

VegNet Vol. 14, No. 5. April 12, 2007

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## **More Cold Air**

Nothing like last time, but there are some more opportunities for frost in the next several days. Over the weekend, a big Noreaster will set up off the east coast and this will help create a superhighway for cold air to funnel into our region on Saturday and Sunday night with the potential for frost on both nights followed by a warm up. Late next week, around Thursday and Friday, the potential for frost returns again.

These will only be one or two day events with temperatures in the low 30s and nothing like we had over Easter weekend. As before, follow local NWS forecasts for up to date information.

**Imidacloprid, Bees and Vegetables** by Gerald M. Ghidui, Ph.D., Specialist in Vegetable Entomology. From: Plant and Pest Advisory, April 11, 2007. Rutgers Cooperative Extension at the NJ Agricultural Experiment

## Station

Imidacloprid, originally sold as Admire, Provado, and Gaucho, has been reported to be responsible for high losses in honeybees. High bee losses have been reported throughout Europe, Canada, and North America, with significant decline in the production of honey. Beekeepers believe that the use of imidacloprid has been responsible for some, if not all, of this decline. Many studies have been conducted beginning around 1998 to determine if imidacloprid is related to the bee population decrease and subsequent decline in honey production. However, after much testing, there is no definite data to show that this material is harmful to bees, or related to the bee loss. Tests designed to show that bees lose their orientation and cannot function normally have been inconclusive, and tests designed to test bee kill have had contradicting results. Imidacloprid is sold in nearly 70 countries, and many of these areas report no bee losses. Even in the US, the fruit growers in the state of Washington rely heavily on imidacloprid, and have not had the reported bee problems. And in France, even after a 4 year ban on sunflower seed treatments with imidacloprid, a significant drop in bee populations is still observed. Some researchers believe that honeybee decline may be totally unrelated to the imidacloprid, and that something other than a pesticide is responsible for this sudden honeybee decline. Even though the data does not present a clear cause-and-

effect relationship, vegetable growers can opt to use non-imidacloprid treatments that are just as effective in many vegetable crops as preplant, in-furrow or seed treatments. These include Bifenthrin (a pyrethroid), Counter, Cruiser (thiamethoxam), diazinon, lindane seed treatments, Fortress (chlorpyrifos), Furadan (carbofuran), Lorsban (chlorpyrifos), Mocap (ethoprop), Permethrin, Platinum (thiamethoxyam), Thimet (phorate), Trigard (cyromazine), and Venom (dinotefuron) are labeled on certain vegetables.

Before using any preplant, in-furrow or seed treatment, refer to the manufacturers label for complete listing of crops, directions, restrictions and safety information.

### Crop Report by Brad Bergefurd, April 6, 2007

Sweet Corn Freeze Injury have been in several fields this morning where emerged sweet corn even planted under clear plastic has received some cold injury the past few nights. Corn emerged in unprotected non plastic fields are showing much worse injury than the plastic planted corn. How will this corn injury effect plant growth and survivability? Since these plants are still at the just emerged seedling stage the growing point is still below the soil surface about 1/2 to 3/4 inch, however the next few nights forecast in the teens could freeze the soil to this

depth especially in non plastic fields resulting in death of the growing point. The health and condition of the corn plants growing point region plays a major role in determining whether a damaged corn plant will recover or not. A damaged plant with a healthy, undamaged growing point (apical meristem) will survive. Damage to the growing point area will either kill the plant or severely stunt its recovery. Corn's growing point is initially located 1/4 to 3/4 inch below the soil surface, near the crown. The growing point remains below ground until about the V6 stage. While corn younger than V6 can tolerate a fair degree of above-ground damage to leaf tissue by frost, lethal cold temperatures (32F or less for several hours) can 'penetrate' the upper soil surface and damage or kill the growing point of a young corn plant. Damaged corn fields need to be left alone for several days after the damage occurs to give them some time to initiate recovery. Recovery from the whorl will appear within 3 to 10 days, depending on temperature and soil moisture. Warmer temperatures and adequate soil moisture encourage rapid recovery, while cooler temperatures and/or drought stress restrict the rate of recovery. The stalk tissue near the growing point region should remain firm and yellowish-white. Injury occurring close to the growing point may alter normal hormonal activity and cause deformed regrowth. After three to five days, surviving corn plants should be showing new leaf tissue expanding from the whorls, while dead corn plants will still look dead. Yield

