

## Contributions to our Knowledge of the Cercosporae of Bombay State I

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With Plates V & VI.

Species of the genus *Cercospora* are of widespread occurrence parasitising various species of flowering plants and ferns. The interest in the taxonomic study of this genus has been revived by the monographic account by Chupp\*) (1954) who brought together the various descriptions scattered in literature. The work on the species of *Cercospora* in India was taken up by Thirumalachar and Govindu which included large number of species not known before. In the present paper the author is presenting an account of *Cercosporae* of the Bombay State which is based on the work carried out for the last five years. The Bombay State with its varied climate and rainfall in different parts has much diversity in its flora, and this afforded a good opportunity for studying several *Cercospora* species parasitising them. The types of the new species are deposited in the Herb. Crypt. Ind. Orient, New Delhi, Commonwealth Mycological Institute, Ferry Lane, Kew, and at the U.S.D.A. Herbarium, Plant Industry Station, Beltsville, Maryland, U.S.A.

(1) *Cercospora arisaemae* Tai. Chinese Bot. Soc. Bul. **2**: 47. 1936.

Hab. On leaves of *Arisaema murrayi* (Graham) Hook.

Mahabaleshwar. 14-10-54, leg. P. P. Chiddarwar. This species has not been previously reported from India.

(2) *Cercospora barlericola* Payak & Thirum. Indian Phytopath. **2**: 191. 1949. Hab. On leaves of *Barleria cristata* Linn. Poona. 29-9-54. leg. P. P. Chiddarwar. This species has not previously been reported from Bombay State.

(3) ***Cercospora benghalensis*** Chiddarwar sp. nov.

Leaf spots amphigenous, dull brown to dark brown with pale brown centre, irregular, not coalescent, 0.5—4.0 mm. in diameter. Stroma pale brown, loose, sub-stomatal, 17—25  $\mu$  in diameter. Fruiting bodies amphigenous, emerging through stomata. Conidiophores fasciculate to non-fasciculate, 4—20 in number, loose, brown, divergent,

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\*) Chupp, Ch. (1954). A Monograph of Fungus Genus *Cercospora*. Ithaca, New York.

straight to curved, 0—11 septate, scars distinct, 1—4 bluntly geniculate, rounded at apex,  $27.2-233.1 \times 3.4-4.2 \mu$ . Conidia hyaline, acicular, sometimes filiform, straight to mildly curved, 2—22 septate, scars distinct, gradually attenuated, conic to obconic at tip truncate at base,  $27.3-273 \times 2.5 \mu$ .

Hab. On leaves of *Commelina benghalensis* Linn. Poona. 8. 9. 54. leg. P. P. Chiddarwar. No. 1 (Type) Figs. 1, 2 and 3.

Foliorum maculae amphigenae, obscurate brunneae vel fuscae brunneae centro pallide brunneo, irregulares, non coalescentes, 0.5—4 mm. diam. Stroma pallide brunneum, laxum, substomatale, 17—25  $\mu$  diam. Fructificationes amphigenae, emergentes per stomata. Conidiophori fasciculati vel non fasciculati, 4—20 numero, laxi, brunnei, divergentes, recti vel curvati, 0—11 septati, cicatricibus distinctis, 1—4 obtuse geniculati, rotundati ad apicem,  $27.2-233.1 \times 3.4-4.2 \mu$ . Conidia hyalina, hyalina, acicularia, aliquando filiformia, recta vel moderate curvata, 2—22 septata, cicatricibus distinctis, gradatim attenuata, conica vel obconica at apicem, truncata ad basin,  $27.3-273 \times 2.5 \mu$ .

(4) *Cercospora beticola* Sacc. var. **poonensis** var. nov. Chiddarwar. *C. beticola* Sacc. Nuov. Giorn. Bot. Ital. 8: 189. 1876.

Leaf spots amphigenous, numerous, circular to ovoid, dull white in the centre with pale brown periphery, surrounded by brown to purple border, not coalescent, 1—5 mm. in diameter. Stroma pale brown, compact, 17.0—34.0  $\mu$  in diameter. Fruiting bodies amphigenous, emerging through stomata. Conidiophores in fascicles, 5—20 in number, slightly compact, uniformly pale brown, straight to mildly curved, walls straight to slightly sinuous, non septate, rarely 1—2 septate, non geniculate, scars distinct, breadth uniform to slightly attenuated, bulged at the base, rounded at the apex,  $25.5-41.0 \times 3.4-5.1 \mu$ . Conidia hyaline, sub-obclavate to acicular, straight, 3—13 septate, scars distinct, walls smooth, gradually attenuated, conic to obconic at tip, truncate at base,  $35.0-117.0 \times 3.4-3.8 \mu$ .

Hab. On leaves of *Beta vulgaris* Linn. Poona. 24-3-53. leg. P. P. Chiddarwar. No. 33 (Type), Figs. 15 and 16.

The fungus differs from *Cercospora beticola* Sacc., which is reported from a wide host range, in having uniformly coloured non-geniculate and short conidiophores and smaller conidia and is, therefore, described as a new variety.

(5) *Cercospora blainvilleae* Govindu & Thirum. Sydowia 9: 226. 1955. Hab. On leaves of *Blainvillea latifolia* (L.) DC. Poona. 6-10-55. leg. P. P. Chiddarwar. This species is a new record for Bombay State.

(6) ***Cercospora blepharidis*** Chiddarwar sp. nov.

