

SOURCES OF RESISTANCE TO PATHOTYPES OF PEA SEED-BORNE MOSAIC VIRUS IN THE U.S. PLANT INTRODUCTIONS OF PISUM SATIVUM

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In his 'Geographic origin of pea seedborne mosaic virus: An hypothesis', R. O. Hampton listed 39 accessions of Pisum sativum reportedly resistant to pea seed-borne mosaic virus (PSbMV) (4). Twenty eight of these lines (72%) were from India, of which 25 derived from Uttar Pradesh. These and a few other lines were tested with five isolates of PSbMV {(Standard (ST), Pea 1 (P1), Lentil L (L), Lentil 1 (L1), and Pea 4 (P4)} (1,3) and the results (Table 1) can be summarized as follows:

- All lines reacted identically to ST and P1 isolates, which incited similar foliar symptoms in susceptible genotypes. Hence, these two isolates should be considered members of the same pathotype, PSbMV-ST. Resistance is conferred by the gene sbm-1, which is located on chromosome 6 (2,3).
- Also, all lines responded identically to L and L1 isolates. However, in susceptible genotypes, L caused mild mottle and slight downward leaf cupping, whereas L1 incited prominent chlorotic mottle, upward leaf curling, flower abortion, and severe stunting. Consequently, these isolates should be regarded as two different strains of the same pathotype, PSbMV-L. The genes sbm-2 and sbm-3, independently of each other, confer resistance to both strains of this pathotype, and may be duplicate entities (5). The gene sbm-2 is located on chromosome 2 (5).
- Resistance to P4 was found associated with that to PSbMV-ST and PSbMV-L or with one of these two pathotypes, but never alone. In susceptible plants, PSbMV-P4 caused moderate to prominent mottle with a partial recovery on subsequent growth. Resistance is conferred by sbm-4 (6).

Thus, of 45 accessions: a) 29 were resistant to PSbMV-ST, PSbMV-L, and PSbMV-P4; b) two were resistant to ST and L, but susceptible to P4; c) three were resistant to L and P4, but susceptible to ST; d) one was resistant to ST, but susceptible to L and P4; e) five were resistant to L, but susceptible to ST and P4; and f) five were susceptible to ST, L, and P4.

These tests are in agreement with the results of previous work, which concluded that: a) there are at least three pathotypes of the virus, PSbMV-ST, PSbMV-L, and PSbMV-P4 (1,3,5,6); b) resistance is pathotype specific (1); and c) resistance is governed by distinct genetic factors that are independently inherited (2,5,6). However, the frequent association of resistance to the three pathotypes in most of the lines from India and Ethiopia suggest that the genes sbm-1, sbm-3 and sbm-4 may be linked.

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Table 1. Sources of resistance to pathotypes of PSbMV in Plant Introduction of *Pisum sativum*

Accession No.	Origin	PSbMV-ST	PSbMV-L	PSbMV-P4
		ST • P-1	L • L-1	P-4
PI 175877	Turkey	S	R*	S
PI 193584	Ethiopia	R*	R*	R
PI 193586	Ethiopia	R	R	R
PI 193587	Ethiopia	R*	R*	R*
PI 193835	Ethiopia	R*	R	R
PI 193836	Ethiopia	R*	S	S
PI 244054	Yemen	S	S	S
PI 269774	England	R	R	S
PI 269818	USSR	R	R	S
PI 314795	Australia	S	S	S
PI 343305	Idaho	S	S	S
PI 343328	Idaho	S	S	S
PI 343333	Idaho	S	S	S
PI 347328	India U.P	R	R	R
PI 347329	India U.P	S	R	R
PI 347420	India U.P	S	R	S
PI 347421	India U.P	R	R	R
PI 347422	India U.P	S	R	R
PI 347442	India	R	R	R
PI 347452	India U.P	R	R	R
PI 347455	India U.P	R*	R	R
PI 347456	India U.P	R*	R	R
PI 347464	India U.P	S	R	R
PI 347465	India U.P	R	R	R
PI 347466	India U.P	R	R	R
PI 347467	India U.P	R*	R	R
PI 347468	India	R*	R	R
PI 347469	India U.P	R*	R	R
PI 347470	India U.P	R	R	R*
PI 347482	India U.P	S	R*	S
PI 347484	India U.P	S	R	S
PI 347485	India U.P	R	R	R
PI 347487	India U.P	R	R	R
PI 347492	India U.P	R*	R	R
PI 347494	India U.P	R	R	R
PI 347523	India.U.P	R*	R	R
PI 347528	India U.P	S	R	S
PI 356984	India U.P	R	R	R
PI 357003	India U.P	R	R	R
PI 357005	India U.P	R	R	R
PI 357015	India U.P	R	R	R
PI 357023	India U.P	R	R	R
PI 357026	India	R	R	R
PI 357038	India UP	R	R	R
PI 378158	Malaysia	R	R	R

R = Resistant; S = Susceptible; * = Reported or found to contain some susceptible plants

NOTE: Due to the heterogeneity of many P.I. seed lots, lines reported to be fully resistant may also include some susceptible plants.
