Hydrogen Cyanamide Trial, 1984/1985

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Introduction

In the warm climate of Arizona and the California desert, grapes often experience an erratic bud break due to a lack of chilling. Table grape growers in the Coachella Valley were some of the first to experiment with hydrogen cyanamide in an effort to produce an earlier and more uniform bud break. Researchers in the Coachella Valley were able to accelerate bud break by as much as 13 days, and harvested as much as eight days earlier. Hydrogen cyanamide has not been as effective in the San Joaquin Valley where grapes receive adequate chilling.

Researchers in Israel have used hydrogen cyanamide with few long term problems. In vigorous vineyards, however, excessive growth can result in thinner canes the following year.

California researchers suggested that a 5 percent solution provided the best results. Application within 24 hours of pruning appeared to give an additional response. Timing is believed to be an important factor when using hydrogen cyanamide. Application within two to three weeks of the normal bud break delayed bud opening. On the other hand, if the material were applied too early in the winter it produced a sporadic bud break and exposed the vines to frost damage.

Bob Rush at Red Mountain Farm near Dateland expressed a desire to cooperate in hydrogen cyanamide research in their 2-year-old vineyards to determine the effectiveness of hydrogen cyanamide in Western Arizona.

Methods and Materials

Four rates of hydrogen cyanamide (untreated 2.5 percent, 5 percent and 7.5 percent) were applied to five vine plots of Perlettes, Flame Seedless and Thompson Seedless. Applications were made on December 28, January 4 and January 11. The Flame Seedless and Thompson Seedless vines were pruned and the Perlettes stubbed back just prior to spraying.

Counts of the number of open buds were made on January 30, February 11, February 20, March 4, March 13, and March 26. Buds were considered open when green was visible.

Blossom data were collected on April 5, April 12 and April 19. The number of bunches with at least 80 percent of the flowers open was divided by the total number of bunches per vine. This provided the per cent blossom per vine.

When the grapes were being harvested, two 5-bunch samples were taken from each vine. One set was sent to the Arizona State Chemist for residue analysis. The other set was evaluated by Mike Kilby's office at the University of Arizona. The percent soluble solids was measured using a refractometer.

Samples of Perlettes were collected on May 31 and Flame Seedless on June 5.
Unfortunately, the Thompson Seedless were harvested before samples were collected.

Results and Discussion

A summary of the results is provided in Figure I-7. The effectiveness of the 5 percent and 7.5 percent rates on bud break was similar, while providing significantly greater results than the 2.5 percent rate. Bud break was accelerated by 1 to 2 weeks with Perlettes, and up to 2 to 3 weeks with Flame Seedless and Thompson Seedless varieties. The use of hydrogen cyanamide caused a larger number of buds to break than on the control vines for both Perlettes and Flame Seedless. Little difference in total bud break was observed on Thompson Seedless.

The earlier applications on the Perlette and Flame Seedless vines produced a comparatively earlier bud break, which extended over a longer period of time. Late applications on Flame Seedless and Thompson Seedless varieties resulted in a much more dramatic and uniform bud break, making the timing of Gibb sprays and other cultural practices easier.

In nearly all cases the higher concentrations of hydrogen cyanamide produced an earlier blossom. The differences, however, between the 5 percent and 7.5 percent rates were less than between the 5 percent and 2.5 percent. The Perlettes treated with the 5 percent or 7.5 percent rates appeared to be at least a week ahead of the control vines, while the Flame Seedless and Thompson Seedless blossomed seven to 10 days earlier.

