

Minimize Damage to Your Greenhouse from Hurricanes and Wind Storms

John W. Bartok, Jr.

What will you do the next time a hurricane or heavy wind squall threatens your greenhouse operation?

Each year several hurricanes strike the coastal U.S. with severe winds and heavy rain. Wind squalls or weather fronts having hurricane force winds (greater than 75 mph) frequently occur in interior sections of the country. These can cause severe damage to greenhouses that are not properly built and protected.

Greenhouses should be designed and installed to withstand an 80-mph wind. The load placed on the greenhouse varies with wind angle, greenhouse shape and size, the location of the windbreaks and the presence or absence of any openings into the greenhouse.

An 80-mph wind can produce a pressure of 16 lb./sq. ft. For example, the 10' x 100' sidewall of a gutter connected greenhouse would have to resist a load of 16,000 lb.

In a hoop or arch greenhouse, the wind load is transformed to create a lifting effect similar to an airplane wing. An 80-mph wind blowing perpendicular to the side of a 28' x 100' hoop house can create a lifting force of 220 lb./ft. of length or 22,000 lb. on the whole structure. When you consider that the total weight of the materials and equipment in the greenhouse is about 6,000 lb., the foundation pipes are required to have a withdrawal resistance of about 300 lb. each. For this reason it is suggested that concrete be placed around these pipes.

I remember about 10 years ago visiting a tomato grower on a day when a strong nor'easter was passing through the area. As I approached the large wood frame greenhouse, I noticed three large trucks backed up tight against the greenhouse wall. The grower indicated that these were there to keep the greenhouse from blowing away. Once inside the greenhouse it was evident what he meant. With every wind gust, the structure would lift, tightening the strings supporting the tomatoes and raising the foundation posts out of the ground about a foot. As the wind died down, the frame would settle back to the ground. Although the greenhouse is still standing today, it was rather frightening at the time.

Most growers keep pretty good tabs on the weather, but during times when storms or severe weather could occur, a constant monitoring of a radio station with frequent forecasts or tuning in to the NOAA weather channel in your area will give you advanced warning.

Whenever a hurricane approaches, I get a number of calls from concerned growers wanting to know how to minimize the storm damage. Here are a few tips that may help you prepare for the next storm.

Check the area for loose objects. Anything that can be picked up and hurled through the glazing should be secured or moved indoors. Boxes, flats, pieces of sheet metal or plywood can create a large hole which will allow the wind and rain in. Metal chimney (stove pipe) sections should be secured with sheet metal screws.

Inspect for dry or weak tree limbs that could fall on the greenhouse. Use common sense and safety equipment when working in trees.

Close all openings including vents, louvers and doors. You double the effective force of the wind when it is allowed inside the building. The wind on the outside puts a pressure or lifting force on the structure. The wind inside tries to force the walls and roof off.

On poly covered houses, there are a couple of additional measures that can be taken.

1. **Increase the inflation pressure slightly by opening the intake valve on the blower.** This will reduce the amount of rippling that occurs in the plastic. Be sure that the plastic is attached securely and that any holes are taped.

2. **Disconnect the arm to the motor on all ventilation intake louvers and tape the shutters closed.** Then turn on enough exhaust fans to create a vacuum in the greenhouse. This will suck the plastic tight against the frame. All doors should also be closed.

Check all structural joints and bracing. Tighten bolts on collar ties, truss supports, purlins and foundation brackets. It is surprising how many of these work loose over time. On hoop houses and gutter-connected houses inspect diagonal bracing. This is important to prevent the greenhouse from rocking end to end. If your greenhouse does not have bracing, install furring strips, tubing or 1/8" x 1" strapping from the ridge to the foundation. The bracing should be secured to each frame with bolts or clamps.

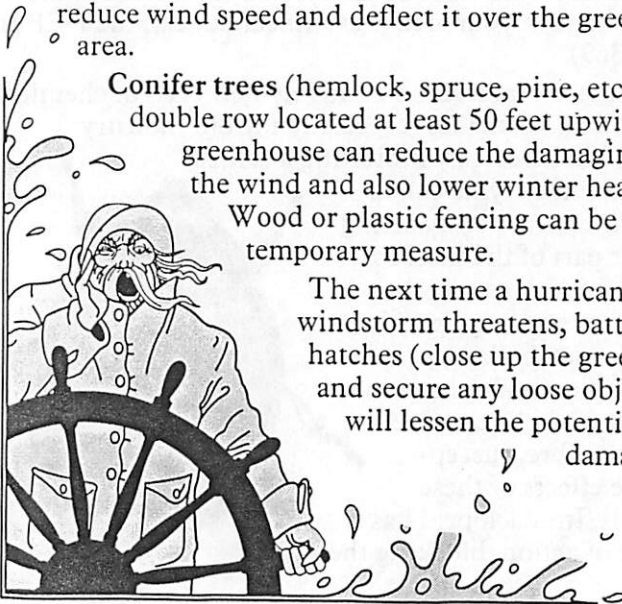
Windbreaks (temporary or permanent) can be installed to

reduce wind speed and deflect it over the greenhouse area.

Conifer trees (hemlock, spruce, pine, etc.) in a double row located at least 50 feet upwind from the greenhouse can reduce the damaging effect of the wind and also lower winter heating bills.

Wood or plastic fencing can be used as a temporary measure.

The next time a hurricane or heavy windstorm threatens, batten down the hatches (close up the greenhouse) and secure any loose objects. This will lessen the potential for damage.



The Many Uses (and Labels) of Imidacloprid

Richard J. McAvoy

Associate Professor and Extension Specialist, Greenhouse Crops

By now, all greenhouse growers are familiar with the imidacloprid pesticide called Marathon, but did you know that this exciting new chemical compound has broad application outside of the greenhouse industry. This material is used to control not only sucking insects like aphids and whiteflies, but also a number of white grub species in turf, weevils and Colorado potato beetles in field-grown food and fiber crops, and there is even a new application as a termite control agent being considered. Table 1 lists some of the commercially available formulations and their labeled uses. As always, follow label directions when using any pesticide, and contact the DEP in your state if you are unsure of the approved usage in your area (in Connecticut call the DEP at 203-424-3369).

Imidacloprid represents a relatively new class of chemical pesticide. Most pesticides (especially the old industry standards) kill insects by inhibiting a critical nervous system enzyme called acetylcholinesterase or by acting on another part of the insect's nervous system. Most of these chemicals are not very specific to the insect's metabolism; people and other animals also have the enzyme acetylcholinesterase and are, therefore, susceptible to the effects of these compounds. Imidacloprid has a new mode of action, blocking the

