

NEW RECORDS ON INDIAN MELIOLINEAE

By

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Eight species of the genus *Meliola* have been collected and described for the first time from India. They are : *Meliola amoorae* Yates ; *M. huileri* Syd. ; *M. capensis* (K & C) Theiss. ; *M. cyrtchaeta* Syd ; *M. jasmini* Hansf. & Stev. ; *M. litseae* Syd. var *rotundipoda* Hansf. *M. machili* Yaman ; and *M. mucunae* Hansf. and Deight.

This paper deals with eight species of the genus *Meliola* collected from different parts of West Bengal. They are described and illustrated below.

1. *Meliolia amoorae* Yates, *Philipp Journ. Sci. C. Botany*, **13** : 364, 1918
(Text-Fig. 1)

The *fungus* is borne only on the upper surface of leaf. It forms black, wooly, scattered, round, superficial, dense patches upto 4.5 mm in diameter. Sometimes 2 to 3 patches coalesce assuming an irregular shape.

The *mycelium* is superficial, and closely reticulate. It is composed of dark brown, septate, branched, straight hyphae, cells 7.92-19.8 x 7.55-8.32 nm producing opposite branches (rarely one sided) and hyphopodia at an acute to wide angle just behind the septa.

The *hyphopodia* are of two types ; capitate and mucronate, the capitate hyphopodia are alternately arranged, rarely irregular, 2-celled, dark brown, straight or bent, 12.28-23.76 nm long. lower cell of the hyphopodium is cuneate to cylindrical, 3.96-7.92 x 7.13-8.32 nm and the upper cell of the hyphopodium is cylindrical, entire, 8.28-15.9 x 7.52-8.32 nm with a small circular spot at the centre. The mucronate hyphopodia are few and mixed with capitate hyphopodia, solitary or oppositely arranged, rarely one sided or irregular, unicellular, ampulliform, brown, 22.55-24.56 x 4.36-5.95 nm.

The *mycelial setae* are scattered but highly aggregated encircling the perithecia, stiff, straight to slightly curved, unbranched, capitate tip, septate, 236.6 - 760.5 x 7.13-8.71 nm and longer than the perithecia.

The *perithecia* are many, single or in groups, black, round, verrucose wall, seated in the centre of the mycelial colony, 51.48-135.6 nm in diameter. The *asci* are few, oval to elliptical, broad, sessile, 2-3 spored. The *ascospores* are cylindrical, broad, 4-septate, rounded at ends, constricted at each septum, smooth walled, straight, brown, 39.6-43.96 x 15.84-16.63 nm.

Host : On leaves of *Amoora* sp.

Locality : Baikunthapur forest (Jalpaiguri) ; March 3, 1976 : SC72 (IMI 215558).

2. *Meliola butleri* Syd., *Ann. Mycol.*, Berlin, 9 : 379, 1911.

(Text. fig. 2)

The *fungus* occurs on both surfaces of leaf. It forms black, velvety, scattered, orbicular, superficial dense patches, upto 6 mm. in diameter.

The *mycelium* is superficial and closely reticulate. It is composed of dark brown, septate, branched, straight to substraight hyphae, cells mostly 13.8-19 x 5.1-6.5 nm, producing opposite branches and hyphopodia at an acute to wide angle just behind the septa.

The *hyphopodia* are of two types, capitate and mucronate. The capitate hyphopodia are alternate, opposite or irregular, 2-celled, dark brown, straight or bent, 19.4-21.2 nm. The lower cell of the hyphopodium is small, cuneate to cylindrical, 5.9-6.12 x 5.34-6.2 nm and the upper cell of the hyphopodium is capitate, oval to pyriform, entire, 8.39-12.02 x 5.1-7.2 nm with a small circular hyaline spot in the apical region. The mucronate hyphopodia are few, irregular, unicellular, ampulliform, brown, 17-21.8 x 3.5 - 7.6 nm.

The *mycelial setae* are scattered, especially around the base of the perithecia, stiff, straight, septate much longer than the perithecia, simple and acute or 2-4 dentate, 388-878 x 8.5 - 11 nm.

