

Replacing bud failure trees

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THE PRECEDING ARTICLE documents yield reductions in Nonpareil almond due to bud failure (BF). Since the yield data indicate crop reductions could potentially result in economic losses to almond growers, this study was developed to assist orchard managers in deciding what action to take when faced with BF. Three courses of action were evaluated: to maintain the BF trees, to graft, or to replant. Other alternatives, such as interplanting, are available in special cases but were not included in the study. The authors assume that normal non-BF trees will be obtained by grafting or replanting, and that a pathogen is not involved. The probability of meeting these assumptions is outlined in the previous articles.

Yield/tree life

In considering the replacement of a BF tree, two factors were considered to be of major importance. These were tree productivity and remaining years of orchard life. When considering specific trees both factors must be estimated, since it is almost impossible to obtain exact figures for each tree in commercial orchards.

In order to justify replanting or grafting, the tree must produce long enough to recover more than the replacement costs plus the value of yield loss during its development period.

As described in the previous article, average yields from BF trees range from 64% (in severe cases) to 91% (in mild cases) of symptomless trees. In this study, hypothetical yields of 40%, 60% and 90% of normal tree yields are used for an orchard producing 1500 lbs of nutmeats per acre, or 20 lbs of meats per tree on unaffected trees. Remaining tree life was estimated by deducting the tree's age from 25 to 30 years, depending on tree condition.

Replacement costs

When all factors are accounted for, the cost to replace BF trees by grafting or replanting is high. This high cost results from the necessity of doing a thorough job of caring for individual trees to insure

optimum growth. Best results are obtained when replant sites are back-hoed and fumigated, with provision for special attention to irrigation, fertilizer, pest control and pruning. Thus, higher than standard orchard development cost figures were used.

Grafted trees can be expected to recover investment costs sooner than replants, but very rapid growth and potential limb breakage can threaten the success of grafting. However, with careful management grafting offers fastest recovery. The estimate of costs for grafting over normal operating costs are: first year, \$8; second year, \$3; third year, \$1. For replanting, comparable costs are: first year, \$17; second year, \$3.

Return to production estimates

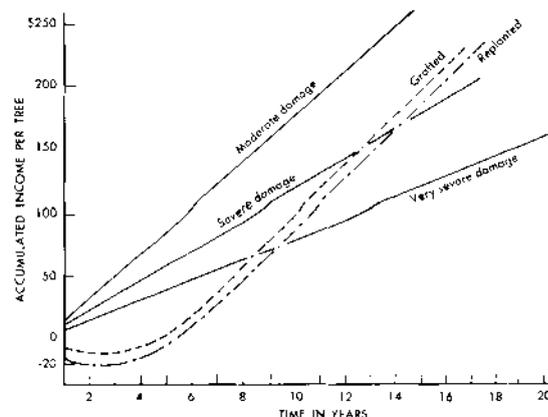
Grafted trees return to normal production more rapidly than replants. Therefore, different return-to-production figures are used for replants and grafts. In the second year, grafts should produce 10% of a normal, mature tree, 25% the third year, 50% the fourth year, 75% the fifth year and 100% the sixth year.

By contrast, in this example, replants were projected to produce 10% of normal the third year, 20% the fourth year, 50% the fifth year, 75% the sixth year and 100% the seventh year.

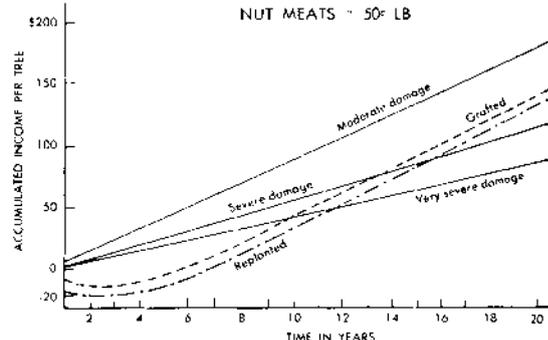
The accompanying charts show accumulated income from normal, grafted, and replanted trees as well as BF-damaged trees that have not been replaced. Almond prices of \$.50 and \$1.00 per nutmeat lb are used. The point where the income line for a replacement tree crosses the income accumulation line for BF affected trees is the break-even point. This point occurs in the year in which increased returns generated by replanting or grafting offset increased costs and loss of income from having the BF tree out of production.

For example, if a severely affected BF tree (estimated 60% of normal yield) were grafted during a period when almonds were returning \$1.00 per meat lb, thirteen years would elapse before returns from the additional crop will repay total costs. The break-even point in this

ACCUMULATED INCOME CURVES
NUT MEATS = \$1.00 LB



ACCUMULATED INCOME CURVES
NUT MEATS = 50¢ LB



case is 13 years. Data presented here also suggest that no tree replacements should be made unless the orchard has approximately 10 years or more of life remaining. Using these graphs the orchard manager can calculate break-even points for his specific situation or he can utilize the techniques described here to develop graphs with his cost and yield figures. Orchards with different yield levels were evaluated using the system described and similar elapsed times to reach the break-even points were obtained. The major factor influencing the time length to reach the break-even point is the severity of BF; orchard yield level and price are of minor importance.

Grafting or replanting involves long-term commitments to insure recovery of additional costs. Orchard managers should realize that these alternatives will not provide short-term profits. It does appear, however, that a management decision and course of action should be made as soon as possible after detecting bud failure. The study adds further evidence to the importance of starting an orchard with low BF-potential trees rather than being faced with BF trees in the orchard.

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