

# **Founding of a Grower-based Weather/Pest Information Network to Aid IPM Adoption**

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## **Goals**

This project had the following four goals:

- 1) Establish 6 local centers for weather data collection from existing instruments and from instruments to be purchased in the future by the fruit and vegetable industries with the ability to download weather data, summarize the data, run the data through previously validated pest forecasting models, display the data, display the results of the pest forecasts, display other pertinent information for pest management and allow for interaction between users and Cooperative Extension personnel.
- 2) Establish a centralized data collection point into which the 6 centers can feed data and information for use by extension specialists and others in order to maintain awareness of current conditions thereby adjusting recommendations.
- 3) Incorporate a Weather Association with a fee structure to provide for sustainability of the network and formally establish the public/private partnership. The Association will occupy an important role in both the marketing and sustainability of the network in that it will keep closely in touch with the network needs of the users and that it will provide a means of funding by fee collection from users and other agribusiness.
- 4) Train growers, extension staff, processing company representatives and other users to use the network to its fullest extent.

## **Materials, Methods, and Procedures**

Each goal was addressed according to the following procedures

**1) Local Data Sites:** Gateway 2000, Pentium computers were purchased to act as Bulletin Board Sites (BBS). Wildcat software was used to program the activities of each site and allow displays of data and information. The software was customized to download from a selection of 57 electronic weather instruments throughout New York state and western Pennsylvania. Most weather instruments collected hourly readings of temperature, relative humidity, rainfall, and leaf wetness. The Wildcat software was programmed to automatically contact the appropriate instruments at approximately 6 am each day and download the previous days' data.

Data was summarized into a number of formats and displayed on the BBS for a number of different purposes. Data was shown as daily and hourly summaries for each weather instrument site. Degree day information was calculated from the temperature data and displayed using several different bases for each instrument site. Those interested in apples, grapes and onions used this information to forecast occurrence of a number of different insects. Forecasting programs for the following pests were loaded onto the BBS's and predictions were calculated from the weather data daily: apple scab, apple fireblight, grape Phomopsis, grape powdery mildew, grape black rot, onion BLIGHT ALERT, modified onion BLIGHT ALERT, Michigan onion Botrytis leaf blight, Michigan onion Alternaria, onion downy mildew, and potato late blight. Results of the forecasts for each appropriate weather instrument site were displayed on the BBS in the appropriate crop specific section after the calculations were run.

Using 1996 membership fees, a private weather forecaster (Weather Track, Inc., Rochester, NY) was contracted to provide regional daily agricultural forecasts for NY and western PA. Programs were written to automate the downloading of these forecasts onto the BBS's each morning.

Other more general types of pest data were also loaded onto the BBS and made available, including graphics of pests, descriptions of pests, and recommendations for pest management.

In order to contact the BBS and obtain the information, an individual had to be a member of the Northeast Weather Association (NEWA, see goal 3). Information could be obtained in one of two ways - either through modem connection to the BBS or through an automated FAX delivery. Those contacting the BBS through modem connection had unlimited access to the data on the BBS. Those contacting through modem received a customized FAX consisting of the daily forecast from Weather Track plus the crop pest forecasts of their choice. FAXes were automatically sent out about 7am daily. Those contacting through modem and using WINDOWS software were able to view a full graphical interface, those using DOS or Macintosh software viewed a text based format. This is a limitation of the Wildcat software.

**2) Data Archive:** After considerable discussion, it was decided that the most efficient archiving system for the weather data was to make use of ZIP drives for each site. Since most uses of archived data happen after the full seasons data is collected, there is little use for immediate centralization. The ZIP drive system allows data to be stored at each location throughout the growing season and then centrally stored and organized during the winter months. The previous years data will also be available on the individual BBS sites.

**3) Association:** The Northeast Weather Association (NEWA) is a non-profit, membership organization that was formed in July of 1996 in order to sustain, enhance and increase the use of the weather network over time. A number of interested groups and individuals met on several occasions in the fall and winter of 1995 and 1996 in order to make decisions concerning the formation of the organization. From these interested parties a group of 11 were chosen to be the founding board of directors.

Among the decisions the NEWA board made was to contract with Weather Track, Inc. to provide daily forecasts. It was decided by the board that regional agricultural forecast information was critical to increasing membership and to make NEWA a sustaining organization. Also the NEWA board decided on a fee structure and set membership goals for

1996 and 1997. An attorney was hired from membership fees to handle the paperwork of forming NEWA and other membership funds were expended to obtain the forecasts from Weather Track.