The *perithecia* are many, scattered, round, black, with uneven wall, seated in the centre of the mycelial colony, 90-190.8 nm in diameter. The *asci* are many, oval, sessile, 2-spored, The *ascospores* are cylindrical, broad, 4-septate, rounded at ends, constricted at each septum, straight, smooth-walled, brown, 43.6 - 55 x 17.1 - 24.3 nm.

Host : On leaves of *Citrus cinensis*

Locality : Mirik (Darjeeling), November 20, 1975, SC 48 (IMI 199446).

3. *Meliola capensis* (K. & C.) Theiss., *Ann. Mycol.* 10 : 19, 1912

(Text fig. 3)

The *fungus* is borne on both surface of leaf, but more prevalent on the upper surface. It forms black, scattered, orbicular, superficial thin to subdense patches upto 1.5 cm in diameter. Sometimes 2 or 3 patches coalesce and take an irregular shape.

The *mycelium* is superficial and loosely reticulate. It is composed of dark brown, septate, branched, slightly wavy hyphae. Cells usually 18-39.6 x 6.75-7.12 nm, producing opposite branches (rarely one sided) and hyphopodia at an acute to wide angle just behind the septa.

The *hyphopodia* are of two types : capitate and mucronate. The capitate hyphopodia are brown, oppositely arranged, (rarely solitary or irregular), 2-celled, antrorse, straight or bent, 10.5-15.2 nm long. The lower cell of the hyphopodium is small, cuneate, 3.1-3.62 x 6.16-6.64 nm and the upper cell of the hyphopodium is capitate oval to cylindrical, entire, 7.2 - 11.82 x 6.64 - 7.2 nm. The mucronate hyphopodia are oppositely arranged (rarely irregular or solitary), unicellular, ampulliform, brown, 20.25-21.3 x 7-7.5 nm.

The *mycelial setae* are very few, scattered, longer than the perithecia, stiff, acute, straight or slightly curved, unbranched, septate, black, 306-1242 x 9-13, 32 nm.

The *perithecia* are many, scattered or in groups, black, round with verrucose wall, seated in the mycelial colony, 118-319.6 nm in diameter. The perithecial setae (setose) are many, shorter than the mycelial setae, end more curved. The *asci* are oval to elliptical, sessile, 2-spored.

The *ascospores* are cylindrical, straight, 4-septate, rounded at ends, smooth walled, constricted at each septum, brown, 32.25-51.4 x 10.5 - 18.08 nm. The germ tubes come out from one end cell and adjacent cell.

Host : On leaves of *Meliosma pinnata* Planch.

Locality : Sukna forest (Darjeeling), March 2, 1976, SC 64 (IMI 215541).

4. *Meliola cyrtochaeta* Syd., *Ann. Mycol.* 26 : 85, 1928

Text-Fig. 4

The *fungus* is borne on both surfaces of leaf, but more prevalent on the upper surface. It forms black, scattered, round, superficial dense patches, upto 6 mm in diameter. Sometimes patches coalesce and take an irregular shape.

The *mycelium* is superficial and loosely reticulate. It is composed of dark brown, septate branched substraight hyphae, cells usually 30.4-41.2 x 8.18-10.01 nm,

producing opposite branches and hyphopodia at an acute to wide angle just behind the septa.

The *hyphopodia* are of two types : capitate and mucronate. The capitate are alternate, rarely irregular, 2-celled, dark brown, straight to bent, 16.9-18.72 nm. The lower cell of the hyphopodium is small, cuneate to cylindrical, 6.2-7.8x6.01-6.12 nm and the upper cell of the hophopodium is capitate, nearly round, entire, 10.8 - 12.12 x 8.5 - 9.45 nm. The mucronate hyphopodia are few, oppositely or alternately arranged, rarely solitary, unicellular, ampulliform, dark brown, 13.8 - 17.61 x 7.85-8.3 nm.

The *mycelial setae* are scattered specially round the base of the perithecia, longer than the perithecia, stiff, obtuse, unbranched septate, hooked-tip and 152-310 x 6.89 - 7.62 nm.

The *perithecia* are many, scattered or in groups, black, round, wall verrucose, the centre of the mycelial colony like pin heads, 75-262 nm in diameter.

