

# Rust

*Uromyces striatus* Schroet.  
Donald L. Stuteville

## PLANT CULTURE

### Growth Chamber/Greenhouse

Media..... Sand or soil mixture  
Temp/Light..... 22 to 25°C; 1 hour photoperiod  
No. of Plants..... 30 to 50 per replication  
No. of Reps..... 3 minimum

### INOCULUM CULTURE

Source..... To reduce the possibility of culturing a single race of the fungus, urediniospores should be collected from several locations  
Collection ..... For initial field collections or small tests, urediniospores for inoculum may be shaken or brushed from rusted plants; however, for larger tasks cyclone spore collectors (3,6) are very helpful  
Storage..... Urediniospores can be stored a few weeks under refrigeration (about 4°C) with little loss in germination; urediniospores newly produced in lab (98% germination) and stored at -20°C in vials covered with Parafilm germinated 88, 80, 69, 38, and 13% after 4, 8, 12, 16, and 23 months, respectively; the latent period (days from inoculation to first pustule) was 9 days with inoculum stored up to 9 months and increased to 14 days following inoculation with urediniospores stored 21 to 23 months (1); urediniospores may be stored several years in liquid nitrogen without loss of viability (4)  
Increase..... To insure high quality inoculum, use urediniospores freshly harvested from plants grown in the greenhouse or lab

### INOCULATION PROCEDURES

Plant Age..... Plants 3 to 5 week old, or older with vigorous regrowth  
Method ..... To prepare 100 mL of inoculum add 100 mg urediniospores to 100 mL of distilled water to which two drops of Tween 20 have been added; this provides about 3.5 x 10<sup>5</sup> spores mL<sup>-1</sup>; it is necessary to stir the mixture for at least 20 minutes to disperse the spores; the suspension is sprayed onto plants until run-off

## INCUBATION

Infection ..... Inoculated plants are maintained at 100% relative humidity (kept wet) at 25°C in darkness for 24 hours to permit infection; enclosure in a humidity chamber, or in plastic boxes (6), or plastic bags, will provide adequate humidity  
Temperature ..... Temperature affects the genetic behavior of resistance; best expression of susceptibility is found when plants are kept at 25°C after infection  
Photoperiod ..... 16 hours  
Time of Rating ..... 15 to 20 days after inoculation

## RATING

Score the most severely infected leaflet on each plant.

- 1 Resistant.....No symptoms
- 2 Resistant.....Flecks, plus possibly a few small closed pustules
- 3 Susceptible .....A few flecks and closed pustules plus several small open pustules
- 4 Susceptible .....Many small open pustules
- 5 Susceptible .....Many medium to large open pustules

Plants in classes 1 and 2 are considered resistant because they prevent reproduction of the rust fungus.

The percentage of resistant plants and ASI can be used for comparisons with check cultivars.

## CHECK CULTIVARS

	Approximate Expected Range of Resistance (%)	Acceptable Reaction (%)
<b>Resistant</b>		
MSA-CW3An3	50	40-60
<b>Susceptible</b>		
Saranac	1	0-10
Moapa 69	10	5-15

Values for resistant standards include the total of 1's and 2's.

## DISTRIBUTION AND SEVERITY OF RUST



Alfalfa rust, *Uromyces striatus* Schroet.

(Click on the map above for a larger version. See also the [KEY](#))

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### CORRELATION TO FIELD REACTION

High if the same races are involved; however, some plants resistant in the field are susceptible in the lab (6).

### RACES

There are different races of *Uromyces striatus*.

### HELPFUL INFORMATION

Some cyclone spore collectors and inoculation equipment developed for cereal rust research (2) work equally well with alfalfa rust. The cyclone collector designed by Cherry and Peet (3), which attaches to a vacuum cleaner, is especially useful for the rapid collection of spores. This and various other spore collectors (2) are available from G-R Electric Manufacturing Co., 1317 Collins Lane, Manhattan, KS 66502.

### ALTERNATIVE METHODS

McMurtrey and Elgin (5) outline procedures for inoculating plants with dry urediniospores diluted with talcum powder. Latent-period data provide a less subjective measurement of resistance than infection-type data. They are highly correlated ( $r = 0.97$ ,  $P < 0.0001$ ) (6). However, the collection of latent-period data requires daily examination of plants during pustule development.

### REFERENCES

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