

Two new Species of *Phytophthora* from India.

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As one of the research programs of the Botany Department, the authors have undertaken the study of the surface flora of the leguminous fruits of different species growing in this region. Purpose of the scheme is not only to know the surface mycoflora of the legumes but also to find out the nature of the micro-organism in relation to disease development. During the isolation of the mycoflora on potato dextrose agar several species of *Phytophthora* have been found associated with the surface of the pods along with other fungi. In this paper two such species of *Phytophthora* have been described. As they are different in their morphology from that of the species already known they are reported as new to science.

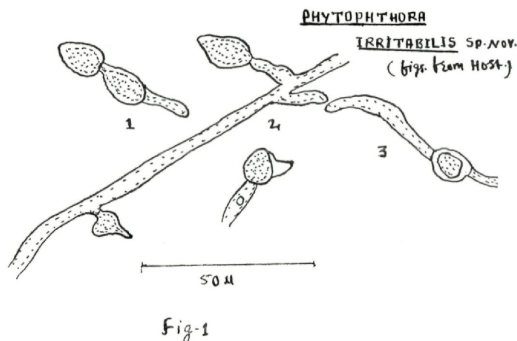


Fig. 1. *Phytophthora irritabilis* from host (*Phaseolus vulgaris*). — i) Sporangia in chains. — ii) Sporangiophore bearing sporangia. — iii) Chlamydospore.

Phytophthora irritabilis sp. nov.

This fungus has been isolated from brown, circular, sunken water-soaked lesions on the pods of *Phaseolus vulgaris* L. obtained from the local market.

Mycelium on PDA profuse, cottony mass, fast growing, entirely

vegetative even after one month's growth, aerial hyphae abundant, response of the mycelium growing on any artificial medium to the touch of the needle is reminiscent of the process of contraction found in Touch-me-not plant (*Mimosa pudica* L.). This feature unique of this species as it has not been observed and reported in the case of others isolated from leguminous pods; Hyphae $2.5-5\ \mu$ in diameter,

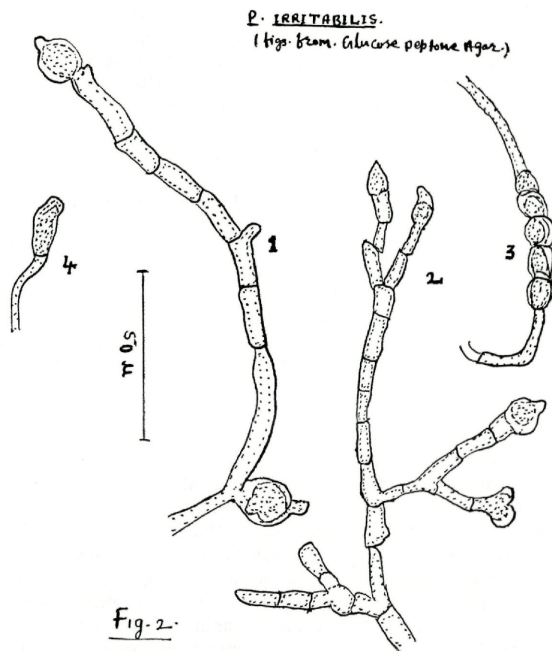


Fig. 2. *P. irritabilis* (from GPA) fig. 1—4. — i) Hyphae bearing sporangia.
— ii) Branching of the sporangiophore. — iii) Chlamydospores in chains.
— iv) Hyphal thickening.

non-septate when young, closely septate when old and in both cases hyaline, showing radiate growth, sometimes swellings at the apex of the hyphae, $10-12.5\ \mu$ in diameter.

Culture on glucose pectone agar (GPA) reproductive only after one month's growth, rate of growth on PDA and GPA similar, sporangiophore in the wild culture (on pod) lateral, unbranched, some

times very short, irregular in size, usually $2.5\ \mu$ in diameter and thus narrow than the vegetative hyphae; On glucose pectone agar culture sporangiophore long, undifferentiated, septate, unbranched, or sympodially branched, sometimes very short or absent, sporangium in wild culture obpyriform, terminal on sporangiophore or lateral on vegetative hypha, sometimes papillate, sometimes in chain, $7.5\text{--}15\ \mu \times 7.5\text{--}15\ \mu$. On glucose pectone agar, sporangium papillate ovate, $17.5\text{--}22.5\ \mu \times 12.5\text{--}15\ \mu$ chlamydospores in both cultures present $12.5\text{--}17.5\ \mu$ in diameter, wall $2.5\ \mu$ in thickness, intercalary, single or in chains; sex organs not found. Fig. 1, (from host) & Fig. 2 (GPA).

Mycelium in PDA effusum, gossypinum, celeriter crescens; hyphae aerae numerosissimae, $2.5\text{--}5\ \mu$ crassae, primum continuae, in maturitate dense septatae, hyalinae, radiate crescentes, interdum in apice usque ad $10\text{--}12.5\ \mu$ inflatae; incrementum in PDA et GPA omnino simile; sporophoris in cultura ad matricis leguminibus lateralibus, simplicibus, interdum brevissimis, quoad magnitudinem irregularibus, plerumque $2.5\ \mu$ diam. et tunc hyphis mycelicis angustioribus, in GPA longioribus, vix differentibus, septatis, simplicibus vel sympodialiter ramosis, interdum brevissimis vel etiam absentibus; sporangia in cultura ad matricis leguminibus obpyriformia, terminalia in sporophoris vel lateralibus in hyphis mycelicis, interdum papillata, subinde etiam catenata, $7.5\text{--}15\ \mu$ diam., in GPA ovoidea, papillata, $17.5\text{--}22.5\ \mu \times 12.5\text{--}15\ \mu$; chlamydosporae $12.5\text{--}17.5\ \mu$ diam., pariete $2.5\ \mu$ crasso praeditae, intercalares vel catenatae.

