

flexa) and 254 American osmanthus (*Osmanthus americanus*) were planted in 29 participant locations.

This year, 30 participants received 446 trees of a clone of the Danube ash (*Fraxinus holotricha* 'Moraine') and 357 Chilean peppertrees (*Schinus polygamus*). Most of the participants received 12 ash trees and 8 each of two sizes of the peppertrees. One participant in the Bay Area received 54 ash trees, however, and another in the Central Valley received 70. In these two plantings, differential treatments of soil aeration and fertility will be made with the assistance of the local farm advisor.

Communities receiving candidate trees in 1963 include: Berkeley, Costa Mesa, Davis, Downey, Escondido, Fresno, Fullerton, Hawthorne, Hayward, Hermosa Beach, Los Angeles, County of Los Angeles, Merced, Modesto, Pacifica, Pasadena, Pomona, Redding, Redondo Beach, Richmond, Riverside, Roseville, Sacramento, San Francisco, San Leandro, Santa Clara, Santa Fe Springs, Sunnyvale, Tracy, and Walnut Creek.

Such a long-range performance evaluation of landscape trees is possible only through the excellent support of the participants who have purchased the more than 1,300 candidate trees already planted, at costs totalling over \$4,000. This, plus their cost of planting, staking, and caring for the trees, represents a gift to the Landscape Tree Evaluation Program of considerably more than \$10,000. Information from this research should ultimately focus attention on more of the better kinds of trees that could enhance the urban landscape.—*Philip A. Barker, Lecturer, Department of Landscape Horticulture, and Asst. Specialist, Agricultural Experiment Station, U. C., Davis.*

LOW SOIL OXYGEN

Most Damaging to Plants During Hot Weather

Low soil oxygen conditions were found most detrimental to plant growth when air or soil temperatures were high. Test results also emphasized the importance of promoting rapid water intake rates to eliminate prolonged flooding of the soil to get water into root zones.

DAMAGE TO PLANTS from holding water on the soil surface for relatively long periods of time during hot summer weather has been observed to cause cotton bolls to drop and alfalfa to become "scalded." Roots require an adequate supply of oxygen to make good growth and support a vigorous plant. High moisture content and/or soil compaction reduce the amount of oxygen in the soil. The detrimental effects of prolonged watering during hot temperatures may also be related to a reduction in soil oxygen.

Experiments were conducted by the departments of soils and plant nutrition at Riverside, and irrigation and soil science at Los Angeles to analyze temperature influences on the degree of damage to plants under different soil-oxygen conditions.

Sunflowers were grown in specially constructed containers and various air-oxygen concentrations were passed over the soil surface—allowing different amounts of oxygen to be established in the soil root zone. The soil temperature was controlled by placing the watertight containers in water which was circulated and kept at a constant temperature. The circulating "water bath" with plant containers was then placed in a growth chamber where air temperature could be controlled. This arrangement allowed full control of soil oxygen content, soil temperature, and air temperature. Experiments were conducted at soil temperatures of 55, 75, and 92°F.

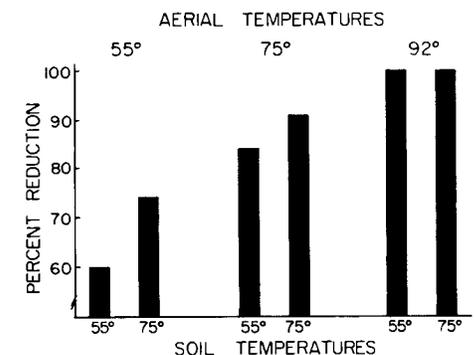
The bar graph shows the reduction in growth of the plants under the lowest oxygen treatment in comparison with the plants used as checks for each temperature condition. The check plants grew differently depending upon temperature, so the graph indicates a relative growth rather than an actual growth.

Plants grown under the lowest oxygen treatment failed to survive at air temperatures of 92°F, but they did survive and make some growth at 55 and 75°F. Plants were stunted in growth by the low oxygen treatment. As indicated by the bar graph, the greatest reduction in growth occurred under higher air and soil temperatures.

These data indicate that reduction of soil oxygen by such practices as prolonged water application in hot weather, could be causing plant damage. Results of previous experiments have indicated that low soil moisture is more detrimental during high temperatures than under lower temperatures. The grower is therefore faced with the problem of maintaining both adequate water and soil oxygen for plants during high temperatures. Flooded conditions create poor soil oxygen conditions, however. High water intake rates allow the water to get into the root zone in a short time thus avoiding the need for prolonged flooding and a possibility for excessively low oxygen conditions to develop. Adding excessive water for the purpose of leaching should be avoided during hot weather except to keep damaging salt levels from accumulating in the root zone.

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PER CENT REDUCTION IN GROWTH OF SUNFLOWERS TREATED WITH VERY LOW SOIL OXYGEN AS COMPARED WITH THE CHECK AT EACH TEMPERATURE



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