

WARRIOR— A Bruchid-Resistant Vetch

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THE VETCH BRUCHID or vetch weevil, which does extensive damage to susceptible varieties, has met its match in a new resistant variety.

The variety, Warrior vetch (*Vicia sativa*), recently released by the Auburn University Agricultural Experiment Station (2), is resistant to the vetch bruchid (*Bruchus bruchialis* Fahr.).

The bruchid does extensive damage to seed of susceptible varieties. Seed that appear to be of high quality at harvest may actually be of poor quality because of the bruchid effect on seed germination. Visible damage to the seed may not appear for several weeks after harvest when the bruchids emerge from the seed, leaving only empty seed coats, Figure 1.

Vetch has been a popular crop in Alabama for many years. Its use has been mainly for green manure, but it has been grown to a limited extent for grazing.

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² Resigned.

Recent research at this Station indicates that vetch is a promising grazing crop (3). With livestock production on the increase in the State, vetch will probably be used more extensively for grazing in the future.

In addition to green manure and grazing, vetch has also been used as a seed

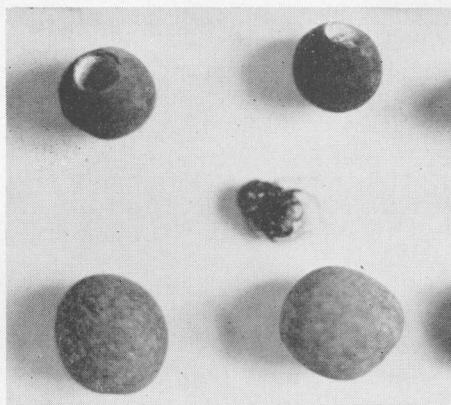


FIG. 1. Typical bruchid damage to hairy vetch seed (top row) as compared with sound seed of the resistant Warrior variety (bottom row). Bruchid or vetch weevil is shown in center.

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crop in Alabama, Figure 2. During the period 1941 through 1945, between 2 and 2½ million pounds of vetch seed were produced in the State each year.³ A large percentage of these seed was hairy vetch. Since 1945, however, the amount of vetch seed produced declined steadily to less than one-half million pounds in 1958.

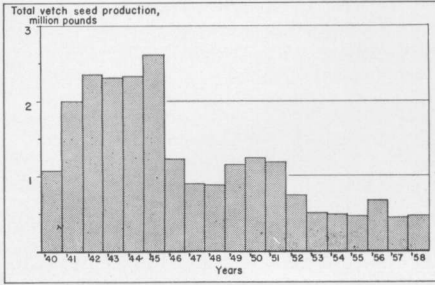


FIG. 2. The chart shows pounds of vetch seed produced in Alabama, 1940-1958, based on county agents' reports.

The vetch bruchid was one cause of this decline. The adult of this insect is a small, almost black, chunky beetle about 1/8-inch long, resembling the pea weevil, but less than one-half as large. The bruchids overwinter in the adult stage, and come out of hibernation during warm days of spring. By the time vetch is in bloom, all of the adults are out of hibernation and widely distributed in vetch fields. The female bruchids lay eggs on the outside of pods. The newly hatched larvae penetrate the pod and feed inside the seed. The insects remain inside until seed are harvested, or until the pods burst open. After this they emerge as adults. There is only one generation of bruchids per year. The bruchid does not infest seed in storage (1).

Entomologists at this Station have developed effective control methods for this weevil in susceptible varieties (1). However, effective control requires repeated applications of the proper chemical during the flowering period. This increases the cost of seed production. Re-

sistant varieties offer a more practical solution.

Results from early studies of bruchid-resistance of vetch showed a wide range among species (4). Seed of hairy vetch (*Vicia villosa*) were found to be heavily infested, whereas, no bruchid adults were observed to mature in seed of common vetch (*Vicia sativa*). These findings were substantiated by vetch breeding research at this Station in 1951 and in subsequent years when component lines of Warrior were being evaluated.

Warrior is easy to establish in grass sods and furnishes early grazing. It is sufficiently cold hardy to be used for winter grazing, green manure, or a seed crop in the southern two-thirds of Alabama. In this part of the State, Warrior has produced as much green manure as hairy or Willamette (2).

PROCEDURE

In the fall of 1956, tests were begun to determine relative seed yields and bruchid resistance of Warrior and hairy vetch. With the exception of one year at the Alexandria Experiment Field, cotton stalks were used as support for the vetch, Figure 3. At Alexandria in 1956-57 rye was used. All experiments were replicated 4 to 5 times in a random pattern. Seed were threshed with a stationary thresher. Bruchid infestation was determined 6 to 8 weeks following seed



FIG. 3. Warrior vetch grown for seed in cotton stalks on the Main Station is shown above. Photo shows growth in May 1957.

³ Based on county agents' reports.

harvest. This was done by counting 1,000 seed of each variety from each replication, inspecting each seed, and counting the number of seed from which a weevil had emerged, Figure 1.

RESULTS

Results of these experiments show that Warrior is resistant to the vetch bruchid, Table 1. In experiments over a three-year period at Alexandria Experiment Field, an average of 50.1 per cent of hairy vetch seed was infested. There was no infestation of Warrior seed. At the Plant Breeding Unit, Tallassee, and the Prattville Experiment Field, no Warrior seed were infested and 45.0 and 48.6 per cent of the hairy seed were infested, respectively. No Warrior seed were found infested in other experiments conducted at this Station. When Warrior is grown in a field where there are plants of hairy vetch, the vetch weevil may emerge from seed of hairy in the mixture.

Warrior has produced higher yields of seed than hairy at four locations, Table 2. At Auburn, Tallassee, and Prattville (central Alabama) Warrior produced 1,009, 1,139, and 1,432 pounds of seed per acre, respectively, as compared with 195, 403, and 504 pounds of hairy vetch seed. At Alexandria (northern Alabama) Warrior averaged in a 3-year period 558 pounds of seed per acre and hairy averaged 387. During this period seed yields of Warrior ranged from 144 to 1,003 pounds per acre. These results show Warrior is not as well adapted for seed production in northern Alabama as it is in central Alabama.

TABLE 1. PERCENTAGE OF BRUCHID-INFESTED SEED FROM TWO VETCH VARIETIES

Location	Percentage of infested seed	
	Warrior	Hairy
	<i>Pct.</i>	<i>Pct.</i>
Alexandria ¹	0.0	50.1
Tallassee ²	0.0	45.0
Prattville ²	0.0	48.6

¹ Northern Alabama, 3-year average.

² Central Alabama, 1-year.

TABLE 2. YIELD OF SEED PER ACRE PRODUCED BY TWO VETCH VARIETIES

Location	Yield of seed per acre	
	Warrior	Hairy
	<i>Lb.</i>	<i>Lb.</i>
Alexandria ¹	558	387
Auburn ²	1,009	195
Tallassee ³	1,139	403
Prattville ⁴	1,432	504

¹ Northern Alabama, 3-year average.

² Central Alabama, 2-year average.

³ Central Alabama, 1-year.

⁴ Central Alabama, 2-year average.

SUMMARY

Warrior, a new variety of vetch developed at the Auburn University Agricultural Experiment Station, was compared with hairy vetch to determine relative seed yields and resistance to the vetch bruchid. Results show that Warrior is resistant to the bruchid and that hairy is susceptible.

Warrior produced good seed yields each year in central Alabama, whereas, yields varied from poor to good during 3 years of testing at one location in northern Alabama. In all tests Warrior produced higher yields of seed than hairy vetch.

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