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DISEASE NOTES OR NEW RECORDS

First report of tuber-rot of Safed musli (*Chlorophytum borivilianum*) caused by *Fusarium solani* in India

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Abstract. *Fusarium solani* was identified for the first time as causing a tuber-rot of Safed musli, a medicinal herb, in India.

The herb species *Chlorophytum borivilianum* belongs to the Liliaceae family. It was originally grown in thick forests of Madhya Pradesh, Rajasthan, Tamilnadu, Kerala, Karnataka and Gujarat states in India (Shariff and Chennaveeraiah 1972). About 300 species are distributed throughout the tropical and subtropical parts of the world, of which 18 species are reported to be medicinally important. Tropical and subtropical zones of Africa are the probable centre of origin of the genus (Geetha and Maiti 2002). In India, it is becoming the most remunerative medicinal crop, where, as in other parts of the world, it is being used as an ornamental plant. The roots (tubers) are rich in alkaloids, vitamins, minerals, proteins, carbohydrates, saponins, polysaccharides and steroids of various therapeutic values as total rejuvenator, antioxidant and immuno-modulator (Anon. 2001). It is being used as an anti-arthritic and anti-cancer drug. Because of its aphrodisiac properties, it is mainly identified as 'herbal viagra'. The dried tubers are being exported to the Middle East and Europe where it is used to manage diabetes and hypertension (Bordia *et al*. 1995).

Until now, producers experiencing disease had no systematic work performed to determine the causal agent involved. Tuber rot with dark brown, disintegrating tissue separated from the wrinkled brown skin is one of the most common and serious disease problems faced by the cultivators and no information on its aetiology is available in the field (Figs 1, 2 and 3). Hence, the present investigation was undertaken to identify the causal organism, which would help in developing a disease management strategy.

In the present investigation, 25 rotted tubers were separately obtained from three different fields. The tubers were gently washed 3–4 times with distilled water and then blotted dry. Dried tubers were cut into pieces of 1 cm length and plated equidistantly on potato-dextrose agar (PDA) in

Fig. 1. Healthy plant of *Chlorophytum borivilianum* at flowering stage.

Petri dishes and on the three layers of wet filter paper discs (9-cm-diameter) in perspex plates. In a separate experiment, pieces of infected tubers were surface sterilised with 2% NaOCl solution for 3–5 min followed by 3–4 washes with sterilised distilled water, then blotted gently and plated on PDA and on wet filter paper discs in perspex plates. In each experiment, plates were incubated according to

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Fig. 2. Healthy tubers of *Chlorophytum borivilianum* at harvest stage.

Fig. 3. Rotted tubers of *Chlorophytum borivilianum* due to *Fusarium solani* infection.

the procedures of ISTA (Anon. 1996). Pieces of tuber showing no disease symptoms were plated on PDA and incubated under similar conditions to serve as a control. On the 8th day of incubation, cream to pinkish fungal colonies were observed. Only *Fusarium solani* could be isolated from the infected pieces. Micro conidia were hyaline, reniform and cylindrical to oval and rarely 1 septate measuring 8–16 × 2–4 µm, produced from long lateral phialides, laterally or on branched conidiophores. Macro conidia were hyaline, septate from the side inequilaterally fusoid with the widest point above the centre, measuring 45–80 × 2.5–3 µm, chlamydospores globose, smooth to rough walled, 9–12 × 8–10 µm, borne singly or in pairs on short lateral branches.

In all the pieces of rotted tubers, sporulating colonies of *F. solani* were recorded. In contrast, the pieces of apparently healthy tubers did not show any such colonies. Eight-day-old sporulating colonies of the same isolate of *F. solani* were further used to inoculate healthy tubers. Inoculation was performed using a spore suspension of 12×10^5 spores/mL. Undamaged, intact healthy tubers were immersed in the spore suspension for a period of 16 h, then aerated for 10 min at $28 \pm 2^\circ$C under aseptic conditions. The tubers were sown in pots containing sterilised, moist, sandy soil and maintained under greenhouse conditions. Tubers were evaluated for the occurrence of tuber-rot after 1 month. The tubers were found to be decayed and the same fungus was reisolated from all the infected tubers. In contrast, the control plants did not show any symptoms. This is the first report of tuber-rot of Safed musli caused by *F. solani* in India.

References

Anon. (1996) International Rules for Seed Testing Association. *Seed Science and Technology* **29**, 335.

Anon. (2001) Medicinal plants; more on safed musli. *Agriculture and Industry survey* (May), 38–39.

Bordia PC, Joshi XX, Simlot MM (1995) Safed moosli. In 'Advances in horticulture. Vol. I. Medicinal and aromatic plants'. (Eds KL Chadha, R Gupta) pp. 429–451. (Malhotra Publishing House: New Delhi)

Geetha K, Maiti S (2002) Biodiversity in *Chlorophytum borivilianum,* Santapau & Fernandes. *International Plant Genetic Resources Institute Newsletter* **129**, 52–53.

Shariff A, Chennaveeraiah MS (1972) Karyomorphology of four diploid species of *Chlorophytum. The Nucleus* **15**, 39–45.

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