Leaf spots amphigenous, irregular to ovoid, pale to dark brown

with concentric rings especially distinct on lower sides, coalescent, 3—18 mm. in diameter. Stroma well developed, compact, dark brown, 25.5—50.0  $\mu$  in diameter. Fruiting bodies amphigenous, emerging through stomata. Conidiophores in compact fascicles, numerous, slightly divergent, brown, straight to irregularly curved, margin wavy, thick walled, 0—1 septate at base, rarely 2 septate, scars distinct, non-geniculate, unbranched, tapering gradually to abruptly, bulged at the base, rounded to narrowly obtuse at apex, 18.7—39.1  $\times$  3.4—4.4  $\mu$ . Conidia sub-hyaline to light coloured, narrowly acicular, straight to slightly curved, 6—13 septate, gradually attenuated, conic to obconic at tip, truncate at base, 34—59.5  $\times$  2.5  $\mu$ .

Hab. On leaves of *Blepharis asperrima* Nees. Khandala. 9-11-56. leg. P. P. Chiddarwar. No. 2 (Type) Figs. 4 and 5.

Foliorum maculae amphigenae, irregulares vel ovoideae, pallide vel fusce brunneae annulis concentricis distinctis praesertim in inferiore pagina, coalescentes, diametientes 3—18 mm. Stromata bene evoluta, compacta, fusce brunnea, diametientia 25.5—50.0  $\mu$ . Fructificationes amphigenae, emergentes per stomata. Conidiophori compacte fasciculati, plurimi, tenuiter divergentes, brunnei, recti vel irregulariter curvati, marginibus undulatis, parietibus crassis, 0—1-septati ad basin, raro bis septati, cicatricibus distinctis, non geniculati, nec ramosi, plus minusve gradatim fastigati, tumescentes in medio, rotundati vel anguste obtusi ad apicem, 18.7—39.1  $\times$  3.4—4.4  $\mu$ . Conidia subhyalina vel pallide colorata, anguste acicularia, recta vel tenuiter curvata, 6—13-septata, gradatim fastigata, conica vel obconica ad apicem, truncata ad basin, 34—59.5  $\times$  2.5  $\mu$ .

(7) *Cercospora blumeae* de Thuemen. Revue. Mycol. **2**: 38. 1880. Syn. *C. blumeae-lacerae* Sawada. Taiwan Agr. Rev. **38**: 694. 1942. Hab. On leaves of *Blumea eriantha* DC. Mahabaleshwar. 14-10-54. leg. P. P. Chiddarwar. This species has not been previously recorded from Bombay State.

(8) *Cercospora blumeicola* Das. Current Sci. **27**: 260—261. 1958. Hab. On leaves of *Blumea lacera* DC. Poona. 8-1-1956. leg. P. P. Chiddarwar. This species has not been previously reported from Bombay State

(9) ***Cercospora bombycina*** Chiddarwar sp. nov.

Leaf spots amphigenous, rounded to ovoid dull white with concentric pale brown rings in the centre, surrounded by dark brown border, not coalescent, 3—15 mm. in diameter, Stroma brown to pale brown, loose, sub-stomatal, 20—30  $\mu$  in diameter. Fruiting bodies amphigenous, emerging through stomata. Conidiophores in loose fascicles, 5—30 in number, brown, slightly divergent, straight to curved, margin sinuous, 2—6 distinctly septate, scars distinct, 1—6 sub-geniculate, breadth uniform, narrowly rounded at apex, 54—130

$\times 4.1-5.1 \mu$ . Conidia hyaline, sub-obclavate, straight, margin smooth, 4-12 septate, scars distinct, gradually attenuated, obconic at tip, truncate at base,  $54.6-129.7 \times 3-3.4 \mu$ .

Hab. On leaves of *Pothos scandens* Linn. Poona. 22-10-54. leg. P. P. Chiddarwar. No. 3 (Type) Figs. 6 and 7.

Foliorum maculae amphigenae, rotundatae vel ovoideae, sordide albae annulis concentricis pallide brunneis in medio, circumdatae margine fusce brunneo, non coalescentes, 3-15 mm. diam. Stroma brunneum vel pallide brunneum, laxum, substomatale, 20-30  $\mu$  diam. Fructificationes amphigenae, emergentes per stomata. Conidiophori laxe fasciculati, 5-30 numero, brunnei, paulum divergentes, recti vel curvati, marginibus sinuosis, 2-6 distincte septati, cicatricibus distinctis, 1-6 subgeniculati, latitudine uniformi, anguste rotundati ad apicem,  $54-130 \times 4.1-5.1 \mu$ . Conidia hyalina, subobclavata, recta, marginibus levibus, 4-12 septata, cicatricibus distinctis, gradatim attenuata, obconica ad apicem, truncata ad basin,  $54.6-129.7 \times 3-3.4 \mu$ .

(10) *Cercospora brachiata* Ell. & Ev., Jour. Mycol. **4**: 5. 1888. Syn. *C. amaranti* Lobik. Bolezni Rast. **17**: 193. 1928.

Hab. On leaves of *Amaranthus paniculatus* Linn. Poona. 12-12-55. Leg. P. P. Chiddarwar. This species is new record for India & *Amaranthus paniculatus* L. is a new host record for the fungus.

(11) *Cercospora calendulae* Sacc. *Michelia* **1**: 267. 1879.

