A Tridentaria subsisting on testaceous rhizopods and Pythium oospores

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With Figure 1.

Among the many hyaline clampless hyphomycetes which have been set forth as obtaining their nourishment through destruction of minute animals are included 4 species — *Pedilospora dactylopaga* Drechsler (1934), *Tridentaria carnivora* Drechsler (1937), *Tridentaria glossopaga* Drechsler (1961), and *Triposporina quadridens* Drechsler (1961) — that subsist by capture of testaceous rhizopods and reproduce by forming branched conidia. A clampless hyphomycete readily distinguished from any of the 4 species but showing a similar manner of subsistence and of reproduction has recently come under observation. As this hyphomycete would seem to differ significantly also from any of the presumably saprophytic fungi hitherto described in the Moniliaceae-Staurosporae, it is held deserving of recognition as a separate species, for which a term (τυλωτή) meaning "knobby" may serve as an appropriate epithet.

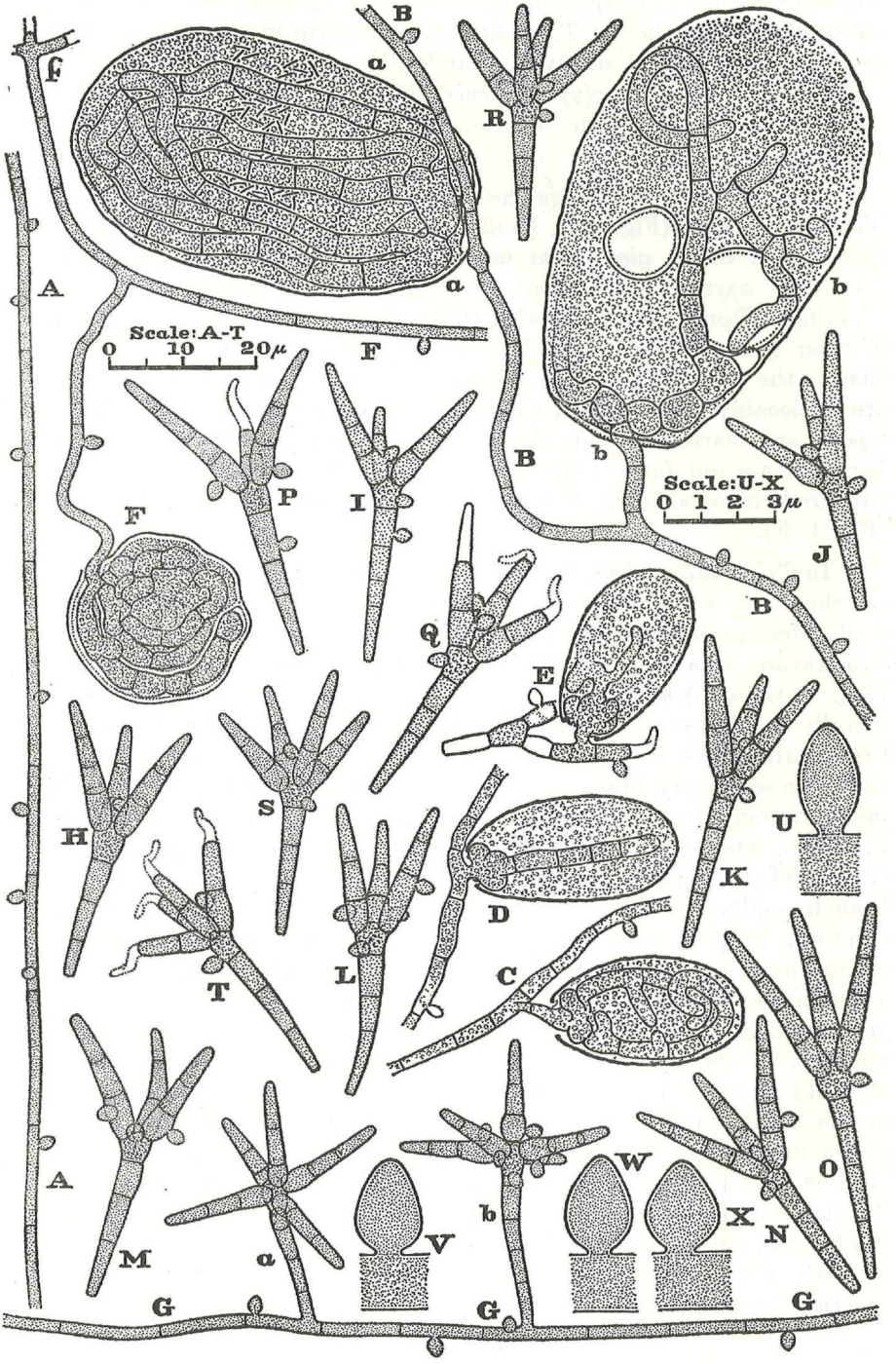
Tridentaria tylota sp. nov. Mycelial hyphae sparsely extended, procumbent or submerged, colorless, rather sparingly branched, moderately septate, mostly 1,5—2,5 μ wide, studded here and there with adhesive protuberances; these protuberances usually ovoid or strobiliform, mostly 2—3 μ long, 0,6—0,9 μ wide at the base, 1,6—2,1 μ in greatest width at or slightly below the middle, often adhering apically to a testaceous rhizopod, thereby holding fast to the animal, then elongating distally and after obstructing the aperture of the captive extending assimilative hyphae, mostly 2—4,5 μ wide, into the fleshy interior. Conidia colorless, consisting of 4—6 parts in trident-like arrangement: the basal trunk that corresponds to the shaft of a trident being club-shaped, usually divided by 3—4 septa, mostly 19—30 μ long, 1—1,4 μ thick at the base, widening gradually upward to a diameter of 3—4,7 μ near the broadly rounded tip, whereon are borne 3—5 divaricate prongs; the prongs inversely clavate, mostly 13—24 μ long, 2,3—3,7 μ wide near the base, 1,2—1,7 μ wide near the rounded tip, divided by 1—3 septa into 2—4 cells; the wider upper cells of the shaft and the lower cells of the prongs often becoming studded with several (1—6 in all) adhesive protuberances.

