



Chemical Options for Defruiting Young Apple Trees

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Introduction

Defruiting newly planted and young apple trees (e.g., 2nd and 3rd leaf), particularly those on dwarfing rootstocks, allows the trees to fill their allotted bearing space and become structurally capable of bearing a decent crop by the fourth and fifth year. Although defruiting can be achieved manually by removing flower clusters and small fruitlets, several chemical options can make defruiting much faster and less labor-intensive. These include the following:

I. Using chemical blossom thinners:

Two to three applications of lime sulfur at 3% (3 gallons/100 gallon per acre) mixed with oil (e.g., JMS Stylet-oil) at 2% should be enough to prevent the fertilization and fruit set of the majority of king and side blossoms. It is worth noting that blossom thinning applications should be avoided when daytime temperatures are favorable for fire blight infections, e.g., 75 to 85°F, or when fire blight models predict blossom infections. Growers may also consider applying streptomycin with or after bloom thinning applications to reduce the probability of infection. The two lime sulfur products labeled for blossom thinning in Virginia are Rex lime sulfur and NovaSource lime sulfur. Our research indicated that both products are equally effective.

II. Using post-bloom thinners (recommended):

Products containing 6-BA (e.g., Maxcel and Exilis plus) or NAA (e.g., Fruitone L, PoMaxa, and Refine 3.5WSG) can be applied in combination with carbaryl (e.g., Sevin XL plus) to remove apple

fruitlets. One application will be sufficient at petal fall and another at fruit size 6-12 mm. 6-BA at 100 ppm (64 fl oz) or NAA at 15 ppm (6 fl oz) combined with carbaryl at 1 qt/100 gal/acre should achieve desirable results (Figure 1). Some forms of 6-BA and NAA may contain a higher percentage of the active ingredient. So, it is always advisable to read the product label and use the fl oz amounts that correspond to 100 ppm and 15 ppm of 6-BA and NAA, respectively.

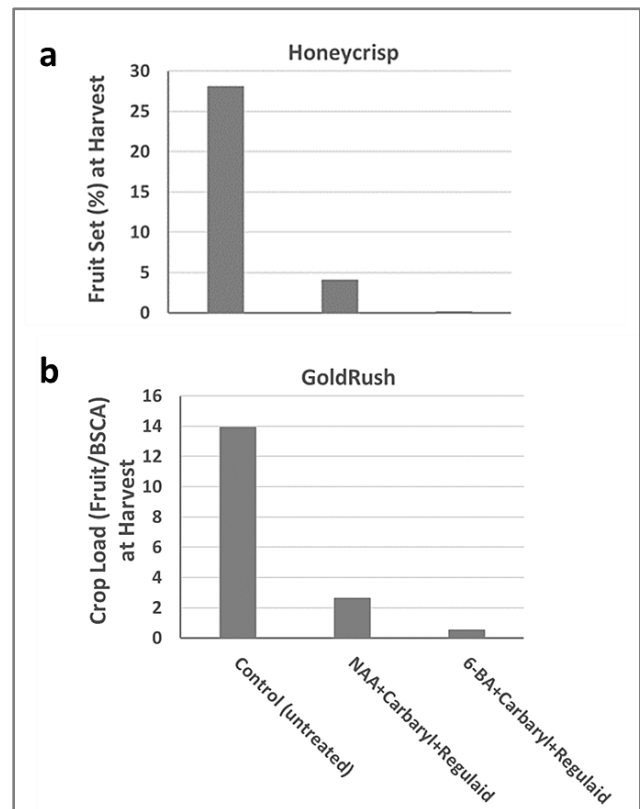


Figure 1, Trees of 'Honeycrisp' and 'GoldRush' were treated with a mixture of Maxcel + Carbaryl + Regulaid or PoMaxa + Carbaryl + Regulaid at petal fall and at fruit size ~10mm. The time of application was determined by the Carbohydrate thinning model on NEWA. Fruit set (%) was calculated based on an initial number of 100 fruit/tree. Crop load was

determined based on the number of fruit/1 cm² of branch cross-sectional area (BCSA).

It should also be noted that defruiting with 6-BA or NAA is more efficient when trees are under carbohydrate deficient conditions. The carbohydrate thinning model on the NEWA website (<https://newa.cornell.edu/apple-carbohydrate-thinning/>) predicts the carbohydrate status of the tree based on daytime temperatures and solar radiation values. The best defruiting results are obtained when the 7-day weighted average balance is between -40 to -80 g/day. If the model is not accessible, 6-BA and NAA applications should be made when daytime temperatures are ≥ 85 °F. Cloudy days at and after spray applications should also be targeted for increased efficiency. Adding a non-ionic surfactant (e.g., Regulaid) to the spray tank will also enhance the efficacy of defruiting applications.

III. Using a mixture of ethephon, carbaryl, and oil:

The recommended rate for this application is 1 – 1.5 pt of ethephon tank mixed with 1 qt of carbaryl and 1 qt of Superior oil/100 gal/acre. The best results can be achieved when applying this mix at 10-15 mm fruit size and daytime temperatures 75 – 90°F. It should be noted that ethephon can severely inhibit tree growth, and therefore it is not recommended to use it for defruiting weak- and medium-vigor cultivars (e.g., Granny Smith & Honeycrisp) on dwarfing rootstocks (e.g., B.9, G.41, and G.16).

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