of Agriculture at the state Capital.





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Mr. Frank Stottlemyer Spring, Maryland, winner Trophy. He comes throu Congratulations Frank.

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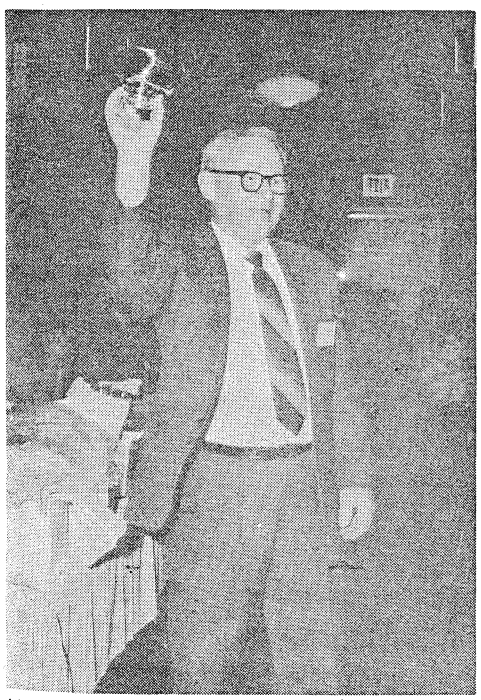
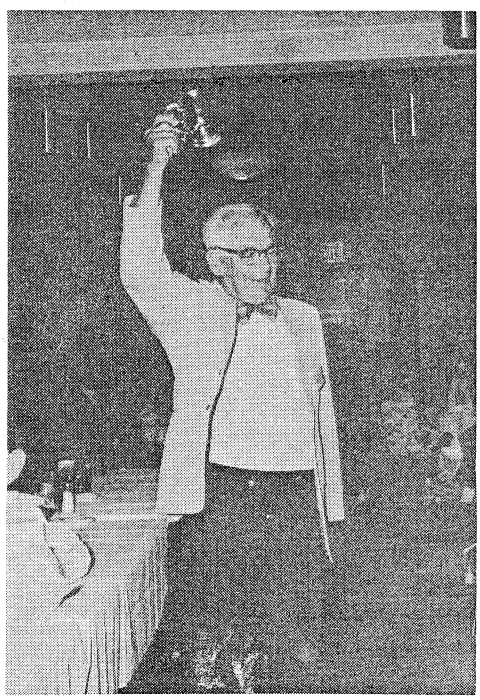
Dr. Rolf Boch is not only proud of his award but also of his very fine family.

Dr. Marvin Houck, Vice-President in West Virginia admiring his trophy from the President of E.A.S. for Chunk Honey.



Mr. Frank Stottlemyer from Silver Spring, Maryland, winner of the A.I. Root Trophy. He comes through each year. Congratulations Frank.



Art Dean, retired Treasurer of E.A.S. knows how to use this mug presented to him at West Virginia.

Some of the wonderful people who attended E.A.S. in West Virginia. Let's double this at Guelph. How about it beekeepers!!!!!

Long Island Beekeeping Delegation with Mrs. Boetcher (right) and Link Wells (left). A good group.

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