

Corn flea beetle and Stewart's wilt predictions for 2008

Mike Hoffmann & Jeffrey Gardner, Dept. of Entomology, Cornell University, Ithaca.
John Gibbons, Ontario Co. CCE,
Keith Eggleston, Northeast Regional Climate Center

Stewart's wilt is an important disease of sweet corn in New York. The disease is caused by a bacterial pathogen that is vectored almost exclusively by the corn flea beetle. The bacteria overwinter in the gut of adult flea beetles. In the spring, beetles infest early plantings of corn and transmit the pathogen to the plant by feeding and defecating on leaves. Stewart's wilt is characterized by development of conspicuous streaks on the leaves and stalk due to plugging of vascular tissue. Early wilt infections cause reduction of yield in susceptible varieties by reducing stands due to death or stunting of infected seedlings. Seedlings, which survive early infections, remain stunted, tassel prematurely, and frequently produce no ears or nubbins. Disease severity is aggravated by high temperatures, which causes faster development and movement of the bacteria through the infected plants.

Corn flea beetles spend the winter as adults near the soil surface in grassy areas in and around cornfields. Severe winter temperatures can kill most of the population and result in a very low incidence of Stewart's wilt disease the following summer. Thus, a winter temperature index is used to predict the likelihood of Stewart's wilt problems. One forecast uses the number of months with mean temperatures above 24°F for December, January, and February. The Stewart's wilt index (likelihood of wilt problems) is as follows:

| Iowa State method | |
|--------------------------------------|------------------|
| Number of months $\geq 24^{\circ}$ F | Predicted risk |
| 0 | Negligible |
| 1 | Low to moderate |
| 2 | Moderate to high |
| 3 | High |

2008 forecast:

The winter of 2007-2008 was generally mild, and the Iowa model predicts moderate to high risk throughout much of NY. Risk maps can be accessed at http://www.nrcc.cornell.edu/grass/stewart_maps.html. The model does not account for the number of beetles entering the winter, the number of surviving beetles that actually carry the pathogen, or the effect of varietal susceptibility. Despite these knowledge gaps the model has done well in predicting relative incidence of Stewart's wilt.

Management options for Stewart's wilt disease control include:

- 1) planting resistant varieties
- 2) planting with treated seed for susceptible varieties
- 3) applying a foliar insecticide spray if needed to protect seedling corn.

Tabulated risk of Stewart's wilt for many locations in NY:

| Station | County | Average °F | | | IA Count | Risk |
|--------------|----------|---------------|------|------|-------------|------------------|
| | | Dec | Jan | Feb | | |
| ADDISON | STEUBEN | 29.0 | 27.8 | 24.5 | 3 | High |
| ALBANY | ALBANY | 27.8 | 27.6 | 26.2 | 3 | High |
| Albion | ORLEANS | 29.4 | 29.9 | 25.3 | 3 | High |
| ALCOVE DAM | ALBANY | 26.6 | 25.4 | 25.9 | 3 | High |
| ANGELICA | ALLEGANY | 26.5 | 26.1 | 22.5 | 2 | Moderate to high |
| Appleton | NIAGARA | 31.1 | 32.1 | 25.6 | 3 | High |
| Arkport | STEUBEN | 28.3 | 27.9 | 24.1 | 3 | High |
| AUBURN | CAYUGA | 28.3 | 27.8 | 25.8 | 3 | High |
| BAINBRIDGE | CHENANGO | 26.4 | 25.7 | 24.2 | 3 | High |
| Batavia | GENESEE | 27.9 | 28.5 | 23.6 | 2 | Moderate to high |
| BATH | STEUBEN | 28.2 | 27.3 | 23.8 | 2 | Moderate to high |
| BINGHAMTON | BROOME | 27.3 | 27.2 | 24.2 | 3 | High |
| BLOOMINGBURG | SULLIVAN | 29.4 | 29.3 | 28.7 | 3 | High |
| BOONVILLE | ONEIDA | 21.0 | 21.7 | 18.7 | 0 | Negligible |
| Branchport | YATES | 28.6 | 28.2 | 24.1 | 3 | High |

