

## Notes on some Indian Cercosporae - X.

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This work is a continuation of the studies by the authors on species of *Cercospora* in India. Since the publication of the previous list, several investigators got interested (Chiddarwar, Sydowia and Indian Phytopathology 1959, Mycopathologia et Mycologia Applicata 1962; Munjal, Lall and Chona, Indian Phytopathology 1959, 1960, 1962) and made good contributions in this group, which remained neglected in India. The present authors first started this work in 1953 on this group in a concentrated way attempting to illustrate the fruiting structures in most of the cases. In the present paper, a systematic account of some of the Cercosporae collected is presented.

The authors are grateful to Prof. Dr. Franz Petrak for kindly giving us the latin diagnosis of the new species.

### 1. *Cercospora senecionis-grahamii* Thirum. & Govindu sp. nov.

Leaf spots ovoid to irregular, 2—5 mm. in diameter, dull-white in the centre surrounded by a brownish border. Fruiting epiphyllous rarely hypophyllous, stroma fairly well developed, compact and composed of olivaceous-brown cells, 15—30  $\mu$  in diameter. Conidiophores olivaceous-brown, arising in fascicles of 4—8, 1—6-septate, septa indistinct, rarely branched, sub-geniculate, slightly bulbous at base, rounded at apex, 40.2—85.4  $\times$  1.8—4.2  $\mu$ ; conidia hyaline, acicular to obclavate, straight or bent, obtuncate at base, subacute at tip, 1—14-septate, 45.6—151.6  $\times$  2.8—4.0  $\mu$ .

Maculae ellipticae vel irregulares, 2—5 mm diam., sordide albidae, brunneo-marginatae; caespituli epiphylli, raro etiam hypophylli; hypostroma bene evolutum, 15—30  $\mu$  diam., contextu pseudo-parenchymatico, e cellulis olivaceo-brunneis, composito; conidiophora olivaceo-brunnea, 6—8 fasciculatim ex hypostromate orta, 1—6-septata, septis indistinctis, raro ramulosa, subgeniculata, ad basin parum incrassata, antice obtusa, 40.2—85.4  $\times$  2.8—4.2  $\mu$ ; conidia hyalina angustissime obclavata, apicem versus paulatim attenuata et subacuminata, postice plus minusve truncata, 1—14-septata, 45.6—151.6  $\times$  2.8—4  $\mu$ .

Hab.: On leaves of *Senecio grahami* Hook., Mahabaleswar, near Poona, October 14, 1955, leg. O. P. Chiddarwar, MYSP Herb. No. 496 (Fig. 1).

Comparative studies indicate that *Cercospora senecionis-grahamii* is distinctly separate from *C. jacquiniana* Thumen and *C. senecionicola* J. J. Davis on several species of *Senecio*. The latter develops effuse spots and conidia and conidiophores are smaller in size. *C. jacquiniana*

has also shorter conidiophores and conidia with other differentiating characters.

2. *Cercospora wagatae* Thirum. & Govindu sp. nov.

Infection spots in irregular pale black patches often coalescing to form irregular patches, 1–2 mm. in diameter. Fruiting hypophyllous emerging through stomata, stroma well developed 25–80  $\mu$  in diameter, compact and composed of brown cells. Conidiophores medium olivaceous-brown to deep brown, arising in fascicles of 15–35, 3–8-septate, septa distinct, unbranched, irregular in width, non-geniculate, slightly broad at base, narrowly rounded at tip, tip subhyaline, 50.2–160.4  $\times$  3.1–4.9  $\mu$ ; conidia subhyaline to pale brown, cylindrical, straight to curved, obtruncate at base, bluntly rounded at apex, 1–5-septate, 25.4–60.2  $\times$  3.3–5.7  $\mu$ .

Maculae irregulares, nigrescentes, 1–2 mm diam., confluento etiam majores; caespituli hypophylli, e stomatibus emergentes; hypostroma bene evolutum, 25–80  $\mu$  diam. contextu pseudoparenchymatico, e cellulis brunneis composito; conidiophora olivaceo-brunnea vel obscure fusca, 15–35 fasciculatim ex hypostromate orta, indistincte 3–8-septata nec ramosa, crassitudine irregularia, recta, nec geniculata, ad basin indistincte incrassata, antice obtusa, in apice subhyalina, 50.2–160.4  $\times$  3.1–4.9  $\mu$ ; conidia subhyalina vel pallide brunnea, angustissime cylindracea, recta vel curvula, ad basin plus minusve truncata, in apice obtusa, 1–5-septata, 25.4–60.2  $\times$  3.3–5.7  $\mu$ .

Hab: On leaves of *Wagata spicata* Dalz., Balehonnur, Mysore State, May 5, 1954, leg. H. C. Govindu, MYSP Herb. No. 493 (Fig. 2).

