WALNUT FRUIT GROWTH AND DEVELOPMENT

K. Pinney, V. Stallman, and V. Polito

Ashley, Hartley, and Franquette fruits were collected from the Deseret Farms orchards in West Sacramento. Twenty samples of each variety were taken at weekly intervals from bloom to harvest. At full bloom sufficient numbers of individual flowers at the same stage of pistillate flower development were tagged to insure that all fruits collected throughout the season were at comparable developmental stages.

Measurements of critical parameters of fruit growth were made for each sampling date. Fresh weight, dry weight, overall length and maximum circumference were determined for whole fruits. Nut (shell) length and maximum diameter were measured, as was embryo (kernel) fresh weight and dry weight. Details of all measurements are available.

Patterns of growth were most clearly expressed in the Ashley and Hartley fruits and these are summarized below:

Fresh weight gain followed a double sigmoid pattern of growth. Both Ashley and Hartley fruits entered a three week long period of slowed growth beginning seven weeks after bloom. Rate of increase in total length, diameter, and volume slowed greatly at week seven. By this time 75-90% of final fruit (husk, shell, kernel) size had been reached.

Kernel (embryo) growth also appeared to follow a double sigmoid curve with its initial, rapid phase of growth approximately coincident with the slowing in rates of fresh weight gain and size increase at week seven. Phase III of the embryo growth curves, representing the final increases which occur in kernel weight during the weeks prior to harvest, corresponds with the final, flat portion of growth curve representing increase in total weight. This rapid rate of increase in kernel weight began 15 weeks after bloom in Ashley and Hartley and remained high through harvest.

Late in the season total fresh weight showed fluctuations which corresponded with irrigation schedules.

Much more variability was found among the Franquette fruits which made the data for this variety less clear although, it appears that the same trends may be evident.