

## Notes on some Cercosporae of India-VIII.

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With plates VII—X.

In continuation of previous part, studies on further collections of *Cercospora* made in different parts of India are presented here. Some of the species which have been previously reported, but collected either on new hosts or new localities in India are also included.

*Cercospora vestita* Ramakr. Proc. Indian Acad. Sci. Ser. B. **34**: 69, 1951. Hab. On leaves of *Leucas mollissima*, Hosamande, Nilgiris, Madras, 18-6-1953, leg. H. C. Govindu (Fig. 1). This species is different from *C. leucadis* Thirum. & Govindu and *C. patelii* Thirum. & Govindu reported on the same host genus.

*Cercospora dioscoreae* Ellis & Martin. Amer. Nat. **16**: 1003, 1882. Hab. On leaves of *Dioscorea alata*, Chikmagalur, Mysore, 20-5-1953, leg. H. C. Govindu. (Fig. 2). The geniculations are very conspicuous and the spores are almost hyaline, unlike the 0—1 geniculate condition with pale subhyaline spores reported in *C. dioscoreae*.

*Cercospora teucris* Ellis & Kellerman. Bull. Torrey Bot. Cl. **11**: 116, 1884.

Hab. On leaves of *Teucrium tomentosum*, Nandi Hills, Mysore, 31-1-1953, leg. H. C. Govindu. (Fig. 3).

*Cercospora cichorii* Davis. Wis. Acad. Trans. **19**: 715, 1919.

Leaf spots circular to polygonal, 2—3 mm in diameter often coalescing to form larger patches; Fruiting amphigenous but mostly epiphyllous; stroma subglobose, 15—45  $\mu$  in diameter. Conidiophores light medium to olivaceous-brown, unbranched, 1—4-septate, straight or undulating at the apex, subgeniculate at tip, 14—71  $\mu$   $\Rightarrow$  4—7  $\mu$ . Conidia hyaline, obclavate to acicular, 1—12-septate, tip subacute, straight or slightly curved, 50—84  $\mu$   $\Rightarrow$  2,8—4,2  $\mu$ .

Hab. On leaves of *Cichorium intybus*, Bangalore, 4-1-1954, leg. H. C. Govindu. (Fig. 4). Though widely distributed in Europe and America, this species has not been previously reported from India.

### *Cercospora pavettae-indicae* sp. nov.

Infection spots angular or irregular, 2—8 mm in diameter, often coalescing to form large patches, surrounded by a dark-brown border. Fruiting amphigenous; stroma subglobose, well developed, composed

of dark brown cells, 15—75  $\mu$  in diameter. Conidiophores fasciculate, compact and laterally coalescent, olivaceous-brown, 1—10-septate, rarely or not branched, 22—72  $\Rightarrow$  2,8—4,2  $\mu$ . Conidia subhyaline to pale olivaceous-brown, 1—10-septate, 40—100  $\Rightarrow$  2,8—4,2  $\mu$ .

Hab. On leaves of *Pavetta indica*, Kemmangundi, Mysore, 25-10-1953, leg. K. M. Safeeulla. (Fig. 5).

Maculae angulares vel irregulares, 2—8 mm diam., saepe confluentes, atro-brunnea-marginatae. Caespituli amphigeni; hypostroma bene evolutum, 15—75  $\mu$  diam., compactum e cellulis brunneis compositum. Conidiophora fasciculata, compacta, lateraliter subconata, olivaceo-brunnea, raro vel vix ramosa, 22—72  $\Rightarrow$  2,8—4,2  $\mu$ . Conidia subhyalina vel pallide olivaceo-brunnea, 1—10-septata, 40—100  $\Rightarrow$  2,8—4,2  $\mu$ . *Cercospora pavettae-tomentosae* is a different species having shorter conidiophores and conidia.

### ***Cercospora argyreiae* sp. nov.**

Infection spots in irregular patches, often coalescing and inciting the drying of the entire leaf. Stroma well developed, 15—60  $\mu$  in diameter, composed of brown cells. Conidiophores very compactly grouped, olivaceous-brown, flexuous, 1—3-septate, unbranched, blunt at apex, subgeniculate, 10—35  $\Rightarrow$  2,8—6  $\mu$ . Conidia subhyaline to pale brown, obclavate to obcylindric, 1—10-septate, truncate at base and subacute at tip, 15—50  $\Rightarrow$  2,5—3  $\mu$ .

Hab. on leaves of *Argyreia* sp., Nandi Hills. Mysore, 10-1-1954, leg. H. C. Govindu. (Fig. 6).

