

DIFFERENTIAL SET

Lettuce mosaic virus (LMV) – **Lettuce**

Lettuce mosaic virus (LMV), scientific name *Potyvirus lactucae*, is a major disease of commercial lettuce crops. LMV is transmitted by seeds and aphids. Resistance in cultivated lettuce is governed by two recessive genes *mo1*¹ and *mo1*² which are considered to be either closely linked or allelic and by one dominant gene *Mo2* (overcome by most LMV isolates). In addition, the resistance gene *Mo3* has been described in wild lettuce (*L. virosa*). The most common mechanism of resistance is mediated by a reduced multiplication of virus compared to susceptible varieties.

Pink et al. (1992) classified the LMV isolates into four pathotypic groups (I, II, III, IV) based on the presence or absence of clear symptom expression of LMV isolates in lettuce varieties with identified resistance genes. Later research demonstrated that some initially identified resistance reactions actually concerned mild susceptibility reactions (Bos et al. 1994, Revers et al. 1997) and some authors proposed additional pathotypic groups to reflect these variations. For the sake of clear communication, the ISF differential table only differentiates between highly resistant (HR) and susceptible (S) reactions. The HR reactions in the table were reported as symptomless plants with no detectable virus or strongly reduced virus titer (Revers et al. 1997).

The pathotypic groups I-IV originally described by Pink et al. (1992) are still the basis of the differential table, but for the sake of uniformity in resistance communication ISF is referring to these pathotypic groups as races LMV: 1-4, respectively. Thus, race LMV: 1 refers to pathotypic group I which is represented by LMV reference isolates LMV-Yar (Yemen), Gr4 (Greece) and Gr5 (Greece). Race LMV: 2 refers to pathotypic group II which is represented by LMV isolates Ls1 (Netherlands), Ls265 (Netherlands), LMV-0 (France), LMV-F (CA, USA) and LMV-W (UK). Race LMV: 3 refers to pathotypic group III which is represented by LMV isolates LMV-1 (France) and LMV-9 (France). Race LMV: 4 refers to pathotypic group IV which is represented by isolates LMV-E (France), LMV-13 (France) and Ls252 (France).

TABLE

	ISF Code and races	LMV: 1	LMV: 2*	LMV: 3*	LMV: 4
Differentials	Gene (s)				
Sucrine*, Saladin	-	S	S	S	S
Ithaca*	<i>Mo2</i>	HR	S	S	S
Capitan*, Malika, Mantilia	<i>mo1</i> ¹	S	HR	S	S
Salinas 88*	<i>mo1</i> ²	S	HR	HR	S

Vanguard 75*	<i>mo1² Mo2</i>	HR	HR	HR	S
PIVT1398 (<i>L. virosa</i>)	<i>Mo3</i>	HR	HR	HR	HR

Explanatory Note:

When evaluating plant varieties for resistance to specific pathogens or pests, the following classifications are used:

- **S** – Susceptible
- **HR** – Highly Resistant

Susceptible combinations can contain varying levels of LMV virus titer and may display severe symptoms, mild symptoms, or delayed symptoms.

* groups/races and differentials that are actively used across the seed sector.

For further information on these definitions, see the following ISF document:

[Definitions of the Terminology: Plants, Pests & V/O Seed Industry \(2022\)](#)

References:

Bos, L., Huijberts, N. and Cuperus, C. 1994. Further observations on variation of lettuce mosaic virus in relation to lettuce (*Lactuca sativa*), and discussion on resistance terminology. *European Journal of Plant Pathology* 100:293- 314.

Maisonneuve, B. 2003. *Lactuca virosa*, a source of disease resistance genes for lettuce breeding: results and difficulties for gene introgression. *Eucarpia Leafy Vegetables*, p. 61-67, eds. Th.J.L. van Hintum, A. Lebeda, D. Pink, J.W. Schut.

Maisonneuve, B. 2025. Personal communication: dr. Maisonneuve described a non-published finding by dr. Hervé Lot in 1995 at the Plant Pathology department of INRAE-Avignon (France) in which PIVT1398 did neither show symptoms nor virus titer after inoculation with an isolate from Greece and an isolate from Yemen. Although the origin suggests that those isolates belonged to pathotypic group 1, It was unclear whether the isolates were the same ones as the ones used by Pink et al. 1992

Pink, D. A. C., Lot, H. and Johnson, R. 1992. Novel pathotypes of lettuce mosaic virus – breakdown of a durable resistance? *Euphytica* 63:169-174.

Pink, D.A.C., Kostova,D. and Walkey, D. G. A. 1992. Differentiation of pathotypes of lettuce mosaic virus. *Plant Pathology* 41:5-12.

Revers, F., Lot, H., Souche, S., Le Gall, O., Candresse, T. and Dunez, J. 1997. Biological and molecular variability of Lettuce mosaic virus isolates. Phytopathology Vol. 87, 4:397-403.

Protocol

CPVO. See <http://www.cpvo.europa.eu/> for a protocol on disease resistance testing

For more information contact the ISF Secretariat at isf@worldseed.org

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