

Some Rhizomycophilous and Foliicolous Fungi of Ginger from India-II.

By M. P. HAWARE, L. K. JOSHI and N. D. SHARMA

Department of Plant Pathology, J. N. Agricultural University, Jabalpur, India.

The first paper of this series was entitled, „Some Foliicolous, Rhizomycophilous and Foliicolous Fungi of Ginger from India“ (HAWARE, JOSHI and SHARMA, Sydowia). In this paper, which is second in series, new fungi isolated from rhizomes and soil are being described. No fungi, parasitic on leaves are being described here. Some of the fungi reported here are responsible for a rot of ginger during storage. Many of the fungi were not reported previously as rhizome borne or soil borne.

The serial number are in continuation from the previous paper. The specimen cultures have been deposited in the Herb. I. M. I. Kew.

Ascomycotina

12. *Chaetomium globosum* KUNZE ex FRIES
in Syst. Mycol., 3: 255, 1829.
Isolated from soil (ginger field), Adhartal Jabalpur, August 1972,
Leg. N. D. SHARMA, Herb. I. M. I. No. 172185.
13. *Chaetomium spirale* ZOPF sens. lat.
in Nova acta Leop. Carol. Akad., 42: 275, 1884.
Isolated from soil (ginger field), Adhartal, Jabalpur, August 1972,
Leg. N. D. SHARMA, Herb. I. M. I. No. 172104.
14. *Thielavia sepedonium* EMMONS
in Bull. Torrey bot. Club, 59: 415, 1932.
Isolated from soil (ginger field), Adhartal Jabalpur, Sept. 1972,
Leg. N. D. SHARMA, Herb. I. M. I. No. 172185.
15. *Thielavia terricola* (GILMAN & ABBOTT) EMMONS.
in Bull. Torrey bot. Club, 57: 123-1261, 1930.
Isolated from soil (ginger field), Adhartal Jabalpur, Oct. 1972,
Leg. N. D. SHARMA, Herb. I. M. I. No. 172181.
16. *Leptosphaerulina trifolii* (ROST.) PETRAK,
in Sydowia, 13: 67-86, 1959, Phytopathology, 51: 680, 1961.
Isolated from soil (ginger field), Adhartal Jabalpur, Oct. 1972,
Leg. N. D. SHARMA, Herb. I. M. I. No. 174089.
Colonies slow-growing, covered with a black crust of large,
often compound ascocarps; perithecia darkbrown, globose to sub-

globose, $130-220 \times 50-90 \mu$, ostiolate, asci clavate to fusiform, hyaline, bitunicate, paraphysate, stalked, with 8-irregularly arranged ascospores; ascospores oval to elliptical, subhyaline to darkbrown at maturity with conspicuous gelatinous sheath, 4-transverse septa, 0-2 longitudinal septa, $26-34 \times 10-12 \mu$.

Although the ascospore dimension given is unusually small the fungus is the same in all other essential characters. The difference could be attributed to natural variation within a species (GRAHM & LUTTRELL, 1961). A careful review of literature showed that there is no previous record of this fungus from soil of India.

Deuteromycotina

17. Conidial state of *Nectria inventa* Pethybr.

in Trans. Brit. mycol. Soc., vi, p. 107, 1919.

Isolated from ginger rhizome (*Zingiber officinale* ROSE.), Adhartal, Jabalpur, July 1973, Leg. M. P. HAWARE, Herb. I. M. I. No. 174092.

Colonies grey to red when old, hairy; conidiophores subulate, darkbrown below, paler above or almost hyaline, upto 350μ at the apex, branches formed singly, in pairs or verticils beneath at the upper 3-7 septa, concolourous with the stipe; each branch or stipe bears usually 3-5 phialides at its end and a few also along the sides; phialides lageniform with well-defined collerates, hyaline to very pale brown, $10-18 \mu$ long, $2-3 \mu$ thick in the broadest part; conidia ellipsoidal, hyaline, $2-6 \times 2-3 \mu$.

ELLIS (1971) in his monographic treatment to „Dematiaceous hyphomycetes“, placed this fungus under conidial state of *Nectria inventa*. Subramanian (1971) placed it under the same perfect state but under the name *Verticillium luteo-album* and it has been recorded from India under this name on a variety of hosts. Now it is reported as „brown rot“, a storage disease of ginger.