Forty-three individuals and groups became members of NEWA in 1996. \$11,000 in membership fees were collected. The goal of NEWA for 1997 is to double each of these figures - something which seems likely at this point. NEWA is currently purchasing booth space at winter fruit and vegetable meetings in order to develop a large membership.

**4) Training:** All members were offered training for contacting the BBS at the time of sign up. All members contacting the BBS via modem received the manual prepared to guide them through the process. Individualized sessions were provided by IPM staff for those members who needed more intensive training. Troubleshooting was handled over the phone and in person by IPM staff. In general the manual and answers to a few questions were sufficient to get members on line. Contact with the BBS was a relatively simple process.

## Activities

### BBS use facts for Geneva, Canandaigua, and Fredonia

Site	# FAX subscriptions	# BBS subscriptions	# times logged on	# minutes logged on
Geneva	3	23	114	680
Canandaigua	3	8	175	1244
Fredonia	7	19	309	1709

### Publicity surrounding NEWA

NEWA generated considerable interest among agricultural publishers of newsletters and magazines because of the attempt we are making to overcome funding cuts in the public sector by organizing a private effort. These articles are on file and available upon request.

## Impacts

The impacts of this project are of two types: impacts from the effort that can be measured in general terms across the grower community and impacts that can best be stated as individual impacts on individual growers.

### General impacts:

-NEWA was established. A group of fruit and vegetable industry people were formalized with the common goal of focusing their weather information needs and cooperating to achieve them.

-43 members joined and \$11,000 was collected from NEWA members in fees. This is private sector money attracted to the use of electronic weather technology. Previously these dollars were not available for use in the delivery of electronic technology.

-Daily weather forecasts, custom-made by Weather Track for agricultural purposes, were formulated and disseminated electronically. Previously these forecasts were not available and any forecasts members received were through radio or television and not customized for agricultural purposes.

-The apple industry purchased 7 electronic weather instruments for approximately \$14,000 in order to be able to tap into the network. This represents a significant investment in equipment by the industry and a commitment to the growth of the network and NEWA.

-Growers received more timely information to better manage their farm activities. The pest forecasts provided information for growers to help reduce pesticide applications. Much of the pest information has only been available sporadically in previous years. Any member of NEWA had access to daily pest forecasts for many different crop areas of NY.

-This project helped growers make use of electronic technology. Many of them had fax machines, but never used them. Some had computers but had not used them to gather information previous to taking part in the network. They now have a purpose for using their technology.

-So far the vegetable industry has indicated that it is willing to commit \$3,500 to NEWA for 1997. Further vegetable industry and fruit industry support commitments are expected.

-Four other states and one Canadian province have indicated interested in joining forces with NEWA to operate weather networks. NEWA will explore these options.

### **Individual impacts**

-A potato grower scheduled his spray applications according to weather forecasts thus optimizing pesticide applications, obtaining disease control at least cost, and making environmental savings.

-Another potato grower adjusted spray timing according to weather and pest forecasts.

-A grape grower is buying a computer to tap into the BBS.

-At least two growers upgraded their computer systems to log on to the BBS. They obtained better hardware and upgraded software.

-An onion grower used the pest forecast information to time sprays more accurately.

-An onion grower thought the information he received was useful and wanted to be able to get information updated more frequently.

-A potato grower said that the forecast from the National Weather Service could not be received in his area on weather radio so he became very dependent on these faxes.

-A potato grower said the faxed weather information became the first thing he looked at each morning.

-A potato grower is applying for grant money to get more weather instruments in his area to cover different weather conditions in other areas. He will buy instruments compatible with the NEWA network and contribute the use of them to NEWA.

## **Lessons learned**

-Growers get accustomed to electronic technology through experience and over time. NEWA's continuing operation will allow growers to become acquainted at their own speed and for a purpose which is useful to their farms.

-System Operators for our BBS sites need to be able to commit time to the project and need to be very knowledgeable in operation of the software on the system.

-By using call forwarding, we can extend the size of local areas served by the bulletin boards. This could reduce the number of qualified system operators needed and the number of computers needed for NEWA to continue to expand. In the future this could result in significant savings to NEWA, lower prices to members and higher grower access to the electronic information.

## **Summary**

This project successfully achieved all of its goals. The project has proven the concept of local BBS sites as a source of agricultural weather information to be a sound one. The establishment of NEWA has allowed the information dissemination process to continue into the indefinite future. The impacts of this project will continue to accrue for as long as NEWA remains of interest to its members and the agricultural industry in New York. The commitments made by the fruit and vegetable industries and the interest from other states lead us to be optimistic NEWA will continue for many years to provide an agricultural weather focal point in the northeastern US.