Maculae irregulares, saepe coalescentes. Hypostroma bene evolutum, 15—60  $\mu$  diam. e cellulis brunneis compositum. Conidiophora compacta, olivaceo-brunneola, flexuosa, 1—3-septata; simplicia, apice obtusa, subgeniculata, 10—35  $\Rightarrow$  2,8—6  $\mu$ . Conidia subhyalina vel pallide brunnea, obclavata vel subcylindracea, 1—10-septata, postice truncata, antice subacuta, 15—50  $\Rightarrow$  2,5—3  $\mu$ .

The fungus closely resembles *Cercospora cordobensis* Speg. known only from Argentina on *Argyreia* (*Ipomoea*) *megapotomica*, but differs in having smaller and narrower conidia. The conidia in *C. cordobensis* measure 35—110  $\Rightarrow$  4—6  $\mu$  as compared with 15—50  $\Rightarrow$  2,5—3  $\mu$  in *C. argyreiae*.

*Cercospora canescens* Ell. & Mart. Amer. Nat. 1003, 1882.

Hab. On fruits of *Vigna catajung*, Hebbal, Bangalore, 10-11-1953, leg. H. C. Govindu (Fig. 7) and fruits of *Dolichos lablab*. (Fig. 12). *C. canescens* is recorded as a leaf parasites on several leguminous hosts, but on the pods of *Vigna catajung* (cowpea), the fungus causes fruit lesions. The diseased portions become black and shrivelled, and covered over with the fruiting bodies of the fungus. Examination of the seeds inside showed discoloration, but further studies whether the fungus became seed borne, was, not investigated.

*C. viticis* Ell. & Evr. Jour. Mycol. 3: 18, 1887.

Hab. On leaves of *Vitex negundo*, Hebbal, Bangalore, 15. 1. 1952, leg. H. C. Govindu. (Fig. 8).

***Cercospora trapae-bispinosae* sp. nov.**

Leaf spots circular to irregular, 2–6 mm in diameter, greyish-brown at the centre, surrounded by light yellow margin, which is slightly raised. Fruiting epiphyllous, stroma 20–50  $\mu$  in diameter, composed of olivaceous-brown cells. Conidiophores olivaceous-brown, compactly grouped, closely septate at base, 2–3-septate above, rarely branched, blunt at tip, subgeniculate, 21–57  $\Rightarrow$  2,8–4,2  $\mu$ . Conidia hyaline, obclavate to acicular, straight or bent, 1–12-septate, obconical at base and acute at tip, 14–116  $\Rightarrow$  2,8–4,2  $\mu$ .

Hab. On leaves of *Trapa bispinosa*, Lalbagh, Bangalore, 16-12-1953, leg. H. C. Govindu (Fig. 9).

Maculae circulares vel irregulares, 2–6 mm diam., griseo-brunneae, margine pallide luteae. Caespituli epiphylli; hypostroma 20–50  $\mu$  diam., e cellulis olivaceo-brunneis compositum. Conidiophora olivaceo-brunnea, compacta, 2–3-septata, raro ramosa, antice obtusa, subgeniculata, 21–57  $\Rightarrow$  2,8–4,2  $\mu$ . Conidia hyalina, obclavata vel acicularia, recta vel curvata, postice obconica, antice acuta, 44–116  $\Rightarrow$  2,8–4,2  $\mu$ .

*Cercospora trapae* Thirum. & Govindu was recorded on the same host species from Patna, Bihar. The conidia of this fungus are subhyaline in contrast to hyaline conidia of *C. trapae-bispinosae*. The conidia are shorter and conidiophores longer in *C. trapae* than in *C. trapae-bispinosae*.

	<i>Conidiophores</i>	<i>Conidia</i>
<i>C. trapae</i> (Sydowia 8: 346, 1954)	60–160 $\Rightarrow$ 2,5–4 $\mu$	34– 66 $\Rightarrow$ 2,5–3,5 $\mu$
<i>C. trapae-bispinosae</i>	21– 57 $\Rightarrow$ 2,8–4,2 $\mu$	44–116 $\Rightarrow$ 2,8–4,2 $\mu$

***Cercosporae barleriae-cristatae* sp. nov.**

Leaf spots circular to polygonal, 2–6 mm in diameter, greyish-withe at centre and surrounded by pinkish border. Fruiting amphigenous, stroma none or consisting of few cells. Conidiophores olivaceous brown, 1–8-septate, unbranched, irregularly geniculate, 33–200  $\Rightarrow$  2,8–4,2  $\mu$ . Conidia hyaline, acicular, straight or bent, obconically truncate at base, acute at tip, 1–16-septate, 33–67  $\Rightarrow$  2,5–3,5  $\mu$ .

