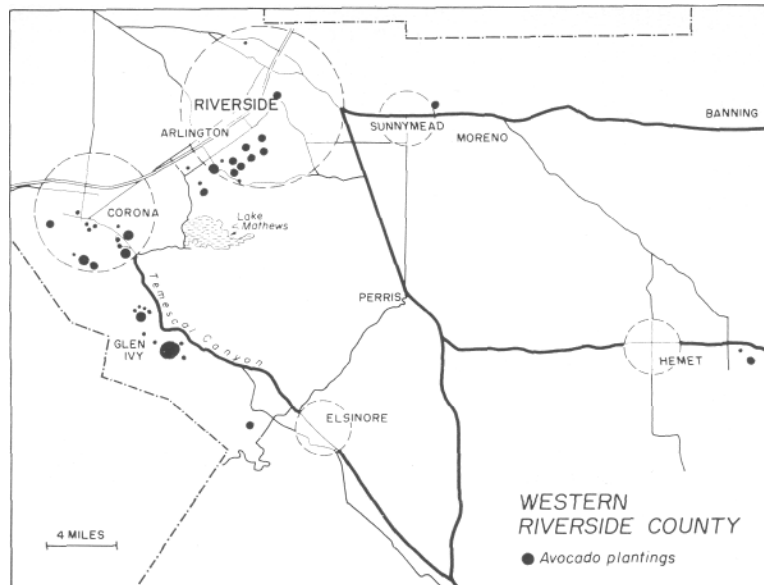


Poor Drainage and Excess Soil Moisture Encourage Spread of Avocado Root Rot

R. M. BURNS, M. P. MILLER, R. B. HARDING, K. D. GOWANS and G. A. ZENTMYER



Only seven known avocado root rot infestations have been located out of the 450 acres of avocados grown in Riverside County, and of these, only one grove has been extensively damaged. As previously reported from preliminary results of the statewide survey, this Riverside study also showed that root rot damage is dependent on the introduction of the fungus *P. cinnamomi* in soils with poor internal drainage. However, even with the best soils, the rate of spread can be increased with excessive soil moisture.

Most of the commercial avocado acreage in Riverside County is located south and east of Corona. The second area of importance is in the foothills southeast of the city of Riverside in what is called the Arlington-Riverside District. In the Corona District, the 15 known avocado groves were found to have generally deep, medium-textured soils (loam to fine sandy loam) with good internal drainage. Avocado root rot has been found in six groves in this area, but damage has been extensive in only one location. In this grove, approximately eight acres of avocados have been killed. The soil in the damaged area has loam surface layers, clay subsoil with bedrock at two to three feet and poor internal drainage.

The soils of the 11 known avocado groves in the Arlington District were also found to be generally deep, medium-textured, with good internal drainage. In only one grove has root rot been found, and the rate of spread has been slow. The largest single avocado planting—and one of the largest in California—is the Terracado Ranch owned by the

Todd Ranch Company. This 85 acres of avocados is located in the Temescal Canyon east of Corona. The soils in this grove have been found to have generally good internal drainage. Apparently the root rot fungus was introduced into this grove in 1959 on avocado nursery stock. The disease spread has been controlled by a combination of good soil-water conditions, early disease identification and prompt soil fumigation.

AVOCADO ACREAGE IN RIVERSIDE COUNTY—1962

District	Bearing	Nonbearing	Total
Corona	288	53	341
Arlington-Riverside ...	87	5	92
Moreno	12	3	15
Elsinore	2	—	2
Hemet	1	—	1
	390	61	451

The avocados in the Moreno Valley are grown in the foothills northeast of Sunnymead. The texture of the soils in this area ranges from loamy sand to sandy loam. The internal drainage in these orchards is good. A few trees in one grove were damaged from excessive amounts of soluble salts in the soil, but no root rot has ever been isolated from this area.

In the Hemet area there are two known avocado groves, predominantly the Duke variety, planted on medium-to-coarse-textured soils and with good internal drainage.

There are a few avocado trees grown experimentally in the Coachella Valley. These trees are growing in deep, light-to-medium-textured soils with very good internal drainage. However, the possibilities of commercial avocado production in this area offer little promise at the present time.

The dominant soils in the four groves with very slow disease spread and only a few trees affected each year, were deep and medium-textured (sandy loam), with good internal drainage. Soils in the two groves with moderate spread involving several trees each year were deep, with medium-textured (loam) surface soils and moderately fine subsoils (clay loam). Internal drainage in these soils is somewhat restricted. The one grove found with rapid spread of avocado root rot damage has soils with a loam surface and clay subsoil. The internal drainage in these soils is slow.

Previous studies have also shown that root rot damage is dependent on the introduction of the fungus *P. cinnamomi* in soils with poor internal drainage, under conditions of excess moisture. When the fungus is present in deep, medium-textured soils with good internal drainage, the rate of disease spread and damage is usually lessened. However, even with the best soils, the rate of spread can be increased with excessive soil moisture. Careful water management is necessary in any avocado culture.

Robert M. Burns is Extension Horticulture Technologist, University of California, Riverside; M. P. Miller is Farm Advisor, Riverside County; R. B. Harding is Associate Chemist, U.C., Riverside; K. D. Gowans is Extension Soils Specialist, U.C., Davis; G. A. Zentmyer is Plant Pathologist, U.C., Riverside

William Thorn, John Mircetich, and Saburo Hashimoto, laboratory technicians, Department of Plant Pathology, U.C., Riverside, assisted with this survey.