

NEWA (Network for Environment and Weather Applications) 2015: A Year in Review

Project Leaders: Juliet Carroll, Tim Weigle, Abby Seaman, and Jennifer Grant; NYS IPM Program, Cornell University, Geneva, NY and Portland, NY

Collaborators: Art DeGaetano, Keith Eggleston, and Bill Noon, Northeast Regional Climate Center (NRCC), Department of Earth and Atmospheric Sciences, Cornell University, Ithaca, NY

Expansion Network Partner State Coordinators:

VT NEWA - Terence Bradshaw, University of Vermont, Burlington, VT

MA NEWA - Jon Clements, University of Massachusetts Extension, Belchertown, MA

NJ NEWA - Peter Oudemans, Rutgers, The State University, Chatsworth, NJ

PA NEWA – Robert Crassweller, Pennsylvania State University, University Park, PA

CT NEWA – Mary Concklin, University of Connecticut, Storrs, CT

MN NEWA – JP Jacobson, Minnesota Apple Growers Association, MN

NC NEWA – Mike Parker, North Carolina State University, NC

NH NEWA – Cheryl Smith, University of New Hampshire Extension, NH

Abstract: The Network for Environment & Weather Applications (NEWA) conducts onsite environmental monitoring and transmits weather data to NEWA's servers that automatically calculate and provide tabulated weather data summaries, degree days, and IPM and crop production forecast model results. Currently, 30 IPM and crop production tools and 13 degree day tools are freely available in NEWA. Weather stations transmitting to NEWA via RainwiseNet have access to Rainwise features including graphing weather parameters and alarms for monitoring every parameter on the weather station. Minnesota joined NEWA in 2015. North Carolina and New Hampshire are joining NEWA in 2016. Individual growers have joined NEWA in Illinois, Iowa, Maryland, Nebraska, Virginia and Wisconsin. NEWA has 384 station locations (including 36 that are offline for repair or calibration). Upgrades to vegetable IPM and apple IPM and crop production tools are being developed and implemented. Over 22 presentations on NEWA were given, reaching 1310 people. Hands-on workshops on NEWA tools are planned for 2016. NEWA enjoyed two million page views in 2015. Top priority for improving NEWA are deploying virtual weather station locations and determining the requirements for a responsive website design.

Objectives:

- 1) Operate and maintain the NEWA electronic weather network.
- 2) Track and promote NEWA usage.
- 3) Update the NEWA website and pest forecast models.

Procedures, Results, and Discussion:

1) OPERATE AND MAINTAIN THE NEWA ELECTRONIC WEATHER NETWORK.

Data transmission to NEWA. In 2015, most weather data was retrieved from the weather equipment using the IP-100 interface. This device transmits data to Rainwise servers via the internet, which then make the data available to the Northeast Regional Climate Center (NRCC) NEWA database via RainwiseNet. Data is housed in these two locations. Assistance with

weather stations is frequently accomplished via email through an automated email alert system that identifies data outages in the NEWA weather database on the NRCC servers.

NEWA personnel have made fewer maintenance and trouble-call field visits and phone calls due to implementation of the IP-100. Most visits made to the field were to assist with station installations or to maintain IPM owned instruments. The IP-100 data transmission device has greatly improved trouble-free weather data transmission to NEWA servers.

Most NEWA station owners have upgraded to the IP-100, but a few continue to use the FTP system which logs data to their computer.

New from RainWise, is the TeleMET, a cellular modem equipped instrument (Fig 1) that can be stationed anywhere within the cellular communications coverage area managed by RainWise. The cellular data plan makes for easy installation at the grower's site. Three of these instruments are now in the NY network, in Watkins Glen, Williamson and Clintondale. Existing AgroMET instruments can be upgraded to the TeleMET.



Figure 1. TeleMET weather station with cellular modem data transmission.

Weather station locations & NEWA Expansion Networks. As of February 2016, there were 384 (up 32% compared to 2014) weather station locations: in Connecticut (CT), Illinois (IL), Iowa (IO), Maryland (MD), Massachusetts (MA), Minnesota (MN), Nebraska (NE), New Hampshire (NH), New Jersey (NJ), New York (NY), North Carolina (NC), Pennsylvania (PA), Virginia (VA), Vermont (VT), and Wisconsin (WI) (Fig 2). Growers in non-member states can join NEWA for a yearly fee. Approximately 120 NWS NEWA locations are airport stations, another 35 are in the NJ state climatology mesonet, and the remaining are Rainwise instruments.