Hab. *Calendula officinalis* Linn. Poona. 12-11-1956. leg. P. P. Chiddarwar. There is no previous record of this species from India.

(12) ***Cercospora canscorina*** Chiddarwar sp. nov.

Leaf spots amphigenous, irregular to angular, pale brown to brown with distinct dark brown border, not coalescing, 3-6 mm. in diameter. Stroma moderately developed, sub-stomatal, pale brown, compact, 17-42.5  $\mu$  in diameter. Fruiting bodies amphigenous, emerging through stomata. Conidiophores in fascicles, 5-20 in number, compact, thick walled, pale brown, slightly divergent, straight to curved, 1-3 septate, rarely non-septate, 2-4 bluntly geniculate. slightly attenuated, obconic at apex, broader at the base,  $29.8-85.0 \times 3.4-4.2 \mu$ . Conidia subhyaline, sub-obclavate, straight to curved, walls smooth, 3-9 septate, gradually attenuated, obconic at tip, truncate at base,  $31.2-89.9 \times 3-3.4 \mu$ .

Hab. On leaves of *Canscora diffusa* R. Br. Khandala. 9-11-1956. leg. P. P. Chiddarwar. No. 4 (Type) Figs. 8 and 9.

Foliorum maculae amphigenae, irregulares vel angulares, pallide brunneae vel brunneae, margine distincto, brunneae circumdatae, non coalescentes, 3-6 mm. diam. Stromata moderate evoluta, substomatalia pallide brunnea, compacta, 17-42.5  $\mu$  diam. Fructificationes

amphigenae, emergentes per stomata. Conidiophori fasciculati, 5—20 numero, compacti, crassis parietibus, pallide brunnei, tenuiter divergentes, recti vel curvati, 1—3-septati, raro non-septati, obtuse 2—4-geniculati, tenuiter attenuati, obconici ad apicem, latiores ad basin,  $28.9-85.0 \times 3.4-4.2 \mu$ . Conidia subhyalina, subobclavata, recta vel curvata, parietibus levibus, 3—9-septata, gradatim attenuata, obconica ad apicem, truncata ad basin,  $31.2-89.9 \times 3-3.4 \mu$ .

(13) *Cercospora carthami* (H. & P. Syd.) Sund. & Ramak. Agri. Jour. India. **23**. 383. 1928.

Syn. *Cercosporina carthami* H. & P. Syd. Ann. Mycol. **11**: 406. 1913. *C. carthami* Mendoza. Philipp. Jour. Sci. **75**: 168. 1941.

Hab. On leaves of *Carthamus tinctorius* Linn. Poona. 4-1-1955. leg. P. P. Chiddarwar. There is no previous record of this species in Bombay State.

(14) *Cercospora cassiae-siameae* Chiddarwar sp. nov.

Leaf spots amphigenous, irregular, generally at the margin, pale brown to brown, surrounded by indistinct brown border, rarely coalescent, 5—12 mm. in diameter. Stroma pale brown, compact, substomatal,  $17-23.8 \mu$  in diameter. Fruiting bodies amphigenous, mostly hypophyllous, emerging through stomata. Conidiophores in compact fascicles, numerous, pale brown to brown, slightly divergent, straight to mildly curved, 0—1 indistinctly septate, generally at the base, scars distinct, 1—2 in number, rarely 3, non-geniculate, unbranched, narrowed truncate at apex, blunt rounded at base,  $15.3-27.2 \times 3.4-4.2 \mu$ . Conidia light brown, narrowly cylindrical to cylindro-obclavate, straight, 3—10 septate, sub-truncate at base, rounded at apex,  $28.9-93.5 \times 3.4-4.2 \mu$ .

Hab. On leaves of *Cassia siamea* Lamk. Poona. 10-10-1958. leg. P. P. Chiddarwar. No. 5 (Type) Figs. 10 and 11.

Foliorum maculae amphigenae, irregulares, ut plurimum ad margines, pallide brunneae vel brunneae, circumdatae margine indistincto brunneo, raro coalescentes, 5—12 mm. diam. Stroma pallide brunneum, compactum, substomatale,  $17-23.8 \mu$  diam. Fructificationes amphigenae, vulgo hypophyllae, emergentes per stomata. Conidiophori compacte fasciculati, plurimi, pallide brunnei vel brunnei, parum divergentes, recti vel curvati, 0—1 indistincte septati, generatim ad basin, cicatricibus distinctis, 1—2 numero raro 3, non geniculati, non ramosi, angustati truncati ad apicem, obtuse rotundati ad basin,  $15.3-27.2 \times 3.4-4.2 \mu$ . Conidia pallide brunnea, anguste cylindrica vel cylindrico-obclavata, recta, 3—10 septata, subtruncata ad basin, rotundata ad apicem,  $28.9-93.5 \times 3.4-4.2 \mu$ .

(15) *Cercospora catappae* P. Hennings. Bot. Jahrbücher von Engler **34**: 56. 1905.

Syn. *C. terminaliae* Sawada. Formosa Agri. Rev. **38**. 701 1942.

Hab. On leaves of *Terminalia chebula* & *T. tomentosa* W. & A. Mahabaleshwar. 17-1-1955. leg. P. P. Chiddarwar. There is no previous record of this species from Bombay State; and *T. tomentosa* is a new host species.

- (16) *Cercospora colocasiae* Chupp. in Monogr. genus *Cercospora*, 58. 1954.