Hab. On leaves of *Barleria cristata*, Bangalore, 10-12-1953, leg. H. C. Govindu (Fig. 10).

Maculae circulares vel polygonales, 2–6 mm in diam., griseo-albidae, zonula rubra cinctae. Caespituli amphigeni; hypostroma non



evoluta vel e paucis cellulis compositum. Conidiophora olivaceo-brunnea, 1—8-septata, simplicia, irregulariter geniculata,  $33-200 \cong 2,8-4,2 \mu$ . Conidia hyalina, acicularia, recta vel curvata, postice obconica, antice acuta, 1—16-septate,  $33-67 \cong 2,5-3,5 \mu$ .

*C. barbericola* Payak & Thirumalachar (Indian Phytopathology **2**: 191, 1949) was described from Banaras on the same host. The present fungus from South India differs in having differences in spore measurements. Conidiophores are 50—90  $\mu$  long in *C. barbericola* and 33—200  $\mu$  in *C. barberiae-cristatae*. Conidia measure 33—133  $\mu$  in *C. barbericola* and 33—67  $\mu$  in *C. barberiae-cristatae*.

*Cercospora jussiaeae* Atk. Jour. Elisha Mitchell Sci. Soc. **8**: 50, 1892.

Leaf spots circular to irregular, 2—8 mm in diameter, medium brown to black, margin slightly beaded and pink bordered. Fruiting amphigenous, stroma 15—45  $\mu$  in diameter, subglobose, olivaceous-brown. Conidiophores subhyaline to pale brown, 1—2-septate, unbranched, subgeniculate,  $14-57 \cong 2-3 \mu$ . Conidia subhyaline, 1—20 septate, obclavate to cylindrical, straight or curved, blunt at tip,  $14-83 \cong 2,8-3,5 \mu$ .

Hab. On leaves of *Jussiaea repens*, Hebbal, Bangalore, 18-12-1953, leg. H. C. Govind u. (Fig. 11). This species has not previously been reported from India.

### ***Cercospora guizoticola* sp. nov.**

Infection spots dark, circular, often coalescing with each other to form large patches. Fruiting amphigenous; stroma none or composed of few brown cells in substomal space. Conidiophores olivaceous brown to subhyaline, unbranched, 1—6-septate, subgeniculate hyaline at the tip,  $28-79 \cong 2,8-4,2 \mu$ . Conidia hyaline obclavate to cylindrical, 1—20 septate, truncate at base and acute at tip,  $50-83 \cong 2,4-4,2 \mu$ .

Hab. On leaves of *Guizotia oleifera* (*G. abyssinica*), Hebbal, Bangalore, 15-11-1953, leg. H. C. Govind u. (Fig. 13).

Maculae fuscae, circulares, coalescentes. Caespituli amphigeni; hypostroma nullum, vel raro minutissimum e paucis cellulis brunneis compositum. Conidiophora subhyalina vel olivacea, simplicia, 1—6-septata, subgeniculata, antice hyalina,  $28-79 \cong 2,8-4,2 \mu$ . Conidia hyalina, obclavata vel cylindrica, 1—20-septata, postice truncata, antice acuta,  $50-83 \cong 2,4-4,2 \mu$ .

*C. guizoticola* differs from *C. guizotiae* Siemaszko (Mat. Mikol. i Fitopatol. Ross. **1**: (3) 40. 1915) described from Russia and Poland. The published descriptions for *C. guizotiae* indicates that the conidiophores and conidia are very broad (5 to 7  $\mu$  as compared with  $2,8-4,2 \mu$  in the present species) and the fasciculate conidiophore are developed from prominently developed stromata. In *C. guizoti-*

cola stroma is almost absent. These characters separate *C. guizotiae* from *C. guizoticola*.

*Cercospora biophyti* H. & P. Sydow (Philip. J. Sci. (Botany) **8**: 284, 1913.

Hab. On leaves of *Biophytum sensitivum*, Darbhanga, Bihar, 10-12-1952, leg. M. J. Thirumalachar (Fig. 14).

*Cercospora beticola* Sacc. Nuov. Giorn. Bot. Ital. **8**: 189, 1876.

Hab. on leaves of *Beta vulgaris*, Bangalore, 15-12-1953, leg. H. C. Govindu (Fig. 15).

