Fresno County
Seed Crop Notes

University of California Cooperative Extension — May 1989

Certification Deadlines

Growers of certified alfalfa seed in Fresno County need to fill out applications for certification to the California Crop Improvement Association (CCIA) before June 1. A renewal application form should be used after the first year. This year, the CCIA should send applicants for **renewal** a completed renewal application for each field which was submitted last year. They ask that the applications be reviewed, corrections made as necessary, and forms submitted to the farm advisor in your county. **New** applications should be filled out by the applicant as usual, and submitted to the farm advisor.

It is important to remember that an application must be made each year, including the seedling year, whether or not seed production is intended that year if the field is to remain eligible for certification in a later year. Only the membership fee will be billed on such a field, acreage fees are not required. Normally an applicant will apply for certification the first year a field has been established, but on occasion the applicant will overlook an application if there will be no production the first year or certification is not desired that year. A few growers found out this past year that once a field went through one growing season without an application, the Crop Improvement Association cannot accept it into certification. The reason for this rule is to mark the planting date, establish an age of stand, and inspect the field for purity (mainly volunteers).

While we are on the subject of applications I would like to emphasize the importance of providing maps on each application: ranch maps, aerial photographs or good hand-drawn maps. The inspectors rely on these maps to locate the certified fields in many areas of the state. If the inspectors cannot easily locate the field, they will move on to the next location until the map can be verified. During the late part of the inspection season it could mean delays to the grower by not having inspections complete and the field ready to dessicate or harvest. A good map will supply a readable plan with roads, canals, buildings and landmarks noted and described. It should also include Township, Range and Section.

Applications are available from the University of California Cooperative Extension office in each county where seed is grown. In Fresno County, the address is 1720 S. Maple Avenue,

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Deadlines

April 1 - Grain, Hybrid Asparagus, Pasture Crops
June 1 - Alfalfa, Bermudagrass, Clover, Safflower
July 15 - Beans, Cotton, Rice, Sorghum

Honeybees In Alfalfa Seed Production

The first blooms are appearing in Fresno County alfalfa seed fields. Any day now, we'll begin to see honeybees moving into the fields to begin their work. Honeybees are a necessary crop management tool for growers of alfalfa seed, melons, and almonds in Fresno County. In California, honeybees do the major pollination work to produce an annual alfalfa seed crop of over 35 million pounds.

Visitation of alfalfa flowers by bees is influenced by several conditions. Among these conditions are colony strength, health, location, plant turgidity, odors, pesticides, temperatures, wind, and location of water sources for bee use. Cooperation between growers, beekeepers, and insecticide applicators is the key to insect control and adequate pollination.

Pollination and Tripping

Alfalfa flowers require tripping and cross-pollination (transfer of pollen among different plants) in order to produce commercial seed crops. Usually the temperature is best for uniform flowering and maximum bee activity in Fresno County during the last part of May. Clipping schedules are recommended to bring the alfalfa plants into bloom when the climate is favorable for seed set. April 1st through the 20th is the recommended period for clip-back.

Alfalfa seed growers should contact their beekeepers **early** concerning the number of colonies needed for seed fields. The recommendation for bees in alfalfa seed is a minimum of three strong colonies per acre, preferably with each

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Honeybees In Alfalfa Seed Production *Continued*

colony having at least 600 to 800 square inches of brood covered with adult bees, and an actively laying queen in a two-story colony. (There are typically about 200 sq. inches of brood per frame.) The pollen needs of such colonies are greater than those with less brood; therefore, more bees will become pollen collectors. Pollen gathering bees, comprising about 25% of the field bees, are the most efficient trippers and cross-pollinators. Insects which visit alfalfa blossoms for nectar may also trip and cross-pollinate, but these are not as efficient as pollen foragers. Nectar-collecting honeybees (totalling approximately 75% of the field bees) increase their foraging efficiency by using a side approach (learning to avoid the trip mechanism) and thus decrease their effectiveness as pollinators. They remain important pollinators of alfalfa bloom despite their lower tripping rate simply because they usually visit a greater number of blossoms.

Alfalfa is not an abundant pollen producer. When the bees' needs can be satisfied by better or more easily worked blossoms, they show no interest in alfalfa pollen. The major competitors for honeybee visitation in seed growing areas of California are safflower, milo, corn, cotton, mustard, and melons. More than three colonies per acre can be helpful if the crop must be set quickly or if severe competitive bloom exists.

