

Solanum muricatum*- a new host of *Phytophthora infestans

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ABSTRACT

Solanum muricatum, known as pepino, is a species of evergreen shrub grown for its sweet edible fruits. It has recently been introduced in Himachal Pradesh from northeastern region. In field surveillance conducted during the months of January and February 2012 and 2013, blight symptoms were noticed on leaves and fruits of pepino. The severity of the disease on leaves ranged between 10 and 15 per cent. The disease first appeared as water-soaked, light brown lesions on the leaf blade. The lesions turned dark brown, dry and brittle at the advanced stage of infection. On fruits, late blight infections produced dark brown firm lesions which got enlarged and destroyed the entire fruit. The associated pathogen was isolated from the diseased leaf tissue on to potato dextrose agar medium. After 5-7 days of incubation at $25 \pm 1^\circ\text{C}$, white fluffy colonies of mycelium appeared and the morphological characters of the fungus were studied. On the basis of morphological characters of the pathogen, it was identified as *Phytophthora infestans* (Mont) de Bary. Pathogenicity was also proved by artificially inoculating healthy detached pepino leaves. This is the first report of *S. muricatum* as a new host of *P. infestans* in Himachal Pradesh.

Keywords: *Solanum muricatum*; pepino; late blight; *Phytophthora infestans*

INTRODUCTION

Solanum muricatum Aiton is a species of evergreen shrub grown for its sweet edible fruits. It is known as pepino. The pepino is vegetatively propagated by stem cuttings and esteemed for its edible fruit, a berry that is juicy, scented, mild sweet and that can be highly variable in shape and colour. It has recently been introduced in Himachal Pradesh from northeastern region.

MATERIAL and METHODS

Field surveillance was conducted during the months of January and February 2018 and 2019 in the field. The diseased leaf tissue was brought to the laboratory, excised, sterilized with 0.1 per cent mercuric chloride, transferred on to oat meal agar (OMA) medium and incubated for 5-7 days at $25 \pm 1^\circ\text{C}$. The morphological characters of the fungus were studied and compared with those of Stamps et al (1990) and Waterhouse (1963). Pathogenicity was also proved

by artificially inoculating healthy detached pepino leaves. The inoculated leaves were maintained in Petri dishes in the laboratory for 7 days at a temperature of $25 \pm 1^\circ\text{C}$. When symptoms appeared on the leaves after 5 to 7 days the fungus was re-isolated from these infected leaves.

RESULTS and DISCUSSION

In field surveillance blight symptoms were noticed on leaves of pepino (Plate 1). The severity of the disease on leaves ranged between 10 and 15 per cent followed by drying up of plants. The disease first appeared as water soaked and light brown lesions on the leaf blade (Plate 2). The lesions turned dark brown, dry and brittle at the advanced stage of infection. On the underside of the diseased leaves, gray coloured growth of the fungus was observed which was more pronounced under high humidity conditions. On fruits, late blight infections produced dark brown and firm lesions (Plate 3) which got enlarged and destroyed the entire fruit.

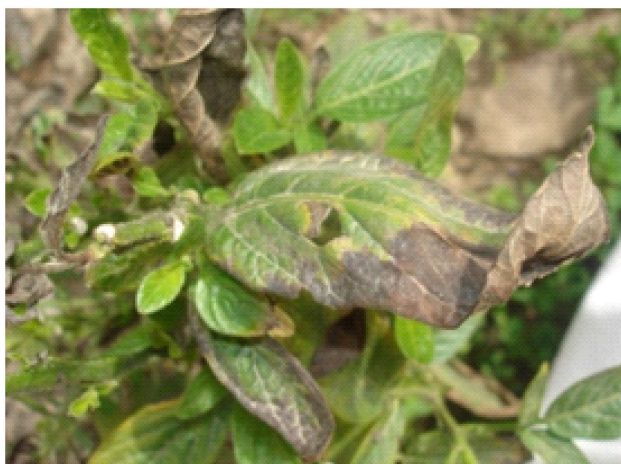


Plate 1. Blight symptoms



Plate 2. Initial symptoms of blight



Plate 3. Blight symptoms on fruit



Plate 4. Culture of *P. infestans* on OMA

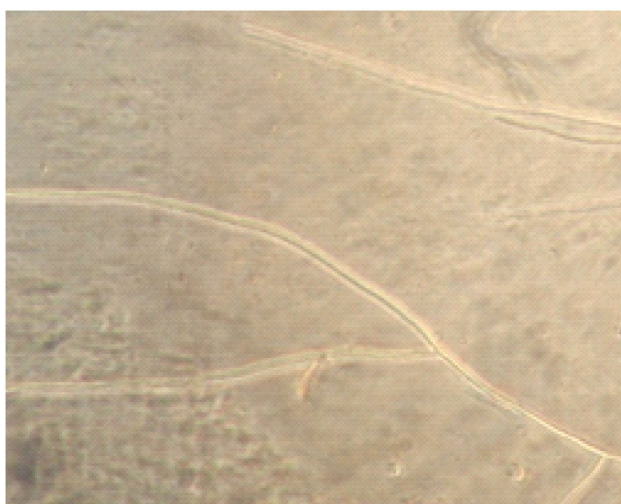


Plate 5. Mycelium of *P. infestans* (x 20X)