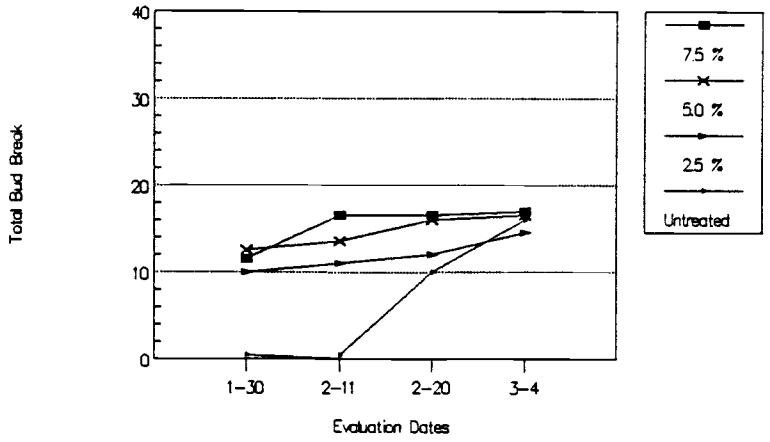
The time of application had an effect on the earliness of blossom. However the difference between treatments appeared to be less than observed at bud break.

When the percent soluble solutes were measured at harvest, the treated vines nearly always gave a higher Brix count than the control vines. The 5 percent solution usually produced the highest percent soluble solutes. With the Perlettes, the Brix count for the 5 percent solution averaged 3.5 above the control vines. The smaller difference of 1.3 with the Flame Seedless is due at least in part to picking of the early ripening bunches by the grower before samples were taken.

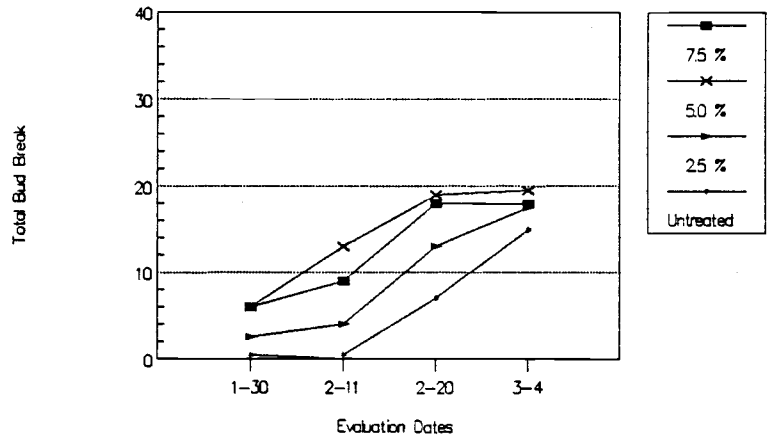
Since percent soluble solutes were only measured near the time of harvest, it is difficult to determine how many days earlier the treated vines would have had marketable grapes. From the difference in Brix count it would appear to be a significant amount, especially with the Perlettes.

These trials have shown that in southwest Arizona hydrogen cyanamide affects both the timing and uniformity of bud break, the earliness of blossom and percent soluble solutes at harvest. Of the rates evaluated in this study, a 5 percent solution appears to give the best results in nearly all situations. Depending on the timing of application, it is possible to obtain an earlier and/or more uniform development. With the earlier varieties such as Perlette it may be more important to achieve earliness, while uniformity of bud break may be more desirable for Thompson Seedless and Flame Seedless.

December 28, 1984 Application



January 4, 1985 Application



January 11, 1985 Application

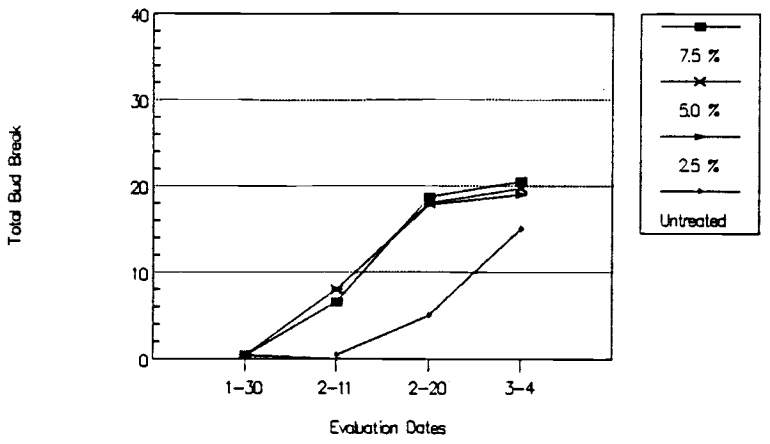


Figure 1. Bud break through time for Perlette grapes receiving hydrogen cyanamide applications on December 28, January 4 and January 11.