The *asci* are many, oval to elliptical, sessile, 2-4 spored. The *ascospores* are cylindrical, 4-septate, rounded at ends, constricted at each septum, middle cell slight larger than the other abjuscent cells, straight, brown, smooth walled, 35-42.2x 10-11.98 nm.

Host : On leaves of *Uncaria* sp.

Locality : Baikunthapur forest (Jalpaiguri), March 3, 1976, SC60 (IMI 215646).

5. *Meliola jasmini* Hansf. & Stev, *Journ. Linn. Soc. London*, 51 : 273, 1937.

Text-Fig. 5

The *fungus* is borne on both surfaces of leaf, but is more vigorous on the upper surface than on the lower. It forms black scattered, irregular, superficial thin patches upto 2mm. in diameter. The *mycelium* is superficial and loosely reticulate. It is composed of brown septate branched straight to slightly wavy hyphae' cells mostly 21.8-28.6x5.94-8.32 nm, giving rise to opposite (rarely one sided) hyphopodia at an acute to wide angle just behind the septa.

The *hyphopodia* are of two types, capitate and mucronate. The capitate hyphopodia are alternately arranged, 2-celled, brown straight or bent, 21.78-31.68 nm long. The lower cell of the hyphopodium is cuneate to cylindrical, 7.92-11.88x7.52-8.32 nm. The upper cell of the hyphopodium is capitate to cylindrical, entire 11.88-19.8 x 8.32-13.1 nm with a small circular spot at the centre. The mucronate hyphopodia are few, solitary or oppositely arranged, unicellular, ampulliform, brown, 15.84-19.8 x 8.32-8.72 nm.

The *mycelial setae* are rarely scattered but highly aggregated at the base of the perithecia, stiff or slightly curved, unbranched, mostly acute, septate, much longer than the perithecia, brown in colour, 320.2 - 676 x 8.32 - 8.72 nm.

The *perithecia* are many, scattered or in groups, black, shiny, seated on the mycelium like pin heads, round, verrucose, 79.2-178 nm in diameter.

The *asci* are many, oval to elliptical, sessile, 2-spored. The *ascospores* are cylindrical, 4-septate, rounded at ends, constricted at each septum, straight, broad to cylindrical, smooth walled, hyaline when young but brown at maturity, 35.65-43.56 x 11.88-15.84 nm.

Host : On leaves of *Jasminum pubescens* Willd.

Locality : Seroke forest (Darjeeling), March 26, 1976, SC 75 (IMI 215559).

6. *Meliola litseae* Syd. var. *rotundipodo* Hansf., *Reinwardtia* 3 : 88, 1954

(Text fig. 6)

The *fungus* is borne only on the lower surface of leaf. It forms regularly circular, black, superficial thin patches upto 1.5 cm in diameter. Sometimes it takes flocculose appearance on the leaf surface. The *mycellium* is superficial and loosely reticulate. It is composed of dark brown septate branched wavy hyphae, cells mostly 23.76-39.6 x 5.94-8.32 nm giving rise to opposite branches at an acute to wide angle.

The *hyphopodia* are of two types : capitate and mucronate. The capitate hyphopodia are alternately arranged, rarely one sided or irregular, 2-celled, brown, straight or bent, antrose 19.41-22.97 nm long. The lower cell of the hyphopodium is small, cuneate to cylindric, 3.96-7.12 x 7.52-8.32 nm. The upper cell of the hyphopodium is capitate, oval, entire, 15.44-15.84 x 11.08 - 11.88 nm. The mucronate hyphopodia are few, solitary (rarely alternate), unicellular, ampulliform, brown, 21.78-24.16 x 7.53-8.32 nm.

The *mycelial setae* are scattered but highly aggregated encircling the perithecia, long, stiff, straight, acute, unbranched, septate, 304.2 - 1014 x 7.92-11.88 nm.

The *perithecia* are many, scattered or in groups, black, round with uneven wall, seated in the centre of the mycelial colony, 79.2-158.4 nm. in diameter.

The *asci* are few, oval to elongated, sessile, 2-spored. The *ascospores* are cylindrical, broad, 4-septate, rounded at ends, constricted at each septum, smooth-walled, straight, brown, 39.6-47.52x17.028-20.2 nm.

