Image by Derek Markham

NORTHEAST CLIMATE HUB NEWSLETTER

HIGHLIGHTS FROM JULY 2016: PART 2

Working as a collaboration to promote climate informed decisions on farms and forests in the Northeast

NORTHEAST WEATHER VARIABILITY THIS SPRING & EARLY SUMMER: WET WEST VIRGINIA, DRY UP NORTH

Howard Skinner, USDA Northeast Climate Hub and Agricultural Research Service

One expected impact of climate change is an increase in weather variability; an increase in the number and severity of both droughts and floods. Such has certainly been the case in the Northeast this spring and early summer.

While most of the Northeast is experiencing abnormally dry weather, West Virginia has been hit with record rainfall causing massive damage and loss of life. June precipitation ranged from less than 25% of normal in much of New England and the Mid-Atlantic to more than 200% of normal in southern West Virginia. Parts of West Virginia received more than 8 inches of rainfall on June 24th making it the wettest day on record, more than doubling the previous record, and also making June the wettest month on record. Reports starting to come in from West Virginia suggest that farmers lost about $1.6 million in corn, $1.4 million in hay and $100,000 worth of pasture. Damage to farms structures such as barns and fencing totaled another $1 million. Crops that were under water but not otherwise damaged will have to be destroyed due to the presence of mold and toxins that will make them unfit for consumption.

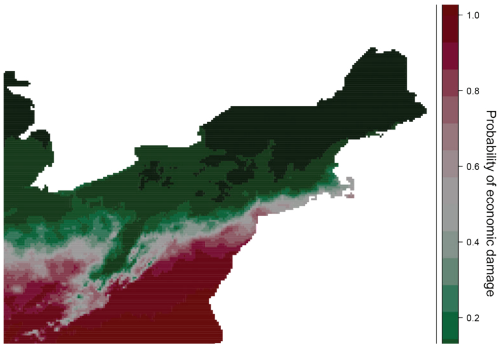
"Family farms took a hard blow from rising water as hayfields were quckly transformed into lakes." Image by WV FSA

Meanwhile, southern New Hampshire has experienced nine consecutive months with less than average precipitation. Overall, this past spring was the 15th driest on record for the northeast region averaging 78% of normal. Three states, New York (9th) Connecticut (12th), and Pennsylvania (14th) ranked this spring among the top 15 driest. While drought has not yet caused serious economic losses compared to flooding, there is concern about what the rest of the summer might bring as rivers and irrigation ponds are unseasonably low. Without substantial rainfall over the next few weeks, producers will have to closely monitor water supplies and be prepared for yield reductions if drought conditions worsen. For official, up-to-date information on drought conditions in the Northeast and elsewhere, see the Drought Monitor website, a partnership between USDA, NOAA, and the University of Nebraska-Lincoln.

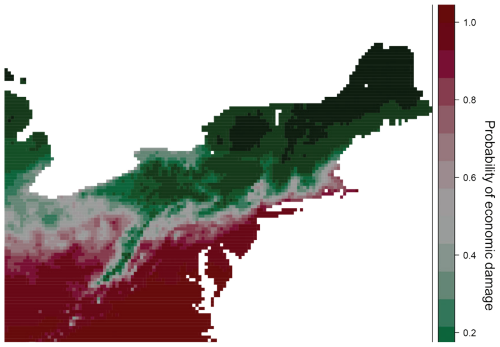
"WHEN WE TRY TO PICK OUT ANYTHING BY ITSELF, WE FIND IT HITCHED TO EVERYTHING ELSE IN THE UNIVERSE."

John Muir

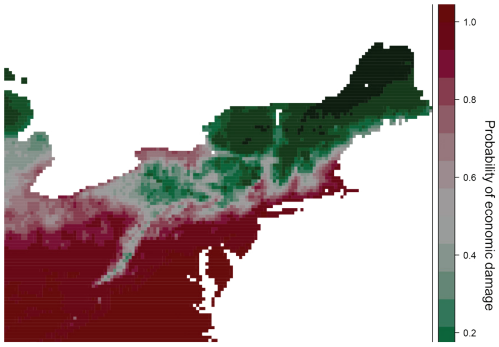
SCAN QR CODE TO DISCOVER THE OTHER SECTIONS OF OUR LATEST E-NEWSLETTER, SUCH AS SHARED REGIONAL RESEARCH, MEDIA AND UPCOMING EVENTS, FOR A FOCUSED DIGEST ON CLIMATE, AGRICULTURE AND FORESTRY IN THE NORTHEAST.



