

## Clothianidin & CCD :: Fact Sheet

**What is Colony Collapse Disorder?** Colony Collapse Disorder, or CCD, is the name given to the mysterious decline of honeybee populations around the world beginning around 2006. Each winter since, one-third of the U.S. honeybee population has died off or disappeared (more than twice what is normal). While CCD appears to have multiple interacting causes including a mix of pathogens, a range of evidence points to sub-lethal [pesticide exposures](#) as important contributing factors. Neonicotinoids are a particularly suspect class of insecticides, especially in combination with the dozens of other pesticides found in honeybee hives. Key symptoms of CCD include: 1) inexplicable disappearance of the hive's worker bees; 2) presence of the queen bee and absence of invaders; 3) presence of food stores and a capped brood.

**What are "conditional registrations"?** Clothianidin was given a conditional registration in 2003. EPA is supposed to license ("register") pesticides only if they meet standards for protection of environment and human health. But pesticide law allows EPA to waive these requirements and grant a "conditional" registration when health and safety data are lacking in the case of a new pesticide, allowing companies to sell the pesticide before EPA gets safety data. The company is supposed to submit the data by the end of the conditional registration period. Conditional registrations account for 2/3 of current pesticide product registrations. It is a common practice for the EPA's Office of Pesticide Programs, to afford rapid market access for products that remain in use for many years before they are tested. [According to the Natural Resources Defense Council](#), of the 16,000 current product registrations: 11,000 (68%) have been conditionally registered; almost 8,200 products have been conditionally registered ("CR status") since 2005; approximately 5,400 products have had CR status since 2000; and over 2,100 products have had CR status since 1990.

**European examples: France:** Imidacloprid has been banned as a seed dressing for sunflowers in France since 1999, after a third of French honeybees died following its widespread use. Five years later it was also banned as a sweetcorn treatment. In 2008, French authorities declined to register clothianidin. French beekeepers report hive recovery as a result of the bans. **Germany:** In May 2008 German authorities banned seed treatment with neonicotinoids following a large bee kill in the Baden-Württemberg region of Germany which was linked to clothianidin use. **Italy:** As a precautionary measure, Italy's agriculture ministry suspended neonicotinoids in 2008. In 2009, Italy's neonicotinoid-free corn sowing resulted in no cases of widespread bee mortality in apiaries around the crops. This had not happened since 1999.

### **Pesticide questions:**

**Neonicotinoids:** Clothianidin is of the neonicotinoid family of systemic pesticides, which are taken up by a plant's vascular system and expressed through pollen, nectar and gutation droplets from which bees then forage and drink. Neonicotinoids kill sucking and chewing insects by disrupting their nervous systems. Beginning in the late 1990s, these systemic insecticides began to take over the seed treatment market. Clothianidin is Bayer's successor product to imidacloprid, which recently went off patent. Both are known to be toxic to insect pollinators, and are lead suspects as causal factors in CCD. Together, the two products accounted for over a billion dollars in sales for Bayer Crop Science in 2009. Imidacloprid is the company's best-selling product and among the most widely used insecticides in the U.S. Starting in about 2004, seed companies in the U.S. began to market seeds treated with a 5-X rate of neonicotinoids (1.25mg/seed, compared with the traditional 0.25 mg/seed).

**"Chemical cocktail" effect – or synergistic and cumulative pesticide exposures:** EPA regulates on a chemical-by-chemical basis, but interacting chemicals can have [synergistic](#) effects at very low levels — where a "chemical cocktail" of multiple interacting chemicals combine to have greater effects than would be predicted by traditional toxicological models. Traditional toxicological models proceed from the 16<sup>th</sup> century maxim that "the dose makes the poison." Pesticides can also have a cumulative "toxic loading" effect both in the immediate and long term. Neonicotinoids are known to persist in the soil for years and to accumulate on neurotransmitters over time. [U.S. environmental regulation remains behind current toxicological science](#) in accounting for synergistic and cumulative chemical effects.

### **Crop questions:**

**Why is corn relevant? Bees don't pollinate corn.** Because corn is wind pollinated it must produce pollen in abundance and bees exploit this rich protein source, bringing in more than their daily need and storing large surpluses for later use. Many commercial honeybees also feed on corn syrup over the winter. Corn covers 88 million acres of U.S. farmland. Despite the fact that honeybees aren't used to pollinate corn, by virtue of its sheer prevalence, this crop accounts for a large portion of honeybee nutrition and exposure, and nearly all U.S. corn is treated with systemic insecticides.

**Are neonicotinoids necessary for corn production?** Bayer claims that their seed treatments increase yields by 6-8 bushels per acre, but corn yields in Europe have not experienced an equivalent decline after banning the products. [According to Dr. Benbrook](#), in the U.S., corn was a leading crop in terms of Integrated Pest Management (IPM) practices in the early 1990s. At that time, 1/3 to 1/2 of corn acres were not treated with any insecticide. Pest threats were managed with crop rotations and other IPM practices. Since 2000 however, virtually all conventional corn seed has been treated with one or more insecticide seed treatments. The average acre of corn contains plants with three systemic insecticides moving through them – two *Bt* toxins manufactured in the plant, and a neonicotinoid such as clothianidin or imidacloprid. So while it is difficult to find untreated corn seed, the crop itself is not reliant.