Beekeeping: Watermelon Pollination[1]

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Watermelons are big a business in Florida. Keys to producing a profitable watermelon crop are numerous, but it is generally recognized that growers who harvest early, quality melons have the most chance of being successful. Several things must happen in order to produce a good crop. The grower needs to ensure optimum growing conditions, and the weather must cooperate, although there is little a producer can do about the weather. Consequently, the watermelon grower is also at the mercies of climatic vagaries.

Many conditions in the field besides the weather are under the control of the watermelon producer. Such things as pH and fertility of the soil, as well as control of insect pests and other pathogens often can be regulated by the grower (http://edis.ifas.ufl.edu/topic_watermelon). Within this decision-making mix, one of the most critical is whether or not to employ honey bees in pollinating the crop.

The best review on the subject of watermelon pollination by honey bees is found in *Crop Pollination by Bees* by Keith S. Delaplane and Daniel F. Mayer. Of primary importance to the watermelon grower are pages 275–277, which present an overview of the watermelon pollination requirements and practices. In addition, the introductory material on honey bee management, and particularly the section on pollination agreements and services, should be of interest to all people in many realms of agriculture. In this document, we present an overview of the sections mentioned above in an effort to more widely disseminate information on optimizing watermelon pollination.

It has been universally recognized that watermelons are insect pollinated, even as far back as the turn of the 20th century. Of utmost importance in watermelon pollination is the fact that at least 1000 grains of pollen must be evenly deposited on the tree lobes of the stigma if a uniform melon is to result. Because the pollen grains produce pollen tubes directly downward with very little lateral movement, an insufficient amount of pollen on one stigma lobe will result in an asymmetrical melon. Thus, saturation pollination is an important consideration if uniform melons are to be produced.

Other considerations also influence fruit set, according to S. E. McGregor in his Agricultural Handbook *Insect Pollination of Cultivated Crop Plants*: "It...appears that number of bee visitors (eight or more), time of bee visits (6 to 10 a.m.), length of ovary at time of pollination (28mm or longer), plant vigor, and number of melons already set on the vine, all contribute to the greatest percentage of fruit set." Most honey bees visit melon fields in the morning when the highest percentage of fruit set is expected. Given that mornings are also the times of greatest variability in weather conditions can a producer ignore the possibility that natural pollinators will not be available during this critical period? As such, honey bees are a necessary component of any watermelon production endeavor and pollination must be left solely to managed pollinator populations (honey bees)?

Although it is recognized that honey bees are important for watermelon pollination, there is a great variance in recommendations concerning bringing bees in to pollinate

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crop. Estimates vary from one to five colonies of bees per acre as being necessary for adequate melon pollination (the literature average is 1.8 hives per acre or 4.5 hives per ha). Other conditions like placement of colonies in discrete groups within the field versus on the perimeter will also affect resulting pollination.

Recommendations for numbers of colonies are not precise because conditions can vary within a colony, which can have as little as 10,000 and more than 60,000 individuals at any particular time. Some recommend a bee population that will provide one bee for each 100 flowers in the field.

Unfortunately, watermelon flowers are not always attractive to honey bees. If certain types of other plants are blooming in the area, honey bees will shift from visiting watermelons to visiting the other plants. Consequently, watermelon growers may need to resort to other methods of increasing honey bee visits to target flowers. The best way to accomplish this is to increase the number of bee colonies per acre of watermelons grown. Other growers have used bee attractants in an effort to encourage bees to visit the flowers. However, most studies on bee attractants and honey bee pollination of watermelons have not shown a benefit of using bee attractants.

A standard pollination recommendation for watermelons grown in Florida does not exist. Like recommendations for many beekeeping practices, there is no good "cookbook" formula that works well for every producer under the extreme variety of possible conditions found at any particular time. In the long run, it will be best for the grower to work with a beekeeper in determining the best possible population of bees and their placement for optimum watermelon pollination.

To that end, it is important to use a written contract that details the expectations of both parties—grower and beekeeper. It is extremely important that the grower gain knowledge of beekeeping practices and bee biology to help in developing such a contract. It cannot be assumed that each colony or unit must necessarily have a queen, adequate food supplies and a generous population of worker bees for doing the pollinating work. It is important to remember that although bees may be collecting pollen and nectar from a watermelon field, they will not be able to sustain themselves solely on this source of nutrients. A supplementary source in the form of stored honey and pollen will be needed or the colonies will lose populations and become ineffective pollinating units.

A primary concern of beekeepers when involved in contracting their bees for pollination is the use of pesticides by the grower. The University of Florida published the EDIS document *Minimizing Honey Bee Exposure to Pesticides* http://edis.ifas.ufl.edu/in1027 which provides important pointers on this subject. A sample pollination agreement can be found here- https://edis.ifas.ufl.edu/aa169.

References

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