*Cercospora apii* Fries. Betr. zur Mycol. **3**. Heft. p. 9, 1863.

Hab. on leaves of *Apium graveolens*, Mysore, 10-4-1954, leg. H. C. Govindu (Fig. 16).

### ***Cercospora curcumae* sp. nov.**

Leaf spots dark-brown to almost sooty black, irregular, 3–5 mm in diameter, appearing conspicuous when it dries up. Fruiting amphigenous, stroma 20–50  $\mu$  in diameter, globose, compact, composed of dark brown cells. Conidiophores olivaceous brown, arising in fascicles, rarely 1–2 branched, 1–6-septate, tip subhyaline, geniculate, 14–71  $\Rightarrow$  2,8–5,7  $\mu$ . Conidia hyaline, obconical to cylindrical, 1–10-septate, truncate at base and acute at tip, 29–71  $\Rightarrow$  2,8–4,2  $\mu$ .

Hab. On leaves of *Curcuma longa*, Hebbal, Bangalore, 12-4-1954, leg. H. C. Govindu (Fig. 17).

Maculae irregulares, fusco-brunneae vel nigrae, 3–5 mm diam.: caespituli amphigeni, hypostroma 20–50  $\mu$  diam., globosum, e cellulis brunneis compositum. Conidiophora olivaceo-brunnea, fasciculata, raro 1–2-ramosa, 1–6-septata, antice subhyalina, geniculata, 14–71  $\Rightarrow$  2,8–5,7  $\mu$ . Conidia hyalina, obconica vel cylindrica, 1–10-septata, postice truncata, apice acuta, 29–71  $\Rightarrow$  2,8–4,2  $\mu$ .

The species differs from other *Cercospora* species on *Zingiberaceae* in having hyaline conidia. It closely resembles *C. zingiberi* Togashi & Katsuki in having occasionally branched conidiophores and colourless conidia.

*Cercospora nojimai* Togashi & Katsuki. Sci. Rets. Yokohama Nat. Univ. Sect. **2**, 1: 5, 1952.

Leaf spots large and irregular, often bordering the veins, dark brown, often coalescing to form large patches. Fruiting amphigenous; stroma 10–30  $\mu$  in diameter subglobose, consisting of few dark-brown cells. Conidiophores olivaceous-brown, short, 0–1-septate, unbranched, bulbous at base, subhyaline at tip, 8–25  $\Rightarrow$  2–3  $\mu$ . Conidia subhyaline to pale olivaceous, clavate to cylindrical, 1–8-septate, septa indistincte, subacute at tip, 21–57  $\Rightarrow$  2,8–4,2  $\mu$ .

Hab. On leaves of *Impatiens balsamina*, Nandi Hills, Mysore, 10-2-1954, leg. H. C. Govindu. (Fig. 18). The subhyaline conidia

and short unbranched conidiophores differentiate the species from others on *Impatiens*. *C. nojimai* has previously been recorded only from Japan.

*Cercospora angustata* Chupp & Solheim, in Monogr. Cercosp. p. 230, 1953.

Leaf spots circular to irregular, dark-brown, surrounded by a dark border on the upper surface, dingy-grey. Stroma well developed, composed of dark brown cells, 20—40  $\mu$  in diameter. Conidiophores compactly grouped, short and stumpy, olivaceous brown, unbranched, unseptate, hyaline at the tip, subgeniculate, 7—37  $\Rightarrow$  2,8—4,2  $\mu$ . Conidia subhyaline, obclavate to cylindrical, 1—8-septate, 16—71  $\Rightarrow$  2,8—5,5  $\mu$ .

Hab. On leaves of *Cassia glauca* var. *suffruticosa*, Patna, Bihar, 10-12-1952, leg. M. J. Thirumalachar (Fig. 19).

The species has previously been reported from Columbia, South America only on *Cassia hirsuta*.

*Cercospora occidentalis* Cke. Hedwigia 17: 39, 1878.

Hab. On leaves of *Cassia occidentalis*, Mysore, 13-9-1952, leg. H. C. Govindu and Patna, Bihar, leg. M. J. Thirumalachar, 1-11-1951. (Fig. 20).

*Cercospora marrubii* Tharp, Mycologia 9: 111, 1917.

Leaf spots circular to polygonal, 1—5 mm in diameter, often coalescent with each other to form large patches, dark brown in colour with a yellow hallow. Stroma absent or composed of few brown cells. Conidiophores fasciculate, 5—10 in number, olivaceous brown, unbranched, 1—5-septate, 24—85  $\Rightarrow$  3,5—4,5  $\mu$ . Conidia hyaline, acicular, truncate at base, tip acute, 1—16-septate, 36—92  $\Rightarrow$  2,8—3,5  $\mu$ .

