

Typhula Fr. : Fr.

A rather heterogenous genus of parasitic or saprobic clavarioid species on stems, leaves and rarely wood. Most species form fruitbodies from a sclerotium and many have amyloid spores. The hyphae of the flesh are normally uninflated (though the type species *T. phacorrhiza* has partly inflated hyphae). The fruitbodies can be club-shaped, cylindrical, worm shaped or nail shaped, unbranched or rarely branched once. They are normally less than 1 mm thick and $\pm$ negative gravitrophic.

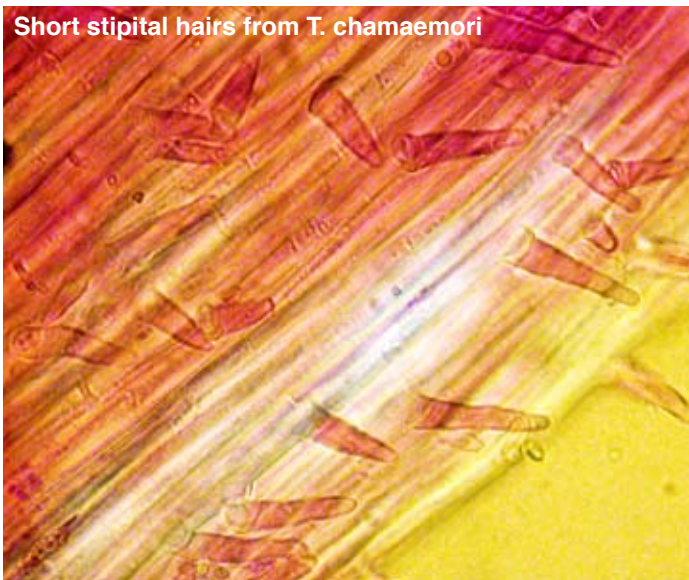
Important characters separating *Typhula* species include spore morphology, stipe hairs and the morphology of the sclerotium.

The variation in fruitbody morphology is great and the genus is certainly polyphyletic. The designation of *T. phacorrhiza* as lectotype (Donk 1954) is most unfortunate as this species clusters with species of *Macrotyphula* but may well prove unrelated to most of the other taxa in *Typhula*, including the economically important grass parasites *T. incarnata* and *T. ishikariensis*.

Key to genera with small, *Typhula*-like fruitbodies

1. Frb. arising from a sclerotium 2
Frb. without sclerotium 4
2. Frb. tiny and acute with a sterile tip; hyphal structure dimitic with skeletal hyphae **Pterula**
Frb. small to tiny, $\pm$ blunt; hyphal structure monomitic 3
3. Frb. nail shaped; on *Molinia caerulea* **Pistillina brunneola**
Frb. club-shaped, cylindrical to worm shaped **Typhula**
4. Frb. acute with a sterile tip 5
Frb. blunt with a fertile tip 6
5. Frb. dimitic with skeletal hyphae **Pterula**
Frb. monomitic **Ceratellopsis**
6. Hyphae of the flesh $\pm$ inflated. **Macrotyphula**
Hyphae uninflated **Typhula**

Short stipital hairs from *T. chamaemori*



Long stipital hairs from unidentified *Typhula* sp.