18. *Aureobasidium pullulans* (DE BARY) ARNAUD

1918, Les Asterinées (in Ann. Ec. Agric. Montpellier, N. S. 16: 39.

Isolated from soil (ginger field) Adhartal, Jabalpur, Sept. 1972, Leg. N. D. SHARMA, Herb. I. M. I. No. 172174.

Colonies effuse, at first white or creamy, later becoming black at least in part and usually slimy, slowgrowing, yeast-like in appearance; mycelium immersed, often torulose, very variable in thickness and shape of cells, cells sometimes rounding off and separating, young hyphae hyaline, thick-walled, septate $10-36 \times 2-7,5 \mu$; old hyphae brown, cells barrel shaped, thick-walled, $7-13,2 \times 2,7-11,0 \mu$, chlamydosporeslike thick walled mycelial cells are round, sometimes aggregated, $3,3-19,8 \times 2,2-18,8 \mu$; conidiophores lacking; conidia arising individually on minute apiculations or directly from the vegetative hyphae; conidia hyaline, ovoid, oblong or clavate,

produced in slime, smooth, continuous, sometimes 1-septate, primary spores derived from vegetative hyphae frequently give rise to secondary and tertiary series of blastospores, $2,2-22 \times 1,6-4,4 \mu$.

Dr. STOCKDALE of Commonwealth Mycological institute identified it as *Aureobasidium* sp. In our culture chlamydospores are thick-walled and in abundance. Spores also show some variations, but it is better to place it at present in broad concept of *Aureobasidium* which shows much variation in culture (COOKE, 1961, 1962).

19. *Botryodiplodia theobromae* PAT.

in Syll. Fung. 22: 1011, 1913.

as *Lasiodiplodia theobromae* (PAT.) GRIFF. & MAUBL.

in Ann. mycol. Berl. 14: 205, 1916.

Isolated from soil (ginger field), Imalia, Jabalpur, December 1972, Leg. N. D. SHARMA, Herb. I. M. I. No. 172170.

20. *Curvularia senegalensis* (SPEG.) SUBRAM.

in J. Indian bot. Soc., 35: 466, f. 11, 1956.

Isolated from soil (ginger field) and also from ginger rhizomes Adhantal, Jabalpur, December 1972, Leg. N. D. SHARMA, Herb. I. M. I. No. 174095.

Colonies gregarious, black, velvety; mycelium olive brown, septate hyphae upto 5μ in diam; conidiophores single or in fascicles, erect, straight or flexuous, septate, brown, $60-150 \mu$ long, $3-5 \mu$ wide; geniculate at the tip; conidia unequally ventricose-fusiform, straight or curved, mostly 4 septate, at times 3-5 septate, $16,5-25 \times 6-10 \mu$; central cell of the conidium the darkest, widest and longest, olivaceous black, apical and basal cells paler in colour and subhyaline, with distinct basal scar.

21. *Curvularia trifolii* (KAUFFM.) BOEDIJN

in Bull. Jardin Botan. Buitenzorg, Ser. III, 13: 128, 1933.

Isolated from soil (ginger field) Adhantal, Jabalpur, November 1972, Leg. N. D. SHARMA, Herb. I. M. I. 172168.

Colonies dark brown, mycelium composed of branched septate, pale brown, smooth or verrucose, hyphae upto 4μ wide; conidiophores long, olivebrown, septate, geniculate, thick towards the apex, upto 300μ long, 5μ wide; conidia acropleurogenous, brown, 3-septate, the third cell larger and darker than the others, unequally ventricose-fusiform, mostly strongly curved, the two central cells are darker than the end cells; $19-30 \times 8-11 \mu$.

22. *Drechslera hawaiiensis* (BUGNICOURT) SUBRAM. & JAIN ex M. B. ELLIS;

in ELLIS, Dematiaceous Hyphomycetes, 1971, p. 415.

SUBRAM. & JAIN, 1966, Curr. Sci., 35: 354 (as 'hawaiiense').

Isolated from ginger rhizome, Adhantal, Jabalpur, February 1973, Leg. N. D. SHARMA, Herb. I. M. I. No. 174093.

