

# CLOVER ROOT CURCULIO RESISTANCE

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*Sitona hispidulus* (F.); Robert A. Byers

**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 FOR TOLERANCE

### 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 trifoliolate consumed

**5 Susceptible** ..... 100% of trifoliolate consumed

### Field (% of plants with damage)

**1 Resistant** ..... Roots clean and white, no lesions, 0% damaged

**3 Resistant** ..... Lesions small, roots still white, 0 to 5% damaged

**5 Susceptible** ..... Lesions brown, irregularly shaped grooves; severe 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 (%)	
<b>Susceptible</b>		
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.)

### SCIENTIST WITH EXPERTISE

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### CULTURE OPTIONS AND RANGE CONDITIONS

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

### PLANT GROWTH OPTIONS AND RANGE OF CONDITIONS

Best results in the greenhouse have been with first trifoliate leaves. Although the adults feed on cotyledons and unifoliate 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 slantboard culture method for white clover<sup>(4)</sup>. 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.<sup>(2)</sup>

### 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 greenhouse 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

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4. Newton, R.C. 1958. Rearing *Sitona hispidula* larvae for various research uses. *J. Econ. Entomol.* 51:917-918.
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