Hab. On leaves of *Marrubium vulgare*, Bangalore, 25-8-1954, leg. H. C. Govindu (Fig. 21).

*Cercospora solani-melongenae* Chupp, Bothalia, 4: 892, 1948.

Leaf spots circular to subcircular, dark reddish-brown, often confluent with each other, becoming sooty black in appearance after profuse conidia formation. Stromata well developed, 20—60  $\mu$  in diameter, composed of brown cells. Conidiophores olivaceous-brown, fasciculate, compactly grouped, thick, short and stumpy, unbranched, 1—2-septate, 7—21  $\Rightarrow$  2,8—4,2  $\mu$ . Conidia subhyaline, 1—10-septate, clavate to cylindrical, 14—57  $\Rightarrow$  2,8—5,7  $\mu$ .

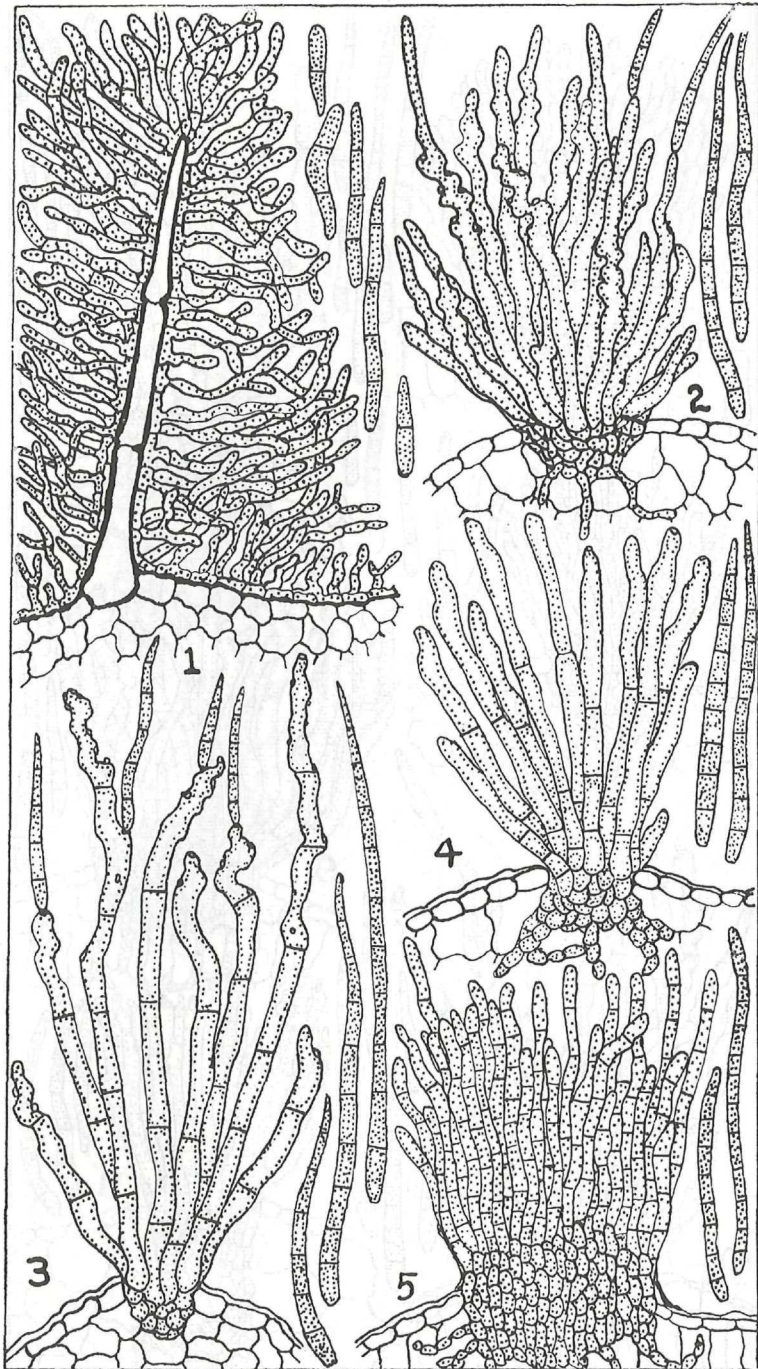
Hab. On leaves of *Solanum melongena*, Bangalore, 20-1-1952, leg. H. C. Govindu (Fig. 22).