3. *Cercospora lawsoniae-albae* Thirum. & Govindu sp. nov.

Leaf spots circular to oval, 1–4 mm. in diameter, grayish-white at centre and surrounded by dark-brown border. Fruiting amphigenous, emerging through stomata, stroma poorly developed, composed of dark-brown, compact, irregular cells, 15–30  $\mu$  in diameter. Conidiophores medium-brown to dark brown, arising in fascicles of 6–10, septate, septa distinct, unbranched, irregularly wavy, subgeniculate at tip, tip subhyaline, 45.5–140.4  $\times$  2.8–4.2  $\mu$ ; conidia hyaline, acicular to obclavate, straight or bent, truncate to subtruncate at base, conic to obovate at tip, 1–12-septatae, septa indistinct, 16.2–75.6  $\times$  1.2–2.1  $\mu$ .

Maculae orbiculares vel ellipticae, 1–4 mm diam., griseo-albae, obscure brunneo-marginatae; caespituli amphigeni, e stomatibus emergentes; hypostroma minutum 15–30  $\mu$  diam. contextu pseudoparenchymatico e cellulis obscure brunneis irregularibus, composito; conidiophora pallide vel obscure brunnea, 6–10 fasciculatim ex hypostromate orta, distincte septata nec ramosa, irregulariter undulata, apicem versus subgeniculata et subhyalina, 45.5–140.4  $\times$  2.8–4.2  $\mu$ ; conidia hyalina acicularia vel angustissime obcla-

vata, retca vel curvula, ad basin plus minusve truncata, apicem versus attenuata, indistincte 1—12-septata,  $16.2-75.6 \times 1.2-2.1 \mu$ .

Hab: On leaves of *Lawsonia alba* Lamk., Bannerghatta, Bangalore, April 4, 1954, leg. H. C. Govindu, MYSP Herb. No. 491 (Fig. 3).

4. *Cercospora randiae* Thirum. & Govindu sp. nov.

Leaf spots circular to polygonal, crimson-red with pale brown border and with or without dark-brown concentric rings above, brown to dull-brown below, tending to coalesce with each other to form large necrotic areas, 4—10 mm. in diameter. Fruiting hypophyllous, emerging through the stomata, stroma fairly well developed, pycnidial in shape with irregular to ovoid cells, brown, 25—45  $\mu$  in diameter. Conidiophores dark-olivaceous brown, arising in groups, loose, 2—5-septate, straight to tortuous, beaked at apex, unbranched, tip subhyaline and subtruncate,  $45.2-78.3 \times 3.1-4.1 \mu$ ; conidia subhyaline to pale brown, obclavate to broadly acicular, 1—12-septate, often slightly constricted at the septum, subtruncate at base, subobtuse at tip,  $55.5-128.8 \times 3.2-5.4 \mu$ .

Maculae orbiculares vel angulosae, coccineae, pallide brunneo-marginatae, interdum concentricae et obscurae brunneo-striolatae, subtus brunneae vel obscurae fuscae, saepe confluentes et tunc usque ad 4—10 mm diam. metientes; caespituli hypophylli, e stomatibus emergentes; hypostroma bene evolutum, late ovoideum, 25—45  $\mu$  diam. contextu pseudoparenchymatico, e cellulis irregulariter angulosis, brunneis, composito; conidiophora obscura olivaceobrunnea, laxe fasciculata, 2—5-septata, recta vel tortuosa nec ramosa, apicem versus attenuata, subhyalina et subtruncate,  $45.2-78.3 \times 3.1-4.1 \mu$ ; conidia subhyalina vel pallide brunnea, obclavata vel crassiuscule aciculosa, 1—12-septata, ad septa  $\pm$  constricta, ad basin subtruncate, in apice subobtusa,  $55.5-128.8 \times 3.2-5.4 \mu$ .

Hab: On leaves of *Randia brandisii* Gamble, Kemmangundi, Mysore State, May 15, 1954, leg. H. C. Govindu, MYSP Herb. No. 495 (Fig. 4).

5. *Cercospora spermaeocis* Thirum. & Govindu sp. nov.

Leaf spots circular to ovoid, 1—4 mm. in diameter, dark-brown to brown. Fruiting amphigenous emerging through stomata; stroma well developed, pale-brown, compact with irregular brown cells, 12—40  $\mu$  in diameter. Conidiophores medium olivaceous-brown to pale brown, arising in fascicles of 5—15, 1—5-septate, unbranched, geniculate, slightly bulbous at base, rounded at tip,  $40.1-79.2 \times 3.2-4.9 \mu$ ; conidia hyaline, obclavate to acicular, 1—12-septate, truncate at base, subacute at apex,  $39.9-135.9 \times 2.2-4.2 \mu$ .