| Station | County | Average °F | | | IA Count | Risk |
|-----------------|--------------|---------------|------|------|-------------|------------------|
| | | Dec | Jan | Feb | | |
| BRIDGEHAMPTON | SUFFOLK | 35.4 | 33.9 | 35.0 | 3 | High |
| BUFFALO | ERIE | 29.3 | 29.7 | 25.1 | 3 | High |
| CANTON | ST. LAWRENCE | 21.3 | 23.5 | 19.2 | 0 | Negligible |
| CARMEL | PUTNAM | 29.4 | 28.4 | 28.5 | 3 | High |
| CHEMUNG | CHEMUNG | 28.3 | 26.5 | 24.2 | 3 | High |
| COBLESKILL | SCHOHARIE | 25.7 | 26.2 | 24.5 | 3 | High |
| CONKLINGVILLE | SARATOGA | 26.3 | 22.9 | 22.4 | 1 | Low to moderate |
| COOPERSTOWN | OTSEGO | 26.2 | 25.9 | 23.9 | 2 | Moderate to high |
| CORNING | STEUBEN | 25.9 | 25.2 | 21.3 | 2 | Moderate to high |
| DANSVILLE | LIVINGSTON | 29.7 | 29.0 | 26.1 | 3 | High |
| DELHI | DELAWARE | 25.4 | 23.7 | 23.5 | 1 | Low to moderate |
| DELTA DAM | ONEIDA | 26.0 | 25.5 | 21.6 | 2 | Moderate to high |
| Dresden | YATES | 27.3 | 25 | 25 | 3 | High |
| DUNKIRK | CHAUTAUQUA | 32.0 | 31.2 | 27.0 | 3 | High |
| EAST JEWETT | GREENE | 25.1 | 23.2 | 23.3 | 1 | Low to moderate |
| EAST SIDNEY | DELAWARE | 26.3 | 25.0 | 24.4 | 3 | High |
| Elba | GENESEE | 26.5 | 27.2 | 26.1 | 3 | High |
| ELLENBURG DEPOT | CLINTON | 19.7 | 21.1 | 19.0 | 0 | Negligible |
| ELMIRA | CHEMUNG | 28.5 | 28.3 | 25.3 | 3 | High |
| FARMINGDALE | SUFFOLK | 36.4 | 34.5 | 34.9 | 3 | High |
| FRANKLINVILLE | CATTARAUGUS | 26.1 | 25.1 | 21.8 | 2 | Moderate to high |
| Fredonia | CHAUTAUQUA | 32 | 31 | 22.6 | 2 | Moderate to high |
| Freeville | TOMPKINS | 28.8 | 28.7 | 26.5 | 3 | High |
| Friend | YATES | 28.6 | 28.5 | 23.1 | 2 | Moderate to high |
| FULTON OSWEGO | OSWEGO | 27.6 | 28.2 | 24.3 | 3 | High |
| Gainesville | WYOMING | 26.8 | 26.4 | 25.1 | 3 | High |
| Geneva | ONTARIO | 28.8 | 29.2 | 22.4 | 3 | High |
| GLENS FALLS | WARREN | 24.9 | 22.2 | 21.8 | 1 | Low to moderate |
| GRIFFISS AFB | ONEIDA | 25.9 | 26.5 | 24.1 | 3 | High |
| Groveland | LIVINGSTON | 29.7 | 30 | 25.5 | 3 | High |
| HIGHMARKET | LEWIS | 18.7 | 19.2 | 16.0 | 0 | Negligible |
| Himrod | YATES | 30.3 | 30.3 | 25.8 | 3 | High |
| HONEOYE | ONTARIO | 29.0 | 28.6 | 25.4 | 3 | High |
| HOOKER | LEWIS | 22.6 | 23.5 | 19.8 | 0 | Negligible |
| HORNELL | STEUBEN | 26.3 | 25.4 | 23.5 | 2 | Moderate to high |
| INDIAN LAKE | HAMILTON | 21.0 | 20.5 | 17.9 | 0 | Negligible |
| ISLIP | SUFFOLK | 35.1 | 33.8 | 34.0 | 3 | High |
| Ithaca | TOMPKINS | 29.1 | 28.2 | 26.5 | 3 | High |
| JAMESTOWN | CHAUTAUQUA | 29.0 | 27.5 | 23.7 | 2 | Moderate to high |
| Lansing | TOMPKINS | 30.2 | 30.1 | 24.6 | 3 | High |
| LANSING MANOR | SCHOHARIE | 27.3 | 27.9 | 26.4 | 3 | High |
| LITTLE FALLS | HERKIMER | 26.1 | 25.2 | 22.4 | 2 | Moderate to high |
| LOCKE | CAUYGA | 24.5 | 24.0 | 23.0 | 2 | Moderate to high |
| Lockport | NIAGARA | 30.3 | 30.6 | 26.4 | 3 | High |
| LOWVILLE | LEWIS | 22.9 | 23.4 | 18.6 | 0 | Negligible |
| MALONE | FRANKLIN | 19.5 | 22.0 | 18.9 | 0 | Negligible |
| MASSENA | OTSEGO | 20.3 | 21.3 | 18.0 | 0 | Negligible |
| MECKLENBURG | SCHUYLER | 26.7 | 26.7 | 23.2 | 2 | Moderate to high |
| MONTGOMERY | ORANGE | 30.1 | 29.1 | 27.7 | 3 | High |
| MORRISVILLE | MADISON | 24.6 | 24.8 | 22.3 | 2 | Moderate to high |
| NEW ALBION | CATTARAUGUS | 26.9 | 25.2 | 21.8 | 2 | Moderate to high |
| NEWCOMB | ESSEX | 19.6 | 18.1 | 16.8 | 0 | Negligible |
| NORWICH | CHENANGO | 25.8 | 26.2 | 24.1 | 3 | High |

