

Colony Collapse Disorder

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Beekeepers around the US have reported higher-than-usual bee colony losses since the fall of 2006. This malady has been called CCD or Colony Collapse Disorder. Some beekeepers in states reporting CCD have lost 50-90% of their colonies. Honeybees contribute billions of dollars in added revenue to the US agriculture industry. Honeybees are needed in the production of more than one third of the fruits, nuts, and vegetables we eat.

Healthy colonies of bees contain thousands of worker bees. Colonies with CCD can appear healthy as few as 3 weeks prior to collapse. The adult bees soon disappear from colonies, leaving behind a hive full of honey, pollen, capped brood, a queen and a few workers. These CCD colonies do not contain any dead bees, or dead bees outside the hive. The adult bees simply vanish.

Researchers think that this CCD may be caused by neonicotinoids, a class of insecticides. They are an artificial form of nicotine that acts as a neurotoxin in insects. Neonicotinoid insecticides include imidacloprid, thiamethoxam, clothianidin and several others. Imidacloprid is used extensively in seed dressing for field and horticulture crops such as corn, sunflower and canola. Imidacloprid was detected in soils, plant tissues and pollen. The levels of insecticide found in pollen suggested probable delirious effects on honey bees. Since 2000, French and Italian beekeepers have noticed that imidacloprid is lethal to bees and the insecticide was suspected in causing the decline in hive populations by affecting the bee's orientation and ability to return to the hive. A scientific team led by the National Institute of Beekeeping in Bologna, Italy found that pollen from seeds dressed with imidacloprid contained significant levels of the insecticide and suggested that polluted pollen was one of the main causes of CCD. Analysis of corn and sunflower crops that were grown from imidacloprid treated seed indicated that large amounts of the insecticide will be carried back to honeybee colonies. Sub-lethal doses of imidacloprid in sucrose solution affected the homing and foraging activity of honeybees. Bees fed with 500 or 1,000 ppb (parts per billion) of the insecticide in sucrose solutions failed to return to their hive and disappeared completely, while bees that had imbibed 100 ppb solutions were delayed 24 hours compared to the controls (no insecticide). Sub-lethal doses of imidacloprid in laboratory and field experiments decreased flight activity and impaired olfactory (smell) discrimination and olfactory learning performance.