Hyphae mycelii exigue expansae, procumbentes vel immersae, incoloratae, parce ramosae, mediocriter septatae, plerumque 1,5—2,5 μ latae, hic illic tuberibus tenacibus praeditae; tenacia tubera ovoidea vel strobiliformia, plerumque 2—3 μ longa, basi 0,6—0,9 μ lata, medio 1,6—2,1 μ lata, saepe ad rhizopoda testacea inhaerentia, animalia ita tenentia, mox apice crescentia, itaque captivos penetrantia et hyphas assumentes vulgo 2—4,5 μ latas intus evolventia quae carnem exhauriunt. Conidia incolorata, vulgo ex 4—6 partibus ad instar fuscinae composita; pars infera quae hastile facit aliquantum clavata, vulgo 3—4 septata, plerumque 19—30 μ longa, basi 1—1,4 μ crassa, sursum latescens, apice 3—4,7 μ crassa, ibi 3—5 dentes divaricatos ferens; dentes inversum clavati, plerumque 13—24 μ longi, basi 2,2—3,7 μ lati, apice 1,2—1,7 μ lati, 1—3 septis in 2—4 cellulas divisi; cellulae dentium inferae et cellulae hastilis superae saepe nonullis (1—6 omnino) tuberibus tenacibus praeditae.

Heleoperam sylvaticam et Euglypham laevem capiens consumensque etiam oosporas Pythii ultimi interficiens habitat in caulibus Phaseoli vulgaris putrescentibus prope Cape Charles, Virginia. Typus: Figura 1, A—X.