T. caricina



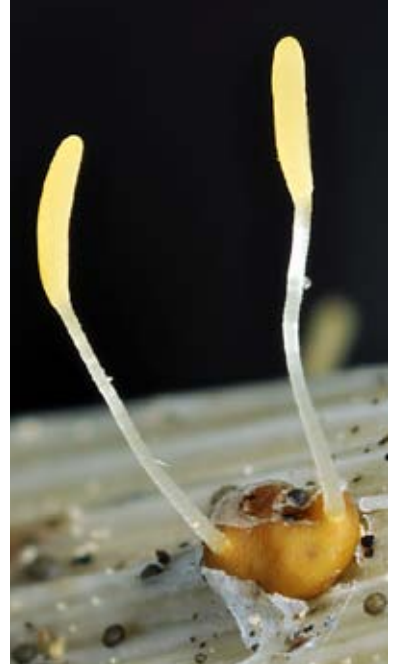
T. gyrans



T. erythorpus



T. chamaemori



T. subhyalina



T. crassipes



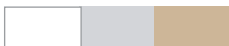
T. chamaemori



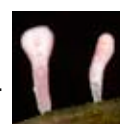
T. micans



Key to the European species of Typhula

1. Frb. uniformly buffish to brown all over, 5-120 mm high or less than 1 mm high and growing on *Eryngium* 2 — 
Frb. with different colours or size 5
2. Sclerotium absent see *Macrotyphula juncea* & *M. tremula*
Sclerotium present 3
3. On *Eryngium*; frb. 0.3-1 mm high. Sp. ellipsoid, 12.5-15 x 7-7.5 μm , Qm $\approx$ 1.8, probably amyloid; clamps present. **T. eryngii nom. ined. Olariaga**
On other hosts; frb. much higher 4
4. Frb. 5-20 mm high; sclerotium hairy (lens!); on stems of *Gentiana*. Sp. ellipsoid to flattened ellipsoid, 7.5-12 x 3.5-4.5 μm , Qm $\approx$ 2.4, amyloid; clamps present. **T. muelleri (Saut.) Corner**
Frb. 15-120 mm high; sclerotium smooth; on rotten deciduous leaves. Sp. ellipsoid, 10-16 x 4.5-5.5 μm , Qm $\approx$ 2.6, non-amyloid; clamps present. **T. phacorrhiza (Reichardt) Fr.**
5. Frb. with a reddish brown to blackish brown stipe and a white to pale greyish fertile part. 6 — 
Frb. with different colours or stem and fertile part with $\pm$ the same colour . 9
6. Stipe smooth (lens!); frb. 1.5-5 mm high; sp. 9-13.5 x 2.5-4 μm , Q = 3-3.5, $\pm$ sigmoid, cylindrical to swaybacked; clamps absent. Sp. non- or weakly amyloid; on deciduous leaves. **T. neglecta Pat.**
Stipe pubescent (lens!); frb larger; sp. to 12 x 4.5 μm , Q $\approx$ 1.8-2.6, $\pm$ ellipsoid; clamps present. 7
7. Sclerotium hairy (lens!); on stems of *Gentiana* see *T. muelleri*
Sclerotium smooth; on twigs and leaves 8
8. Sclerotium $\pm$ round; fertile part pale grey; hairs on the stipe thin-walled, not attenuating; on twigs of *Buxus*. Sp. cylindrical to subballantoid, 6-9.5 x 3-4.6 μm , Qm $\approx$ 2, amyloid; clamps present. **T. buxi Maire**
Sclerotium elongated; fertile part white; hairs thin-walled, attenuating; on petioles and leaves of broadleaved trees. Sp. ellipsoid, 5-7.5 x 2.3-3.4 μm , Qm $\approx$ 2.1, amyloid; clamps present. **T. erythropus Pers.**
9. Fertile part yellowish 10 — 
Fertile part white, greyish, buffish to pinkish 12 — 
10. On leaves of *Ilex*; frb. to 1.5 mm high; sp. ellipsoid, Qm $\approx$ 2.4. Sp. ellipsoid, 8-9 x 3-4, amyloid; clamps present. **T. ilicis Bertault**
On leaves of deciduous trees or dicot herbs; sp. cylindrical to sway-backed, Q $\approx$ 3.0-3.2 11
11. On dicot herbs; sclerotium jigsaw plates clearly dotted/pored. Sp. cylindrical to swaybacked, 8-12.5 x 2.5-4 μm , Qm $\approx$ 3.1, non-amyloid; clamps absent or present. **T. chamaemori L.Holm & K.Holm**
On leaves and petioles of broadleaved trees (e.g. *Populus*); sclerotium jigsaw plates smooth to weakly dotted/pored. Sp. cylindrical to swaybacked, 7.7-10.9 x 2.6-3.6 μm , Qm $\approx$ 3, non-amyloid; clamps absent or rarely present. **T. lutescens Boud**
12. Fertile part pinkish 13 — 
Fertile part white, greyish to buffish. 17 — 
13. Sclerotium present 14
Sclerotium absent 15

