



A, Colonies on host, $\times 5$; B, conidiophores and conidia, $\times 700$, ex M. B. Ellis;
C, pustule of conidiophores ex host, $\times 500$.

***Cymadothea trifolii* (Pers.: Fr.) Wolf, *Mycologia* 27: 71, 1935.**

Sphaeria trifolii Pers.: Fr., *Systema mycologicum* 2: 435, 1823.

Sphaeria trifolii Pers., 1801.

Conidial state: *Polythrincium trifolii* Kunze ex Ficin & Schubert, *Fl. Geg. Dresd. Krypt.*: 287, 1823.

Colonies punctiform or effuse, olivaceous brown. *Mycelium* immersed. *Stroma* pseudoparenchymatous. *Conidiophores* macronematous, mononematous, caespitose, unbranched or with several branches arising at one point, up to 100 μm long, 6–9 μm wide, upper part curved and often thickened on the side away from the curvature, undulate, often torsive, pale brown, smooth. *Conidiogenous cells* polyblastic, integrated, terminal, sympodial, cylindrical, undulate cicatrized; scars large, flat unilateral. *Conidia* solitary, acropleurogenous, simple, cuneiform or pyriform, hyaline to pale brown, smooth or verruculose, 1-septate, 17–24 μm long, 13–24 μm wide in the broadest part, 4–5 μm wide at the base (after Ellis, 1971).

Spermogonial stage (Wolf, 1935) arising from the intercellular mycelium in the autumn separately below the conidial particles or as an extension to the conidial stroma.

Spermogonia spherical to flask shaped. *Spermatia* 3–5 \times 1.5–2 μm .

Ascocarps initials arising in locules within the same stromata simultaneously or closely following the spermogonia, locules up to 135 μm diam. *Asci* 8-spored, clavate, 48–55 \times 20–25 μm ; produce a basal clump. *Ascospores* hyaline to pale brown, obovate, 1-septate, straight or inaequilateral, 22–26 \times 6–7.5 μm .

HOSTS: On leaves of a wide range of *Trifolium* species; reported on *Medicago* in India.

DISEASES: Black blotch or sooty blotch of clover.

GEOGRAPHICAL DISTRIBUTION: Bavaria, Britain, Canada, Cyprus, Ethiopia, Germany, Guernsey, India, Iraq, Irish Rep., Israel, Italy, Jamaica, Jersey, Kenya, New Zealand, Pakistan, Rumania, Sweden, USA, USSR.

PHYSIOLOGIC SPECIALIZATION: None reported; O'Rourke (1970) found it would spread from one variety of clover to another.

TRANSMISSION: By air-borne ascospores in spring and by conidia throughout the growing season. Believed to overwinter as ascospores in stromata on infected leaves; has been reported to survive in soil for 5 yr.

NOTES: Petrak (1941) considered this species to belong to *Mycosphaerella* and made the combination *M. killianii* Petr. after the first mycologist to describe the asci. The basionym *Sphaeria trifolii* Pers.: Fr. was pre-empted by *M. trifolii* (Karat.) Moesz (1926), a different species.

The disease affects herbage yields by stunting and partial defoliation of affected plants. Horses, cattle and sheep show toxic effects and deaths have been reported after grazing on infected herbage (46, 1022). Both in Britain and New Zealand infection of clover has been found to raise the coumeston levels and this may lead to reproductive disorders in animals fed on infected clover (Newton *et al.*, 1970; Wong & Latch, 1971). In USA infected clover was found to cause 'trifoliosis' or mouth ulcers in grazing animals (USDA, 1960).

LITERATURE: Newton, Betts, Drane & Saba, *Occasional Symposium British Grassland Society* **6**: 309–313, 1970; O'Rourke, *Research Report, Plant Science Division Agricultural Institute, Dublin* 1970: 45–46, 1970; Oxtoby & Lelliot, *Plant Pathology* **15**: 129–130, 1966; Petrak, *Annales Mycologica* **39**: 324, 1941; USDA, *Agricultural Handbook* **165**, 531 pp., 1960; Wong & Latch, *New Zealand Journal of Agricultural Research* **14**: 633–638, 1971.

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