Colonies on PDA ash-white to smoky-grey, conidiophores simple, erect, thick-walled, septate, solitary, geniculate, olivaceous-brown, $23-60 \times 2,1-4,1 \mu$; conidia light-brown, cylindrical with rounded ends distinctly scarred at the base 3-6 septate borne in whorls generally, $21-32 \times 4,2-6,3$, base $2,1 \mu$ wide.

23. *Drechslera heveae* (PETCH) M. B. ELLIS comb. nov.

= *Helminthosporium heveae* PETCH 1906 Ann. R. bot. Gdns. Peradeniya 3 (1): 8-9.

also in ELLIS Dematiaceous Hyphomycetes 1971 p. 451.

Isolated from soil (ginger field), Adhantal, Jabalpur, January 1973 Leg. N. D. SHARMA Herb. I. M. I. No. 174092.

Conidiophores solitary or in groups straight or flexuous geniculate, cylindrical, pale to midbrown, upto 200μ long, $4-7 \mu$ thick, much darker in culture; conidia usually curved, navicular or fusiform, midgolden to reddish brown, smooth, 5-9-pseudoseptate, mostly $35-80 \times 9-17 \mu$ hilum $3-4 \mu$ wide.

The culture examined by Dr. M. B. ELLIS of the Commonwealth Mycological Institute, Kew, who reported "It is *Drechslera* sp. possibly co. *heveae* or *D. incurvata*. In our culture on PDA conidia are red coloured with a distinct hilum place it close to *D. heveae*."

24. *Fusarium arthrosporioides* SHERBAKOFF

in Mem. Cornell agric. Exp. Sta. 6, p. 175, 1915.

Isolated from soil (ginger field), Adhantal, Jabalpur, September 1972, Leg. N. D. SHARMA Herb. I. M. I.

Aerial mycelium white with weft of rose or salmon colour, substratum leather brown or light red, 1-celled conidia $4-6 \times 3,8 \mu$, 3-5 septate, spindle - to lance - shaped slender conidia, $35 \times 5,8 \mu$ and occasional larger, more or less pedicellate, slightly curved, spindle - or sickled-shaped, 5-septate conidia $42 \times 4 \mu$, lacks chlamydospores.

F. arthrosporioides is a new record for India.

25. *Fusarium equiseti* (CORDA) SACC.

in Syll. Fung. 4: 707, 1886.

WOLLENWEBER & REINKING, Die Fusarien, p. 63, 1935.

Isolated from soil (ginger field) and also from ginger rhizomes, Adhantal, Jabalpur, December 1972, Leg. N. D. SHARMA, Herb. I. M. I. No. 172188.

26. *Fusarium semitectum* BERK. ex RAV.

in BERK., *Grevillea*, 3: 98, 1875.

Isolated from soil (ginger field), Adhantal, Jabalpur, August 1972, Leg. N. D. SHARMA, Herb. I. M. I. No. 172187.

27. *Memmoniella echinata* (RIV.) GALL.

in Trans. Brit. mycol. Soc., 18: 163-165, 1933.

Isolated from ginger rhizomes, Adhantal, Jabalpur, July 1972, Leg. N. D. SHARMA, Herb. I. M. I.

Colonies slowgrowing, thick, black; conidiophores dilute brown, erect, 2–3 septate, $45-80 \times 3-4,5 \mu$ with compact whorls of about 8 phialides; phialides 5–8, subhyaline, pyriform or ellipsoidal or clavate, slightly diverging, $6-8 \times 3-4 \mu$, conidia black, globose to angular, catenulate, flattened dorsiventrally, verrucose, 3–4 μ in diam.

Cause 'blackrot' of ginger rhizome.

28. *Scopulariopsis brevicaulis* (SACC.) BAINIER,

in Bull. trimest. Soc. mycol. Fr., 23: 98–100, 1907.

Isolated from soil (ginger field), Adhartal, Jabalpur, December 1972, Leg. N. D. SHARMA, Herb. I. M. I. No. 172175.

29. *Trichurus spiralis* HASSELBRING,

in Bot. Gaz., 29: 321, 1900.

Isolated from soil (ginger field) also from ginger rhizomes, Adhartal, Jabalpur, September 1972, Leg. N. D. SHARMA, Herb. I. M. I. No. 172174.

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Autor(en)/Author(s): Haware M. P., Joshi L. K., Sharma N. D.

Artikel/Article: [Some Rhizomiicolous and Foliicolous Fungi of Ginger from India-II. 143-147](#)