14. Frb. 1-30 mm high; sp. 8.0-10.5 x 3.7-4.8 μm , $Q_m \approx 2.2$; clamps present; on grasses. Sp. ellipsoid, non- or weakly amyloid. **T. incarnata** Lasch
 Frb. up to 3 mm high; sp. 6.6-9.2 x 2.4-3.4 μm , $Q \approx 2.7$; clamps absent; on *Cyperaceae* (*Schoenus*). Sp. ellipsoid to flattened ellipsoid to amyloid. **T. schoeni** Olariaga & Salcedo
15. Frb. almost nail shaped, only faintly pink. Stipe with 30-80 μm long hairs; on *Typha* (and possibly *Cyperaceae*) see *T. subhyalina* –
 Frb. with $\pm$ globose, clavate to cylindrical fertile part, faintly to obviously pink 16
16. Frb. with a well defined, $\pm$ globose fertile part; stipe with 70-240 mm long hairs. Sp. 8.7-13 x 3.9-5.0 μm , $Q_m \approx 2.4$, amyloid; clamps present; on monocot herbs. . . **T. capitata** (Pat.) Berthier ss. Olariaga —
 Frb. club-shaped, fertile part not well defined; stipe without hairs. Sp. broadly ellipsoid, ellipsoid to almond shaped, 9-12 x 4-6.5 μm , $Q_m \approx 2$, amyloid; clamps present; on dicot and monocot herbs. . . .
 **T. micans** (Pers.) Berthier —
17. Growing on ferns 18
 On other substrates 21
18. With several, white, worm-shaped fruitbodies emerging from a $\pm$ yellowish sclerotium; stipe (if present) practically smooth (with up to 25 μm long protuding cells); sp. Q 1.6-2.0. . . . see *T. crassipes* —
 With singular fruitbodies with a clearly defined fertile part emerging from a $\pm$ brown sclerotium; stipe with 15-130 μm long hairs (lens!); sp Q 2.5-3.8 19
19. Frb. 2-7 mm long, rather tough; fertile part distinctly club-shaped; on *Pteridium aquilinum*. Sp. ellipsoid to flattened ellipsoid, 8.5-13 x 3.3-5 μm , $Q_m \approx 2.5$, amyloid; clamps present. **T. quisquiliaris** (Fr.) Henn.
 Frb. mostly larger, more fragile; fertile part $\pm$ cylindrical; always (?) on other ferns 20
20. Sp. Q = 2.4-2.8, sp. 8.0-14 x 3.4-4.4 μm , cylindrical; stipe hyalin-whitish, possibly yellowish at the base. Sp. cylindrical to ellipsoid with one flattened side, amyloid; clamps present; on *Athyrium* and *Dryopteris* (and other ferns?).
 **T. athyrii** Remsberg
 Sp. Q = 2.7-3.4, sp. 11.5-16.5 x 3.5-6.0 μm , ellipsoid; stipe with an olive-green tinge. Sp. cylindrical to almond shaped, non-amyloid; clamps present; on *Athyrium* and *Matteuccia* (and other ferns?) **T. olivascens** Berthier
 Sp. $Q_m \approx 3.8$, sp. 8.0-12.0 x 2.0-3.3 μm , cylindrical-swaybacked-sigmoid. Known from India on ferns. . . T. longispora Corner, K.S.Tind & Dev
 Sp. $Q_m \approx 3.1$, sp. 14.0-18.0 x 4.5-5.7 μm , , oblong almond shaped. Known from Asia on *Matteuccia* Typhula struthiopteridis Corner
 This is a species complex in need of a revision.
21. On wood; often with many club-shaped fruitbodies from each sclerotium 22
 On leaves of broadleaved trees or parts of mono- or dicot herbs; with one (to two), club-shaped to cylindrical fruitbodies from each sclerotium 26
22. Frb. with a globose fertile part on a cylindrical stipe, 1-3 mm high; sp. 10.5-12 x 4.5-6 μm , $Q_m \approx 2.1$.
 Sp. ellipsoid to flattened ellipsoid, amyloid; clamps present. **T. sphaeroidea** ss. Berthier —
 Frb. club-shaped to cylindrical; often larger; spores more narrow 23
23. Sclerotium black; frb. up to 2 mm, one per sclerotium. Sp. ellipsoid, 10.5-12 x 5-6 μm , $Q_m \approx 2$, amyloid; clamps present
 see *Pistillaria paradoxa* Karsten
 (found once in Finland, probably neither belongs in *Typhula* nor *Pistillaria*)
 Sclerotium $\pm$ brown; frb mostly larger, usually more than one frb. pre sclerotium 24
24. On deciduous twigs (e.g. *Fraxinus*, *Alnus*, *Salix*, *Rosa*, *Syringa*, *Juglans*, *Populus*, *Corylus*). Sp. cylindrical to suballantoid, 5.6-10.5 x 3.2-5 μm , $Q_m \approx 1.9$, amyloid; clamps present or absent. **T. spatulata** (Corner) Berthier
 On coniferous wood 25



