

# **Non-infectious Bud Failure Management**

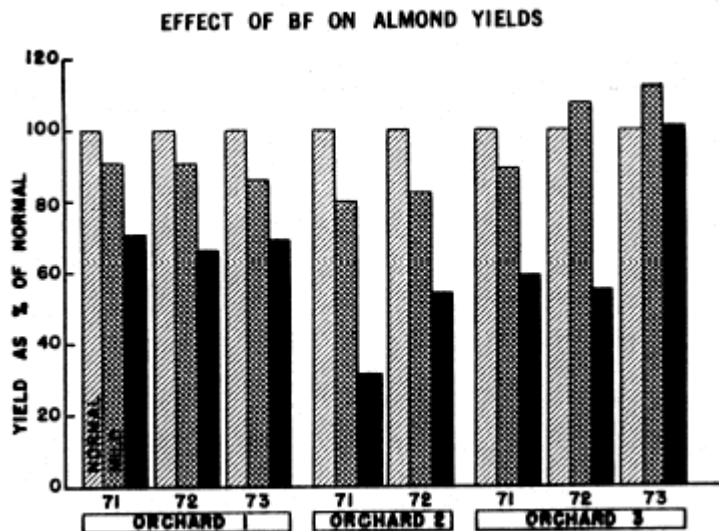
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Nickels Field Day, May 2, 2007

## **BF Basics---**

- Genetic disorder.
- More severe in warmer areas, following hot summers, after mild winters.
- Nonpareil parentage in the genetic background.
- Basal or terminal buds may survive since they grow during cooler times of season.
- Pruning won't eliminate the problem; re-growth has the same potential to develop BF.

## **Options**

- 1) Maintain BF trees
- 2) Topwork by grafting or budding
- 3) Replant new tree



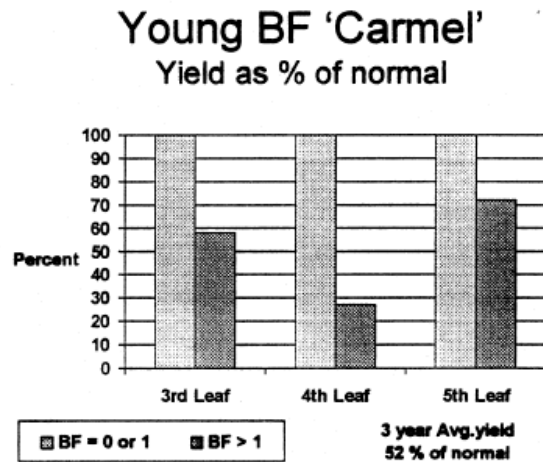
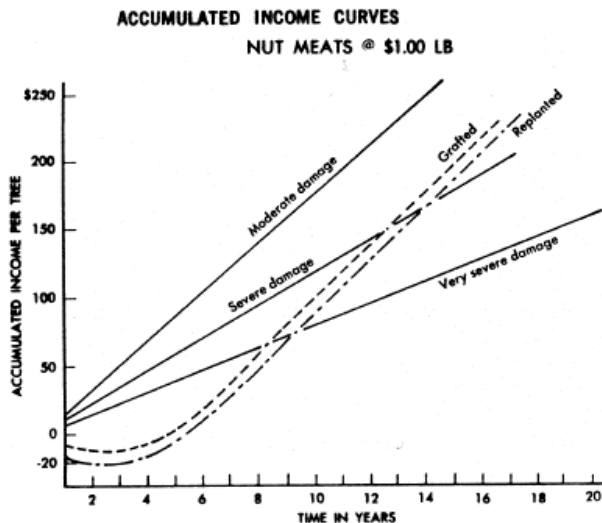
In the above study (M.Gerdts,et.al.), the normal Nonpareil yields are shown in the light hatched bars, mildly affected trees are shown by the intermediate hatching, and the severely affected trees are represented by the black bars.

**Mild BF:** defined as BF found only in several secondary branches.

- 3 year average Nonpareil yield was **91% of normal**
- BF trees out produced normal trees in one orchard in some years due to later bloom and better pollination weather.

**Severe BF:** defined as BF displayed in at least one major scaffold with other symptoms showing throughout tree.

- 3 year average Nonpareil yield was **64 % of normal**
- Researchers found decreases in kernel weight and in kernel numbers.
- They also observed a trend toward more double kernels.



Hypothetical yield curves (L.T.Browne, et.al., above left) represent 90, 60, and 40 % of normal 1500 lb./acre orchard yields. The break even point is where lines cross-- the increased returns of grafted or replanted trees finally offset the increased cost and loss of income from having the BF tree out of production. Yield effects in young Carmel almonds (K. Shackel, above right) may be even more severe.

- The major factor affecting break even is the severity of BF.
- Orchard yield and price per pound are minor factors.
- Different yield levels have a similar time to reach the break even point.
- The orchard must have more than 10 years of life remaining to justify the tree replacement.

### What to do ---

- When second through fourth leaf trees are affected, BF has the greatest impact on productivity. Make a major effort to detect BF in the second to fourth leaf and replace or topwork affected trees using budwood with low BF potential as soon as possible.
- For trees five to six years old, remove and replace the trees only if BF is affecting the main framework of the tree. BF only in the upper canopy may not seriously affect yield.
- When older trees become affected, do nothing. The cost of replacement and the yield loss will not be offset by increased production before the orchard is removed. There's less impact on productivity since BF is restricted to upper portions of canopy.
- Avoid any stress in the orchard that can raise canopy temperatures. Anything that can cause defoliation such as water stress, mites, scab, or leaf rust could contribute to higher canopy temperatures and possibly aggravate BF.

### Sources:

- M.Gerdts, W.C. Micke, D.Rough, K.W.Hench, L.T.Browne, G.S.Sibbett, Almond Yield Reduction, California Agriculture, March, 1975, pg.14.
- L.T.Browne, M.Gerdts, E.A.Yeary, Replacing Bud Failure Trees, California Agriculture, March, 1975, pg.15.
- Shakel, Ken, Tom Gradziel, Dale Kester, Mario Viveros, Warren Micke, Mike Cunningham. Non-infectious bud-failure, 1996 Annual Report to the Almond Board, Project No. 96-K23, Spring 1997, 7 pgs.