Mites Influencing Pollination

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The varroa mite, *Varroa destructor*, was first identified in the United States in 1987. It was first found in, and abruptly sent out of, California in 1990. By 1992 the mite was pretty well distributed throughout the country.

As with the introduction of an entirely new parasite into any host population, our European honey bees were pretty much unable to fend off the infestations. Both managed colonies and feral colonies became infested. In most cases, within a year or two, the infested colonies died. Those deaths first were attributed to overwhelming mite numbers (which can happen), but a significant portion of the deaths was due to viral epidemics spread by the mites acting as disease vectors.

Dying colonies did not simply dry up and disappear. They became weak and susceptible to robbing. Robbing bees brought more mites back home. Disoriented drones drifted into neighboring or distant colonies, bringing the mites with them. Beekeepers moved infested bees all over the country.

When an infested colony collapsed, hundreds or thousands of adult bees left the hive to find another colony in which to live. Even if the guard bees at the "new" colony fought off the invaders, the mites dropped off the fighting bees and got into the colony.

By 1995-96, there were very few feral colonies across the nation. Growers with smaller acreages of crops, who had relied upon feral honey bees for "free" pollination, were desperately seeking beekeepers who could supply bees for their crops.

At this "peak" of mite numbers, commercial beekeepers had to treat their colonies with acaricides as many as three times a year to keep them alive. It is quite difficult to find chemicals and doses that will kill one species of arthropod in a colony of arthropods that we wish to protect.

Fortunately, there was a time-release treatment available that was quite efficacious and the industry "survived" the first influx of mites. With time, the mite numbers dropped significantly, and the beekeepers were able to settle in to treating one time a year pretty successfully. With a reduced mite load in the environment, feral colonies began to be noted, again, in trees and buildings.

As with any chemical used repeatedly to subdue a pest, the varroa mites eventually became resistant to the first acaricide. This took about ten years. So, a second time-release acaricide was registered for the same use. Unfortunately, resistance developed to the second acaricide much more quickly, with some beekeepers only getting about three years of usefulness

from the product. A third, easily applied, time-release product has not come onto the market for mite control.

In many commercial bee-keeping operations across the nation, varroa mites are increasing in numbers again and causing significant losses to the beekeepers. Even before the infestations reach lethal levels, the presence of mites causes significant losses of honey yields. The infested (stressed) colonies are more susceptible to diseases and adequate numbers of mites can generate epidemics of viral diseases that lead to colony death with "Parasitic Mite Syndrome." The two most commonly found viruses in the U.S. collapsing colonies are Acute Paralysis Virus and Deformed Wing Virus. But, Kashmir Bee Virus seems to be causing problems, elsewhere, and we have that virus in the U.S.

The resurgence of varroa mites in commercial beekeeping operations is causing significant economic effects on the costs of maintaining colonies. Beekeepers, again, have to treat their colonies up to four times a year to keep them alive. That increases the costs for treatment chemicals and for the labor involved in the applications.

Since infested colonies do not collect and store as much food as healthy colonies, coupled with a prolonged western U.S. drought, feeding colonies sugar syrup and pollen substitutes raise the costs of operation significantly in terms of feed and labor to apply it to the bees. Colony losses are beginning to rise, again, fairly abruptly. These losses increase expenses as new bees are purchased to refill empty hives. Add to that the increases in costs of gasoline, labor costs, workman's comp, etc. and the beekeepers are facing a real uphill battle.

The beekeepers have little control over the prices of honey. Even though honey prices were at historic levels over the last couple of years, U.S. and California colony numbers did not increase. Beekeepers cannot raise prices to their peers, significantly, for queens and bulk bees, so all that is left to help meet the rising costs of doing business is pollination income.

California beekeepers pollinate over 50 commercial crops in California, but the mutual relationship between almond growers and beekeepers is the one that holds the system together. In 2003, colony rentals averaged about $46 apiece. In 2004, the average approached $50. Next year (2005), the beekeepers report that they have to increase prices significantly, just to stay in business. Early contracts have been signed for $60 a colony, but that may be the lower end of the scale. Beekeepers watching their "bottom line" carefully say that $75 may be necessary to keep them in business. Even at that price, bees may be in short supply for almond pollination, since out-of-state beekeepers are having serious problems with colony health, also. Members of the beekeeping and almond growing communities must remain in constant, meaningful contact to be certain that both industries remain healthy well into the future.