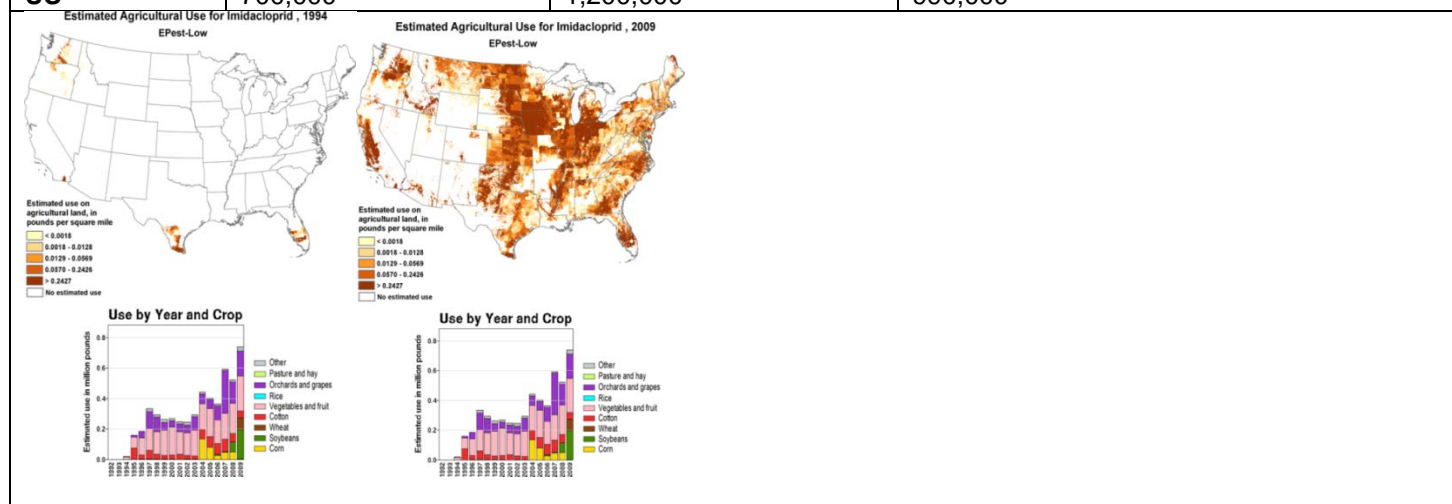


Project title: 2014 Understanding Systemic Insecticides, Dr. Vera Krischik, Dept of Entomology, UMinnesota

In 2009 143/442 million acres in the US use a neonicotinyl insecticide, 83 million acres of corn have seed treatments of neonicotinyls, and honeybees rely on corn for pollen.

Systemic neonicotinyl insecticides (imidacloprid, clothianidin, dinotefuran, and thiamethoxam) are widely used due to low toxicity to humans, but they are very toxic to bees and birds as addressed in two new review papers by the Xerces Society (2012) and American Bird Conservatory (2013). To understand how little kills a bee, let us think of a heart healthy aspirin that is 80 milligrams = 80,000 micrograms= 80,000,000 nanograms (ng). A bee that eats 4-40 ng imidacloprid can be killed and 1- 3 ng reduces the bee's ability to forage, navigate, and return to the hive.

	Imidacloprid lbs (ai)	Clothianidin lbs (ai)	Thiamethoxam lbs (ai)
MN	52,048	43,663	68,876
CA	348,247	3,182	30,687
US	700,000	1,200,000	990,000



Plant	Imidacloprid ppb	Reference
Sunflower (treated-seed)0.11 mg/seed	2 nectar 4 pollen	Schmuck et al. 2001
Pumpkin (soil drench) 4mg/sgft	4 - 12 nectar 37 - 87 pollen	Dively & Hooks 2010
Milkweed (soil drench) 300 mg/sgft	6000 ppb nectar	Krischik 2013
Eucalyptus tree (soil drench) 67g	550 ppb nectar	Paine et al 2011
Horsechestnut tree (trunk injection)	5-283 blossom	Bayer, unpublished, Maus et al. 2004b
Serviceberry (soil drench)	1,038- 2,816 blossom	Bayer, unpublished, Doering et al. 2005a,b
Neonicotinyl chemical	Ld50	Lethal dose in 20µL nectar ppb (ng/.1gbee)
imidacloprid	3.7-40	37-400 EFSA 2012, Bayer says in the field 192 ppb kills a bee Bayer says at 20 ppb alterations in behavior and navigation
dinotefuran	23-47	230-470 EFSA 2012
thaimethoxam	5-30	50-300 EFSA 2012
clothianidin	3-22	30-220 EFSA 2012