

## Taxonomy of *Synchytrium* Species Parasitic on Cucurbitaceae <sup>1)</sup>

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**Summary.** Two *Synchytrium* species (*S. lagenariae* MHATRE and MUNDKUR and *S. trichosanthidis* MHATRE and MUNDKUR) parasitic on Cucurbitaceae were taxonomically evaluated in reference to the accepted criteria. It is proposed to accommodate *Synchytrium trichosanthidis* as a variety of *Synchytrium lagenariae* on priority basis.

The genus *Synchytrium* was established by DE BARY and WORONIN in 1863 for 2 species, viz. *Synchytrium taraxaci* DE BARY et WORONIN and *S. succisae* DE BARY et WORONIN with *S. taraxaci* as the type species. Since inception of the genus, a large number of species has been added and now the genus includes more than 200 species. Several eminent workers on the genus through their classical work, have enabled the genus concept to a stable and sound understanding (KARLING 1964). This has and will necessitate a restudy and revision of several poorly known species for taxonomic validity in the light of modern taxonomic understanding of the genus which is laid down by KARLING (1964). Among the poorly known species of *Synchytrium*, two — *S. lagenariae* MHATRE and MUNDKUR and *S. trichosanthidis* MHATRE and MUNDKUR (MHATRE and MUNDKUR 1945) — parasitic on cucurbitaceous hosts and widely distributed in the gangetic plains of Uttar Pradesh and Bihar, were taken up for a restudy in reference to the criteria accepted for taxonomic evaluation and determination of the species. Critical observations have revealed that they are similar in their ontogeny and developmental morphology, but not coincident with or overlapping each other and show several distinct differences between them as summarized below:

1. *Synchytrium lagenariae* and *S. trichosanthidis* have shown a close similarity in the time of their appearance in the field and symptomatology of the hosts. The only difference that could be noticed was the form and appearance of sporangial galls in *S. trichosanthidis*, where the galls on the host(s) were not much raised or protruding as on the host infected by *S. lagenariae*.

2. In both species, the initial cell functioned as a prosorus in germination, giving rise to an attached superficial sorus of sporangia.

<sup>1)</sup> Based on the research thesis submitted by the first author for Ph. D. degree of the Banaras Hindu University, Varanasi — 5. India.

The ontogenic development and germination of prosorus were nearly similar in the two species with minor variations. Segmentation of the incipient sorus in *S. trichosanthidis* occurred only by a single mode similar to one of the two observed in *S. lagenariae*.

3. The two species showed a broadly similar type of resting spore development without much deviation in the sequence and method of formation. Few minor deviations were noticed in the host reaction during the resting spore development in *S. trichosanthidis*. There was a greater amount of reddish brown residue deposited around the maturing resting spores in this species and more numbers of cells in the gall tissue were filled with the residue. In *S. lagenariae*, the amount of residue deposited was far less and mostly confined to the cell in which the resting spore developed, and occasionally exceeded to adjacent cells in the gall. However, this character appeared more as a result of host reaction than a significant criterion for segregating the species.

4. In both species, the resting spores behaved as a prosorus in germination, giving rise to an attached superficial sorus of sporangia. The time required and the sequence involved in the resting spore germination were also broadly similar in the two species. The morphology and biometry of the zoospores were also closely similar.

5. The sporangial galls in the two species were composite and multicellular and histoid in origin (KARLING 1955). Not only the epidermal cells were infected, but the adjacent healthy cells also were stimulated to divide. *S. lagenariae* developed galls on both upper and lower leaf surfaces, while *S. trichosanthidis* formed them only on the upper leaf surface. Both species induced development of more than one type of gall. *S. lagenariae* was less diverse in this respect in presenting only 2 types of sporangial galls, while *S. trichosanthidis* was more so as it induced as many as 5 types. Also, a differential time lag was observed for the secretion of enzymes; in *S. lagenariae* the giant space needed for prosorus germination was formed earlier, while it was belated in *S. trichosanthidis*.

6. The resting spore galls in the 2 species were composite and multicellular and only the epidermal infection was noticed. Both infected and adjacent healthy cells were stimulated to divide. Both the species induced development of more than one type of resting spore gall. However, *S. lagenariae* showed a tendency to form definite shapes of these galls, whereas *S. trichosanthidis* did not.

7. The host range and host reactions to the two species were also broadly similar on cucurbitaceous and noncucurbitaceous hosts. Both species infected all the cucurbitaceous hosts tested and a majority of the noncucurbitaceous hosts were found equally susceptible to both of them. No apparent or marked variations in the host reactions to infection were observed between the 2 species.

8. Physiological adaptability of the species for tolerance or resistance to heat was also closely similar. Their tolerance/resistance to dry and wet heat and time: temperature relation necessary to trigger germination of their resting spores was also broadly alike (RAGHAVENDRA RAO 1976).

The two species of *Synchytrium* parasitic on the cucurbitaceous hosts and subsequently more (species) added as parasitic on them (GUPTA and SINHA 1951), but later synonymized (KARLING 1964) have remained in taxonomic confusion, warranting a logical solution on the basis of accepted criteria. KARLING (1964) has indicated the assignment of priority to *S. lagenariae* following the rules of International Code for Botanical Nomenclature. While accepting this proposal, *S. trichosanthidis* has exposed enough morphological and developmental variations for its segregation as a variety. It is, therefore, proposed to accommodate it as:

*Synchytrium lagenariae* MHATRE and MUNDKUR var. *trichosanthidis* (MHATRE and MUNDKUR) RAGHAVENDRA RAO and PAVGISTAT. NOV.  
Syn: *Synchytrium trichosanthidis* MHATRE and MUNDKUR in Lloydia 8: 136—137, 1945.

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