Host : On leaves of *Litsaea* sp.

Locality ; Baikunthapur forest (Jalpaiguri) ; March 3, 1976 ; SC 107 (IMI-215551).

7. *Meliola machili* Yaman., *Trans Nat. Hist. Son. Formosa*, **31** : 23, 1941
(Text-fig. 7)

The *fungus* is borne only on the upper surface of leaf. It forms black, scattered, round superficial thin patches upto 5 mm in diameter. Sometimes the patches coalesce and take an irregular shape. The *mycelium* is superficial and loosely reticulate. It is composed of dark brown, septate branched slightly wavy hyphae. Cell mostly 26.74 - 45.84 x 7.64-10.69 nm, producing opposite branches (rarely one-sided) and hyphopodia at an acute angle just behind the septa.

The *hyphopodia* are of two types : capitate and mucronate. The capitate hyphopodia are alternately arranged, rarely one sided, 2-celled, straight or slightly bent, 19.10 - 30.56 nm long. The lower cell of the hyphopodium is small, cuneate, 4.2 - 7.64 x 7.25 - 8.02 nm. The upper cell of the hyphopodium is capitate, oval to cylindrical, entire, 14.89 - 22.92 x 9.93 - 13.37 nm. The mucronate hyphopodia are few, oppositely or alternately arranged, unicellular, ampulliform, brown, 19.10 - 30.56 x 7.64 - 10.69 nm.

The *mycelial setae* are aggregated, encircling the perithecia, stiff, straight or slightly bent, longer than the perithecia, acute, unbranched, septate, and 362.9 - 668.5 x 7.64 - 12.84 nm.

The *perithecia* are many, scattered or in groups, round, black, possessing verrucose wall, seated in the centre of the mycelial colony and 133.7 - 343.8 nm in diameter.

The *asci* are many, oval, sessile, 3-spored. The *ascospores* are cylindrical, straight, and septate, rounded at ends, smooth-walled, constricted at each septum, brown, 42.02-49.65 x 17.19-19.48 nm, germ tubes are coming out from the ascospore wall.

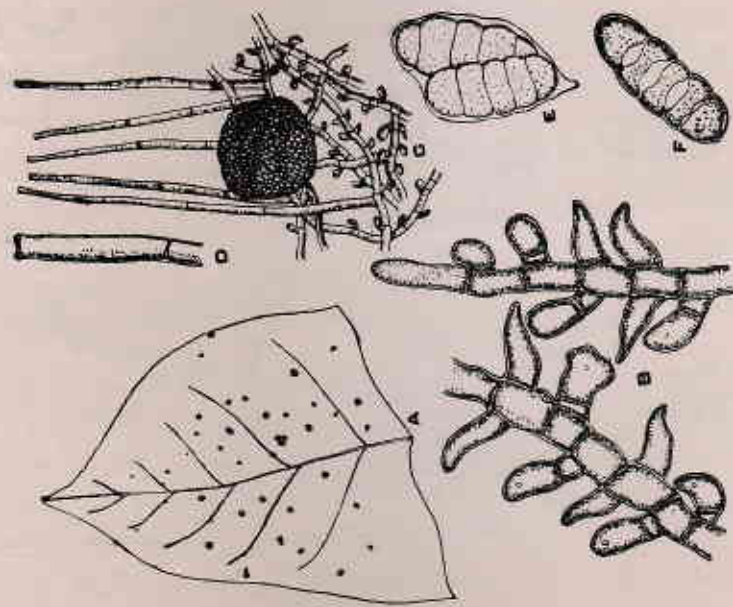
Host : On leaves of *Machilus edulis* King

Locality : Senchal lake (Darjeeling) ; July 10, 1977 ; SC 135 (IMI 215566)