Factors to Consider When Placing Bees in a Seed Field

Experiments with honeybees show that they fly no further than is necessary to obtain sufficient food. The distribution of foragers in the crop is more closely correlated with the availability of adequate bloom than with the distribution or density of colonies. If bloom is poor, no matter how many colonies you place in the field, the bees will be exploring your neighbor's field, instead of setting seed at home.

Bees should be distributed to provide a 1/10 mile grid over the field, with groups of 12-18 colonies at each location. The most effective pollination activity occurs within a 100-yard radius of the colony, with the newly emerging field worker force accounting for much of the pollination of alfalfa seed. Substantial activity requires strong colonies to maintain a good working force throughout the pollination period.

An actively laying queen is needed for the long alfalfa seed pollination period. During a heavy nectar flow from alfalfa or nearby crops, beekeepers must add more "supers" of open frames. Without open area for egg laying, the colony becomes "honey bound" and field activity of the bees will suffer. An extra super to provide hive space may also encourage bees to enter the colony earlier on warm nights, which could help to avoid some bee kills from night pesticide applications.

Timing

Don't move bees into your field until there is sufficient bloom to "hold" the bees there. Honeybee colonies used for pollination of alfalfa seed should be moved into the fields beginning at 1/3 to 1/2 bloom (about 45 days after mid-April clip-back in the San Joaquin Valley). Less than half of the bee colonies required should be moved into the field at the early bloom stage. If the entire bee requirement is moved at early bloom, the bees will seek competitive bloom to satisfy their needs. After their flight patterns are established, it is unlikely that they will do an adequate job of pollination in the seed field. The remainder of the bees should be moved to the field within 7 days after the half bloom stage.

If the field begins to look like a flower garden, there are not enough bees per acre. Growers must quickly determine if additional bee colonies need to be provided, or if the situation is the result of a management practice. It has paid growers on occasion to bring in 2 or 3 additional bee colonies per acre for the last two weeks of a late bloom period to finally set a crop which had not developed earlier in the season. If this is necessary, the grower should avoid using pesticides which will repel bees during this critical period.

Honeybee field visitation levels in alfalfa seed crops drop rapidly during the first week of July in the central San Joaquin Valley. However, most seed fields have the potential for increased seed production after July 10th if water is available for bloom and seed development. If new bee colonies (inexperienced to the area) are moved into a seed field after the bee visitation drops to a very low level (2 bees/minute/60 ft. of row), it is possible to increase bee visitation for about 3 weeks. Visitation levels were a function of the number of colonies added in research trials.

It takes between 25 and 28 days for alfalfa seed to mature after the alfalfa flower has been pollinated. Therefore, bees can and should be moved from the alfalfa seed fields about 20 to 25 days prior to harvest.

Colony Strength

Colony strength is usually measured in terms of the number of frames covered with worker bees and the total square inches of brood. Flight activity and foraging tend to be proportionate to colony strength. For example, bees will fly from strong colonies at lower temperatures than they will from weak ones at the same temperatures. It is possible for alfalfa seed growers to request inspection and certification of honeybee colony strength. These requests should be directed to the Agricultural Commissioner's Office in Fresno. A fee to cover the cost will be assessed to the party requesting the inspection and certification.

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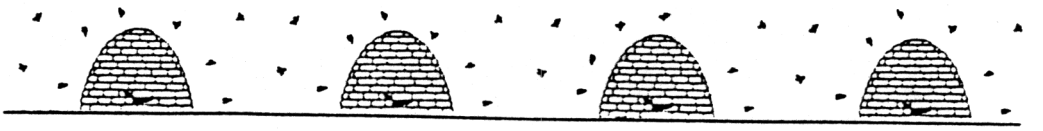


