

RELEASE LC® (gibberellic acid) FOR DELAY OF MATURITY, INCREASED YIELD AND LARGER FRUIT SIZE IN 'FRENCH PRUNE': Report of Preliminary Findings, 1996

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Introduction:

Gibberellic acids (GA) have come into wide use in crops as diverse as grapes, citrus, stone fruits, berries, vegetables, sugar cane and potatoes (Abbot Laboratories). The effect of GA differs with species, application timing and rate. However, in general it appears that for fruit crops, early application to vegetative tissue tends to increase vegetative growth, while application to fruit tends to delay fruit maturity, while increasing firmness, quality, size and yield. Applications during flower bud differentiation tend to decrease bloom the following year. In 'Italian' prunes GA has been shown to increase firmness and delay maturity, resulting in reduced internal browning and watery pit and overall improvement in fruit quality (Proebsting and Mills, 1966). In 1990-91 we carried out experiments applying GA on prune tree limbs and whole trees at different dates. In all cases fruit firmness was increased and maturity delayed.

Prune trees exhibit a tendency for alternate bearing, with heavy cropping years resulting in smaller fruit size, limb breakage, potassium deficiency and leaf scorching. Reduction of flower number by application of GA during light cropping years could reduce the overabundance of flowers the following year. An increase in fruit size, quality and yield would lead to more saleable fruit, and lower sorting costs. The ability to selectively delay fruit maturity using GA would allow growers and packers to more effectively use limited dryer space and manage harvest practices. These benefits of GA are already being seen in the cherry industry where growers can selectively delay a portion of their crop to coincide with market demand, packing house schedules and labor availability, while also increasing quality and yields. Similar benefits might also be realized by prune growers if effective guidelines for use of GA on prunes could be established.

Objective:

1. Obtain a preliminary assessment of the effects of Release LC prune flower thinning, fruit maturation rate, fruit size and yield.

Materials and Methods:

Experimental Design:

Release LC® (Gibberellic Acid) was applied to 'French' prune trees at rates of 24 g/acre and 48 g/acre on July 25, 1996 approximately one month before harvest. Each rate was applied to 17

trees in a single row located in a nine acre orchard at Wolfskill Experimental Orchards in Winters, CA. Control rows of 17 trees were located near each treated row separated by a row of guard trees. Application was by speed sprayer. Tree spacing was 17 feet between rows and 14 feet between trees for an orchard density of 183 trees/acre. Soil type at the winters site is Yolo clay-loam, and trees were under drip irrigation with nitrogen applied via fertigation. At the time, the row treated with 24 g/acre of Release LC and the control row for that treatment were receiving 0.14 lb N/tree/year during mid summer. The row treated with 48 g/acre of Release LC and its control row were receiving 1 lb N/tree/year in 10 applications throughout the growing season.

Data Collection:

Fruit from treated and control rows was harvested on August 23 with measurements taken for calculation of yield, #/fruit/lb, drying ratio, % soluble solids and fruit firmness.

Results and Discussion:

Application of Release LC at both the 24 and 48 g/acre rates appeared to increase dry yields, fruit size and average firmness compared to the unsprayed controls (Table 1). % soluble solids at the 48 g/acre rate was lower than the control, but at the 24 g/acre rate, % soluble solids was higher than the control. Drying ratios exhibited a similar pattern (Table 1). An overall increase in fruit firmness for the treatments suggests that Release LC may delay maturity. This was especially evident at the higher rate. No unusual level of fruit drop or other problems were observed from the time of application to harvest. Treated trees will be observed for reduction in flower number next year. While these are preliminary results of unreplicated applications, the differences in fruit yield, size and firmness suggest Release LC may have potential to increase yield and size of 'French' prunes while allowing the grower to delay maturity and harvest. The ability to delay maturity in prunes could be very beneficial in allowing growers and packers to extend the harvest period to more effectively utilize limited dryer space, harvest equipment and work crews. Larger fruit size would mean less undersized fruit and along with greater yields could markedly increase profits. More detailed studies of Release LC should be undertaken to determine if this product could help alleviate grower losses from undersized fruit and extend the harvest period to reduce restrictive harvest quotas resulting from limited dryer space.

Table 1. Application of Release LC (GA) at 24 and 48 g/acre versus an unsprayed control for delay of maturity in 'French' prunes, 1996

Treatment	Dry yield lb/tree	# Fruit/lb	Dry ratio	% sol. solids	firmness (lb)
Release 24 g/acre	49.0	36.7	2.42	25.5	3.9
Control	21.6	39.0	2.48	25.1	3.4
Release 48 g/acre	46.1	35.9	2.5	23.4	4.6
Control	40.5	38.8	2.42	24.4	3.7

References:

Abbot Laboratories. *Spraying Guide: Pro-Gibb, planned growth for planned profits*, 1976.

Proebsting, E.L. and H.H. Mills. 1966. Effect of Gibberellic acid and other growth regulators on quality of early Italian prunes (*Prunus domestica* L.). *Proceedings of the Amer. Soc. for Hort Sci.* Vol 89 p.p. 135-139.