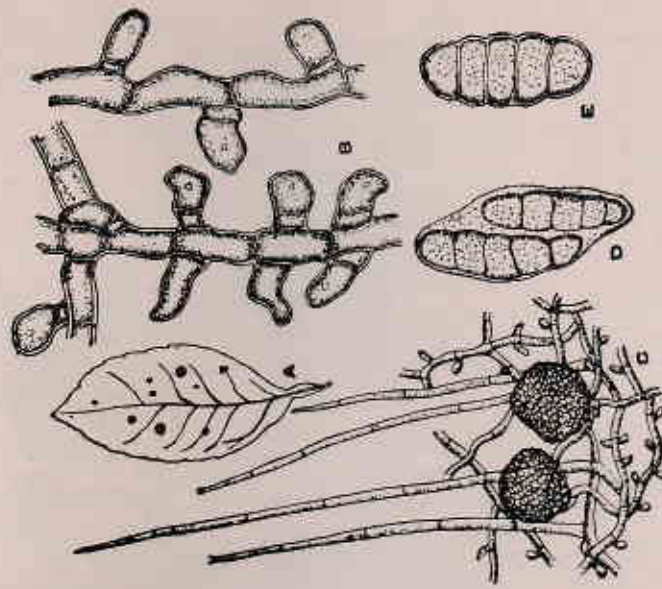
8. *Meliola mucunae* Hansf. & Deight. *Mycol Paper*, IMI, **23** : 36, 1948

(Text-fig. 8)

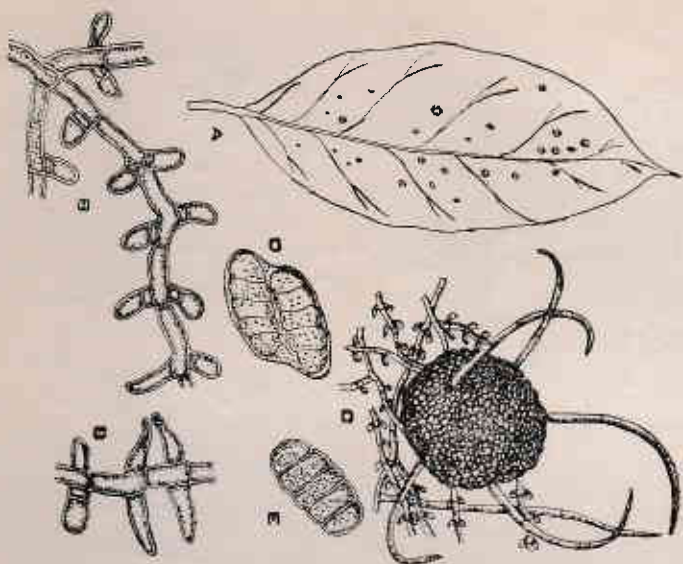
The *fungus* is borne only on the upper surface of leaf. It forms black, woolly scattered, orbicular, superficial dense patches upto 7.55 mm in diameter. Sometimes 2 or 3 patches coalesce and take an irregular shape. The *mycelium* is superficial and loosely reticulate. It is composed of brown, septate, branched wavy hyphae, cells mostly 13.37-42 x 7.2-8 nm giving rise to opposite (rarely alternate or one sided) branches and hyphopodia at an acute to wide angle just behind the septa.



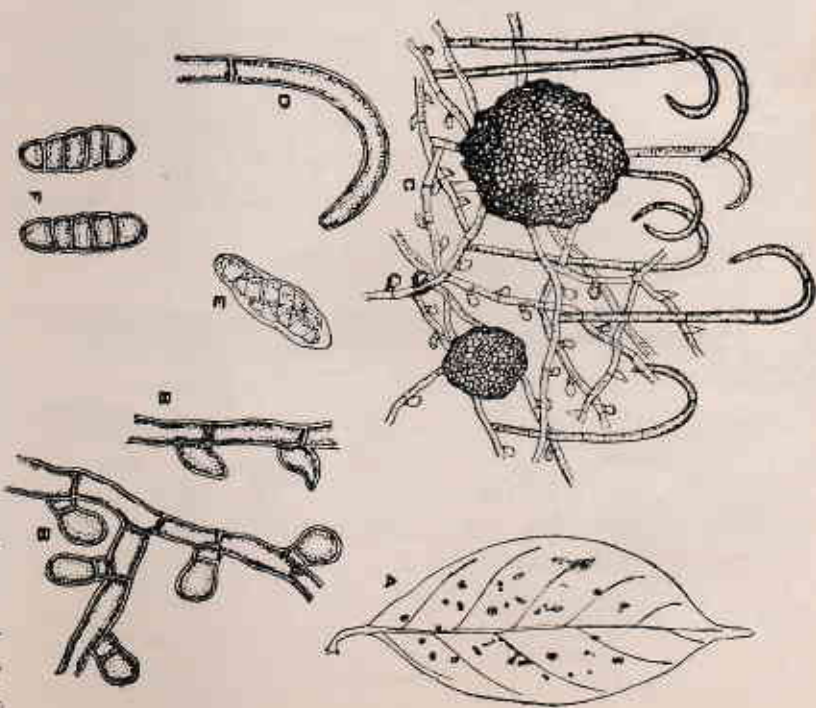
Text fig. 1, A - F, *Meliola amooraе*, A, portion of a leaf showing patches of infection X 1; B, hyphae with hyphopodia, X 1160; C, perithecium associated with mycelium and setae X 250; D, apical portion of a setae magnified, X 1160; E, ascus, X 160; F, ascospores, X 1160.



