SARE Conference: Our Farms, Our Future

SARE PROJECT LNE16-353 RE12-006

Project Leader: Crystal Stewart
Co-PI's: Christy Hoepting, Robert Hadad, and Sandra Menasha

Development of Disease Management, and Fertility Best Practices for Northeast Garlic Production

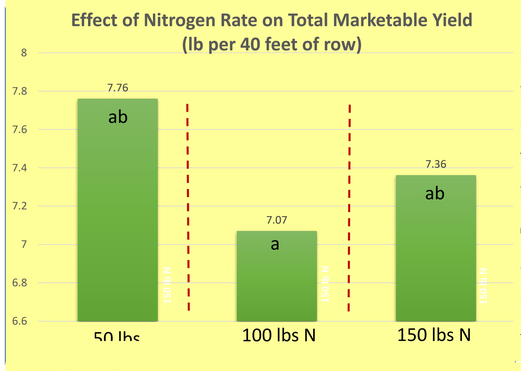
Garlic production in the Northeast:

Garlic is a $20 million industry in New York, and it represents and important and growing niche crop across the Northeast. As the numbers of garlic growers and acreage in garlic have increased, the number of diseases associated with this once trouble-free crop have also increased. Nearly 25% of growers surveyed indicated they have lost 30% or more of their garlic crop at least once in the last five years.

Through two projects funded by Northeast SARE's Research and Education Grants, we were able to examine fertility, disease management, and post-harvest handling, and weed control practices currently common in the industry and identify best practices. This poster highlights some aspects of this work including Fusarium management through cultural controls, nitrogen fertility optimization, and post-harvest handling practices which dramatically reduce drying and storage losses. For complete information on these studies visit https://enych.cce.cornell.edu

Optimizing nitrogen fertility

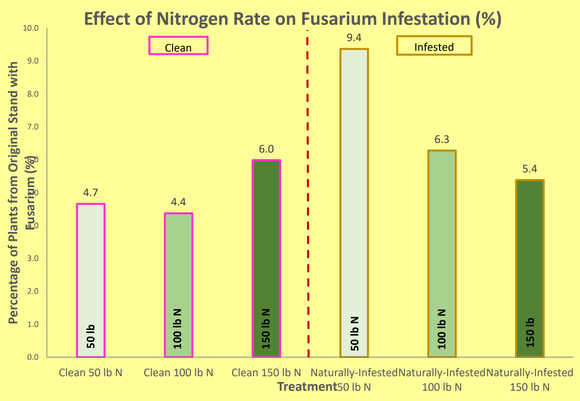
During both SARE funded projects we examined nitrogen fertilizer rates in order to create a yield response curve for nitrogen and to better understand the effects of nitrogen rates on disease incidence.



Phosphorus, potassium and pH were optimized using soil tests pre-planting in all trials. During the 2018 study, soluble nitrogen sources were applied in the spring at emergence. Rates used were 50 lbs, 100lbs, and 150 lbs of N. Effects of these applications on yield are shown to the left.

The 2014-15 study used the same rates and focused on the use of slow-release N sources such as pelletized chicken manure and alfalfa meal, with 25% of total N applied in the spring from quick-release sources.

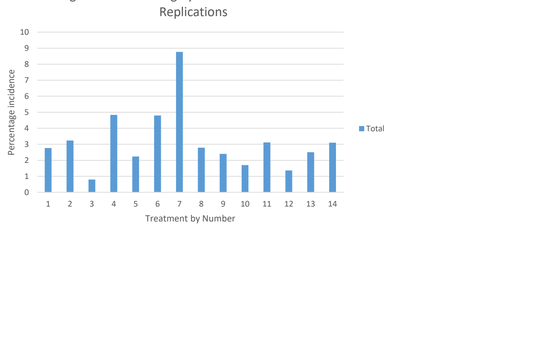
In the 2014-15 study we saw a more numerically linear response curve but again without significant differences between the marketable yields different rates across three trial sites.. Our conclusion based on this work was that, if using plant available N sources in the spring, 50 lbs of total N is sufficient, and if using slow-release N sources at planting, 100 lbs of N is sufficient to account for nitrification lagging in cold soils.

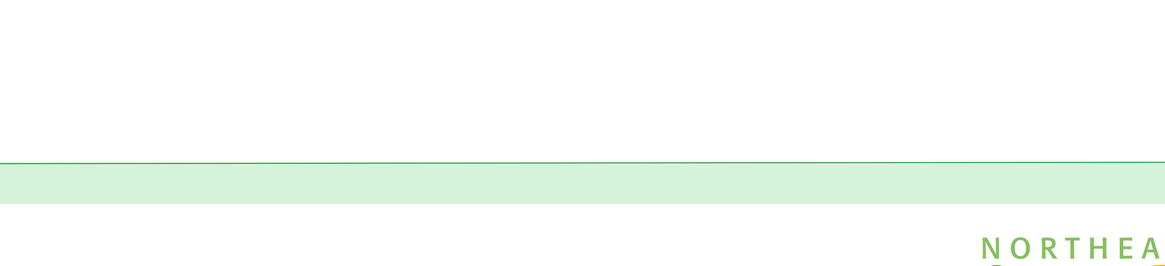


Raised beds, mulches, timing, and variety

We completed two replicated trials examining the effects of raised beds, flat ground, black and white plastics, straw mulch, bare ground, Porcelain vs. Rocambole varieties, and spring versus fall planting on *Fusarium* incidence, yield, and bulb quality. Seed stock was rated for disease severity prior to planting, and ratings were repeated after curing and storage. Each plot was also graded by size and average weight per bulb was calculated for each treatment.

The largest factor affecting disease incidence in our trials was variety, which suggests that growers should experiment with different varieties to determine what will do best in their environment. Other factors, such as uniformity and size distribution, were affected by growing systems. Overall average size was notably not significantly different, aside from in spring planting, which was significantly smaller but otherwise very healthy.





Above (L-R): two row planting systems with drip on black plastic, white plastic, bare ground, and straw.
Below: Planting stock used to evaluate initial disease levels (L) and cloves used to evaluate final disease levels (R).

Post-Harvest Handling

In order to determine best practices surrounding post-harvest handling, we compared treatments including cutting tops prior to drying, drying with heat, washing, cutting roots compared to controls of drying whole plants at ambient temperature

High Tunnel vs. Open Air: Across six trials conducted over two years, high tunnels consistently dried an average of 3 days quicker; yielded garlic with less Aspergillus, Botrytis, and Embellisia; and importantly high tunnels never damaged any of the garlic that was dried in them.

The addition of dehumidifiers at night in closed high tunnels removed an additional 10-15 gallons of water, further speeding the drying process.

Tops trimmed vs. tops untrimmed: Trimming the tops mechanically in the field greatly increased the speed of harvest and reduced the space needed for drying without increasing disease incidence.

Cornell University Cooperative Extension

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