25. Sp. 7.0-10.5 x 4.0-5.0 μm , $Q_m \approx 1.9$; sclerotium with an outer, gel-like layer. Sp. ellipsoid, amyloidity unknown; clamps probably absent. **T. abietina (Fuckel) Corner**
 Sp. 6.5-8.5 x 3.0-3.8 μm , $Q_m \approx 2.2$; sclerotium without gel-like layers. Sp. ellipsoid to flattened ellipsoid, amyloid; clamps present. **T. piceicola Berthier**
26. On monocots or *Equisetum* 27
 On dicot herbs or leaves of deciduous trees 33
27. Frb. $\pm$ nail-shaped with a sterile underside and a fertile top, 0.5-3 mm high 28 — 
 Frb. $\pm$ cylindrical to club-shaped or with a globose head with a hymenium at the whole surface, 1-30 mm high. 29
28. With a small, oblong sclerotium; on *Molinia caerulea*; margin of the "head" with short, thick-walled, protuding cystidia. Sp. drop shaped, 8.5-12 x 3.5-5.2 μm , $Q_m \approx 2.3$, non-amyloid; clamps present. see *Pistillina brunneola* Pat.
 Without sclerotium; on *Typha* and other monocots; without such cystidia. Sp. ellipsoid, 9-12 x 3.7-4.2 μm , $Q_m \approx 2.6$, non-amyloid; clamps present. **T. subhyalina Courtec.**
 (syn: *T. hyalinella* Nannf. & L.Holm, *T. capitata* (Pat.) Berthier ss. auct)
 This is surely a species complex in need of a revision.
29. Sp. heart shaped, 5.0-6.5 x 4.0-5.7 μm , $Q_m 1.1-1.2$; sclerotium absent. On grasses (*Poaceae*), sedges (*Cyperaceae*) and *Typha*. Sp. non-amyloid; clamps present. **T. culmigena (Mont. & Fr.) Berthier** — 
 Sp. $\pm$ ellipsoid, $Q_m > 1.5$; sclerotium mostly present 30
30. On *Molinia caerulea*; frb. 1-4 (-6) mm high; sclerotial plates ornamented by concentric zones (looking like growth rings). Sp. ellipsoid to subballantoid, 8-12 x 3.5-4.5 μm , $Q_m \approx 2.5$, amyloid; clamps absent.
 **T. berthieri Olariaga, Ryman & Salcedo**
 (syn.: *T. graminum* P. Karst.)
 On various monocots; frb. 4-30 mm high; sclerotial plates without ornament 31
31. Sp. $\pm$ cylindrical to subballantoid, $Q_m \approx 3$; on *Carex*. Sp. 10.5-13 (-15.0) x 3.4-4.5 μm , amyloid; clamps present.
 **T. caricina P. Karst.**
 Sp. $\pm$ ellipsoid, $Q_m \approx 2.1$; on grasses (and possibly also other monocots) or *Equisetum* 32
32. Sp. 8.5-12.5 x 3.8-6 μm ; sclerotium not gelatinized; joinings of the sclerotial plates thick and glassy. Sp. ellipsoid, $Q_m \approx 2.1$, amyloid; clamps present. **T. trifolii sensu Berthier**
 Sp. 6.0-11.0 x 3.0-5.0 μm ; sclerotium morphology ?. Sp. ellipsoid, $Q_m \approx 2.1$, amyloidity unknown; clamps present.
 **T. ishikariensis S. Imai**
33. Frb. with a globose fertile part; on stems of *Rubus*. Sp. ellipsoid to flattened ellipsoid, 11.6-13.6 x 5.8-8.8 μm , $Q_m \approx 1.7$, amyloid; clamps present; not with certainty found in Europe. **T. sphaeroidea Rensberg**
 Frb. cylindrical to club-shaped; on other substrates including petioles of *Rubus* 34
34. With several, white, worm-shaped fruitbodies emerging from a $\pm$ yellowish sclerotium; stipe (if present) practically smooth (with up to 25 mm long protuding cells). Sp. ellipsoid to drop shaped, 6.5-10 x 3.6-5.5 μm , $Q_m \approx 1.8$, non- or weakly amyloid; clamps absent; on stems or dead laeves of dicot herbs. **T. crassipes Fuckel** — 
 (Syn.: *T. corallina* Quél. & Pat.)
 With one, rarely two, $\pm$ cylindrical to club-shaped fruitbodies from a $\pm$ yellowish, brown or blackish sclerotium or without a sclerotium; stipe with 15-130 μm long hairs (lens!) 35
35. Without a sclerotium 36
 With a sclerotium 37