Phytophthora rubra sp. nov.

When healthy green pods were plated on moist filter paper in a petridish, white cottony mycelium grew from them after 4—5 days.

Mycelium on PDA and GPA fairly uniform, slow growing, hyphae $2.5\text{--}7.5\ \mu$ in diam., red blood pigment on the reverse of the colony on different media, colony hyaline, growth in concentric rings; sporangiophores irregularly branched, $2.5\text{--}5\ \mu$ in diam. sporangia ovoid with conspicuous papilla, abundant, appear within a week, $10\text{--}25\ \mu \times 10\text{--}20\ \mu$ chlamydospores single or in chains continuously or discontinuously thickwalled, $12.5\text{--}20\ \mu$ in diameter, sex organs not formed. Dimensions of hyphae, sporangiophore, sporangia etc. similar both on PDA and on host.

Mycelium in PDA et in GPA satis aequale evolutum, tarde crescens; hyphae $2.5\text{--}7.5\ \mu$ crassae, subtile sanguinolentae; caespites hyalini, circulariter et concentricae accrescentes; sporophora irregulariter ramosa, $2.5\text{--}5\ \mu$ crassa; sporangia ovoidea, distincte papillata, numerosa ca. 7 post dies orta, $10.25\ \mu \times 10\text{--}20\ \mu$; chlamydosporae singulae vel catenatae, pariete aequaliter vel inaequaliter crasso praeditae, $12.50\text{--}20\ \mu$ diam.; dimensiones hypharum sporangiophorum, sporangiorum etc. in PDA et in matricis leguminibus similes.

Discussion

Waterhouse 1963 has described altogether 41 species of *Phytophthora*. Out of them only 9 species attack 22 species of leguminous plants. In India 10 species are reported attacking 87 hosts and among them two species parasitize 3 leguminous plants. Earlier one species of

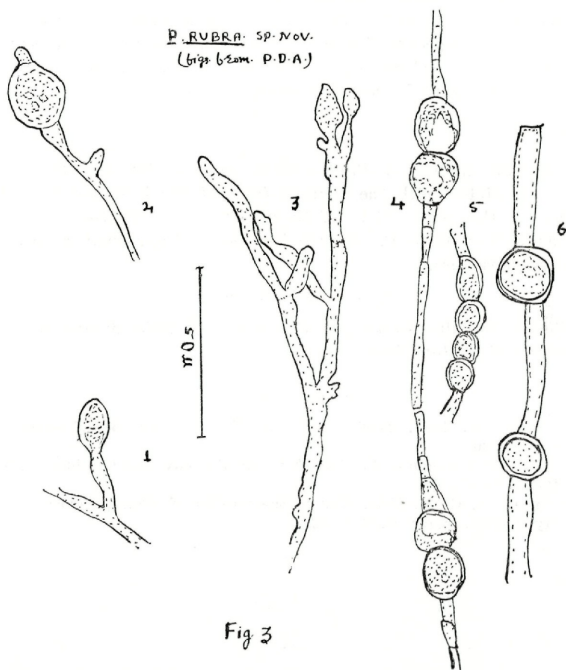


Fig. 3. *P. rubra* sp. nov. (from PDA 1—6). — i) Formation of sporangial initial. — ii) A sporangium. — iii) Branching of the sporangiophore. — iv, v, vi) Chlamydospores single or in chains.

Phytophthora which has been isolated from been pod (*Phaseolus vulgaris* L.) is identified by Rao 1963 as *Phytophthora parasitica* Dastur. When two isolates of *Phytophthora* described here were compared with *Phytophthora parasitica* Dastur, it was found that they differed from it in the diameter of the hyphae, size of the sporangium and also in size of the chlamydospores. Thus *P. parasitica* can not include these two isolates.

Thaxter 1889 isolated *Phytophthora* sp. from Lima beans (*Phaseolus lunatus*) and designated it as *P. phaseoli*. The characters given by Waterhouse 1963 for the species were compared with two isolated from French bean and it was further found that even *P. phaseoli* can not include the two isolates because of the smaller sporangia and presence of chlamydospores.

In view of these differences these two isolates have been described here as two new species of *Phytophthora*. The preliminary inoculation experiments conducted on young green beans have further shown that the former is a parasite and the latter is saprophyte.

Summary

Two new species of *Phytophthora* one causing the disease and another associated with the surface flora of the bean pod have been described in this paper. Both of them differ from *Phytophthora parasitica* as well as from *P. phaseoli* because of their smaller sporangia and other characters.

Acknowledgment

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References.

- Blackwell, E. 1949, Terminology in *Phytophthora*. Mycological paper C. M. I. 30.
Rao, V. 1963. The genus *Phytophthora* in Bombay Maharashtra J. Univ. Poona 24: 55, 60.
Waterhouse, G. M. 1963. Key to the species of *Phytophthora* de Bary. Mycological paper C. M. I. 92.

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