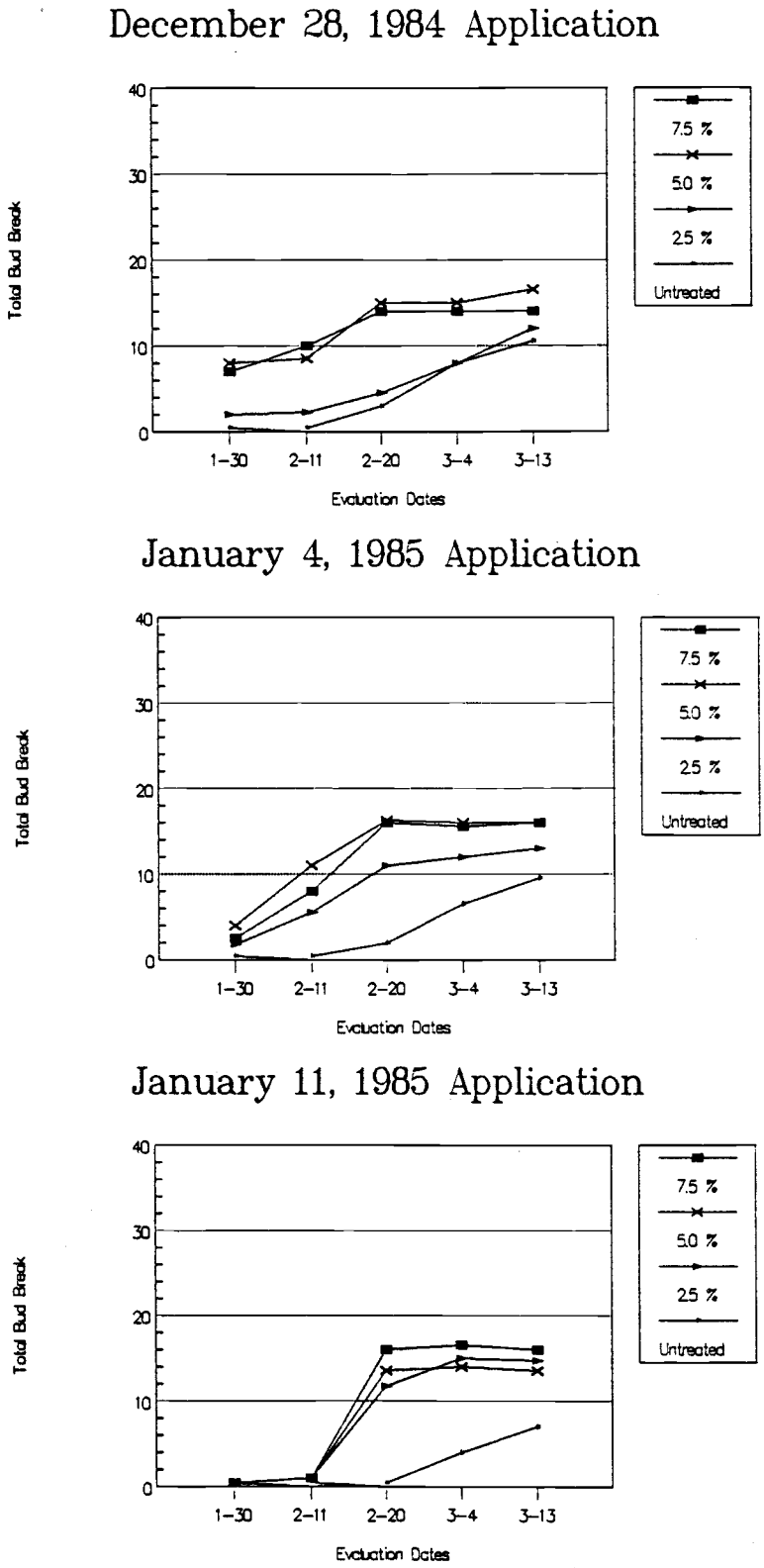


Figure 2. Bud break through time for Flame Seedless grapes receiving hydrogen cyanamide application on December 28, January 4 and January 11.

