Clover Root Curculio Resistance

Sitona hispidulus (F.)

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THIS TEST IS IN THE DEVELOPMENTAL STAGE AND SHOULD BE USED CAUTIOUSLY

PLANT CULTURE

Greenhouse (adult defoliation)

Container	. Flats (6 x 47 x 32 cm or similar size)
Media	. Commercial soil mix
Temp/Light	. 22 to 25°C; 16 hour daylength
No. of Plants	. 20 to 30 plants per rep in rows 2.5 cm apart; 16
	rows per flat
No. of Reps	. 5 replications minimum
Other	. Plant border rows of susceptible standard around
	perimeter of flat; remove border plants and
	discard before rating entries

Field (larval root feeding)

Land Prep	. Prepare a firm seedbed in well-drained area
No. of Plants	. 50 seeds per 1.5 m row; rows 0.6 m apart
No. of Reps	. 5 minimum
Other	. Alleys and borders should be planted to white
	clover; have alfalfa in vigorous vegetative
	growth in autumn at time of adult curculio flight

INSECT CULTURE

Greenhouse

Source	Collect adult weevils by sweeping infested fields
	of white clover, red clover, or alfalfa
Storage	Refrigerate adults with plant foliage or on
	artificial diet (5) for up to 3 months
Temperature	7°C

Field

Source	Adults will infest plot area during autumn flight;
	sweep net collections may be used to
	supplement natural infestation

INFESTATION PROCEDURE

Greenhouse

Age of plants	. 12 to 14 days after emergence; at first trifoliolate
Type	. Adults, unsexed
Rate	. One per plant
Method	Plexiglass cage with plastic screen mesh top is
	pushed into soil in a nat; adults are introduced
	through an opening in plastic screen
Length	. 6 to 7 days, susceptible standards show 50%+
-	defoliation

Field

Age of plants	.3 to 6 months; spring planting is the normal
	procedure, but late summer (early August) may also
	be suitable
Type	.Natural adult populations from the autumn flight;
	sweep net collections (1000 per rep) can be used as a
	supplement
Length	.18 to 20 months (summer)

RATING

Greenhouse

1 Resistant	No feeding on any leaves
2 Resistant	Up to 25% of first trifoliolate is consumed
3 Susceptible	25 to 50% of trifoliolate consumed
4 Susceptible	50 to 75% of trifoliolale consumed
5 Susceptible	100% of trifoliolate consumed

Field (% of plants with damage)

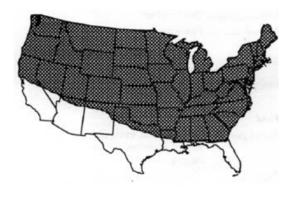
1 Resistant	Roots clean and white, no lesions, 0% damaged
	Lesions small, roots still white, 0 to 5% damaged
5 Susceptible	Lesions brown, irregularly shaped grooves; severe
1	feeding on 50% or more plants; may be associated
	with root rot; undamaged tap root white to tan, 6 to
	100% damaged

CHECK CULTIVARS

	Approximate Expected Resistance(%)	
Susceptible		
Saranac AR	6-100	Root damage
WL316	6-100	Root damage

No resistant check available.

DISTRIBUTION AND SEVERITY OF CLOVER ROOT CURCULIO



Clover Root Curculio, Sitona hispidulus (F.)

Click on the map above for a larger version. See also the KEY.

SCIENTIST WITH EXPERTISE:

CULTURE OPTIONS AND RANGE OF CONDITIONS

Insects can be reared on slant-boards (1) or in pots (5) but the yield is low

PLANT GROWTH OPTIONS AND RANGE OF CONDITIONS

Best results in the greenhouse have been with first trifolio late leaves. Although the adults feed on cotyledons and unifoliolate leaves, feeding is much greater on trifoliolates. Best results have been achieved in the field 2 years after planting. Although roots sustain damage the first summer following infestation, there are many escapes and the level of damage is low, ranging from 5 to 25%. Plants have been evaluated for resistance to larvae using the slant-board culture method for white clover (4). This method has been tried for alfalfa but only tolerance to feeding has been observed. The growth pattern of the roots in this system produces many secondary roots and smaller tap roots and may be unsuitable to locate resistance in alfalfa.(2)

HELPFUL INFORMATION

Greenhouse

Adults should be used as soon as possible after field collection. Although adults can be stored and reused, they usually feed less the second time and mortality from diseases increases. Wet soil conditions in the flats enhances mortality of adults and reduces feeding. Adults for green house evaluations are collected by

sweeping fields of clover and alfalfa. White clover usually has the most adults. Beetles are aspirated from samples spread out on cafeteria trays. Collections are best made on sunny afternoons in fall and spring. Collections before frost in autumn usually yield few adults because they haven't emerged from aestivation. Several other *Sitona sp.* can be separated from S. *hispidulus* by examining under the stereomicroscope in the lab. S. *hispidulus is* the only *Sitona sp.* with hairs on the elytra and thorax. Others such as *S.cylindricollis* and S. *flavescens* are smooth.

Field

Plants are usually dug in July, 2 years after planting. This allows for larval attack during two springs. Roots are cut about 15 to 25 cm below the soil surface, washed and evaluated in the field. Potentially resistant plants are planted in the greenhouse for further testing.

REFERENCES

- 1. Baker, P.B., and R.A. Byers. 1977. A laboratory technique for rearing the clover root curculio. Melsheimer Entomol. Ser. 23:8-10.
- 2. Byers, R.A., and W.A. Kendall. 1982. Effects of plant genotypes and root nodulation on growth and survival of *Sitona* spp. Iarvae. Env. Entomol. 11:440-443.
- 3. Pesho, G.R. 1975. Clover root curculio: Estimates of larval injury to alfalfa tap roots. J. Econ. Entomol. 68:61 -65.
- 4. Newton, R.C. 1958. Rearing *Sitona hispidula* larvae for various research uses. J. Econ. Entomol. 51:917-918.
- 5. Shorey, H.H., and R.L. Hale. 1965. Mass rearing of the larvae of nine nocturnal species on a simple artificial medium. J. Econ. Entomol. 58:522-524.