Improved Oat Variety

resistant to drought, shattering and stem rust, the new Indio shows promise

Coit A. Suneson

Indio—the first oat variety developed for California by using the backcrossing techniques of plant breeding—has definite advantages over other varieties, and further improvements are under way.

In breeding Indio, the basic characters of the Palestine variety—an Indian type oat—were utilized. Introduced from Australia in 1932 the unique earliness, short straw, shattering resistance, and productivity under drought stress of the Palestine were quickly recognized. Equally obvious were its extreme susceptibility to stem rust and poor test weight. These defects precluded the wide use of Palestine after it was released in 1940.

The oat varieties Kanota, California Red, and Palestine are all susceptible to stem rust but despite stem rust injury and low test weight, Palestine produced 28% higher average grain yields than Kanota, and 34% more than California Red during the 1934–1956 period at Davis. Statewide tests from Imperial to Tehama counties showed similar average differences in yield. How much the yields were reduced by stem rust is not known, but stem rust was present in test fields at Davis in 16 of the past 35 years. In eight recent comparisons between Indio—resistant—and Palestine—susceptible—involving various rust levels and interacting weather stresses, the maximum reduction from stem rust was 73% and the mean yield reduction was 38%. Indio and Palestine have produced almost identical yields when there was no stem rust injury. Hence, Indio with its stem rust resistance, and one pound advantage in test weight over Palestine, is a notable advance toward production security and improved quality. Resistance to crown rust was added also.

Indio is a sixth hybrid, cycle selection isolated, in the fifth generation following the last cross of the Victoria-Richland and Fulghum hybrid with variety Palestine. Indio was developed principally in summer grown rust testing nurseries during the years 1940–1955.

In contrast to the principal oat varieties of the world—adapted to cool, humid, and comparatively wind-free climates—the Indio oat has unusual resistance to drought, shattering and stem rust.

Indio has its limitations but improvements are under way. It will winterkill at temperatures of 20°F–22°F and consequently should not be grown at high elevations. Severe injury from Yellow-Dwarf virus may occur in late-sown fields. Lodging is likely, particularly in thick sown stands.

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Indio is a product of cooperative investigations by the University of California and the U.S.D.A.

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ROOTSTOCK

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In determining the proper material to use and the best manner of application, the soil type, its looseness and ability to absorb water are important considerations. A readily available supply of water is necessary for the best use of Vapam, but with soils that absorb water easily, only a small amount of trenching is needed. The application of Shell DD requires the use of a mechanical injector and because most models have only one-half gallon reservoirs, frequent refillings are necessary.

The number of rootstocks to be killed per acre and their size should be considered but the removal of nonbearing vines should return the expense of treatment—within a few seasons—through increased yields.

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The Effect of Three Chemicals Used to Eradicate Mature St. George Rootstock

Chemical	Rate/vine	How applied	Average kill on 5 vines		Remarks
			Sonoma County	Santa Clara County	
Shell DD	50 cc	Soil injection	45%	40%	Small vines were 100% killed
Shell DD	100 cc	Soil injection	95%	98%	Small portions of large vines escaped
Shell DD	200 cc	Soil injection	100%	99%	1 weak shoot survived on one large vine
Shell DD	400 cc	Soil injection	100%	100%	Thorough and rapid kill
CS_2	100 cc	Soil injection	5%	10%	Some yellowing, slight killing
CS_2	200 cc	Soil injection	5%	30%	Some dead shoots, much yellowing
CS_2	400 cc	Soil injection	95%	20%	One vine killed, several severely injured, much yellowing on large vines
Vapam-4S	75 cc/3 gal. water	Trenched around vine	60%	50%	Some yellowing, small vines dead
Vapam-4S	150 cc/3 gal. water	Trenched around vine	100%	99%	One weak, yellowed shoot alive on one vine
Vapam-4S	300 cc/3 gal. water	Trenched around vine	100%	100%	Rapid and complete kill of large vines
Vapam-4S	75 cc	Soil injection	...*	100%	Medium and small vines completely killed
Vapam-4S	150 cc	Soil injection	...	80%	Large vines partially killed, much yellowing; complete kill on small vines
Vapam-4S	300 cc	Soil injection	...	100%	Large vines killed rapidly and completely
Vapam-4S	diluted 1:6 in water—200 cc applied	Soil injection	40%	...	All vines yellow, none completely killed
Vapam-4S	diluted 1:6 400 cc	Soil injection	65%	...	Partial kill, much yellowing
Vapam-4S	diluted 1:6 800 cc	Soil injection	80%	...	One vine only slightly injured, three completely killed
Vapam-4S	diluted 1:12 800 cc	Soil injection	85%	...	4 vines entirely dead, one vine very yellow

* This treatment was not used in both locations.