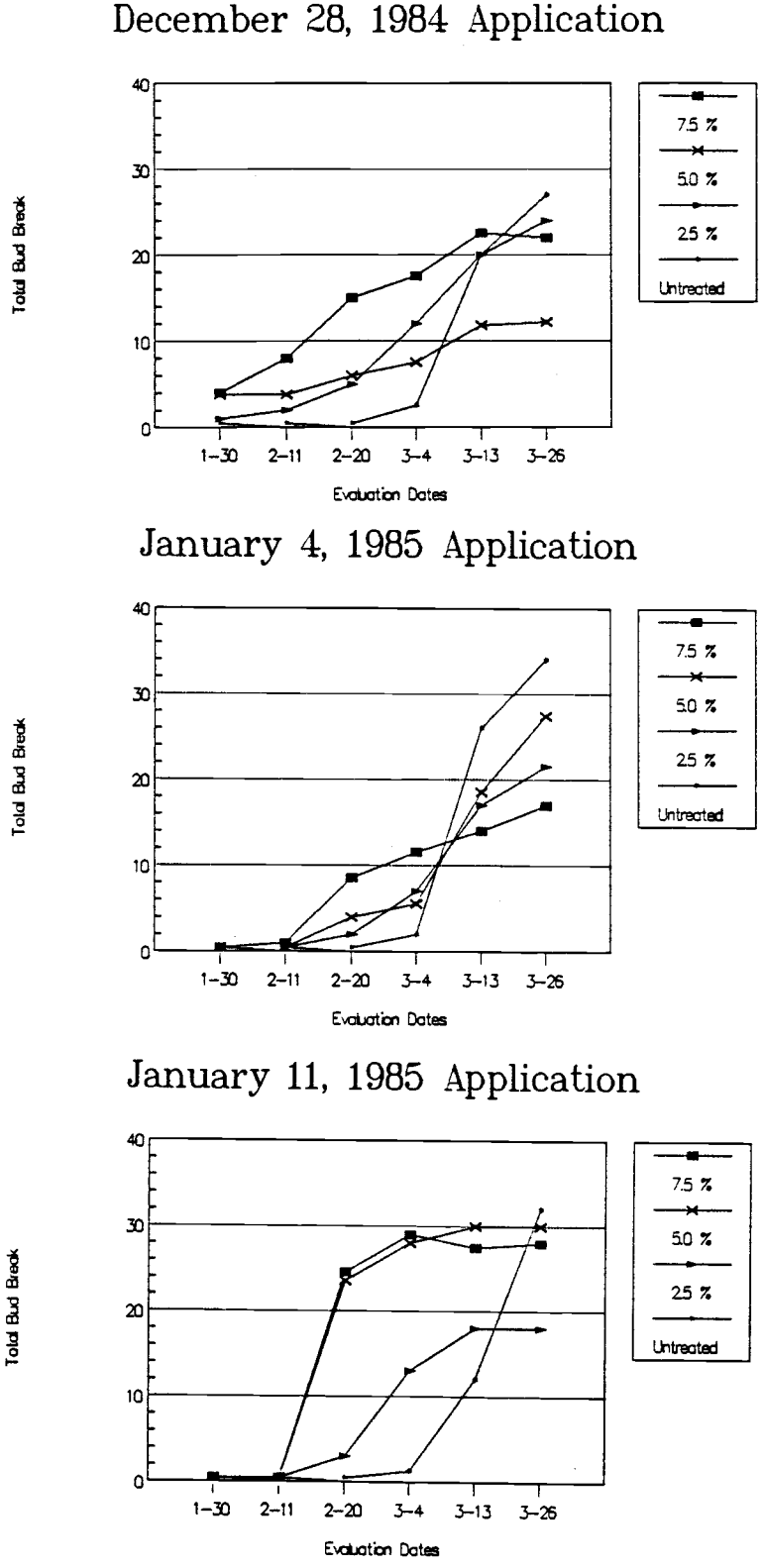


Figure 3. Bud break through time for Thompson Seedless grapes receiving hydrogen cyanamide applications of December 28, January 4 and January 11.