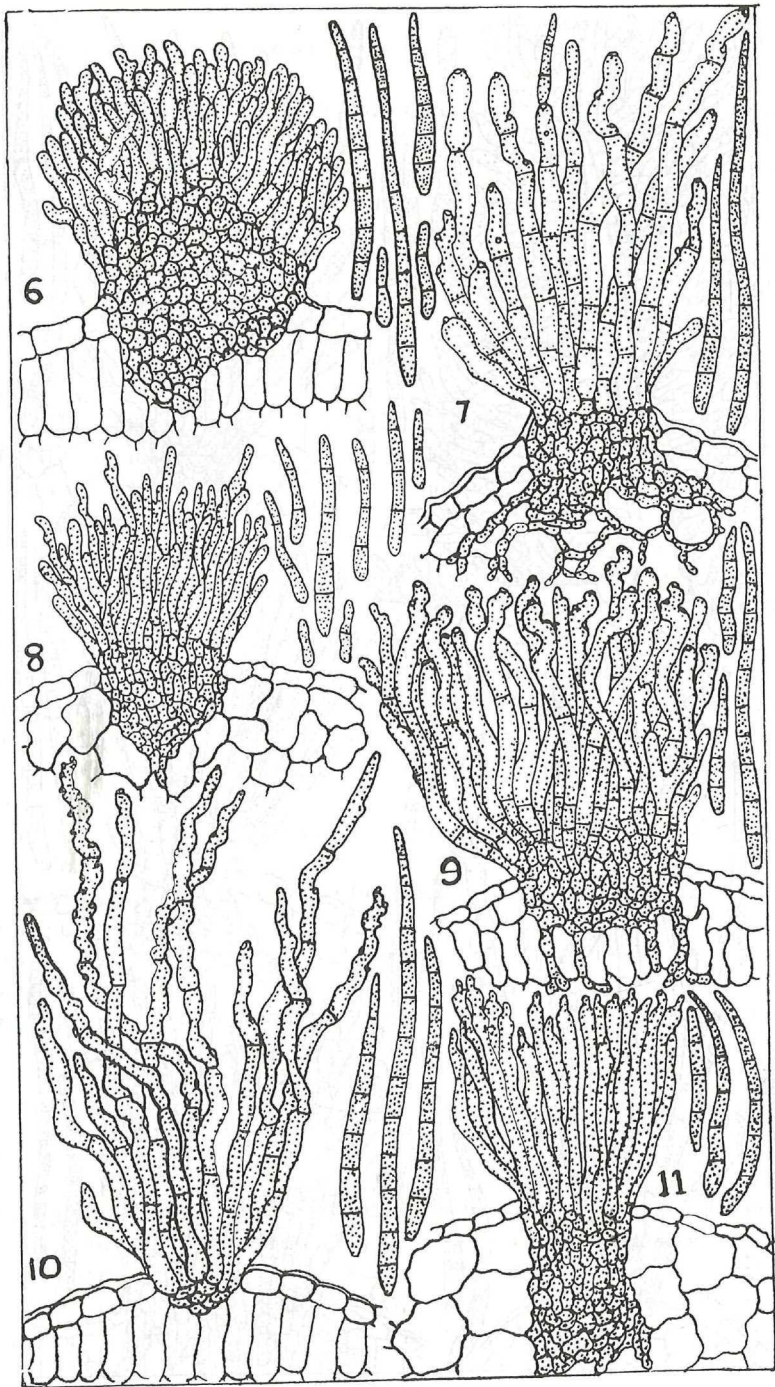
The fasciculate conidiophores developing from stroma, and bearing subhyaline conidia indicates that the species is *C. solani-melongenae* which has not been recorded before in India.

*Cercospora viticis* Ell. & Evr., Jour. Mycol. 3: 18, 1887.