loss to frost damage in corn younger than V6 is related primarily to the degree of stand loss, not to the degree of leaf damage. For more information see the OSU Extension CORN Newsletter from 2002, <http://corn.osu.edu/archive/2002/may/02-14.html> , that covers cold weather injury to corn from that year. Greenhouse pollutant or other Injury to greenhouse transplants I have been in several greenhouses this morning and yesterday where we have identified transplant injury due to heaters not properly functioning. With the past few nights of very low temperatures and the forecast for at least 10 more days and nights of high heat demand in greenhouses growers should be aware of potential air pollutant injury potential in their greenhouses. I observe this injury at least once each year and this could be avoided if growers took a few simple precautionary steps. Transplants we have identified that have been affected, injured, stunted and killed include seedling peppers, lettuce seedlings, cabbage seedlings and tomato seedlings. In the past we have identified high tunnel tomatoes in bloom aborting and dropping their blooms from poorly functioning heaters and the grower lost their first two valuable sets of fruit . Growers should consider placing carbon monoxide alarms around their greenhouse heaters which measure the parts per million of carbon monoxide in the greenhouse air and also several brands will trigger an alarm when levels are accelerated. Air pollutants The most common and serious forms of

greenhouse pollution are combustion gases generated by faulty heat exchangers, dirty fuel openings and incomplete fuel combustion. Poor combustion not only reduces the efficiency of the heater, the fuel that is not combusted contains pollutants such as carbon monoxide, sulfur dioxide, nitric oxide and ethylene. Ethylene, sulfur dioxide and nitric oxide, even in small quantities, can harm tender young seedlings. Well-sealed, energy efficient greenhouses have added to the problem by reducing outside air exchanges. Leaks of fuel such as propane and methane must be fairly large to be hazardous for human health, but even small leaks can adversely affect plants. Similarly, ethylene is only dangerous to humans at high concentrations, but ethylene levels of less than 0.05 ppm can make tomato leaves bend downward (epinasty). With chronic exposure, stems may thicken, branching may increase, and flower buds may abort or develop into malformed fruit. Under chronic low exposures, however, symptoms may be hard to recognize, especially if clean air grown plants are not available for comparison. Diagnosis is also difficult because of the time lag between the period of ethylene exposure and the time damage is noted. The safest practice is to maintain proper ventilation, even at the expense of energy conservation, and observe plants closely for signs of damage when heaters first come on in the fall and during periods of unusually cold weather in the winter. Problems arise when inadequate combustion air within the greenhouse prevents complete combustion

and proper venting of combustion gases. These gases can leak into the greenhouse from the draft diverter on the heater. Proper venting is also essential to prevent exhaust gases from being drawn back into the house. Proper maintenance also prevents problems. Adjustment and checking for gas leaks is best done by professionals before the start of the heating season. Maintenance should include cleaning the unit heater and fuel orifice at least twice a year and regularly inspecting the flame for changes in appearance. Propane flames should have a small yellow tip while natural gas flames should be soft blue, with a well-defined inner cone. Another problem is the use of old burners. If there are holes in the combustion chamber, surface exhaust can be sucked directly into the greenhouse through the heat circulation fan attached to the heater furnace. A properly sized draft induce fan, installed in the chimney can prevent this problem.

Unburned Fuels Unburned hydrocarbon fuels, such as those from gas supply lines and direct-fired heaters or burners for CO<sub>2</sub> generation, can be hazardous. This will occur if the burner operation is faulty (e.g. open gas valve when pilot light is off) or when the pipe fittings are leaking. The latter occurs more often after alterations to the gas supply lines and inadequate checks (pressure tests or soaping the fittings) have been made for leakage. Symptoms are similar to those described for ethylene. For more information on Greenhouse air pollution injury to greenhouse crops see the fact sheet located at

[http://www.ces.ncsu.edu/depts/hort/greenhouse\\_veg/more\\_info\\_/stress2.html](http://www.ces.ncsu.edu/depts/hort/greenhouse_veg/more_info_/stress2.html) for more information. Best thing is to have a certified Heater technician inspect the heaters at the beginning of each season for proper operation. If you suspect injury to plants get a sample to your county Extension Educator, <http://www.ag.ohio-state.edu/~directory/SearchPers.php> , and to Nancy Taylor at the OSU Plant and Pest Diagnostic Clinic , <http://ppdc.osu.edu/> , ASAP for a positive lab diagnosis, culture if it is a disease problem and confirmation of the problem.