

## **BIENNIAL BEARING IN CRANBERRY**

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Biennial bearing has been observed in cranberry for many years. Various studies have shown a percent return bloom ranging from 12% to 65% depending on year, bed vigor, and cultivar. Significant region to region differences have been noted. This research was undertaken to determine the extent of biennial bearing by cranberry cultivar and growing region. The study was conducted in four major cranberry growing areas with four cultivars per area. All sites had Stevens, Ben Lear, and Crowley. In addition, Massachusetts and New Jersey examined Early Black and Howes, Wisconsin examined Searles, and McFarlin was included in Oregon.

In the fall or winter of 1989/1990 six transects were established within a single bed for each cultivar in each region. In MA, WI and NJ uprights were tagged in the fall after harvest, but before the winter flood. The fruiting characteristic was based on the presence of persistent pedicels. In Oregon, uprights were tagged in midwinter in the absence of a winter flood. For each transect 60 to 100 uprights that had produced fruit in 1989 were tagged with a small piece of vinyl tape. After fruit set in 1990, fifty tagged uprights per transect were examined for the presence of flowers for a second year (return bloom) or fruit a second year (return fruit).

Each cultivar had a different amount of return bloom and return fruit depending on where it was grown (Figure 1). In 1990 Wisconsin typically had the highest percent return bloom and return fruit. Massachusetts and Oregon were typically lower, while New Jersey was variable. These data are also supported by 1990 production statistics.

Percent return bloom was highest for Ben Lear in Wisconsin (74%) and lowest for Howes in New Jersey (14%) (Figure 1A). Crowley was the most consistent performer across all production areas. Ben Lear differed most in percent return bloom among regions; from 16% in Massachusetts to 74% in Wisconsin.

Despite high percent return bloom for some cultivars and regions, many flowers did not set viable fruit (Figure 1B). Ben Lear had only 49% return fruit following 74% return bloom in Wisconsin, a 30% reduction. Searles in Wisconsin was highest of the single state cultivars in both return bloom and return fruit. Percent return bloom followed percent return fruit and, of course, in all cases was somewhat lower.

The differences in percent return bloom and return fruit among regions for a given cultivar may have been caused by differences in cultural practices as well as

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environmental factors. The age of the bed, yield in 1989 and 1990 and cultural practices such as sanding, pruning, and fertilization may well have had an influence.

Two internal factors also may be affecting return bloom and return fruiting in cranberry. First, flower initiation, therefore, return bloom may be inhibited by internal plant hormones which are produced by developing flowers and fruit. This has been found to be the case in apples as well as some other fruit. Second, even if flowers open and are pollinated there may be insufficient resources so that the flowers could be weak and would be unlikely to set fruit.

In conclusion, cultivars differed in percent return bloom and set within and among regions. Regional differences for a particular cultivar could have been due to cultural and environmental effects. The low percent return bloom for most cultivars could be due to resource limitation and/or hormonal factors during fruiting, which may adversely affect concurrent flower bud initiation and thus, percent return bloom the following year. Cultivar and regional and cultural differences could be related to photosynthetic efficiency and partitioning of photosynthates. The physiology of either has yet to be determined in Cranberry.

This research will be continued in 1991 with more sites and fewer cultivars as we try to unravel the potential causes for biennial bearing for individual uprights.

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