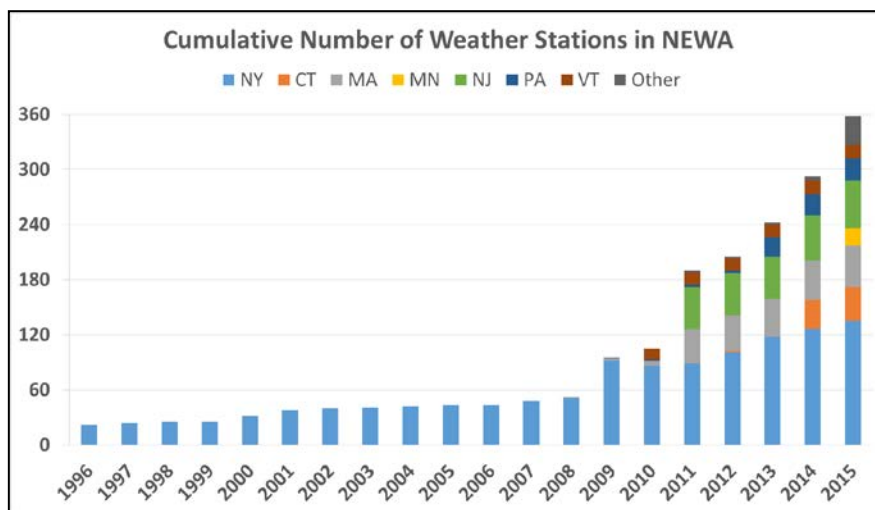


Figure 2. Significant growth in the number of weather station locations has occurred since 2009, when the current NEWA website was launched at newa.cornell.edu. (2015 numbers through June.)

The relative ease with which a weather station can be installed, the low cost of the Rainwise NEWA-configured instruments, and the ability to retrieve data via the internet have contributed to the growth in the number of weather stations (Fig 2). Related to this is the launch of the current NEWA website in 2009 that is easy to navigate and provides users with interactive tools for key IPM and crop forecasts.

The NY Apple Research and Development Program provided funding for us to develop a checklist for station maintenance, update our station maintenance guide and webpage, and write a troubleshooting guide with associated webpages for NEWA (see publications list.) These written guides are provided to growers attending NEWA presentations and workshops (Table 1).

The NEWA Coordinators of the nine state partners in the NEWA system, including NY, help guide the direction and development of NEWA. We have focused on ways to generate revenue for yearly operating and maintenance expenses. Ideas being considered include advertising on the website, requesting donations via the website, and subscriptions to NEWA premium products such as email alerts, alarms, data cache, etc.

The Coordinators and NEWA stakeholders, with funding from a planning grant supported by the Northeast Cooperative Extension Directors (NEED) and the Northeast Agricultural Experiment Station Directors (NERA), met in January to discuss and develop a proposal to fund NEWA innovations including (1) a mobile-ready website platform and (2) virtual weather station locations. A USDA SCRI stakeholder relevancy preproposal was written and submitted, but was not invited for full submission.

2) TRACK AND PROMOTE NEWA USAGE

In 2015, Google Analytics was placed on all the webpages in NEWA, newa.cornell.edu, which will allow a comprehensive analysis of website usage in the coming years, providing insight on NEWA webpages of greatest utility to growers. NEWA web statistics were plotted from Webalizer version 2.23 for ITX-hosted pages and NRCC for forecast model pages for 2015 (Fig 3). NEWA enjoyed over two million page views (2,008,767) in 2015. Comparing web hits and files provides a rough estimate that NEWA has 329,042 repeat visitors.

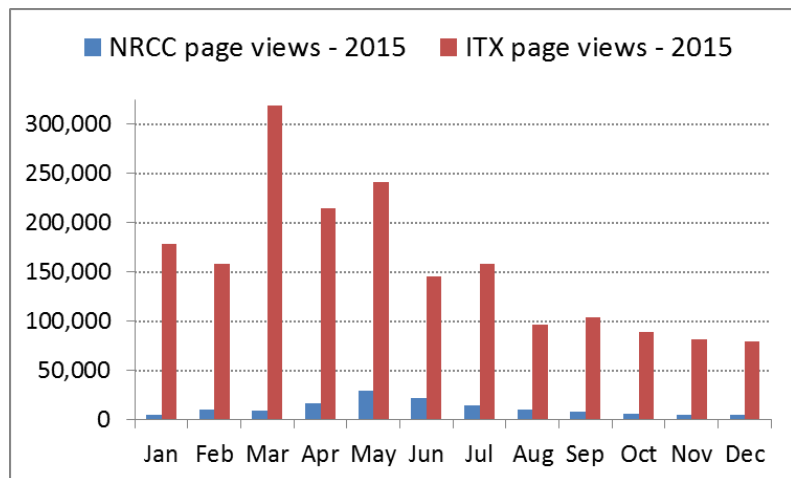


Figure 3. 2015 NEWA page views. NRCC forecast tool pages (blue bars) and ITX all NEWA web pages (red bars).