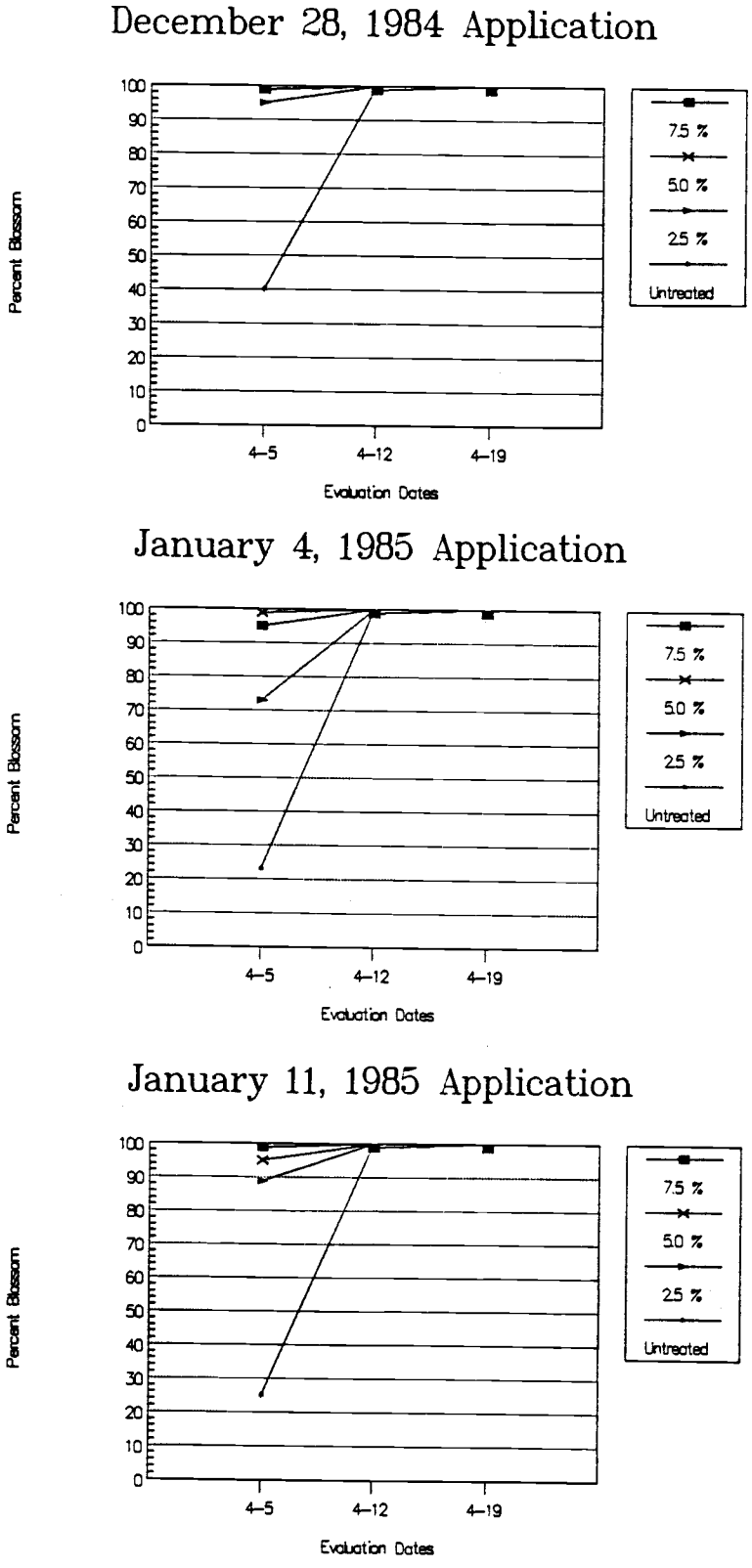


Figure 4. Blossom data for Perlette grapes receiving hydrogen cyanamide applications on December 28, January 4 and January 11.

