# WHERE ARE ALL THE BEES?

By Mary Tran
UCCE El Dorado County Master Gardener

One of nature's most precious resources, bees, are disappearing fast. Have you wondered why and whether you may be able to help? The term "colony collapse disorder" (CCD) refers to the sudden loss of the adult worker bees from a hive of honeybees, leaving the queen and unhatched larvae to die in the hive despite plenty of food stores in the comb.

According to Eric Mussen, UC Davis Department of Entomology, CCD is probably due to multiple factors that weaken the colony, pesticides, parasites such as the *Varroa* mite, diseases such as the virus carried by mites, malnutrition due to loss of habitat, and stress due to transportation of hives plus all of the above. Bee journals reported major colony losses every 10 to 15 years in the late 1800s. The current CCD problem started in 2004 and got press coverage in 2006.

Recent research on possible causes has focused on the neonicotinoid insecticides (imidacloprid, clothianidin, dinotefuran, and thiamethoxam). They are the newest class of insecticide and the most widely used in the world. Compared to earlier insecticides such as organophosphates and carbamates, the neonicotinoids were developed because they show less toxicity to humans and other mammals. All of three types are descendents of nerve gases developed in World War I.

In plants the neonicotinoids are systemic; after application to soil or leaves they spread throughout the plant, including flowers (nectar and pollen). Insects take in the insecticides when they chew or suck on treated plants.

In animals they activate nerve cells that are normally triggered by the neurotransmitter "acetylcholine." Mammals have these neurons in both the peripheral nervious system (muscle contraction) and central nervous system (sensation, planning, and memory). In insects they occur only in the central nervous system.

Neonicotinoids make the nerves stay "turned on," causing paralysis and death. Since they bind more strongly to neurons of insects than mammals, they are considered to be more toxic to insects than mammals, therefore "safe."

A French study published in 2011 found that after exposure to neonicotiods the bees' homing (navigation back to the hive) was impaired. In 2012 researchers at the Harvard School of Public Health reported that they could "cause" CCD by exposing bees to low doses of imidacloprid. "The dead hives looked just like CCD cases; they were empty except for food stores, some pollen, and young bees, with few dead bees nearby. When other conditions cause hive collapse—such as disease or pests—many dead bees are typically found inside and outside the affected hives."

Neonicotinoids have been restricted in France since the 1990s and in Germany since 2008. In 2009 the California Department of Pesticide Regulation decided to reevaluate their previous approval. However, in 2012 when commercial beekeepers and environmental groups petitioned the US EPA to ban one of the neonicotinoids (clothianidin) because it harms honeybees, the petition was denied.

The home gardener can help the bees. Instead of using insecticides, use garden "best practices." Read the label if you do buy pesticides. Include bee-friendly plants in the garden. Try Artemesia *Asteraceae*, Cenizo or Leucophyllum *frutescens*, Creeping Thyme or Thyme *polytrichus britannius*, Goldenrod or Solidago *Asteraceae,* Lavender or *Lavandula*, and Zinnia or *Asteraceae.*

Learn more about bees and their critical role in gardening in El Dorado County on Saturday, February 16th at the Beekeeping class. Master Gardener Sharlet Elms will discuss how to raise bees and handle them safely. There is no charge for this three-hour event. It starts at 9:00 a.m. and is held in the Government Center Hearing Room, Building C, 2850 Fairlane Ct in Placerville.

Master Gardeners are available to answer home gardening questions Tuesday through Friday, 9 a.m. to noon, by calling (530) 621-5512. Walk-ins are welcome. The office is located at 311 Fair Lane in Placerville. For more information about our public education classes and activities, go to our Master Gardener website at http://ucanr.edu/sites/EDC_Master_Gardeners/. Sign up to receive our online notices and e-newsletter at http://ucanr.edu/mgenews/. You can also find us on Facebook.