

The Dangers of Drought on Fruit Crops

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This growing season has been abnormally dry in many parts of Missouri, which is especially damaging to non-irrigated fruit plantings. Moisture deficits at different times of the season will result in varying plant responses depending on the type of fruit. During plant establishment, the availability of water is always critical due to the small size of the root system after planting. Lack of water generally reduces plant growth, affects fruit size during the growing season, and can reduce fruit set the following year.

Small fruit plants, such as strawberries and blueberries, have shallow root systems and are particularly susceptible to extended drought. When strawberry plants are severely water-stressed from the beginning of the growing season, total fruit production can be decreased by about 80%. Also, drought stress before strawberry harvest accelerates ripening and reduces fruit size substantially. When strawberry plants are stressed after harvest, runner production in matted-row fields is delayed during the current season and results in yield loss the following year. When drought occurs at renovation, it may be helpful to throw a half-inch of soil over non-irrigated plants at that time to promote higher rooting on the crowns of older plants and enhanced fruiting the next season.

Blueberry plants are very susceptible to drought because most of their roots are in the upper 8 to 12 inches of the soil. While blueberry roots lack root hairs, which are used by other plants to maximize the uptake of soil moisture and nutrients, endomycorrhizal fungi associated with roots perform these functions. However, severe drought conditions for 20 to 30 days can lead to blueberry fruit loss and/or plant mortality.

For blackberry, raspberry, and elderberry, droughty conditions just before harvest cause the fruit to shrivel or completely dry up. After harvest, the primocane growth of June-bearing blackberries or raspberries will be stunted during a prolonged drought, resulting in reduced fruit yield in the subsequent growing season.

Moisture is also critical for the production of high quality stone fruits. Early season thinning of peaches, leaving at least six inches between each fruit, promotes large fruit. Also, in the three weeks before harvest, fruit size is greatly increased with the uptake of water and is called the period of final fruit swell. Late season drought stress reduces flower bud development of peaches and can lead to fruit defects, such as “doubles” or “triples” where fruit are fused together the following growing season. When drought is prolonged, scaffold branches of peach trees may be cut back severely (e.g., dehorned) to prevent tree mortality. Dehorned trees can two or more subsequent growing seasons to recover.

For apple, fruit buds for the following season are generally initiated about the first 50 days after bloom. Thus, heavy crop load due to lack of fruit thinning and early season drought stress results in poor cropping the subsequent season. Early-season water stress also restricts fruit cell division, contributing to small fruit during the current season and reduces starch accumulation, which shortens the storage life of the fruit after harvest. Because drought is often associated with abnormally high temperatures, red

apples fail to color properly under these conditions and are brownish in color and are prone to preharvest fruit drop.

Shoots on young and mature apple trees usually grow for about 100 and 50 days, respectively. Thus, inadequate moisture during May and June can severely reduce vegetative growth of young trees. Drought during late summer and fall adversely affects trunk enlargement and root growth. For trees on dwarfing rootstocks, which tend to have relatively small root systems, water stress is particularly harmful. It is essential that dwarf trees develop a good root system for adequate tree anchorage and uptake of nutrients. Because calcium uptake by roots requires adequate moisture, this nutrient is often deficient during dry seasons, resulting in fruit disorders such as corkspot and bitterpit. Images of these disorders are available at: <http://ohioline.osu.edu/factsheet/plpath-fru-01>.

During drought, the best way to prevent reduced fruit yield, tree growth, and mortality is have a properly installed irrigation system in a commercial orchard or access to water for hand-watering in a backyard planting. Maintenance of a vegetation-free strip down the planting row or around the base of individual fruit trees will help conserve soil moisture. Weeds also compete with fruit plants for soil moisture, so weed control is especially important during droughty periods. In berry plantings, sawdust or bark mulch will reduce weeds and retard soil moisture loss. Additionally, effective control of defoliating insect pests and diseases will promote leaf retention, thereby enhancing photosynthesis and carbohydrate production for better drought resistance during stressful periods.