Precision Chemical Thinning of Honeycrisp and Gala

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Precision thinning is a strategy to increase the efficacy of chemical thinning. The overall concept is to define the optimum fruit number per tree and try to thin to that specific number through the Precision Thinning program.

Over the last decade Robinson and Lakso have developed the carbohydrate thinning prediction model as an aid to growers in managing crop load with chemical thinning. This model uses weather variables to estimate tree carbohydrate status, which can be used to predict thinning efficacy. A second model called the fruit growth rate model developed by Greene, Lakso, Robinson and Schwallier, can give precise estimates of thinning efficacy within 7 days of application. This model still has not been fully adopted due to significant time and labor requirements. Over the last 2 years we have developed a program to use both models, which we call "Precision Thinning".

Beginning in 2012 we have been organizing a NY statewide group in order to manage chemical thinning of Gala and Honeycrisp more precisely. The method begins with first calculating the final target fruit number needed per tree (based on desired yield) and secondly assessing the number of flower clusters on the trees (after pruning) by counting five representative trees. Once the number of flower clusters per tree is known (each cluster with five flowers) and the final fruit number needed for the desired yield, the percent of the initial flowers needed after thinning can be calculated. The optimum final fruit number per tree is different for each variety and depends on genetic fruit size of the variety (Gala is small genetically and Jonagold is large genetically) and the price in the market (large Galas have a much higher price than small Galas while Jonagolds that are too big have a lower market price) and the inherent bieniality of the variety (Honeycrisp are very biennial and must be managed at a lower crop load than Gala, which is not biennial).

With the variety-specific target of final fruit number per tree and the thinning task in mind, a precision thinning program is conducted by applying sequential thinning sprays followed by rapid assessment of the results in time to apply a subsequent thinning spray, and then an early re-assessment, followed by another spray if needed until the final target fruit number for each variety is achieved.

In practice, precision thinning begins with:

1. A bloom thinning spray at 60% to 80% full bloom.

2. The first spray is followed by a petal fall spray applied two to four days after petal fall (about one week after the bloom spray). Before the petal fall spray, the results of the carbohydrate model are used to guide the rate of chemical and the exact timing of the petal fall spray.

3. The first two sprays are followed by an assessment of the efficacy of those two sprays using the fruit growth rate model which indicates the percentage of thinning achieved with the first two sprays.

4. Then, if needed, a third spray is applied about one week after the petal fall spray. Before the petal fall spray, the results of the carbohydrate model are used to guide the rate of chemical and the exact timing of the third spray.

5. The third spray is followed by an assessment of the effectiveness of all previous sprays using the fruit growth rate model, which indicates the percentage of thinning achieved with all three previous sprays.

6. Lastly, if still more thinning is needed, a fourth spray is applied at 16 to 20 millimeters (about one week after the third spray) to achieve the target fruit number.

For many fruit growers, it may be impractical to use the fruit growth rate model on all varieties since more than 20 varieties are grown in New York. We suggest growers make the fruit diameter measurements on three varieties (two hard-to-thin varieties and an easy-to-thin variety) to guide the decisions for other varieties.

The carbohydrate model can be a guide to let growers know whether or not to spray, how much to spray, what days to avoid spraying. However, the fruit growth rate model has been the best method to physically access, in a more precise way, thinning efficacy. The use of both models together in the Precision Thinning program is a useful tool to optimize crop load and fruit size and a great way to improve profitability.