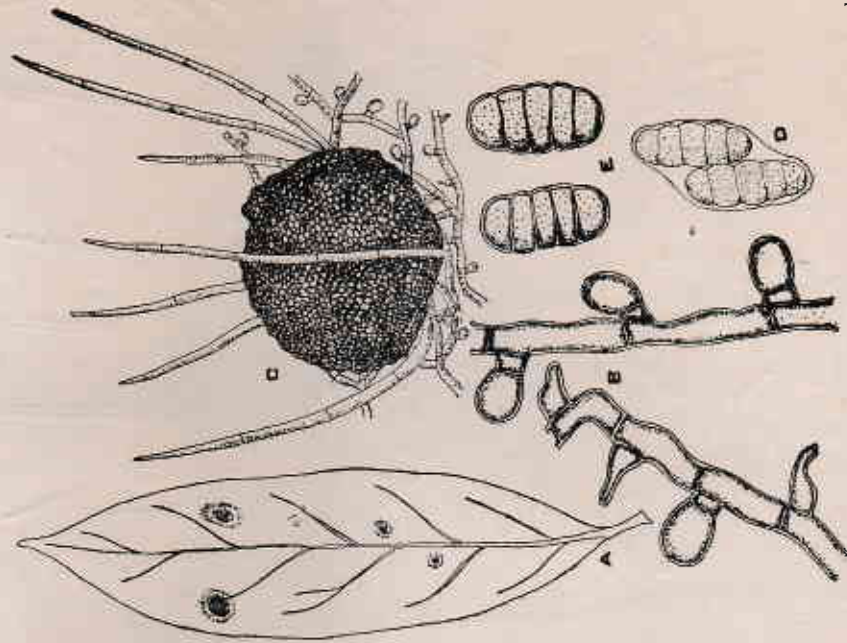
Text - fig. 2, A - E, *Meliola butleri*, A, leaf showing patches of infection, X 1; B, hyphae with hyphopodia, X 1160; C, perithecia associated with mycelium and setae, X 250; E, ascospore, X 1160.



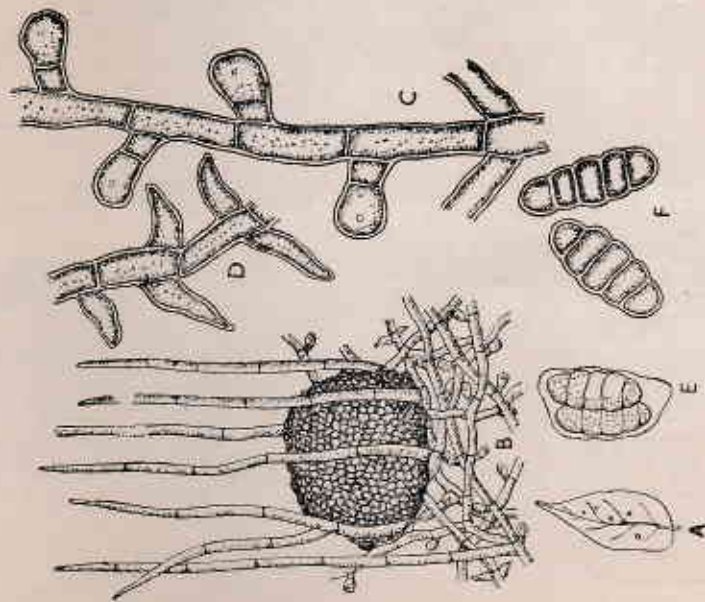
Text - fig 3. A - E, *Meliola copensis*. A, leaf showing patches of infection, X 1 ; B, hyphae with capitate hyphopodia, X 1160 ; C, Hyphae with mucronate hyphopodia, X 1160 ; D, perithecia associated with mycelium and setae, X 250 ; E, ascus, X 1160 ; F, ascospore, X 1160.