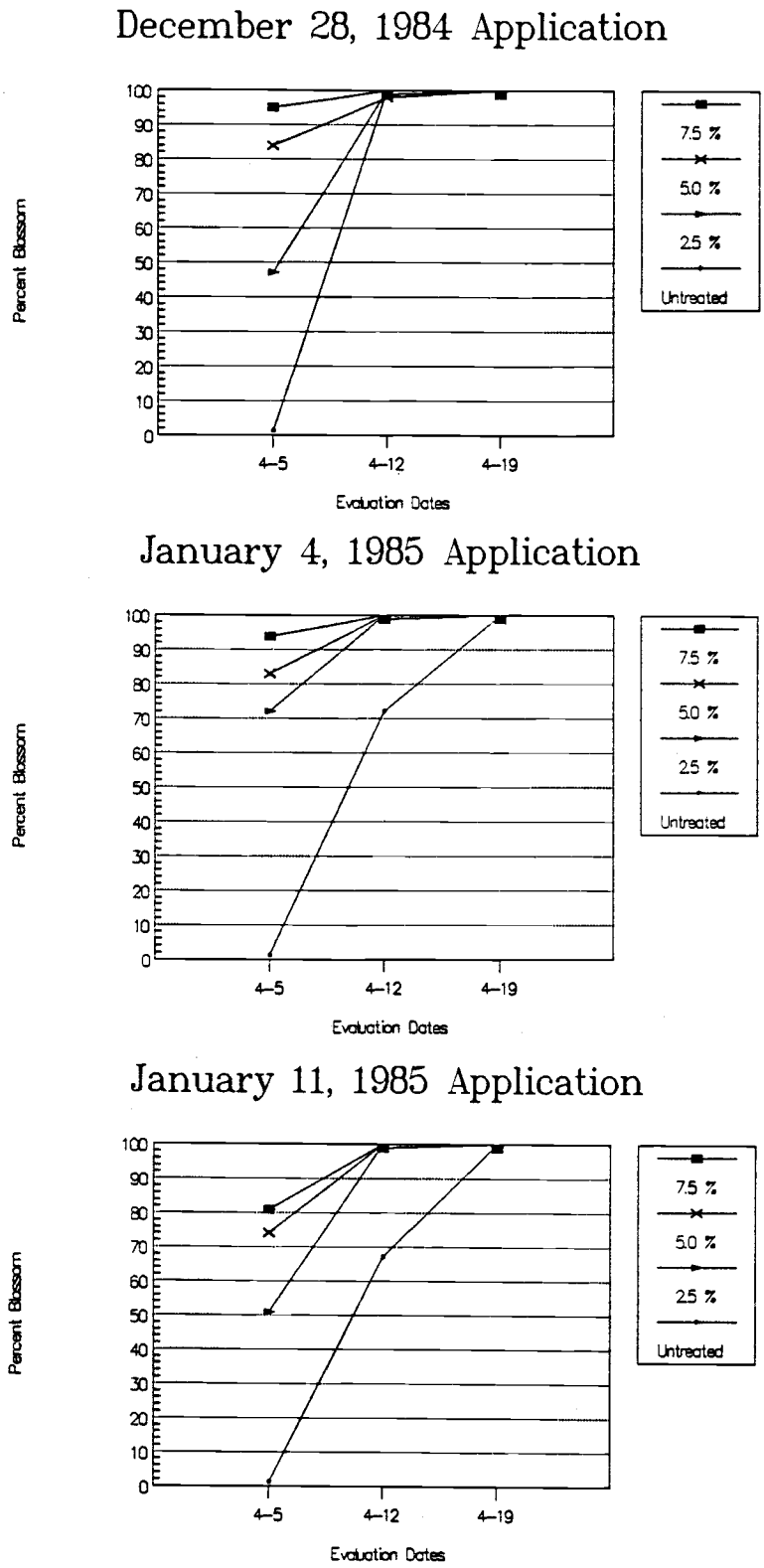


Figure 5. Blossom data for Flame Seedless grapes receiving hydrogen cyanamide applications of December 28, January 4 and January 11.