Syn. *C. caladii* Cooke var. *colocasiae* V. Höhnelt. Sitzb. Akad. Wiss. Wien, Math. nat. Kl. Abt. I. **116**: 150. 1907.

Hab. On leaves of *Colocasia esculenta* (L.) Schoot. Torna. 18-11-1958. leg. P. P. Chiddarwar. *Colocasia esculenta* is a new host record for this species.

- (17) *Cercospora chevalieri* P. Sacc. Syll. Fung. **22**: 1431. 1913. Syn. *C. amorphophalli* Pat. & Har., Bul. Soc. Mycol. de France **24**: 15. 1909.

Hab. On leaves of *Amorphophallus campanulatus* Blume. Poona. 6-11-1955. Leg. P. P. Chiddarwar. This species has not been previously recorded from Bombay State.

- (18) *Cercospora cleomes* Ell. & Hals., Jour. Mycol. **6**: 34. 1890. Hab. On leaves of *Gynandropsis pentaphylla* DC. Poona. 22-1-1954. leg. P. P. Chiddarwar. There is no previous record of this species from Bombay State.

- (19) *Cercospora celosiae* Syd. Ann. Mycol. **27**: 430. 1929. Hab. On leaves of *Celosia argentea* Linn. Poona. 18-11-1955. leg. P. P. Chiddarwar. There is no previous record of this species from Bombay State.

- (20) *Cercospora consimilis* Syd. Ann. Mycol. **23**: 423. 1925. Hab. On leaves of *Vernonia cinerea* (L.) Less. Poona. 3-12-1956. leg. P. P. Chiddarwar. There is no previous record of this species from Bombay State.

- (21) ***Cercospora cosmi*** Chiddarwar sp. nov.

Leaf spots amphigenous, prominent and darker on upper surface, irregular, whitish pale brown in the centre, surrounded by dark brown border, often coalescing, 2—6 mm. in diameter. Stroma sub-stomatal, compact, pale brown, 15.3—28.9  $\mu$  in diameter. Fruiting bodies amphigenous, chiefly epiphyllous, emerging through stomata. Conidiophores in fascicles, 4—15 in number, loose, divergent, pale brown, straight to curved, walls slightly wavy, 1—5-septate, 3—8 geniculate, slightly bulged at the base, 25.5—136  $\times$  5.1  $\mu$ . Conidia sub-hyaline, obclavate to acicular, straight to slightly recurved, 3—29 septate, scar distinct, gradually attenuated, conic to obconic at tip, truncate at base, 39.1—334.0  $\times$  2.5—3.4  $\mu$ .

Hab. On leaves of *Cosmos bipinnatus* Cav. Poona. 16-12-1956. leg. P. P. Chiddarwar. No. 6 (Type) Figs. 12, 13 and 14.

Foliorum maculae amphigenae, eminentes atque fuscores in pagina superiore, irregulares, albidopallide brunneae in medio, marginibus fusce brunneis, saepe coalescentes, 2—6 mm. diam. Stromata substomatalia, compacta, pallide brunnea 15.3—28.9  $\mu$  diam. Fructificationes amphigenae, vulgo epiphyllae, emergentes per stomata. Conidiophori fasciculati, numero 4—15, laxi, divergentes, pallide brunnei, recti vel curvati, parietibus tenuiter undulatis, 1—5-septati, 3—8-geniculati, tenuiter tumescentes ad basin, 25.5—136  $\times$  5.1  $\mu$ . Conidia subhyalina obclavata vel acicularia, recta vel tenuiter curvata, 3—29-septata, cicatricibus distinctis, gradatim fastigata, conica vel obconica ad apicem truncata ad basin, 39.1—334.0  $\times$  2.5—3.4  $\mu$ .

(22) **Cercospora cycleae** Chiddarwar sp. nov.

Leaf spots amphigenous, irregular, pale to dark brown, often coalescent, and forming big infection patches, 2—10 mm. in diameter. Stroma well developed, compact brown to dark brown, 17—42.5  $\mu$  in diameter. Fruiting bodies amphigenous, emerging through stomata. Conidiophores in fascicles, numerous, compact, pale brown to brown, slightly divergent, straight to mildly curved, 1—3 septate, 1—3 geniculate, rounded to obtuse at tip, bulged at the base, 13.6—34.0  $\times$  3.4  $\mu$ . Conidia obclavate to cylindro-obclavate, brown, straight to curved, 2—8 septate, scars distinct, attenuated at the apex, obtuse to obconic at tip, obclavately truncate to sub-truncate at base, 23.8—59.9  $\times$  3.4—4.1  $\mu$ .

Hab. On leaves of *Cyclea fissicalyx* Dunn. Mahabaleshwar. 19. 1. 1955. leg. P. P. Chiddarwar. No. 7 (Type). Figs. 17 and 18.

Foliorum maculae amphigenae, irregulares, pallide vel fusce brunneae, coalescentes saepe atque efformates textus infectionis magnos, 2—10 mm. diam. Stromata bene evoluta, compacta, brunnea vel fusce brunnea, 17—42.5  $\mu$  diam. Fructificationes amphigenae, emergentes per stomata. Conidiophori fasciculati, plurimi, compacti, pallide brunnei vel brunnei, tenuiter divergentes, recti vel curvati, 1—3-septati, 1—3-geniculati, rotundati vel obtusi ad apicem, tumescentes ad basin, 13.6—34.0  $\times$  3.4  $\mu$ . Conidia obclavata vel cylindrico-obclavata, brunnea, recta vel curvata, 2—8-septata, cicatricibus distinctis, attenuata ad apicem, obtuse vel obconica ad apicem, obclavate truncata vel subtruncata ad basin, 23.8—59.9  $\times$  3.4—4.1  $\mu$ .