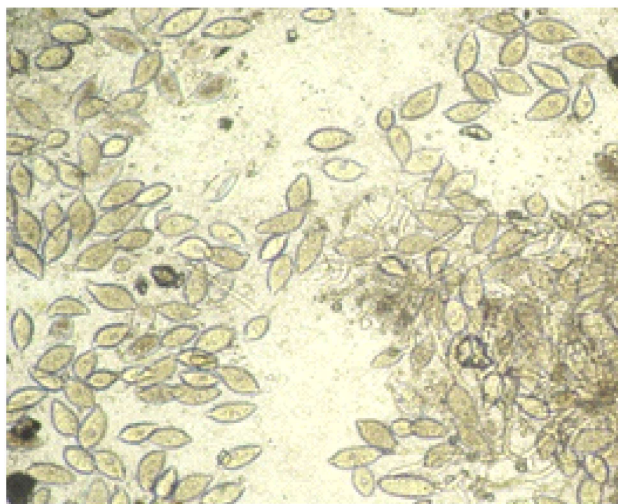


Plate 6. Sporangia of *P. infestans* (x 20X)

In the laboratory study, on the oat meal agar (OMA) medium, after 5-7 days of incubation at $25 \pm 1^\circ\text{C}$, white fluffy colonies of mycelium appeared (Plate 4). The mycelium was coenocytic, hyaline and branched (Plate 5). Sporangioophores were sympodially branched, indeterminate and septate having side branches with swollen bases. Sporangia were formed on the tip of sporangioophores and were hyaline, thin walled, lemon shaped and papillate measuring $21\text{-}28 \times 12\text{-}24 \mu\text{m}$ (Plate 6).

On the basis of morphological characters of the pathogen and their analogy with Stamps et al (1990) and Waterhouse (1963), it was identified as *Phytophthora infestans* (Mont) de Bary.

In pathogenicity study it was observed that the symptoms appeared on the healthy leaves after 5 to 7 days. The fungus was re-isolated from these infected leaves of pepino. This is the first report of *S muricatum* as a new host of *P infestans* in Himachal Pradesh.

P infestans is an oomycete that mainly attacks potatoes and tomatoes although it can sometimes be found on other crops, weeds and ornamentals in family Solanaceae. Erwin and Ribeiro (1996) and Adler et al (2004) listed 89 host species of *P infestans* but more than 25 per cent of these were based only on artificial inoculations. Of the non-tuber-bearing *Solanum* hosts, tomato (*Solanum lycopersicum*) is the most important economically (Adler et al 2002).

Other domesticated *Solanum* species are also hosts of *P infestans*, including pepino (*S muricatum*), tree tomato (*S betaceum*) and eggplant (*S melongena*) (Naranjo 2001). *S muricatum* has also been reported as the host of *P infestans* from Peru (Stamps et al 1990), Colombia (Flier et al 2003) and Ecuador (Abad et al 1995). *P infestans* is also a pathogen of the wild

Solanum species closely related to tomato (Abad et al 1995). Natural infections of *P infestans* were also found on *S nigrum*, *S dulcamara* and *S sisymbriifolium* (Flier et al 2003).

REFERENCES

- Abad ZG, Abad JA, Fernandez-Northcote EN and Ochoa C 1995. Host range of *Phytophthora infestans* in central Peru and list in the world since 1840's. Resistance on wild tomatoes. Abstr, Phytopathology **85**: 1173.
- Adler NE, Erselius LJ, Chacon MG, Flier WG, Ordenez ME, Kroon LPNM and Forbes GA 2004. Genetic diversity of *Phytophthora infestans sensu lato* in Ecuador provides new insight into the origin of this important plant pathogen. Phytopathology **94**: 154-162.
- Adler NE, Chacon G, Flier WG and Forbes GA 2002. The Andean fruit crop, pear melon (*Solanum muricatum*) is a common host for A1 and A2 strains of *Phytophthora infestans* in Ecuador. Plant Pathology **51**(6): 802.
- Erwin DC and Ribeiro OK 1996. *Phytophthora* diseases worldwide. St Paul, American Phytopathological Society Press, Minnesota, 562p.
- Flier WG, van den Bosch GBM and Turkensteen LJ 2003. Epidemiological importance of *Solanum sisymbriifolium*, *S nigrum* and *S dulcamara* as alternative hosts for *Phytophthora infestans*. Plant Pathology **52**: 595-603.
- Naranjo JG 2001. Melon pear (*Solanum muricatum* Ait), a new host of *Phytophthora infestans*. Fitopatología **36**(2): 10-14.
- Stamps DJ, Waterhouse GM, Newhook FJ and Hall GS 1990. Revised tabular key to the species of *Phytophthora*. Commonwealth Agricultural Bureaux International, Wallingford, Oxon, UK, 28p.
- Waterhouse GM 1963. Key to the species of *Phytophthora* de Bary. Mycological Papers Number 92. Commonwealth Mycological Institute, Kew, UK.