Maculae orbiculares vel ellipticae, 1—4 mm diam., obscurae brunneae vel fuscae; caespituli amphigeni, e stomatibus emergentes; hypostroma bene evolutum, pallide brunneum 12—40  $\mu$  diam. contextu pseudoparenchymatico, e cellulis irregulariter angulosis,



brunneis composito; conidiophora olivacea vel pallide brunnea, 5—15 fasciculatim ex hypostromate orta, 1—5-septata nec ramosa, geniculata, ad basin subincrassata, antice obtusa, 40.1—79.2 × 3.2—4.9  $\mu$ ; conidia hyalina, obclavata vel acicularia, 1—12-septata, ad basin truncata, antice subacuta, 39.9—135.9 × 2.2—4.2  $\mu$ .

Hab: On leaves of *Spermacoce stricta* Linn. f. Bannerghatta, Bangalore, April 4, 1954, leg. H. C. Govindu, MYSP Herb. No. 492 (Fig. 5).

*Cercospora borrieriae* Ell. & Ev. is a different fungus with branched conidiophores which are longer and conidia which are larger in size. The subhyaline conidia is in contrast to the hyaline ones in the present species.

6. *Cercospora wendlandiae* Ramak. & Sund. Proc. Indian Acad. Sci. 38: 192, 1953.

Hab: On leaves of *Wendlandia notoniana* Wall., Kemmangundi, Mysore State, May 15, 1954, leg. H. C. Govindu, MYSP Herb. No. 494 (Fig. 6).

7. *Cercospora capsici* Heald & Wolf Mycologia 3: 15, 1911.

Hab: On leaves of *Capsicum annum* Linn., Goribidanur, Mysore State, January 5, 1962, leg. H. C. Govindu, MYSP Herb. No. 268 (Fig. 7).

This fungus causes leaf spotting especially on the lower leaves. When infection is severe, it causes premature defoliation.

8. *Cercospora nicotianae* Ell. & Ev. Proc. Acad. Sci. Phila. 45: 170, 1893.

Hab: On leaves of *Nicotiana tabacum* Linn., Goribidanur, Mysore State, January 5, 1962, leg. H. C. Govindu, MYSP Herb. No. 270; Bangalore, March 5, 1959, leg. H. B. Anand, MYSP Herb. No. 202; Chennapatana, Mysore State, June 6, 1961, leg. H. C. Govindu, MYSP Herb. No. 201 (Fig. 8).

This fungus commonly referred to as 'frog-eye' leaf-spot appears as large, circular sometimes zonate leaf spots, especially in the lower leaves. This is present in all tobacco growing areas of the State especially in Bangalore and Mandya districts.

9. *Cercospora ricinella* Sacc. & Ber. Atti R. Ist. Ven. Sci. Lett. Arti. VI. 3: 721, 1885.

Hab: On leaves of *Ricinus communis* Linn., Hebbal, Bangalore, May 15, 1954, leg. H. C. Govindu, MYSP Herb. No. 29; I. A. R. I., New Delhi, January 28, 1956, leg. K. S. M. Shastry, MYSP Herb. No. 28; Bangalore, July 6, 1961, leg. K. Venketaram, MYSP Herb. No. 30; Bangalore, December 28, 1961, leg. K. A. Lucy, MYSP Herb. No. 314 (Fig. 9).

10. *Cercospora koepkei* Kruger Ber. Versuch. Zuckerr. W. Java 1: 115, 1890.

Hab: On leaves of *Saccharum officinarum* Linn., Hebbal, Banga-

lore, June 14, 1961, leg. H. C. Govindu, MYSP Herb. No. 273; Gauripur, (W. Bengal?), March 6, 1904, leg. E. J. Butler, MYSP Herb. No. 47; Hebbal, Bangalore, January 20, 1962, leg. K. A. Lucy, MYSP Herb. No. 327 (Fig. 10).

11. *Cercospora abelmoschi* Ell. & Ev. Jour. Inst. Jamaica 1: 347. 1893.

Hab: On leaves of *Abelmoschus esculentus* (Linn.) Moensch., Hebbal, Bangalore, December 15, 1961, leg. H. C. Govindu, MYSP Herb. No. 272 (Fig. 11).

