

Wilt Resistant Blackeye Beans

results of tests in 1955 on the new Grant variety in southern California indicate fusarium wilt resistance

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A new variety of blackeye beans—*Vigna sinensis*—known as Grant has shown resistance to Fusarium wilt in field tests in the Chino Valley of San Bernardino County in 1955 and in greenhouse tests. A high level of resistance in the Grant to the race—or races—was noted on two properties in that area where the wilt fungus was present.

Fusarium wilt—caused by *Fusarium oxysporum* f. *tracheifilum*—of blackeye is a devastating disease. The disease can easily be identified by the appearance of yellowing of lower leaves and brown to black internal discoloration of the woody tissue of the root and stem. It occurs in all of the blackeye bean-producing areas in California.

In the Chino area the variety Chino 3 is planted most extensively. This variety is a good bean producer but very susceptible to wilt. California Blackeye 5 and 7 varieties are also susceptible.

The Grant Blackeye was selected several years ago by a grower from Chino. A single healthy plant was selected from a field of Chino 3 blackeyes affected by Fusarium wilt and increased each year in the fields. Many other growers have planted and increased the new variety and a large supply of seed is available commercially.

The Grant variety differs from Chino 3 by its having a two-week later maturity date and a more prostrate growth habit. Nothing is known of the true origin of the resistant plant.

Tests were set up in 1955 to test the resistance of the new Grant variety against pure cultures of the Fusarium wilt organism. In this experiment, roots of seedlings were dipped in a spore suspension of the fungus. This method is more severe than in nature but is a successful method of determining resistance. The results of this test are shown in the accompanying table. The test showed that the Grant variety, although not immune, had a high degree of resistance to wilt. The test was repeated with similar results.

In a large scale field test on a farm near Chino four randomized replications of Chino 3, Blackeye 5, and Grant were compared on a piece of land naturally infested with *Fusarium*. Early in August differences among the varieties due to Fusarium wilt were striking. The Chino

3 and Blackeye 5 varieties were severely affected by wilt and were dying while the Grant variety was green and very few plants were affected. The contrast is shown in the photograph on this page.

On a farm near Ontario the Grant and Chino 3 were compared and again the Grant variety was highly resistant to the wilt fungus while Chino 3 was completely susceptible.

Results from only one year of research are inconclusive, but observation coupled with research indicates that Grant shows promise as a resistant variety. Because reaction to all races of the fungus present in California has not been tested, it is possible that Grant may be susceptible in some areas and not in others.

The Grant variety is extremely susceptible to the root knot nematode—*Meloidogyne javanica*—which is present in many areas in the Chino Valley. This susceptibility is decidedly a serious fault of the variety. Therefore, Grant should not be planted on land known to have a history of root knot nematode damage.

Limited observations indicate that the

Grant variety yields and quality are about the same as Chino 3—in the absence of wilt or the root knot nematode disease.

This brief report is not to recommend the Grant variety, but to acquaint growers—and others interested—with the work done, and with the advantages and faults observed in this variety. It has already been planted extensively in the Chino area.

Time will tell whether Grant is a variety adapted to all parts of the state. Growers trying it for the first time should not plant all their acreage to this variety until more is known about it.

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The Grant variety was named for grower George Grant of Chino who selected the single healthy plant from a field of Chino 3.

George Bowman, Farm Advisor, University of California, San Bernardino County, co-operated in the large scale field test near Chino.

Comparison of the Effect of Three *Fusarium oxysporum* f. *tracheiphilum* Isolates from Blackeye Bean on Chino 3 and Grant Varieties

Fusarium isolate	Ave. disease index* per plant		Ave. height per plant		Per cent of check	
	Chino 3—Grant		Chino 3—Grant inches		Chino 3—Grant	
151	3.5	0.6	2.5	4.2	45	71
152	3.2	1.2	4.0	5.0	72	85
153	3.1	1.1	3.0	4.6	54	78
Check	0.0	0.0	5.6	5.9	100	100

* Index Code: 0 = No disease
 1 = Slight streaking in xylem of stem
 2 = Medium 25–50% streaking in xylem of stem
 3 = Severe 50–100% streaking in xylem of stem
 4 = Plant dead

Resistance of Grant variety of blackeye bean on Fusarium wilt infested land: A, Chino 3; B, Grant; and C, California Blackeye 5. Other replicates of Grant can be seen on the extreme right.