(23) **Cercospora dalbergiae-latifoliae** Chiddarwar sp. nov.

Leaf spots amphigenous, irregular, dark brown towards periphery, pale brown in the centre becoming ash colour with age, not coalescing, 2—12 mm. in diameter. Stroma sub-globular, brown, compact, 17—51  $\mu$  in diameter. Fruiting bodies amphigenous, emerging through stomata. Conidiophores in fascicles, compact, brown, slightly divergent, thick walled, straight to curved, 3—8 septate, scars distinct, 1—10 bluntly geniculate, slightly bulbous at base, rounded to obconic

at apex,  $54.4-170.0 \times 4.2-5.1 \mu$ . Conidia hyaline, acicular, straight to curved, 6-16 septate, scars distinct, gradually attenuated, conic at tip, truncate at base,  $62.4-295.5 \times 2.5 \mu$ .

Hab. On leaves of *Dalbergia latifolia* Roxb. Poona. 16-12-1956. leg. P. P. Chiddarwar, No. 8 (Type). Figs. 19, 20 and 21.

Foliorum maculae amphigenae, irregulares, fusce brunneae ad margines, pallide brunneae in medio, ad maturitatem evadentes cinereae, non coalescentes, 2-12 mm. diam. Stromata subglobularia, brunnea, compacta, 17-51  $\mu$  diam. Fructificationes amphigenae, emergentes per stomata. Conidiophori fasciculati, compacti, brunnei, tenuiter divergentes, crassis parietibus, recti vel curvati, 3-8-septati, cicatricibus distinctis, 1-10-geniculati obtuse, tenuiter bulbosi ad basin, rotundati vel obconici ad apicem,  $54.4-170.0 \times 4.2-5.1 \mu$ . Conidia hyalina, acicularia, recta vel curvata, 6-16-septata, cicatricibus distinctis, gradatim attenuata, conica ad apicem, truncata ad basin,  $62.4-295.5 \times 2.5 \mu$ .

(24) **Cercospora eclipticola** Chiddarwar sp. nov.

Leaf spots epiphyllous, irregular to elongated with dirty white centre and pale brown periphery, not coalescent, 0.5-3 mm. in diameter. Stroma very poorly developed, pale brown, substomatal. Fruiting bodies amphigenous, emerging through stomata, conidiophores non-fasciculate, 1-4 in number, brown, straight to curved, walls sinuous, 2-5 distinctly septate, constricted, scars distinct, 2-4, rarely bluntly geniculate, bulged at the base, rounded at apex,  $35-81 \times 3.4-4.2 \mu$ . Conidia subhyaline, narrowly acicular, straight to curved, 9-22 septate, scars distinct, obconic to conic at tip, truncate at base,  $117-280 \times 3-3.4 \mu$ .

Hab. On leaves of *Eclipta alba* (Linn.) Hassk. Poona. 19-3-1956. leg. P. P. Chiddarwar, No. 9 (Type), Figs. 22, 23 and 24.

Foliorum maculae epiphyllae, irregulares vel elongatae centro sordide albo, peripheria pallide brunnea, non coalescentes 0.5-3 mm. diam. Stroma pauperrime evolutum, pallide brunneum substomatale. Fructificationes amphigenae, emergentes per stomata. Conidiophori non fasciculati, 1-4 numero, brunnei, recti vel curvati, parietibus sinuosis, 2-5 distincte septati, constricti, cicatricibus distinctis, 2-4 raro obtuse geniculati, tumescentes ad basin, rotundati ad apicem,  $35-81 \times 3.4-4.2 \mu$ . Conidia subhyaline, cicatricibus, distinctis, obconica vel conica ad apicem, truncata ad basin,  $117-280 \times 3-3.4 \mu$ .

(25) **Cercospora elaeagnicola** Chiddarwar sp. nov.

Leaf spots epiphyllous, round to ovoid, dark brown when young and brown to pale brown when old, surrounded by pale yellow necrotic area, not coalescing. 4-15 mm. in diameter. Stroma well developed, brown, compact, sub-epidermal, 34-68  $\mu$  in diameter. Fruiting bodies epiphyllous, rarely hypophyllous, emerging, through-



stomata. Conidiophores in fascicles, numerous, brown, not divergent, straight to curved, 1—4 septate at the base, non-geniculate, unbranched, considerably bulged at the base, obconic to truncate at apex, 22.1—39.0  $\times$  2.5—3.8  $\mu$ . Conidia hyaline, cylindric, 2—8 septate, breadth uniform, truncate at base, rounded at apex, 17.0—51.1  $\times$  3.4  $\mu$ .

Hab. On leaves of *Elaeagnus conferta* Roxb. Khandala, 9-11-1956. leg. P. P. Chiddarwar. No. 10 (Type), Figs. 25 and 26.

