Westside Dust Plots

test plantings show some promise as means of reducing dust problem

Lloyd N. Brown and James L. Myler

Areas of bare ground—in fenced test plots of about 500 acres each in Fresno, Kings, and Kern counties—almost disappeared during two years of favorable weather.

The test plots were established in 1951 to introduce plants and develop management practices to alleviate the Westside dust problem.

Trial plantings of grasses and legumes have been made each fall. The plantings made in 1953 started very well. On February 26, 1954, the plantings were growing in good shape but were still small. Soil moisture conditions in Kern and Kings counties were excellent. Fresno County did not get the last rain that fell in the other two counties. But, from the amount of moisture in the soil at that time, it looked as though a good spring growth was assured. However, the plantings made but little growth after February 26. Apparently, the plants had been stunted by earlier dry periods and did not respond to the late February rains. Such phenomena are not uncommon among annuals where the winter rainfall is interrupted by extended periods of no rain. Apparently, this pattern of weather induces the plants to mature, and subsequent rainfall will not start them growing. Fortunately, the condition that results in this plant behavior does not occurr very often or on a large scale.

In 1952 and again in 1954, detailed studies were made on an area 100′ square on the Kings County plot on the growth of cover. The area was laid out into 10′ squares, and a detailed map was made of the cover. The cover was broken down into the four classes of Tall, Medium, Short, and Bare. The area of each class was figured as percentage of the whole. The following table shows the results of this study:

Cover on an Area 100′ Square—Kings County Plot

	1952	1954
Tall	15.3%	20.0%
Medium	41.9	8.3
Short	25.9	70.8
Bare	16.9	.9

The significant thing about this table is that the bare areas had almost disappeared over a period of two years of favorable weather. A survey taken before 1952 would have shown a larger percentage of bare area.

There is indication that the lighter use inside the fenced areas in all three county plots is leading to a slow buildup of plant residue. This slow buildup of plant residue is aiding in giving the plot areas a plant cover and with the return of a series of dry years, should aid in delaying soil movement by wind action.

Lloyd N. Brown is Soils Specialist, University of California, Berkeley.

James L. Myler is Specialist in Range Management, University of California, Davis.

Farm Advisors Richard G. Jones, Fresno County; Herbert S. Etchegaray, Kings County; and Roy V. Parker, Kern County, University of California, participated in the studies reported above.

ALFALFA

Continued from preceding page

showed that the infection process of the fungus in the soil was apparently sensitive to, and adversely affected by, soil microorganisms. When inoculum of the fungus was placed on roots of plants growing in nonsterilized soil, a much lower incidence of disease occurred than where those in sterilized soil were inoculated. These evidences of the unfavorable environment of the soil to *Stagonospora*, coupled with observations of infected crowns and roots of plants from the field, indicate that the fungus first infects a crown stem and progresses downward in the tissues to the tap root. It seems extremely unlikely that the fungus would live over in the soil in the absence of alfalfa.

Dark Crown Necrosis

A type of crown rot which may be called dark crown necrosis is most prevalent of all. The cause is as yet not completely understood. The lesions on the crown may be wedge shaped or may appear longitudinal on crown branches. Eventually, the crown branch or the entire crown is totally affected and the plant is killed.

Numerous isolations of fungi from diseased tissue were made. The fungi found were: *Fusarium roseum*, *F. solani*, *F. oxysporum*, *Coniothyrium* sp., *Phoma* sp., many sterile mycelial types, occasionally *Rhizoctonia solani* and *Pythium* spp.

One isolate each of *Fusarium roseum* and *Phoma* sp. was capable of causing death of one- to 10-day-old seedlings. These fungi were not, however, capable of reproducing the dark crown necrosis or of inciting a root rot of one-month-old alfalfa plants. Some *Pythium* spp. were able to cause death of seedlings but were not damaging to plants one month old. The sterile mycelial types of fungi and other *Fusaria* associated with the disease were not pathogenic to seedlings or to one- to two-month-old plants.

The fungus—*Rhizoctonia solani*—is composed of many different strains, some pathogenic and others not. In these experiments, some strains were pathogenic to seedlings and produced stem and crown canker symptoms that resembled those of dark crown necrosis. The pathogenic isolates also caused crown bud necrosis and death of the buds at the point of origin.

The leaves of stems affected by Rhizoctonia stem canker sometimes turned yellow to reddish purple. A longisection of such a cankered stem showed a black discoloration in the xylem and pith above and below the canker. This darkened tissue sometimes extends into the crown and resembles the symptoms of dark crown necrosis in the field. Although this fungus was not shown to be the entire cause, the evidence indicates that it is one of the more important contributing factors.

Rhizoctonia root canker occurs mainly in the Imperial and Palo Verde valleys and is an important factor in the destruction of stands in the irrigated desert valleys. In these tests, the strains of the fungus that caused crown stem canker did not cause root canker. The root canker strain, however, readily parasitized stems and is probably a more virulent parasite.

The cause of dark crown necrosis is not fully understood. It is certain that *Rhizoctonia solani* is involved but is not the entire cause.

Symptoms of others diseases, such as Stagonospora crown and root rot and Phytophthora root rot, may be masked by secondary microorganisms and be erroneously lumped in the dark crown necrosis class. Injury to plants by the implements used in renovation practices or by other implements has been considered as a possible cause of crown rot and is being tested in the field.

Donald C. Erwin is Assistant Plant Pathologist, University of California, Riverside.