Yields of Wheat or Barley

on root-rot infested soils may be increased by rotation with oats or rye

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The root-rotting fungus—*Ophiobolus graminis*—thrives on wheat and barley but not on oats or rye.

In field tests, wheat was the least productive of the grains, when planted on soil which previously produced either wheat or barley. Best yields accrued from following wheat or barley with oats or rye, or from following oats or rye with wheat or barley.

In 1946, randomly distributed plots of wheat, barley, oats, and rye were drilled in a given area at Davis. Root rots seriously damaged the wheat and barley plots but did not damage the oats or rye. Then in 1947, these same crops were drilled on the same land area at right angles to the previous crop.

The yield data from the checkerboard tests are shown in the accompanying table.

In addition to the root-rot effect, all yields in 1947 also reflect the proportion of 1946 rainfall and available nutrients not taken from the soil by the crop grown in that season. Since the 1947 crop yields reported involved both grain and straw, rye—a tall stemmy plant—shows some advantage over oats. In most areas of the state this advantage for rye over oats will probably not prove real.

	1947 crop yield in grams per sq. foot			
1946 crop	Wheat	Barley	Oats	Rye
Wheat	8*	29	51	55
Barley	8	30	54	58
Oats	42	52	42	51
Rye	45	57	48	54
Fallow	70	..	..	..

* Difference required for significance: 5 grams at 5% level.

Root rots are not a particularly new disease since they have been known to occur on some grain lands of California for about 25 years. They operate variously, sometimes even killing seedlings. Frequently several similar acting fungi may be present in the same field.

Severe damage is most readily detectable after heading. The more severely diseased plants will stool poorly, be shortened, and the roots, crown, and lower stem will be browned or blackened by the parasite. The plants dry up prematurely, particularly in a dry year like this.

In only two areas in the state have farmers been forced—through severe decline of wheat and barley yields such as here reported—into rotating between oats and wheat or barley. Those areas are the Montpelier section of Stanislaus County, and the Montezuma hills and some contiguous Solano County delta land where there is a complex of root-rot fungi.

The actual yield advantage from rotating with oats approximates the results here reported from Davis.

There is reason to believe that other sections or individual farms long cropped only to wheat or barley might profit from growing oats. It must be emphasized, however, that when root rots are not doing serious damage, barley or wheat generally yield better than any presently available oat variety. Diagnosis therefore is important. Severe browning of the lower stem and extremely poor growth of wheat or barley in comparison with wild oats are symptoms farmers can use. Beyond this point, the farm advisor can be helpful.

Agronomists at Davis are working to produce a higher yielding oat variety. Pathologists meanwhile are giving increased attention to identification and to possible control measures for the various root-rot fungi. For the grain farmer with a root-rot problem the only presently known relief involves alternate cropping with oats or rye.

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PRUNES

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moisture decrease in rate of growth. The data show that the trees in the irrigated plots produced a considerable proportion of large-sized fruit, while the unirrigated ones produced only a small percentage.

The results from the unirrigated trees show that in no case was there more than 9.5% of large sizes even from the trees bearing very light crops.

The lack of readily available moisture before the fruit reached full size overshadowed any benefit as far as size is concerned that might have been expected from a light set. On the other hand, the percentage of large sizes from the irrigated trees bears almost a linear relationship to the number of fruits per tree. It is interesting to note that plot No. 5, which had 3,737 fruits per tree, produced 69.3% of the large sizes.

These results are in keeping with the results from the other irrigated plots even though plot No. 5 received about four times as much water as the others.

Apparently, the percentage of large-sized prunes was not increased by the use of excessively large amounts of water.

YIELDS AND SIZES OF FRENCH PRUNES IN 1947

Plot	Av. no. of prunes per sq. cm. trunk cross-section	Av. fresh wt. yields in lbs. per sq. cm. trunk cross-section	Av. no. prunes per tree	Av. fresh wt. yields in lbs. per tree	Percentage of large sizes
		Irrigated			
5	6.4	0.323	3,737	188.1	69.3
17	10.2	0.424	6,185	257.1	29.5
29	9.3	0.386	5,490	228.9	47.6
56	1.8	0.090	967	49.8	88.4
		Unirrigated			
14	9.8	0.259	4,508	136.3	5.8
41	3.5	0.081	1,730	39.9	2.9
50	5.9	0.141	3,051	72.4	2.9
8	11.6	0.309	5,745	152.0	9.5
23	14.8	0.420	7,535	214.0	7.2
32	11.2	0.289	6,001	154.3	4.6
44	13.0	0.301	6,601	152.3	3.1

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A study has been made by the Division of Dairy Industry concerning the type of fruit and the best methods for incorporating fruit in ice cream.