

Pathogenic Variability in *Uromyces viciae-fabae*

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ABSTRACT

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Seven isolates of *Uromyces viciae-fabae* causing rust of pea were differentiated into six pathotypes, based on differential reactions of 15 pea, sweet pea, and lentil hosts.

The pathogen *Uromyces viciae-fabae* Schroet. (= *Uromyces fabae* (Pers.) d By) attacks legumes such as *Pisum*, *Lathyrus*, *Lens*, and *Vicia* (1,3) and is economically important on pea and lentil in Punjab, India. Various physiologic forms of *U. viciae-fabae* have been recorded (2,4,5), and variability in virulence has been established (7-9). No work on pathogenic variability has been done in India, although unconfirmed reports of variability are available (6,10). Differential reactions of pea against rust at different locations were also presumed to be due to pathotypes (11). To establish the existence of pathotypes in *U. viciae-fabae*, seven isolates were studied.

MATERIALS AND METHODS

Isolates of *U. viciae-fabae* on pea collected from several regions in Punjab

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and maintained on detached leaves of the susceptible pea cultivar Bonneville were floated on sterile tap water in petri plates at 18 ± 2 C under 80 W fluorescent tube lamps. Plants of pea, sweet pea, and lentil were grown under polyethylene covers to prevent contamination, and detached

leaves (three replicates each) were used for testing the pathogenicity of isolates.

Inoculations were made by spraying a suspension of about 20 aeciospores (per $\times 100$ field) in mineral oil (Soltrol-170). The inoculated leaves were incubated at light and temperature conditions indicated above.

RESULTS AND DISCUSSION

The reactions of seven rust isolates on 15 hosts are shown in Table 1.

Lentil but not pea or sweet pea hosts showed differential reactions to isolates of *U. viciae-fabae*. Isolates 3 and 4 did not

Table 1. Differential reactions^a on peas, sweet peas, and lentils inoculated with isolates of *Uromyces viciae-fabae* from Punjab, India

Isolate	Pathotype	Lentil											Pea		Sweet pea		
		T	LL	LL	LG	PL	Pusa	Pusa	P	EC	JL	JL	Pant B	Bonneville	Sundry		
1	1	3	3	0	3	4	3	4	4	0	0	i	i	4	0-i	4	i
2	2	i	i	i	0	0	i	4	4	0	i	i	i	4	0-i	4	i
3	3	i	i	i	3	3	4	4	4	i	3	i	4	0-i	4	i	i
4	3	i	i	i	3	3	4	4	4	i	3	i	4	0-i	4	i	i
5	4	i	3	i	0	4	4	4	1	3	3	i	4	0-i	4	i	i
6	5	i	4	i	0	4	0	1	0	i	4	i	4	0-i	4	i	i
7	6	i	3	4	4	4	4	4	4	4	0	4	4	0-i	4	i	i

^a Disease reaction: i = no symptoms; 0 = chlorosis and/or necrosis, no pustules; 1 = chlorosis and/or necrosis, a few small pustules; 2 = chlorosis, little or no necrosis, few small pustules; 3 = chlorosis, many large and abundantly sporulating pustules; 4 = no chlorosis, many large and abundantly sporulating pustules.

differ and are considered to be one pathotype. Each of the other isolates was representative of an individual pathotype.

Isolate 7 infected 11 hosts, but isolate 2 infected only three. Isolates 1, 3, 4, 5, and 6 infected nine, eight, eight, nine, and six hosts, respectively. Only 11 lentil hosts showed differential reactions against these six pathotypes; other hosts reacted uniformly (Table 1). Six pathotypes from seven isolates indicate high variability.

This study also showed that lentils are suitable for differentiation of pathotypes in Punjab, but further effort is required to discover and standardize differentials in pea and sweet pea.

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LITERATURE CITED

1. ARTHUR, J. C. 1962. Manual of Plant Rusts in the United States and Canada. Hafner Publishing Co., New York. 438 pp.
2. BROWN, A. M. 1940. The sexual behaviour of several plant rusts. *Canad. J. Res. Sect. C.* 18:18-25.
3. BUTLER, E. J. 1918. *Fungi and Diseases in Plants.* Thacker, Spink & Co., Calcutta. 547 pp.
4. GAUMANN, E. 1934. A contribution to the knowledge of *Uromyces fabae* (Pers.) de Bary. *Ann. Mycol.* 32:464-470.
5. HIRATSUKA, N. 1933. Studies on *Uromyces fabae* and its related species. *Jpn. J. Bot.* 6:329-379.
6. KAPOORIA, R. G., and S. SINHA. 1971.

Further studies on the host spectrum of *Uromyces fabae* in India. *Indian Phytopathol.* 24:170-171.

7. KISPATIC, J. 1944. Introductory experiments on race formation in *Uromyces fabae* (Pers.) de Bary. *Phytopathol. Z.* 14:475-483.
8. KISPATIC, J. 1949. Contribution to the knowledge of the biology and control of broad beans rust, *Uromyces fabae* de Bary. *Ann. Trav. Agric. Sci.* 1(1):61.
9. McKENZIE, D. L., and R. A. A. MORRALL. 1975. Faba-bean diseases in Saskatchewan in 1973. *Canad. Plant Dis. Surv.* 55(1):1-7.
10. PRASADA, R., and S. P. SINGH. 1975. Sexual behaviour of *Uromyces fabae*. *Indian J. Mycol. Plant Pathol.* 5:139-144.
11. SINGH, S. J. 1979. Studies on *Uromyces fabae* (Pers.) de Bary causing rust of peas. M.Sc. thesis. Punjab Agricultural University, Ludhiana, India.