Foliorum maculae epiphyllae, rotundatae vel ovoideae, fusce brunneae cum novellae, brunneae vel pallide brunneae ad maturitatem, circumdatae area necrotica pallide lutea, non coalescentes, 4—15 mm. diam. Stromata bene evoluta, brunnea, compacta, sub-epidermalia, 34—68  $\mu$  diam. Fructificationes epiphyllae, raro hypophyllae, emergentes per stomata. Conidiophori fasciculati, plurimi, brunnei, non divergentes, recti vel curvati, 1—4-septati ad basin, non-geniculati, non-ramosi, nonnihil tumescentes ad basin, obconici vel truncati ad apicem, 22.1—39.0  $\times$  2.5—3.8  $\mu$ . Conidia hyalina, cylindrica, 2—8-septata, uniformiter lata, truncata ad basin, rotundata ad apicem, 17.0—51.1  $\times$  3.4  $\mu$ .

(26) **Geroospora fagarae** Chiddarwar sp. nov.

Leaf spots amphigenous, irregular, dark brown above, pale brown below, not coalescent, distinct pale yellow necrotic area, 3—10 mm. in diameter. Stroma well developed, compact, brown, 34—102  $\mu$  in diameter. Fruiting bodies hypophyllous, rarely epiphyllous, emerging through stomata. Conidiophores in fascicles, numerous, compact, brown, thick walled, slightly divergent, straight to curved, walls irregularly sinuous, 1—2 distinctly septate, rarely 3 septate, scars 1—3, rarely 4—5, non-geniculate, obtuse at tip, rounded at base, 34—59  $\times$  3.4—4.1  $\mu$ . Conidia obclavate to cylindro-obclavate, pale brown, straight, walls sinuous, 0—3, septate, rarely up to 8-septate, scars distinct, gradually attenuated, obtuse to rounded at apex, truncate at base, 23.8—79.9  $\times$  4.2—5.1  $\mu$ .

Hab. On leaves of *Fagara budrunga* Roxb. Bhimashankar. 5-3-1956. leg. P. P. Chiddarwar. No. 11 (Type), Figs. 27, 28 and 29.

Foliorum maculae amphigenae, irregulares, fusce brunneae supra, pallide brunneae infra, non-coalescentes, distinctae, pallide luteam aream necroticam efformantes, 3—10 mm. diam. Stromata bene evoluta, compacta, brunnea, 34—102  $\mu$  diam. Fructificationes hypophyllae, raro epiphyllae, emergentes per stomata. Conidiophori fasciculati, plurimi, compacti, brunnei, crassis parietibus, tenuiter divergentes, recti vel curvati, parietibus irregulariter sinuosis, 1—2-septati distincte, raro 3-septati, cicatricibus 1—3, raro 4—5 praesentibus, non-geniculati, obtusi ad apicem, rotundati ad basin, 34—59  $\times$  3.4—4.1  $\mu$ . Conidia obclavata vel cylindrico-obclavata, pallide brunnea, recta, parietibus sinuosis, 0—3-septata, raro usque ad 8-septata, cicatricibus,

*distinctis, gradatim attenuata, obtusa vel rotundata ad apicem, truncata ad basin, 23.8—79.9 × 4.2—5.1 μ.*

(27) ***Cercospora ficl-religiosae*** Chiddarwar sp. nov.

Leaf spots amphigenous, irregular to angular, brown, become pale brown to dirty white at maturity, rarely coalescent, irregular brown necrotic area, 1—5 mm. in diameter. Stroma well developed, dark brown, compact, 30.6—68.0 μ in diameter. Fruiting bodies chiefly hypophyllous, emerging through epidermal tissue. Conidiophores in compact fascicles, numerous, pale brown, thick walled, non-divergent, straight to mildly curved, margin slightly sinuous, generally non-septate, rarely 1 septate, scars distinct and apical, non-geniculate, rounded to truncate at tip, slightly bulged at base, 17—32.3 × 2.5—3.4 μ. Conidia sub hyaline, sub-obclavate to cylindro-obclavate, rarely cylindrical, straight, margin smooth, 1—6 septate, generally 3—4 septa, scars distinct, rounded to truncate at tip, conic to obconic at base, 20.4—62.9 × 3—3.4 μ.

Hab. On leaves of *Ficus religiosa* Linn. Mulshi (Near Poona). 11-1-1957. leg. P. P. Chiddarwar. No. 12 (Type), Figs. 30, 31 and 32.

Foliorum maculae amphigenae, irregulares vel angulares, brunneae, ad maturitatem evadentes pallide brunneae vel sordide albiae, raro coalescentes, area necrotica brunnea irregulari, 1—5 mm. diam. Stroma bene evolutum, compactum, 30.6—68.0 μ diam. Fructificationes vulgo hypophyllae, emergentes per textus epidermales. Conidiophori compacte fasciculati, plurimi, pallide brunnei, crassis parietibus, non divergentes, recti vel moderate curvati, marginibus tenuiter sinuosis, ut plurimum non-septati, raro 1-septati, cicatricibus distinctis et apicalibus, non-geniculati, rotundati vel truncati ad apicem, paulum, tumescentes ad basin, 17—32.3 × 2.5—3.4 μ. Conidia subhyalina, sub-obclavata vel cylindrico-obclavata, raro cylindrica, recta, marginibus levibus, 1—6-septata, vulgo 3—4-septata, cicatricibus distinctis, rotundata ad apicem, conica vel obconica ad basin, 20.4—62.9 × 3—3.4 μ.

(28) *Cercospora fukushiana* (Matusuura) Yamamoto. Jour. Plant. Prot. **14**: 699. 1927.

Syn. *C. balsaminae* Mendoza. Philipp. Jour. Sci. **75**: 166. 1941.