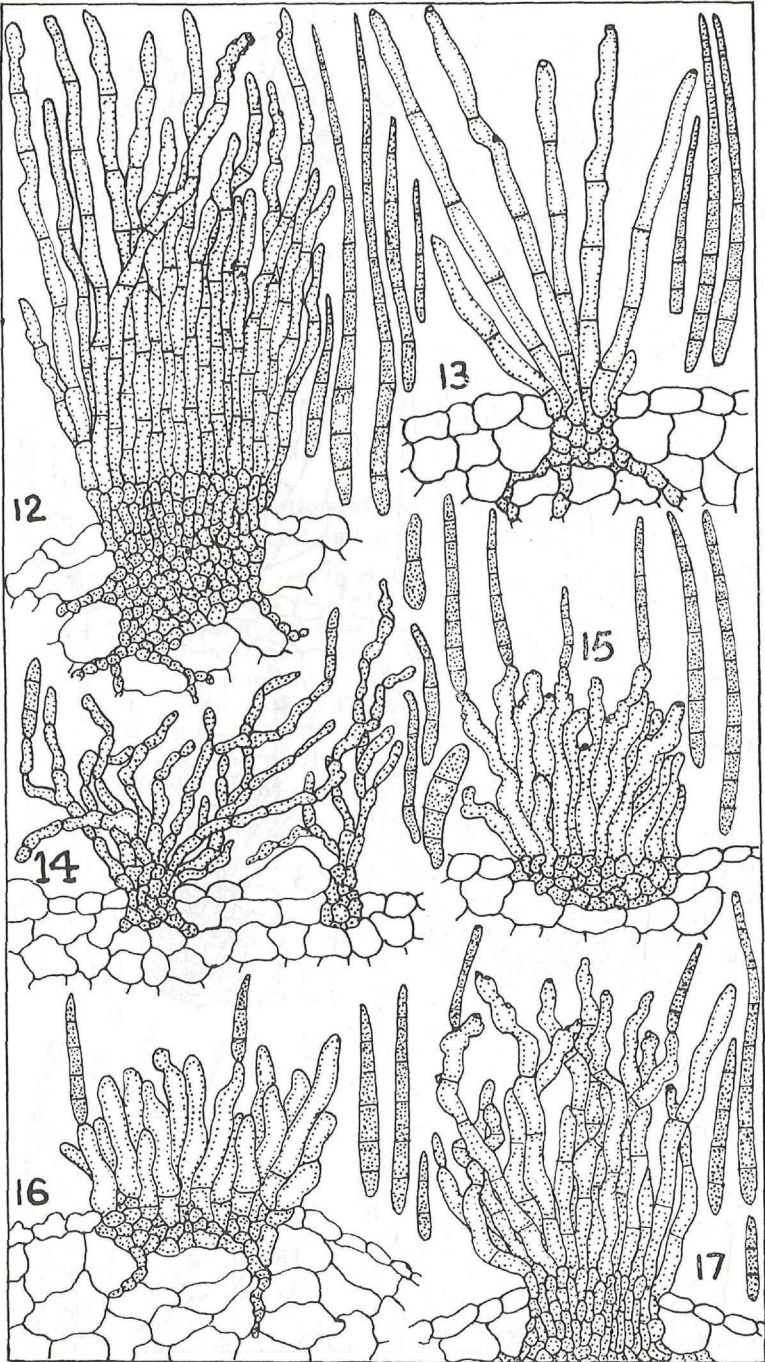
Hab. On leaves of *Vitex altissima*, Bannerghatta, Bangalore, 10-2-1952, leg. H. C. Govindu (Fig. 23).