NEWA weather and pest forecast information is also multiplied via extension newsletters and email alerts that reach many farms. At various meetings, over 22 talks were given on NEWA

topics reaching 1310 people (Table 1). Several training sessions, including presentations, seminars, and workshops on NEWA system are planned in 2016.

Table 1. Presentations on NEWA given in 2015 by IPM educators.

Presenter / Organizer	Date	Title	Location	Audience	# of people
Carroll	1/20 to 1/21/2015	NEWA Planning Meeting	NEWA Planning Meeting, Geneva, NY	NEWA coordinators and stakeholders	9
Carroll	1/28/2015	How to take advantage of NEWA weather and pest models	Mid Atlantic Fruit & Vegetable Conference, Hershey, PA	Apple growers	180
Weigle	2/11/2015	Using NEWA in a Vineyard IPM Strategy	Hudson Valley Fruit School, Kingston, NY	Grape growers	22
Carroll	2/19/2015	Improving the reliability of your weather station, NEWA workshop	NEWA Workshop: Improving the reliability of your weather station, Geneva, NY	Growers, NEWA stakeholders	19
Carroll	2/24/2015	Improving the reliability of your weather station, NEWA workshop	NEWA Workshop: Improving the reliability of your weather station, Geneva, NY	Growers, NEWA stakeholders	9
Weigle	2/28/2015	Using NEWA in a Vineyard IPM Strategy	Finger Lakes Grape Growers Convention, Rochester, NY	Grape growers	225
Carroll	3/12/2015	NEWA the Network for Environment & Weather Applications: History, present products, & future opportunities	Statewide IPM Grower Advisory Committee meeting, Syracuse, NY	Growers, Commissioners, IPM educators	15
Seaman	3/20/15	Late blight forecasts on NEWA	Late Blight Decision Support System Workshop	Growers, consultants, Extension educators	10
Weigle	3/24/2015	Delivery of Weather and Pest Information via eNEWA	8th International IPM Symposium, eTools Session, Salt Lake City, UT	IPM researchers and educators	28
Concklin	March and April	CT Master Gardener Fruit Production training	Master Gardener Workshops, Hartford, Brooklyn, Stamford, Bethel and Norwich, CT	CT Master Gardeners	225
Weigle	4/13/2015	Implementing NEWA resources into a vineyard IPM strategy	Northern NY Grape Growers Meeting, Watertown, NY	Grape growers	24
Carroll	4/21/2015	NEWA and real time IPM: how to make the most of web-based monitoring systems	ENYCHP Apple Orchard IPM Meeting, Plattsburg, NY	Apple growers	20
Carroll	4/22/2015	NEWA and real time IPM: how to make the most of web-based monitoring systems	ENYCHP Apple Orchard IPM Meeting, Ballston Spa, NY	Apple growers	18
Weigle	5/6/2015 – 7/22/2016	Use of NEWA weather and pest model information in a vineyard IPM strategy	Weekly LERGP Coffee Pot meetings held at various locations across the Lake Erie Region in NY and PA	Grape Growers and members of the Lake Erie Grape Industry	270
Carroll	8/3/2015	Delivering site-specific applications to farmers in a knowledge network via cloud integration of weather mesonets and proven predictive models	APS National Meeting, Pasadena, CA	Plant pathologists	6
Carroll	11/17/2015	Weather Driven Tools for Agriculture: NEWA	NY Soil & Water Conservation Society Board Meeting, Geneva, NY	Soil & Water Conservation officers	50
Carroll	11/19/2015	Building expertise and capacity for accurate Integrated Fruit Production models in the Network for Environment and Weather Applications (NEWA) – progress report, 11/19/2015	Apple Research & Development Program Board Meeting, Geneva, NY	Apple growers	20
Concklin	12/2/2015	Network for Environment & Weather Application (NEWA)	Glastonbury, CT	Commercial fruit growers and related industry personnel	130
Seaman	12/17/15	Late blight forecast tools on NEWA	Potato grower advisory committee meeting	Potato growers and industry representatives	30
Total		Over 22 presentations on NEWA topics			1310

A daily email message alert, eNEWA, including weather information and grape forecast model results was provided to several grape growers and educators in NY and PA in 2015, marking the third year of field testing this delivery method.

Posts to the *You're NEWA* blog informed members of the NEWA network about newsworthy items relating to NEWA, pest forecast tools, and weather data (see publications.)

3) UPDATE THE NEWA WEBSITE AND PEST FORECAST MODELS.