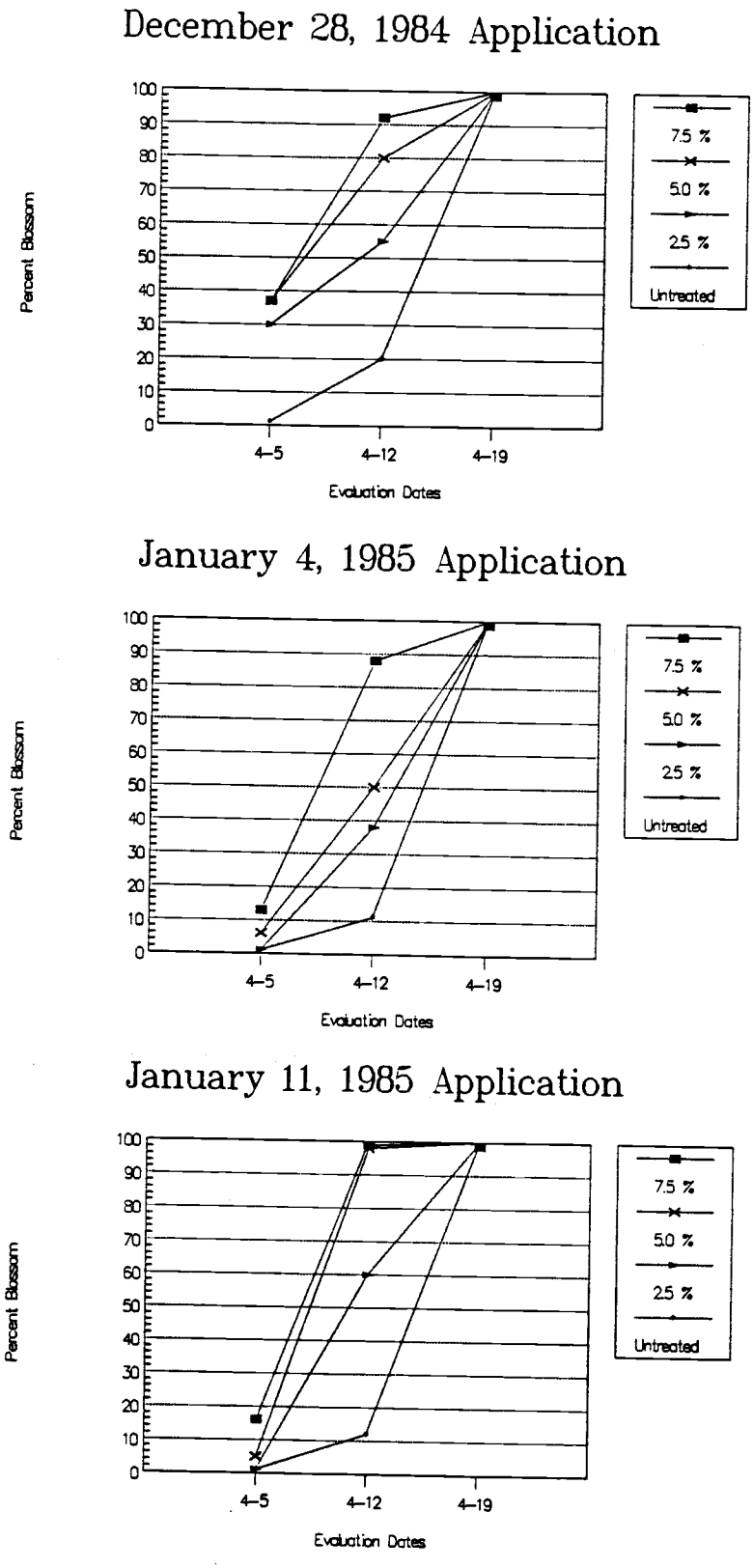
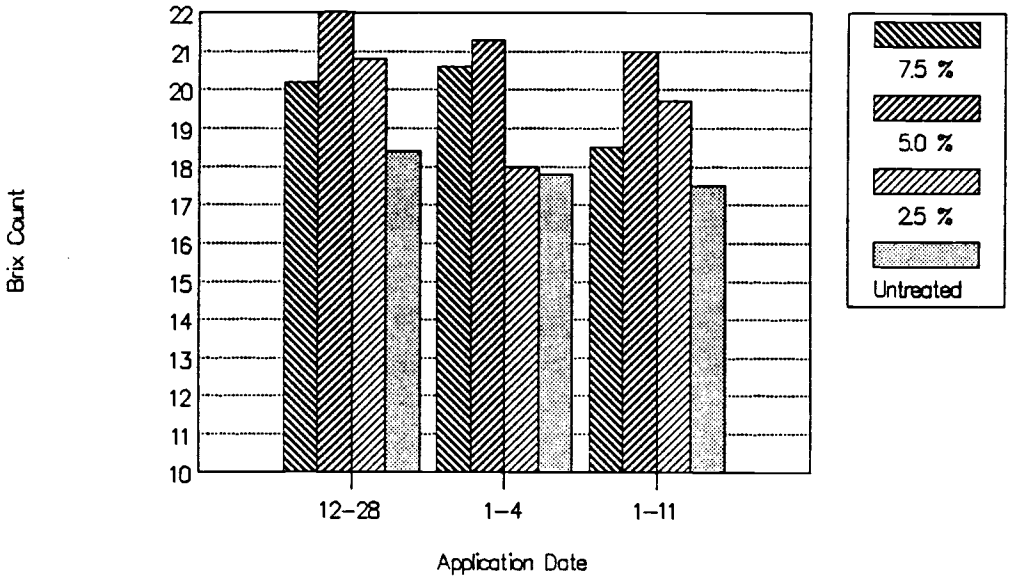


