Project No. 93-F18 - Pollination (continuation of Project No. 92-F17)

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Objectives:

1. Develop information on pollination by bees which will result in increased efficiency and greater grower returns.
2. Improve pollination efficiency of rented honey bee colonies.
3. Evaluate and improve management of alternative pollinators.

Results:

Weather- The bloom season of 1993 was delayed by rains in late February. NePlus reached peak bloom during the rains in the Dixon area. Other cultivars bloomed during good bee flight weather.
High pollen hoarding honey bees- In cooperation with Dr. R. E. Page, we evaluated high pollen hoarding selections. Colonies with high pollen hoarding strain queens had significantly more bees than similarly managed commercial colonies, in February prior to almond bloom. The larger populations of bees in colonies with the high pollen hoarding trait produce more pollen foragers and thus are well suited for almond pollination based on my previous studies.
Buds per meter- Buds production was measured on five cultivars and compared with previous years. Bud production in 1993 was lower than in 1992, especially in NePlus, Nonpareil, and Price. Most of the cultivars showed signs of alternate bearing over a four year period.
Bloom progression- Bloom was late and concentrated in 1993 in all five cultivars in our test orchard near Dixon.
Fruit set- Percent fruit set was higher in 1993 than in 1992 for all five cultivars. It seems inversely related to bud production.
Orchard mason bees- Small populations of the orchard mason bee, *Osmia lignaria propinqua*, were incubated following winter refrigeration and released at early bloom. Bees that spent the summer of 1992 in Davis showed good survival. Nests were established during the relatively short bloom season, but female *Osmia* continued to forage after almonds ceased blooming. Incubation and release methods need improvement.
Bumble bees- Preliminary evaluation of colonies of the native bumble bee, *Bombus occidentalis*, from a commercial producer, showed that: bumble bees work faster, cover more area of bloom per unit time, collect more pollen per individual, leave trees more frequently, and have a higher ratio of pollen foragers than do honey bees. However, bumble bee colonies have hundreds of workers at the time of almond bloom in contrast to thousands of workers in honey bee colonies. More data are needed to determine the economics of bumble bees for almond pollination.