Tridentaria tylota developed in a maizemeal-agar plate culture prepared for the isolation of *Pythium ultimum* Trow from an extensively decaying bean stem taken from a field near Cape Charles, Virginia, late in July 1964. As the stem had not been treated with any surface disinfectant, the agar substratum, after being permeated with *Pythium* mycelium, was further occupied by various bacteria, molds, rhizopods and nematodes. With the culture well protected against evaporation, the agar gradually became softened through prolonged action of the microorganisms. Consequently, after 70 days, some rhizopods, including the robust *Heleopera sylvatica* Penard (1902), were developing in submerged positions as well as on the surface.

Figure 1. *Tridentaria tylota* in maize-meal-agar plate culture 85—90 days after addition of an extensively dexayed bean stem: A—T, ×1000; U—X, ×5000. A, Mycelial hypha with 8 adhesive protuberances. B, Mycelial hypha with 4 adhesive protuberances and 2 captured individuals, a and b, of *Heleopera sylvatica*. C, D, Portions of mycelial hyphae, each with a captured specimen of *Euglypha laevis*. E, Conidium with a captured specimen of *Euglypha laevis*. F, Branched portion of mycelium with a parasitized oospore of *Pythium ultimum*. G, Mycelial hypha lying 15—20 μ under surface and bearing 2 conidia, each of which has 5 prongs extending on or above the surface; one conidium, a, is free of adhesive protuberances; the other, b, is studded with 5 protuberances. H—Q, Detached three-pronged conidia, each bearing one or more adhesive protuberances; in P and Q the distal segment is empty in 1 and in 3 segments, respectively. R—T, Detached conidia, each with 4 prongs; in T the distal segment of each prong is empty. U—X, Adhesive protuberances, more highly magnified to show variations in shape.



Although some submerged individuals of *H. sylvatica* were captured by submerged hyphae of *T. tylota*, this protozoan incurred losses only rather slowly. It still survived abundantly when the culture was 90 days old, whereas *Euglypha laevis* Perty, a smaller species that remained restricted to the surface, had then been virtually exterminated.

The adhesive protuberances borne on the mycelial hyphae of *Tridentaria tylota* (Fig. 1, A, B) differ from the corresponding predacious organs of *T. glossopaga* and *Pedilospora dactylopaga* in their relatively narrow attachment and their more pronounced distal tapering. Often their proximal diameter appears about equal to half of their greatest width, which is usually found closer to the base than to the tip (Fig. 1, U—X). With respect to dimensions they usually are noticeably shorter than the adhesive protuberances of *P. dactylopaga* and narrower than those of *T. glossopaga*. Adhesive protuberances are not formed on the assimilative branches extended into captured rhizopods (Fig. 1, B, a—b; C—E) or into *Pythium* oospores (Fig. 1, F).

In *Tridentaria tylota*, much as in *Triposporina quadridens*, conidial development commonly seems to take place without production of a well differentiated conidiophore. A mycelial hypha, submerged in the substratum at a depth of 15—20 μ, may extend branches upward (Fig. 1, G, a, b) which on reaching the surface may each give rise distally to a whorl of mostly procumbent tapering secondary branches. Cross-walls are then formed in the submerged primary branch as well as in the secondary branches. The widened distal segment of the primary branch, together with the proximal cells of the secondary branches, may put forth several adhesive protuberances (Fig. 1, G, b) before disjunction at the lowermost septum in the primary branch results in release of the ramified structure as a fully developed conidium (Fig. 1, H—T). A spore provided with 1 or more adhesive organs may capture a roving rhizopod and germinate by intruding assimilative hyphae into the animal (Fig. 1, E). Even withut germinating, many conidia, after several days, may show the apical segment in some prongs emptied of protoplasmic contents (Fig. 1, P, Q, T). In all conidia not actively germinating, the terminal segment of the basal trunk is filled with granular material, while the protoplasm in all other living segments appears of homogeneous texture. With respect to length and number of component segments, the basal trunk here clearly exceeds the corresponding part in the conidia of *Tridentaria carnivora*, of *Tridentaria glossopaga*, of *Tridentaria implicans* Drechsler (1940), and of the similarly congeneric *Pedilospora tricornis* Arnaud (1952).

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