36. Frb. 0.5-6 mm high; hymenium not gelatinized; sp. amyloid; stipe hairs attenuating, to 200 μm long; on leaves of deciduous trees. see *T. gyrans*
 Frb. 3-20 mm high; tough with a $\pm$ gelatinized hymenium; sp. non-amyloid; stipe hairs $\pm$ clavate, to 70 μm long but often shorter; on stems of larger herbs, possibly also on leaves of *Populus tremulae*. Sp. ellipsoid to flattened ellipsoid, 5-9.6 $\times$ 2.5-4.5 μm , Qm $\approx$ 2; clamps present... . **T. uncialis (Grev.) Berthier**
37. Frb. 0.5-6 mm high, club-shaped; sclerotium plates with dotted/pored ornamentation. Sp. ellipsoid to flattened ellipsoid, 6-9 $\times$ 2.6-3.7 μm , Qm $\approx$ 2.3, amyloid; clamps absent or rarely present; on leaves of deciduous trees. **T. gyrans (Batch) Fr.** — 
 (Syn.: *T. setipes* (Grev.) Berthier – this is actually a species complex in need of a revision)
 Frb. higher, club-shaped to cylindrical; sclerotium plates without dotted/pored ornamentation . . 38
38. Sclerotial plates with a rugulose to ridged surface ornamentation; sp. Qm $\approx$ 2.2. Sp. ellipsoid, 7.5-13 $\times$ 3.4-6 μm , non- or weakly amyloid; clamps present; on leaves of deciduous trees and dicot herbs. **T. laschii Rabenh.** — 
 (Syn.: *T. variabilis* Riess)
 Sclerotial plates smooth; sp. Qm $\geq$ 2.3 39
39. Sp. 11.3-16.2 $\times$ 4.4-6.2 μm ; basidia 2-spored; sclerotium yellow to pale brownish yellow. Sp. ellipsoid to cylindrical, Qm $\approx$ 2.5, non-amyloid; clamps present; on leaves of deciduous trees. **T. ochraceosclerotata Olariaga & Salcedo**
 Sp. smaller; basidia 4-spored; sclerotium brownish yellow to dark brown 40
40. On leaves of deciduous trees; sp. 8.0-12.0 $\times$ 4.7-6.0 μm ; sp. Q=1.7-2.0. Sp. ellipsoid, non- or weakly amyloid; clamps present; sclerotium with an outer gelatinized layer. **T. hollandii D.A.Reid**
 On dicot herbs or with smaller spores; sp. Q > 2.0 41
41. Sp. non-amyloid. Sp. ellipsoid to flattened ellipsoid, 7.5-10 $\times$ 3.2-4 μm , Qm $\approx$ 2.4; clamps present; sclerotium gelatinized inside; on dicot herbs. **T. sclerotoides (Pers. : Fr.) Fr.**
 Sp. amyloid 41
41. Sp. 7.0-9.5 $\times$ 2.7-3.5 μm ; sclerotium with an outer gelatinized layer; joinings of sclerotial plates thin ("normal"). Sp. ellipsoid to flattened ellipsoid, Qm $\approx$ 2.6, amyloid; clamps present; on petioles **T. pachypus Berthier** — 
 Sp. 8.5-12.5 $\times$ 3.8-6 μm ; sclerotium not gelatinized; joinings of the sclerotial plates thick and glassy. Sp. ellipsoid, Qm $\approx$ 2.2, amyloid; clamps present; on various leaves. **T. trifolii Rostr.** — 