Protect Your Pollinators

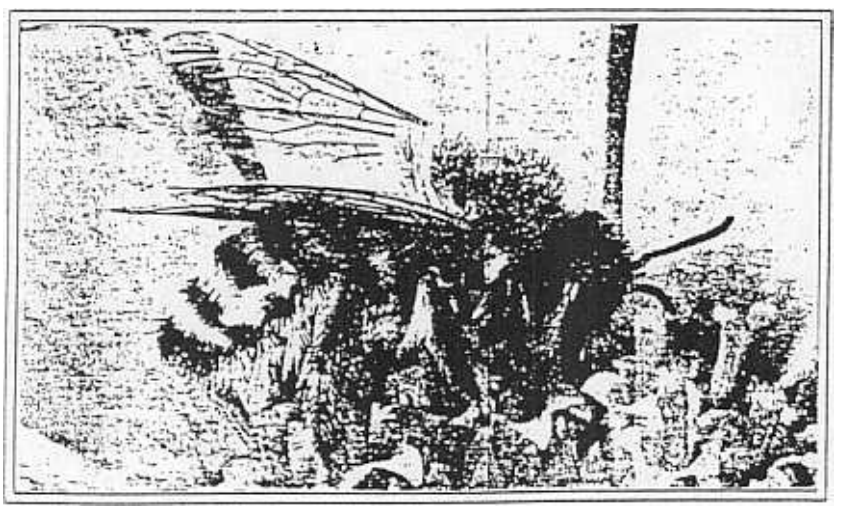
Everyone involved in the production of seed crops should take precautions to protect the honey bee pollinators during the season. Damaged colonies may not really recover for months, even if they survive the initial effects of poisoning. A partial loss of these pollinating insects during the crop bloom period can represent a large reduction in the crop yield. A serious reduction in bee populations may also put a beekeeper out of business and reduce the availability of pollinating insects the following year.

Pesticide applicators need to apply chemicals according to their written labels and in accordance with special instructions from pest control advisors and growers, including locations of bee colonies to avoid or treat with different chemicals, night application start and stop time limits, and inspection of fields for bee activity just before flying. Nearly all of the chemicals used for pest control purposes in seed alfalfa are capable of killing honeybees by direct contact. Visual inspection of colonies must be made to determine if bees are on the outside of the colony boxes prior to applying the insecticides in an area. The condition of colonies, air temperatures, and field conditions will vary greatly; so visual inspection prior to beginning a pesticide treatment is the best way to avoid direct contact between pesticides and bees.

Pest control in crop areas near alfalfa seed fields can have a major impact on honeybees which visit those crops, such as cotton, safflower, corn, or flowering weeds. The same bee protection precautions need to be followed in these crop areas as in alfalfa seed crops when bees are in the area. Honeybees will be visiting cotton plant leaves to obtain nectar from the time cotton is 8 inches high. For this reason, it is equally important during seed pollination periods to fly pesticides on cotton at night using short-residual materials which preferably would dissipate before bees return the following day.

Notice needs to be given to beekeepers at least 48 hours before pesticides harmful to bees will be used. If extra movement of colonies in and out of fields is required, compensation for this needs to be agreed upon and included in the pollination contract.

After insecticides are applied to alfalfa seed fields, alfalfa bloom appears to be less attractive to bees for a period of 2-4 days. In order to avoid poor pollination, it may be advisable to stagger insecticide treatments on neighboring fields in 2-3 day intervals. With very large fields, it may be advisable to treat half of the field at a time. This should provide good pollination within the field on the untreated portion during a peak bloom period.



Removing bees from the field 20 to 25 days before harvest as recommended will help avoid possible insecticide damage late in the season from neighboring fields.

Irrigation Considerations

Both pest control and irrigation management have a major affect on the pollination activities of honeybees in seed alfalfa fields. The correct use of water is one of the most difficult problems in alfalfa seed production. Many seed crops have suffered yield losses from lack of water in the summer months, and some have set poor seed yields due to too much water and vegetative growth. Highest seed yields have been obtained when irrigation practices have prevented severe stress and promoted slow, continuous growth through the entire production period, without excessively stimulating forage production.

Poor bee visitation is evident in fields with lush vegetation and wet soils. It may be possible to maintain high populations of honeybees visiting the slightly stressed areas of the field by using "alternate block" irrigation scheduling. Alternate block irrigation procedures establish a staggered bloom/stress condition in each field and appear to retain all bees foraging in the field. The pattern should be established soon after clip-back and before bloom begins in late May or early June.

If pesticide applications can be timed just after irrigations, the honeybee suppression periods of these two events can overlap and result in less time lost for bee visitations. This procedure appears to maximize visitation by honeybees placed on a single alfalfa seed field.