The current NEWA website, launched in 2009, proved highly user-friendly. In the ensuing years, the impact of the new website design in facilitating and promoting NEWA use among farmers, extension educators, consultants, and researchers has been proven by the growth of NEWA. This growth is exemplified by over 5-fold increase in weather station locations in NY, the expansion of NEWA into several neighboring states, the midwest and southeast, and the widespread interest among extension and research faculty in development and implementation of crop-, pest-, and disease-phenology models as tools for IPM.

NEWA website updates. NEWA tools are increasingly sought on smart phones and other devices that are easier to carry into the field. We are actively engaged in working towards a responsive website design (RWD) that would display seamlessly on any device, from desktop computer to smart phone. Plans are underway to set this goal as a primary objective for the coming year with plans for completion in 2016. The NEWA website does display on smart phones, but the end user must pinch and stretch the display to better use the tools.

Regional geographic expansion and input from NEWA coordinators identified the need for targeted website revisions. The following pages on NEWA were revised and updated:

About NEWA, newa.cornell.edu/index.php?page=about-newa

More About NEWA, newa.cornell.edu/index.php?page=white-page

NEWA Home page left hand side bar, newa.cornell.edu/

Other Weather Data Sources, newa.cornell.edu/index.php?page=Other-Weather-Data-Sources

Other Pest Forecast Tools, newa.cornell.edu/index.php?page=other-pest-forecast-tools

Other Crop Management Tools, newa.cornell.edu/index.php?page=Other-Crop-Management-Tools

Connecting to NEWA, newa.cornell.edu/index.php?page=connecting-to-newa

Maintenance Guidelines, newa.cornell.edu/index.php?page=maintenance-guidelines

Weather Station Troubleshooting Guide, newa.cornell.edu/index.php?page=weather-station-troubleshooting-guide

Battery Installation, newa.cornell.edu/index.php?page=battery-installation

New forecast models. A list of over 40 promising IPM and crop production tools for NEWA was compiled by the NYS IPM Program Coordinators for future prioritization, validation and implementation.

Revisions to the vegetable IPM tools was led by Abby Seaman, NYS IPM Program, who is working with faculty and educators. Improvements to the apple insect models were defined by Art Agnello, Department of Entomology. A degree day calculator is underway. NEWA works with Keith Eggleston, NRCC, for programming and upgrades to the NEWA tools.

GRANTS SUPPORTING NEWA ACTIVITIES

- Bates, T. et al. 2014-2015. A System Approach to Concord Productivity and Fruit Quality in the Lake Erie Production Region. LERGREP Inc. and NY Wine & Grape Foundation. \$60,033
- Carroll, 2014-2015. Apple Research & Development Program, Building expertise and capacity for accurate Integrated Fruit Production models in the Network for Environment and Weather Applications (NEWA), \$16,242.
- Carroll, NEED & NERA 2014-15 Integrated Research and Extension Planning Grants Program, Mobile platform and virtual weather stations to improve fruit and vegetable industry access to IPM and crop management tools in the Network for Environment and Weather Applications (NEWA), \$3981.
- Clements, J. et al. UMass Agricultural Experiment Station. 2014-2015. Massachusetts NEWA. \$5000.
- Grant, et al. 2014-2017. USDA NIFA, Crop Protection and Pest Management, An Integrated Pest Management Program for New York State, (contributed section on Precision IPM with NEWA).
- Seaman, A.J. 2014-2017. Improving and Enhancing Vegetable Pest Forecast Models on the Network for Environmental and Weather Applications (NEWA). Smith-Lever \$69,614

NEWA PUBLICATIONS

- Carroll, J. Rainwise/NEWA stations down. You're NEWA. Cornell University, 17 September 2015. Web. Accessed 8 October 2015. <http://blogs.cornell.edu/yourenewa/2015/09/17/rainwiseneva-stations-down/>
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- Carroll, J. Hard cider apples wanted. You're NEWA. Cornell University, 15 May 2015. Web. Accessed 8 July 2015. <http://blogs.cornell.edu/yourenewa/2015/05/15/hard-cider-apples-wanted/>

- Carroll, J. Forecasting apple scab infection. You're NEWA. Cornell University, 24 April 2015. Web. Accessed 8 July 2015. <http://blogs.cornell.edu/yourenewa/2015/04/24/forecasting-apple-scab-infection/>
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- Carroll, J. Weather station maintenance workshops. You're NEWA. Cornell University, 11 February 2015. Web. Accessed 7 April 2015. <http://blogs.cornell.edu/yourenewa/2015/02/11/weather-station-maintenance-workshops/>
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- Weigle, T. 2015. eNEWA – A New Way to Access Weather and Grape Pest Model Information. LERGP Vineyard Notes. February.