2006 Trial testing Dormex in almond for non-infectious bud failure (‘crazy top’)

Kitren Glozer, Department of Plant Sciences, UC Davis
Bill Kreuger, University of California Cooperative Extension, Tehama County

Summary: We applied 4% Dormex to mature, bearing almond trees exhibiting symptoms of ‘crazy top’ (noninfectious bud failure) on March 4, 2006, in two locations in Northern California. Application was during peak bloom, in order to remove potential for crop as judged appropriate by M. DeBenedetto of Dormex, USA. At each site we applied Dormex to 4 single tree replicates. We evaluated treatment effects at one site which is commercially farmed, on two subsequent dates in spring. We observed numerous ‘shoot breaks’ or adventitious shoot formation as well as previously unbroken vegetative buds on treated trees. Shoot breaks occurred in several types of locations on the trees, and at different branch angles and we discussed the potential for new vegetative and reproductive growth at these locations and angles. We also discussed the potential for management of new growth by selective pruning, as well as the positive and negative aspects of application of Dormex during bloom. We concluded that Dormex showed significant potential for new growth production, however, that pruning selectively would be an expense not typical in an almond management program, and that crop loss due to application of Dormex during bloom would probably preclude adoption of the practice. Upon further discussion, we concluded that future work should focus on application during the dormant season, which would be less likely to destroy the current season’s crop. We also discussed the need to follow new growth and development of symptoms of bud failure on that growth over time, as important to the potential of Dormex to overcome ‘crazy top’.

Significance of Problem:

Non-infectious bud failure or crazy top affects several almond varieties, most commonly Carmel, however, Nonpareil, Merced, Price, Thompson, and Mission also have well documented cases. Crazy top is a genetic disorder in which vegetative buds on vigorous shoots of the previous year’s growth do not ‘break’, although flower buds do open. It has been reported that buds on the basal part of the shoot may be unaffected, but buds on shoot produced later in the growing season (later flushes of growth) are more often killed. Flower buds seem to be more resistant to the factors that severely affect vegetative buds being formed at the time of sensitivity, although there are times when flower buds are also greatly reduced. Bloom is often delayed in trees affected by bud failure and yields can be reduced by 265-860 meat pounds per acre in Nonpareil and by 150-1200 meat pounds per acre in Carmel (Viveros, 2002). Bud failure incidence may be more or less in various California locations, depending on mean summer temperatures, with the incidence of bud failure directly proportional to average temperatures above 80 °F at the time of bud formation (Kester et al., 1976; Kester and Gradziel, 1996), with serious effects at temperatures above 90°F. Their research has shown that early season high heat accumulation (May) may predispose susceptible almond varieties to show more severe bud failure the following spring. Up to this time, only selecting non-susceptible varieties or clones with decreased susceptibility has offered any alternatives to growers.

Experimental procedures:

A single treatment of 4% Dormex was applied on March 4 during late bloom and prior to leaf out. The application included 0.5% Activator 90. The application was made at approximately 100 gallons per acre by back pack sprayer, applied by M. DeBenedetto. This treatment was compared to an untreated control. Each treatment consisted of 4 single-tree replicates, with varying degrees of ‘crazy top’, however, all trees did show symptoms (Figures 1 and 2). Crop destruct was achieved in large part by removal of the bloom chemically by spray application, and will be followed by removal of nuts. Experimental results were evaluated visually by ‘density’ or incidence of bud breaks following treatment in the year of treatment, as
well as location of shoot breaks and branching angle of new shoots relative to that of ‘crazy top’ shoots and ‘normal’ shoots.

Originally the intent was to count number of shoot breaks, density on a per cm shoot length basis, and return bloom and fruit set. It was determined upon observation and discussion, that variability among the treated trees, both in degree of symptoms and response to treatment, was too great to warrant counts of shoot breaks. Thus, all data was subjective and observational with the eventual goal of strategic planning for a subsequent trial using Dormex in the dormant season to preclude crop destruct costs and crop loss to the grower.

**References:**