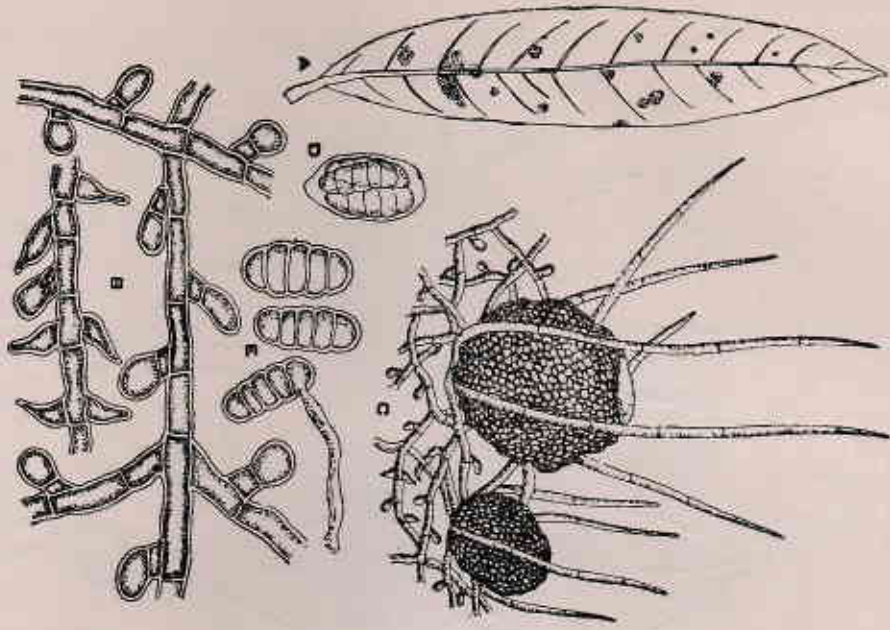
Text - fig. 4. A - F, *Meliola curvicaeta*. A, leaf showing patches of infection, X 1 ; B, hyphopodia, X 1160 ; C, hyphae with mucronate hyphopodia, X 1160 ; D, perithecia associated with mycelium and setae, X 250 ; E, D. apical portion of a setae, magnified, X 1160 ; F, ascus, X 1160 ; G, ascospores X 1160.