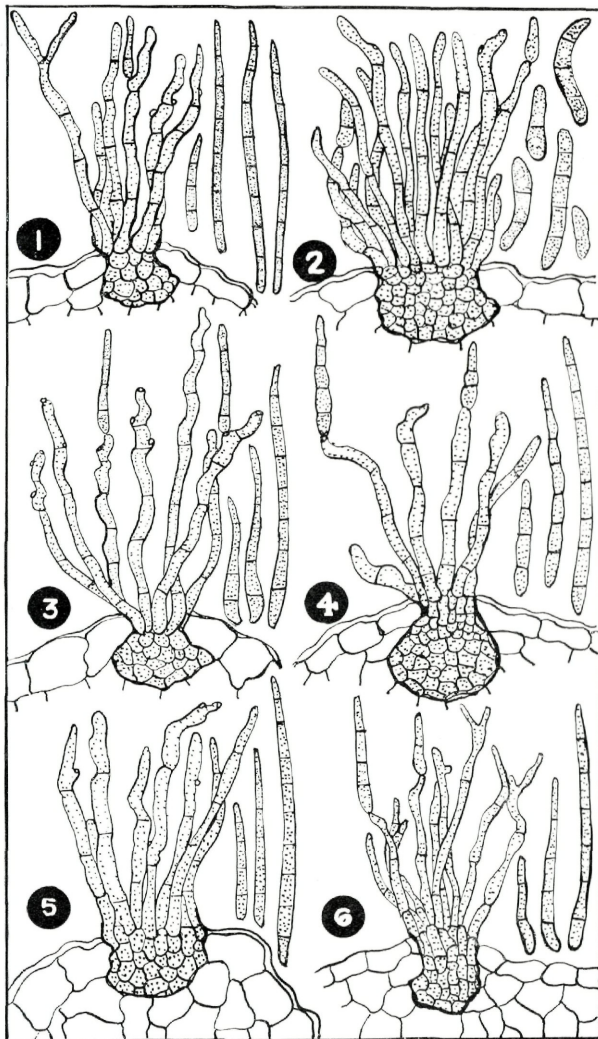
12. *Cercospora cajani* P. Henn. Hedwigia 41: 309. 1902.

Hab: On leaves of *Cajanus indicus* Spreng., Hebbal, Bangalore, December 15, 1961, leg. H. C. Govindu, MYSP Herb. No. 271; Hebbal, Bangalore, October 10, 1951, leg. H. C. Govindu, MYSP Herb. No. 394 (Fig. 12).

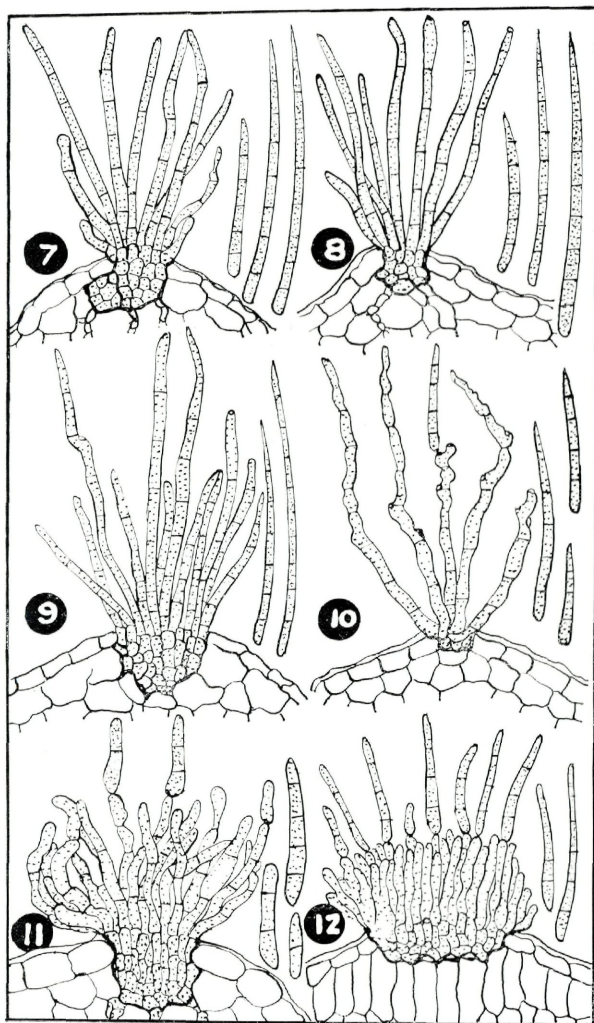
This fungus causes severe leaf-spotting especially on lower leaves. When infection is severe, it causes defoliation.

#### Explanation of plates IV. & V.

Fig. 1. *Cercospora senecionis-grahamii*. — Fig. 2. *C. wagatae*. — Fig. 3. *C. lawsoniae-albae*. — Fig. 4. *C. randiae*. — Fig. 5. *C. spermacoces*. — Fig. 6. *C. wendlandiae*. — Fig. 7. *C. capsici*. — Fig. 8. *C. nicotianae*. — Fig. 9. *C. ricinella*. — Fig. 10. *C. koepkei*. — Fig. 11. *C. abelmoschi*. — Fig. 12. *C. cajani*. — Magnifications about  $\times 750$ .









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