Report to the New Jersey State Board of Agriculture
June 2015

Rutgers professor James Simon and Ph.D. student Rob Pyne in the NJAES campus greenhouse.

Downy mildew diseases are caused by a group of highly specialized plant pathogens called "oomycetes" that infect and feed off of living host plants. Each downy mildew pathogen is specific to its host plant. Basil downy mildew affects only basil, with the most popular type, sweet basil, being the most susceptible. Basil downy mildew is favored by heat and humidity, and by mid-to-late summer, when there is enough inoculum, the disease is widespread in our region. The pathogen can't overwinter in New Jersey but can survive the winter in southern Florida and Texas, where it is a year-round threat. The rapid spread to northern states during the growing season is through the planting of infested seed, importing southern-grown plant material, or via weather patterns coming from southern states. In 2011, a team of researchers from the University of Massachusetts, Cornell University, University of Florida, and Rutgers NJAES assembled to develop a strategy to manage basil downy mildew in the humid conditions of the eastern seaboard. Partner universities are focusing on chemical and cultural controls and the molecular diagnostic markers for the disease; Rutgers has the crucial role of developing new sweet basil varieties that are resistant to downy mildew. The NJAES program is currently the largest basil breeding program in the U.S. Working with leading basil farmers and other NJAES vegetable specialists, Rutgers Department of Plant Biology and Pathology faculty **Jim Simon**, professor of New-Use Agriculture and **Andy Wyenandt**, extension specialist in vegetable pathology, first identified basils from any species that exhibited tolerance or resistance. Aided by graduate student **Robert Pyne**, the team found that all sweet basil varieties evaluated were very susceptible to downy mildew. Once resistance was identified in the other basil types, **Simon** and **Pyne** made hundreds of crosses to get the desired traits of sweet basil along with downy mildew resistance. With funding from a $1.8 million USDA-Specialty Crop Research Initiative grant awarded in 2011, several downy mildew resistant sweet basils have emerged and they are currently undergoing the last rounds of rigorous testing. **Simon** predicts that the first resistant strain will be released next year, and a series of resistant sweet basils of different phenotypes (leaf shape and size) the year after. Once the line is released, it will be licensed to the commercial industry and then it will take one to two years to produce ample seed stock.

Appearance of new spears at the base of plants in a mother stalk treatment (left) and standard harvest spears (right).

The standard season for harvesting asparagus in New Jersey lasts seven weeks, starting in late April and ending in early June. Extension Specialist **Tom Orton** and Professor Emeritus in Plant Science **Steve Garrison** have been investigating the method of mother stalk harvesting, which can extend the asparagus season through the summer and early fall, until mid-October. The longer season allows asparagus growers to participate in lucrative summer and fall markets and to provide locally grown products for a longer period of time.

Garrison has been studying long-term effects of the asparagus mother stalk harvesting method since the early 1990s. The current comprehensive field experiment conducted with **Orton** is contrasting varieties and several harvesting methods on spear yield and quality. This project was started in 2010 and now after four years of data, the experiment is anticipated to conclude in 2016. Standard harvesting involves the removal of all shoots during

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the spring harvest season, while the mother stalk method involves managing the canopy by limiting the number of shoots the plant produces, thus encouraging plants to continually produce more young shoots or spears. The yield dynamics are being compared for different varieties of asparagus and results have shown similar total season quality and yield for mother stalk harvesting as for standard harvesting. The cost/benefits of this method generally apply best to home garden and direct market production, rather than wholesale production, although certain varieties appear to respond favorably to the mother stalk harvesting method, raising the possibility that larger commercial asparagus growers may also benefit from the strategy.

Hops are herbaceous, perennial vines grown for the resins and essential oils in their female flowers or cones that impart the flavor, aroma, and preservative properties necessary for brewing beer. A burgeoning craft brewery industry has seen a rise in demand for U.S. hops as reflected by the 28% increase in value of production from 2012 to 2013. Currently, Washington, Idaho, and Oregon dominate U.S. hops production, accounting for 31,848 of the 35,224 total acres grown annually. Although the Mid-Atlantic area accounts for 34% of national brewery sales, virtually no profit is realized from this $249 million hops industry. As interest builds in sourcing local hops, it offers Mid-Atlantic farmers an opportunity to grow a portion of the supply, creating a totally new source of income for local farmers. Preliminary studies undertaken at Rutgers showed that the Mid-Atlantic zone is conducive to hops production. However, industry standards such as alpha acid (which contributes to bitterness) and essential oil content must be realized to develop a consistent product and ensure economic feasibility. The lack of hops cultivation in the northeastern U.S. has left a void in information regarding best horticultural practices to optimize growth, yield, and chemistry of this cash crop. A grant of $29,912 has been awarded by Northeast Sustainable Agriculture Research and Education to fund a two-year study on hops at the Snyder Research Farm in Pittstown. The objectives of the research are to survey industry demand, initiate a demonstration hops plot, provide a chemical analysis service to growers, and determine best management to optimize hops production and quality in the Mid-Atlantic U.S. The research will be conducted by principle investigator **Jim Simon**, professor of new-use agriculture, Department of Plant Biology and Pathology and Ph.D. students **Robert Pyne** and **Megan Muehlbauer**, and Snyder Farm Supervisor **Ed Dager**, and Area Fruit Agent **Win Cowgill**.

Of Interest:
Extension Specialist in Vegetable Pathology **Andy Wyenandt**, Department of Plant Biology and Pathology reports that the first case of basil downy mildew in field-grown basil in New Jersey this year has been found in a field near Vineland, NJ in early June. All basil growers need to scout on a daily basis and initiate a preventative fungicide program.

The Rutgers Vegetable Crops Online Resources website has been rebuilt and relaunched. The site is available to vegetable growers of New Jersey and the region and provides information on variety trials results, soils and irrigation water, marketing, pest and disease management, on-farm food safety, and crop insurance, as well as Commercial Vegetable Production Recommendations and crop-specific field guides on insect, diseases, and weed management. The site has a new address: http://nj-vegetable-crops-online-resources.rutgers.edu. The re-designed site is readable on desktop, tablet, and phone screens.

Created by Rutgers Cooperative Extension of Salem County to inform New Jersey ag producers about crop insurance, the Garden State Crop Insurance Education Initiative provides important information through multiple media outlets. Visit their website for crop insurance information and reminders of closing dates: http://salem.njaes.rutgers.edu/cropinsurance or call 1-800-308-2449.

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