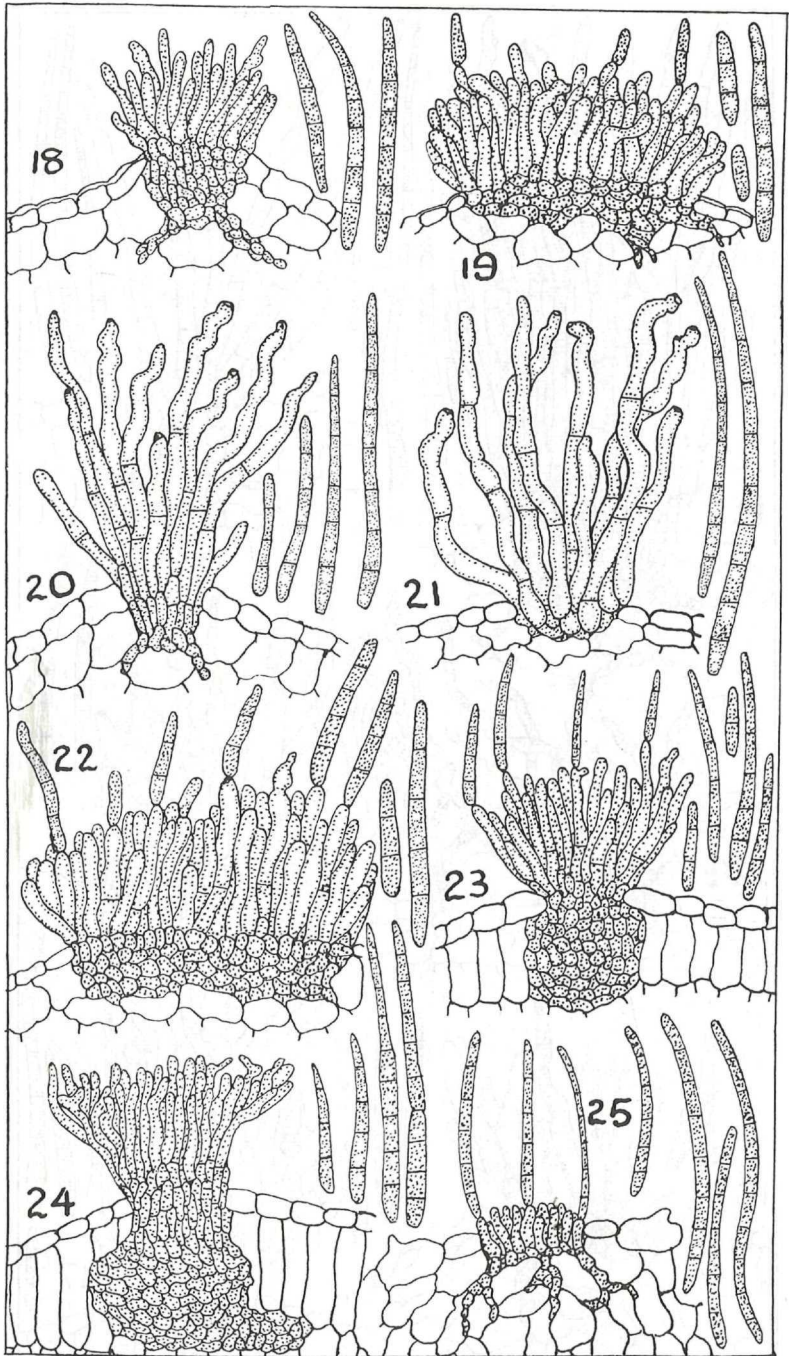














*Cercospora jasminicola* Muller & Chupp. Arch. Inst.

Veg. Rio de Janeiro, 3: 93, 1936.

Hab. On leaves of *Jasminium sambac*, Bangalore, 20-1-1954, leg.

H. C. Govindu (Fig. 24).

*Cercosporaella rottboelliae* sp. nov.

Inciting long brownish-black striae on leaves, often coalescent. Stroma absent, conidiophores hyaline, short, unbranched, unseptate, 14—21  $\approx$  2,8  $\mu$ . Conidia hyaline, cylindrical, 1—8-septate, 42—104  $\approx$  2,8  $\mu$ .

Hab. On leaves of *Hemarthria compressa* (*Rottboellia compressa*), Khandala, Poona, 20-6-1954, leg. M. J. Thirumalachar (Fig. 25).

Maculae striaeformes, brunneae vel nigrae. Hypostroma nullum; conidiophora hyalina, simplicia, continua, 14—21  $\approx$  2,8  $\mu$ . Conidia hyalina, cylindrica, 1—8-septata, 42—104  $\approx$  2,8  $\mu$ .

In conclusion the authors wish to express their gratefulness to Dr. Franz Petrak, Wien, for kindly translating the diagnoses of the new species into latin.

**Explanation of Plates VII to X.**

(Magnifications about  $\times$  750.)

- Fig. 1. *Cercospora vestita*. — Fig. 2. *C. dioscoreae*. — Fig. 3. *C. teucris*. — Fig. 4. *C. chicorii*. — Fig. 5. *C. pavettae-indicae*. — Fig. 6. *C. argyreiae*. — Fig. 7. *C. canescens*. — Fig. 8. *C. viticis*. — Fig. 9. *C. trapae-bispinosae*. — Fig. 10. *C. barleriae-cristatae*. — Fig. 11. *C. jussiaeae*. — Fig. 12. *C. canescens*. — Fig. 13. *C. guizoticola*. — Fig. 14. *C. biophyti*. — Fig. 15. *C. beticola*. — Fig. 16. *C. apii*. — Fig. 17. *C. curcumae*. — Fig. 18. *C. nojimai*. — Fig. 19. *C. angustata*. — Fig. 20. *C. occidentalis*. — Fig. 21. *C. marrubii*. — Fig. 22. *C. solani-melongenae*. — Fig. 23. *C. viticis*. — Fig. 24. *C. jasminicola*. — Fig. 25. *Cercosporaella rottboelliae*.

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