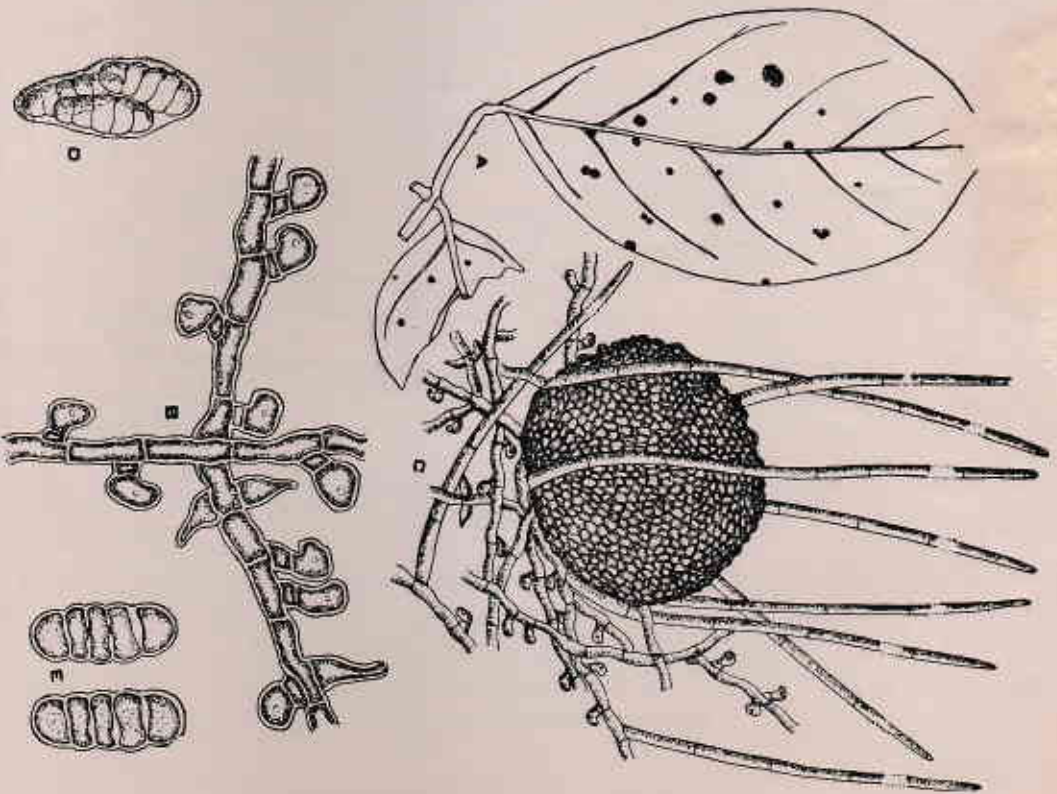
Text - fig 6, A - E *Meliola liseae* var. *rotundipodia*, A, leaf showing patches of infection, X 1; B, hyphae associated with mycelium and setae, X 1160; C, perithecium associated with mycelium and setae, X 250; D, ascus, X 1160; E, ascospores, X 1160



Text - fig. 5, A - E, *Meliola jasmini*, A leaf showing patches of infection, X 1; B, perithecium associated with mycelium and setae, X 250; C, hyphae with mucronate hyphopodia, X 1160; D, hyphae with capitate hyphopodia, X 1160; E, ascus, X 1160; F, ascospores 1160.



Text - fig. 7, A - E, *Meliola machili*. A, leaf showing patches of infection X 1 ; B, hyphae with hyphopodia X 1000 ; C, perithecia associated with mycelium and setae, X 330 ; D, ascus, X 1000 ; E, ascospores with and without germ tube, X 1000



Text - fig. 8, A - E, *Meliola mucunae*. A, leaf showing patches of infection X 1, B, hyphae, with hyphopodia X 1000, C, perithecia associated with mycelium and setae, X 330, D, ascus, X 1000 ; E, ascospores, X 1000.

The *hyphopodia* are of two types : capitate and mucronate. The capitate hyphopodia are many, brown, alternate or irregular (rarely opposite), bent (rarely straight) 14.13-19.48 nm long. The lower cell of the hyphopodium is small, cuneate, 3.4-7.64 x 7.64-8.78 nm and the upper cell of the hyphopodium is capitate, round to oval, entire, 10.3 - 11.84 x 8.4-11.46 nm with a small circular spot at the centre. The mucronate hyphopodia are oppositely arranged, rarely solitary, unicellular ampulliform, brown, 18.71 - 25.97 x 7.25 - 8.4 nm.

The *mycelial setae* are scattered, but aggregated, encircling the perithecia, stiff, obtuse (very rarely acute), straight, unbranched, black, usually much longer than the perithecia, septate, 221.58 - 443.12 x 6.87-9.55 nm.

The *perithecia* are many, scattered or in groups, black, round with verrucose wall, seated in the mycelial colony, 122.2-248.3 nm. in diameter.

The *asci* are many, oval to elliptical, sessile, 2-3 spored.

The *ascospores* are cylindrical, straight, 4-septate, rounded at ends, smooth walled, constricted at each septum, brown, 38.2-42.7 x 14.89-16.04 nm.

Host : On leaves *Mucuna monosperma* DC.

Locality : Targhera forest (Jalgaiguri) ; March 27, 1977 ; SC 144 (IMI 215568).

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