Water for the Field Force

Now is the time to plan for the placement of bee watering barrels in seed fields. Water barrels are cost-effective, even when the seed fields are

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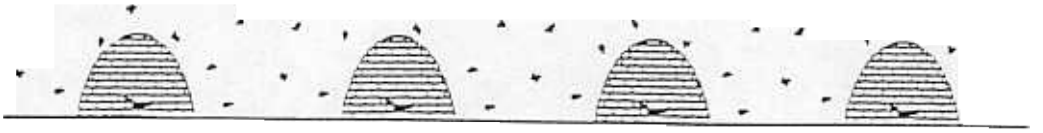
Honeybees *Continued*



bordered by full irrigation canals. Some growers are using 25 gallon plastic trash cans with fastening lids for water containers. Water barrels should be clean, and free from oil or pesticide residues. Water will need refreshing two or three times each week during the pollination period.

Fill the barrels with water and place "landing floats" on the surface **before** the bees are moved to the field. You want the bees to use this source of water to reduce their flight distance and conserve "wing wear" for pollination duties. By reducing flight distances for water during hot periods, it is reasonable to assume that more field bees are available to gather nectar and pollen. It's more difficult to reprogram the bee's patterns after she gets oriented to one water source. Furthermore, during the move into the seed field, honeybees have been deprived of water for quite some time. They will need to have a fresh water source available in the near vicinity of the hives.

Pollination Contracts

I hope that the majority of growers and beekeepers develop a written pollination contract to assist in clear communications. Contracts usually ensure better pollination services and should be initiated by the seed grower far in advance of the pollination season. Copies of sample pollination contracts are available at this office upon request.

1989-90 Assessment Rate

Upon recommendation of the Alfalfa Seed Production Research Board, the Director of Food and Agriculture has established the assessment rate for the 1989-90 marketing season for the Alfalfa Seed Production Research Program. The marketing season is from April 1, 1989 through March 31, 1990. The rate is 20 cents per hundredweight with 10 cents per hundredweight on producers and 10 cents per hundredweight on conditioners (processors). These are the same rates as last year.

There are several publications available at the Fresno County office which provide information on aspects of alfalfa seed production and certification. For a list of these publications, please contact our office by calling (209) 488-3285, or you can stop in or write to us at the U.C. Cooperative Extension Office, 1720 South Maple Avenue, Fresno, California 93702.

Seed Crop Notes is produced by Shannon C. Mueller, Agronomy Farm Advisor

Shannon Mueller

Glossary of Bee Terms

Apiary A collection of one or more populated beehives at a certain location.

Bee Sting The apparatus at the tip of an adult female bee that can inject venom into the victim being stung. The worker sting remains in the victim and continues to inject venom; it should be scraped off sting site.

Boardman Feeder A small, wooden feeder placed at the hive entrance and holding an inverted glass jar of sugar syrup.

Brood Any immature stage of development: egg, larva, or pupa. Also, collectively, all immature bees in the hive.

Cappings A thin layer of wax covering ripened honey or developing pupae. Capped brood refers to pupae.

Colony A community of bees living in close association and contributing to their mutual support by their labor. It is composed of a queen and worker bees, and during spring and summer drone bees are present. The terms colony and hive are often used interchangeably.

Dearth Severe to total lack of availability, usually in reference to nectar and/or pollen.

Drone A male bee that develops from an unfertilized egg.

Flow Refers to the availability of nectar and/or pollen. When food substances are available in abundance, it is a "good flow".

Frame A rectangle, usually of wood, that is hung inside the hive to support the foundation and comb.

Hive Body The part of the hive containing combs in which the queen lays eggs. The hive body rests on the bottom board.

Larva The wormlike immature stage of a honeybee that increases in size dramatically as it feeds on royal jelly, pollen, and diluted honey.

Nectar A dilute sugar solution secreted by glands in different parts of plants, chiefly in flowers.

Pollen Produced in anthers of flowers. Powderlike and composed of many grains, they are gathered and used by honeybees for food as a source of protein.

Propolis Plant resins collected by bees and used as a cement to stick hive parts together and to seal openings. Also called bee glue.

Queen Right A colony of bees with a functioning queen.

Super A wooden box with frames containing foundation or drawn comb in which honey is to be produced. Named for its position above the brood nest.

Worker An infertile, female honeybee, anatomically adapted to perform the work for a colony of bees including: manipulating stored food, feeding brood, guarding hives, foraging for food, etc.