

EFFECT OF UREDIOSPORE CONCENTRATION ON DETERMINATION
OF RACES OF UROMYCES PHASEOLI VAR. PHASEOLI

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The effect of urediospore concentration in an inoculum suspension on the density and size of pustules is important in identification of races of U. phaseoli var. phaseoli. The average number of pustules increased with increases in the urediospore concentration from 10 M to 270 M spores per ml of suspension. As the number of pustules increased, the size of the pustules decreased on all differential varieties. On var. U.S. No. 3, No. 650 and No. 780 the size reduction was enough to lower the reaction grade, thus changing the apparent identity of the race. In race identification experiments, several spore concentrations should be tested to determine which give the most reliable results.

In determining rust resistance in breeding lines, the above situation should be considered. Results of tests in Oregon using race 33 have shown that a concentration of not more than 2×10^3 should be used. However, this concentration may not apply with other races.

A SIMPLIFIED METHOD FOR IDENTIFICATION OF RACES
OF UROMYCES PHASEOLI VAR. PHASEOLI

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A simplified system for identification of races of Uromyces phaseoli var. phaseoli is proposed which utilizes 5 reaction grades in place of the 11 grades of the Harter-Zaunmeyer system. Inoculations were made by spraying a suspension of urediospores on primary leaves of 7 differential varieties of bean, after which the plants were held in a moist chamber for 16-18 hours before being moved to the greenhouse. After 2 weeks, the resulting pustules were measured with an ocular micrometer and the probable size of the pustules of each grade of the Harter-Zaunmeyer system was determined. The data indicated that each grade is based on approximately 50- units which are very difficult to distinguish by observation alone. Several of the grades of the Harter-Zaunmeyer system have been combined and the range of pustule sizes for each grade increased to 200. A printed bean rust grading card with spots approximately 300 and 500 was developed with which one can compare pustules on leaves and determine the respective grade of host-parasite reaction. When the grades of the 34 described races are converted to the new values, the integrity of each race is maintained.

Differences in pustule size on primary and trifoliolate leaves were observed on some varieties. No differences, however, were noted on var. No. 643 or 765. On var. No. 650, 780 and U.S. No. 3, the rust pustules were the same size on primary and young trifoliolate leaves, but on those trifoliolate leaves which were fully expanded at the time of inoculation, the resulting pustules were smaller. On var. Golden Gate Wax and No. 814, pustules produced on the primary and older trifoliolate leaves were the same size; those on the expanding trifoliolates were slightly larger. Therefore, in determining races of the fungus, only primary leaves should be used, but in testing resistance of bean hybrids, both primary and trifoliolate leaves should be used.