Winter 1980-81 to 2010-2011 Damage Probability



Mid Century Damage Probability Map: GCM Ensemble SRES A2



End Century Damage Probability Map: GCM Ensemble SRES A2

CORN FLEA BEETLE & STEWARTS WILT IN CORN: SHIFTS IN GEOGRAPHIC VULNERABILITY OF U.S. CORN CROPS UNDER DIFFERENT CLIMATE CHANGE SCENARIOS

By Scott C. Merrill, assistant research professor, University of Vermont, and Rachel E. Schattman, post-doctoral research fellow, USDA Northeast Climate Hub

Changing climate patterns will likely influence insect pressure on many agricultural crops. Mild winters may decrease the number of insects killed during hard freezes, thereby increasing populations in subsequent years. The corn flea beetle (Chaetocnema pulicaria, Melsheimer) is found on both sweet and seed corn. This beetle not only causes damage to plant foliage, but also serves as the primary overwintering vector for Erwinia stewartii bacterium, which causes Stewart's Wilt. Stewart's Wilt is a vascular disease that severely impacts the health and productivity of corn. It is expected that the corn flea beetle will shift geographic range due to increasing average temperatures, leading to an increased prevalence of Stewart's Wilt. In our research, we use the Stevens-Boewe model to predict the severity of Stewart's Wilt in U.S. corn crops. The Stevens-Boewe model is used by both farmers and extension professionals because it is both simple and reliable. To forecast if corn flea beetle populations and prevalence of Stuarts' Wilt are likely to cause significant economic damage to corn crops, simply sum the average temperatures (Fahrenheit) in December, January, and February. If the sum is greater than 100, there are likely to be significant economic losses (if no preventive action is taken).

We used historical weather data (PRISM 2004, Maurer, Berkke et al. 2007, Zganjar, Girvetz et al. 2009) and climate forecast data obtained from ClimateWizard.org (Zganjar, Girvetz et al. 2009) to create a series of probability maps that show that the likelihood of significant crop loss because of corn flea beetle and Stewart's Wilt in three time frames: (a) the recent past (1980-2010), (b) a projected scenario by the year 2050, and (c) a projected scenario by the year 2100. For the projected scenarios, we used the A2 greenhouse gas emissions climate change scenario (IPCC 2007).

This scenario is a "business as usual" scenario and assumes there will not be actions to reduce Green House Gas emissions. Our maps show that damage from corn flea beetle and Stewart's Wilt increases with a northern progression up through Pennsylvania and into New York as well as along the Northeast coast between the three time periods (dark green areas on the map signify a low chance of loss, while dark red indicates >90% chance of loss from the flea beetle and wilt). We predict that climate change and associated increasing winter temperatures in the U.S. will lead to (1) an increase in corn flea beetle geographic range and (2) a subsequent increase in disease pressure from Stewart's Wilt.

REFERENCES:

IPCC (2007). IPCC Fourth Assessment Report (AR4). Climate Change 2007: Synthesis Report Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. R. K. Pachauri and A. Reisinger. Cambridge University Press, Cambridge, Intergovernmental Panel on Climate Change. AR4.
Maurer, E. P., et al. (2007). "Fine-resolution climate projections enhance regional climate change impact studies." EOS, Transactions American Geophysical Union 88(47): 504.
Merrill, S. C. and F. B. Peairs (2016). "Temperature variability is a key component to accurately forecast the effects of climate change on pest phenology." Pest Management Science.
PRISM (2004). PRISM Climate Group. Oregon State University, http://www.prismclimate.org, created 4 Feb 2004. http://www.prismclimate.org.
Zganjar, C., et al. (2009). "ClimateWizard.org."