



Northern NY Agricultural Development Program 2016-2017 Project Report

Precision Crop Load and Irrigation to Optimize Fruit Size and Quality of NNY Apples

Note: See separate postings at www.nnyagdev.org: Horticulture Research for Background and Methods; and Results

Conclusions/Outcomes/Impacts:

Precision thinning

The comprehensive concept of precision thinning, sometimes viewed by growers as too complex or as requiring too much work, involves substantial effort by the individual fruit grower. Our goal continues to be to demonstrate to growers that the potential income involved is substantial enough to justify this intensive effort to manage crop load in a very precise manner.

Lessons learned in 2017:

- The carbohydrate model worked well and should be used. At bloom and just after, the carbohydrate model predicted a deficit in carbohydrate. Thinners applied at this time had positive thinning effects.
- For most NNY farms, thinning in 2017 was successfully achieved with two spray applications.
- The cold and rainy weather during bloom plays a role in developing thinning recommendations. The FGR model overestimated thinning in several blocks that had experienced the event and, therefore, the results from the FGR model should be adjusted and grower decision regarding thinning should be carefully evaluated based on goals and experience.

Economic implications of water deficit

Good water status is essential to maximize fruit size at any given crop load. In our trials, it was seen that in some locations irrigation was not necessary, but at the Hudson location and in the Champlain Valley in 2016, irrigation led to better fruit size/yield and economic value. Lack of irrigation will infer a loss of \$3,859-\$6,809/ha depending on the tree density, with smaller fruit size (180 g vs. 160 g).

With more precise water management, growers will be able to limit plant water stress and more consistently achieve the optimum economic fruit size and calcium content for each variety. By the use of the updated Apple Irrigation website, growers can easily improve the yield of their orchards by weekly applying the right water amount.

Outreach:

- Winter Schools: irrigation management presentations to make growers aware of the importance of irrigation, key concepts and methodology to properly irrigate orchards
- Thinning meetings and orchard visits to growers to discuss current situation of each block and how to precisely manage thinning under weather conditions.
- Grower recommendations developed through this project were disseminated through Cornell Extension educators, regional newsletters, publications and meetings, with some information disseminated through emails and Extension educators in real time as it developed during the crop load management window (thinning and drought periods), and sent to all tree fruit growers in New York state, and through grower newsletters at various times during the season.

Presentations were made at the following events where NNY growers were present:

- 2017 Empire State Producers Expo, Syracuse, January 17-19: Importance of irrigation (30 min), 120 attendees
- 2017 Northeast Plant Growth Regulators Meeting, Wilkes Barre, PA, March 7-8: 45 attendees

2017 Thinning Meetings (30-45 min each):

May 10: Southern Hudson Valley, 65 attendees

May 11: Northern Hudson Valley, 35 attendees

May 16: Capital Region Petal Fall Meeting, 35 attendees

May 23: Champlain Valley Petal Fall Meeting, 50 attendees

May 25: Wayne County, 70 attendees; Orleans County: (80 attendees)

Lake Ontario Fruit Summer Tour July 12, 2017: Precision chemical thinning (20 min), ~150 attendees; Precision Irrigation (20 min), ~150 attendees

Next Steps:

This project will require several years of effort to extend the precision thinning and irrigation concept to apple growers in Northern NY. We hope to continue to improve these models and the protocol on how to manage crop load to avoid any over thinning. We plan to continue this effort with the support of the farmer-driven Northern New York Agricultural Development Program (NNYADP). In addition, we have received a grant from the NY Farm Viability Institute to develop a smartphone application to integrate the precision thinning and irrigation models in order to reduce labor inputs and increase the profitability of NY apple growers by making it easier to adopt precision management techniques. We plan on including the app in the 2018 next season on all our precision management trials, including the one funded by the NNYADP.

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Reports and/or articles in which results of this project have been published:

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