Figure 6. Blossom data for Thompson Seedless grapes receiving hydrogen cyanamide applications on December 28, January 4 and January 11.



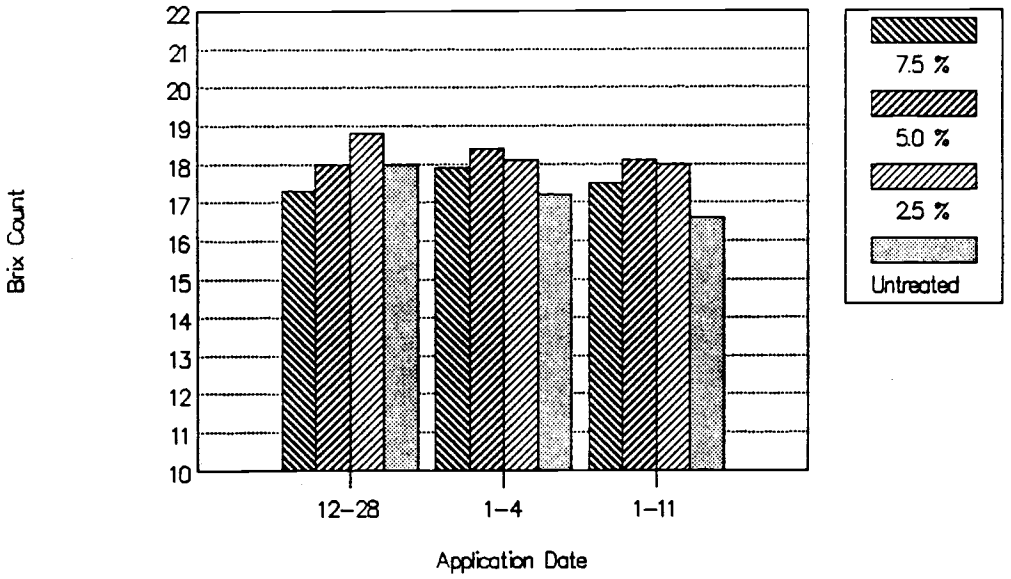


Figure 7. Brix count for Perlettes and Flame Seedless grapes sampled May 31 and June 5 respectively.