*Cercosporina fukushiana* Matusuura. Trans. Tattori Soc. Agr. Sci. Japan: **1**: 83. 1928.

Hab. On leaves of *Impatiens acaulis* Arn. Mahabaleshwar. 6-12-1955 and *Impatiens balsamina* Linn. Poona. 8-12-1954, leg. P. P. Chiddarwar. *Impatiens acaulis* Arn., is a new host for the fungus.

(29) *Cercospora lepidagathidis* Govindu & Thirum. Sydowia **9**: 222. 1955.

Hab. *Lepidagathis cuspidata* Nees. Mahabaleshwar. 24-1-1956. leg. P. P. Chiddarwar. There is no previous record of this species from Bombay State.

- (30) *Cercospora maculicola* Thirum. & Govindu. Sydowia **8**: 343. 1954.

Hab. On leaves of *Bidens biternata* Merr. & Sherff. Poona. 11-1-1954. leg. P. P. Chiddarwar. There is no previous record of this species from Bombay State.

- (31) *Cercospora marsdeniae* Hansford. Proc. Linn. Soc. London. **158**: 50. 1947.

Hab. On leaves of *Marsdenia volubilis* Cooke. Mahabaleshwar. 24-1-1956. leg. P. P. Chiddarwar. There is no previous record of the species from India.

- (32) *Cercospora noveboracensis* Ell. & Ev., Jour. Mycol. **3**: 14. 1887.

Hab. On leaves of *Vernonia indica* Clarke. Mahabaleshwar. 19-1-1955. leg. P. P. Chiddarwar. There is no previous record of this species from Bombay State.

- (33) *Cercospora peristrophe* Thirum. & Govindu. Sydowia **7**: 47. 1953.

Hab. On leaves of *Peristrophe bicalyculata* Nees. Poona. 10-12-1956. leg. P. P. Chiddarwar. There is no previous record of this species from Bombay State.

- (34) *Cercospora senecionis-grahamii* Thirum. & Govindu. Sydowia (in press).

Hab. On leaves of *Senecio grahami* Hook. Mahabaleshwar. 14-9-1955. leg. P. P. Chiddarwar. The species is not previously described from Bombay State.

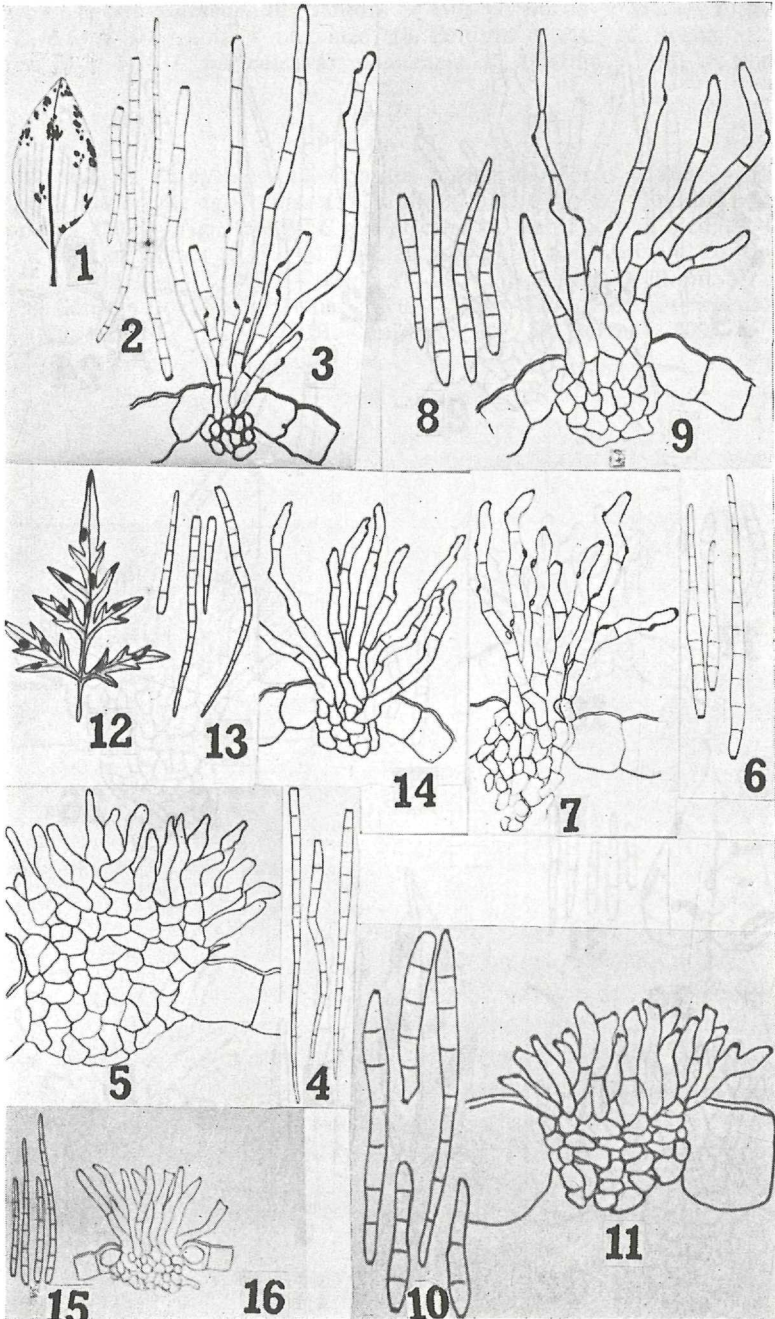
- (35) *Cercospora tridaxis-procumbentis* Govindu & Thirum. Sydowia **8**: 49. 1953.