| Station | County | Average °F | | | IA Count | Risk |
|---------------|-------------|---------------|------|------|-------------|------------------|
| | | Dec | Jan | Feb | | |
| OCEANSIDE | NASSAU | 36.1 | 35.0 | 35.1 | 3 | High |
| OLD FORGE | HERKIMER | 21.8 | 21.4 | 17.5 | 0 | Negligible |
| OLEAN | CATTARAUGUS | 28.4 | 27.7 | 24.2 | 3 | High |
| ONEONTA | OTSEGO | 28.6 | 28.7 | 26.6 | 3 | High |
| Pavilion | GENESEE | 26.4 | 27.6 | 25.6 | 3 | High |
| PENN YAN | YATES | 29.7 | 28.9 | 26.4 | 3 | High |
| PISECO | HAMILTON | 22.2 | 19.1 | 16.9 | 0 | Negligible |
| PLATTSBURGH | CLINTON | 23.3 | 23.3 | 21.7 | 0 | Negligible |
| Potter | YATES | 28.3 | 28.5 | 23.5 | 3 | High |
| POUGHKEEPSIE | DUTCHESS | 32.1 | 30.8 | 30.5 | 3 | High |
| Prattsburg | STEUBEN | 26.9 | 26.7 | 25.1 | 3 | High |
| Pulteney | STEUBEN | 28.3 | 28.7 | 23.1 | 2 | Moderate to high |
| Red Hook | DUTCHESS | 31.3 | 30.3 | 24.4 | 3 | High |
| RHINEBECK | DUTCHESS | 28.4 | 26.5 | 27.3 | 3 | High |
| ROCHESTER | MONROE | 29.3 | 30.4 | 26.4 | 3 | High |
| SARANAC | FRANKLIN | 18.6 | 18.5 | 15.4 | 0 | Negligible |
| Scriba | OSWEGO | 26.8 | 28.6 | 28.8 | 3 | High |
| SHERBURNE | CHENANGO | 26.2 | 25.7 | 24.7 | 3 | High |
| BROOKHAVEN | CHENANGO | 35.4 | 33.4 | 33.6 | 3 | High |
| SLIDE MTN | ULSTER | 23.8 | 22.9 | 22.7 | 0 | Negligible |
| Sodus | WAYNE | 28.2 | 28.8 | 25.1 | 3 | High |
| STUYVESANT | COLUMBIA | 28.3 | 28.0 | 27.4 | 3 | High |
| SYRACUSE | ONONDAGA | 27.9 | 29.5 | 25.7 | 3 | High |
| THURSTON | STEUBEN | 28.3 | 27.3 | 23.4 | 2 | Moderate to high |
| TROY | RENSSELAER | 28.4 | 29.3 | 27.0 | 3 | High |
| TUPPER LAKE | FRANKLIN | 19.5 | 21.1 | 16.0 | 0 | Negligible |
| WALES | ERIE | 27.2 | 26.8 | 22.6 | 2 | Moderate to high |
| WARSAW | WYOMING | 25.3 | 24.2 | 20.5 | 2 | Moderate to high |
| WATERTOWN | JEFFERSON | 25.2 | 27.0 | 20.8 | 2 | Moderate to high |
| WAVERLY | TIOGA | 29.8 | 29.0 | 25.9 | 3 | High |
| Wayland | STEUBEN | 27.7 | 27.6 | 23.9 | 2 | Moderate to high |
| WELLSVILLE | ALLEGANY | 27.6 | 26.4 | 22.8 | 2 | Moderate to high |
| WELLSVILLE | ALLEGANY | 29.0 | 28.0 | 24.6 | 3 | High |
| WEST POINT | ORANGE | 32.5 | 31.1 | 30.8 | 3 | High |
| WESTCHESTER | WESTCHESTER | 33.4 | 32.9 | 32.2 | 3 | High |
| WHITEHALL | WASHINGTON | 18.9 | 23.4 | 22.4 | 0 | Negligible |
| WHITNEY POINT | BROOME | 26.6 | 27.0 | 24.2 | 3 | High |
| Williamson | WAYNE | 29.2 | 29.9 | 25.8 | 3 | High |
| YOUNGSTOWN | NIAGARA | 30.4 | 30.2 | 25.6 | 3 | High |

* Stations in lower case represent Network for Environment and Weather Awareness (NEWA) stations.