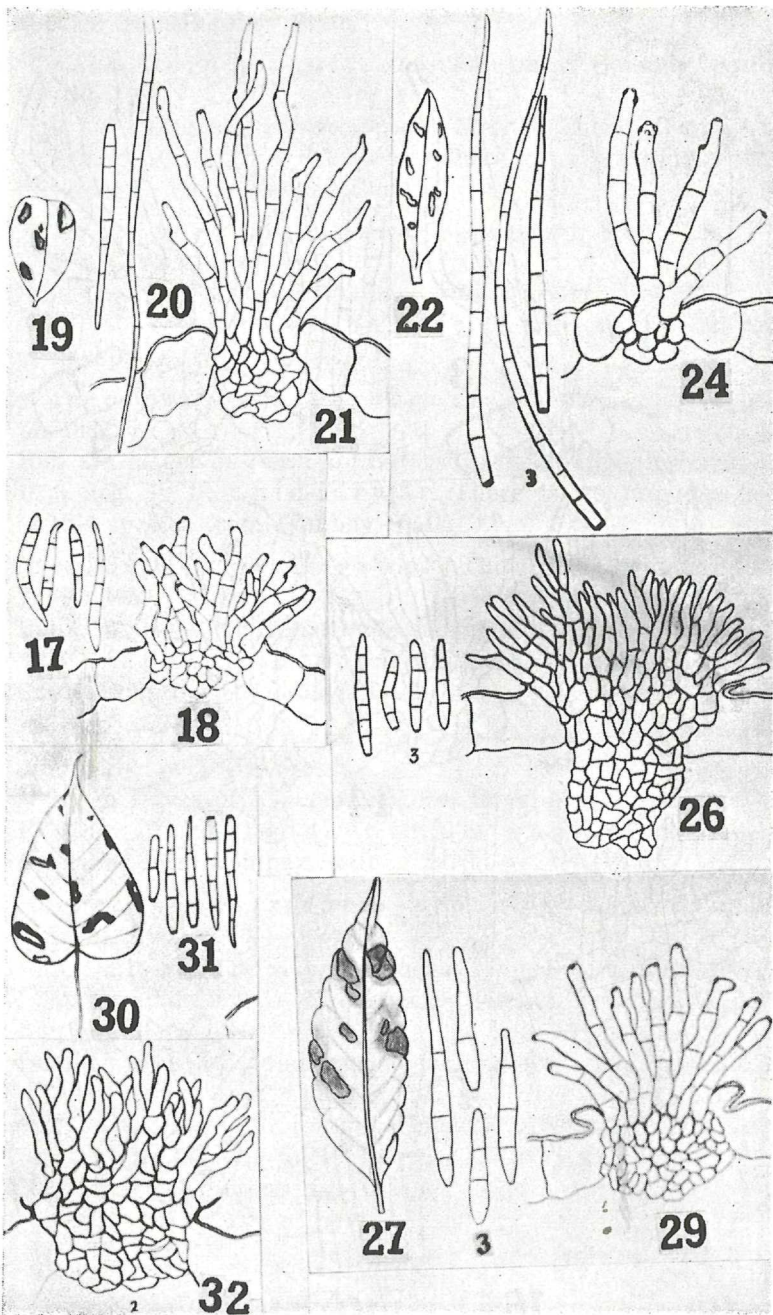
Hab. On leaves *Tridax procumbens*, Linn. Poona. 12-10-1955. leg. P. P. Chiddarwar. This species has not been described from Bombay State.

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#### Plate I.

Figs. 1—3. *Cercospora benghalensis*. 1. Habit  $\times$  nat. size; 2. Conidia  $\times$  290; 3. Sorus  $\times$  290. — Figs. 4 and 5. *C. blepharidis*. 4. Conidia  $\times$  300; 5. Sor





×300. — Figs. 6 and 7. *C. bombycina*. 6. Conidia ×420; 7. Sorus ×420. — Figs. 8 and 9. *C. canscorina*. 8. Conidia ×430; 9. Sorus ×430. — Figs. 10 and 11. *C. cassia-siameae*. 10. Conidia ×410; 11. Sorus ×410. — Figs. 12—14. *C. cosmi*. 12. Habit × nat. size; 13. Conidia ×290; 14. Sorus ×290. — Figs. 15 and 16. *C. beticola* var. *poonensis*. 15. Conidia ×220; 16. Sorus. ×220.

Plate II.

Figs. 17 and 18. *C. cycleae*. 17. Conidia ×280; 18. Sorus ×280. — Figs. 19—21. *C. dalbergiae-latifoliae*. 19. Habit × nat. size; 20. Conidia ×420; 21. Sorus ×420. — Figs. 22—24. *C. eclipticola*. 22. Habit × nat. size; 23. Conidia ×430; 24. Sorus ×430. — Figs. 25 and 26. *C. elaeagnicola*. 25. Conidia ×300; 26. Sorus ×300. — Figs. 27—29. *C. fagarae*. 27. Habit × nat. size; 28. Conidia ×430; 29. Sorus ×430. — Figs. 30—32. *C. fici-religiosae*. 30. Habit × nat. size; 31. Conidia ×300; 32. Sorus ×300.

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