*Conidiophores* in small groups, simple, erect, septate, smooth, geniculate above, 200−400 × 7−10 μm. *Conidia* yellowish brown or olivaceous brown, fusoid to obclavate, straight or curved, smooth, tapering towards the apex, 2−13-distoseptate, 25−166 × 12−13 μm, with an inconspicuous hilum.

**Type: Japan: on** *Zizania latifolia* [n.v.].

**Host:** *Zizania latifolia.*

**Distribution:** Japan.

**Notes:** This species causes eyespots on leaves of *Zizania latifolia*, attacking almost all aerial parts of the plant. Leaf spots dark brown with a paler centre 0.5−5.0 × 0.5−3.0 mm. The lesions on the nodes and inflorescences are covered by black sooty growth of conidiophores and conidia. Attempts to obtain the type material were unsuccessful.

## CURVULARIA BOEDIJN

*Bull. Jard. bot. Buitenz.* III, **13:** 1 (1933).
*Malustela* Bat. & Lima, *Publ. Inst. Mic. Univ. Recife* **263:** 5 (1960).

**Type species:** *C. lunata* (Wakker) Boedijn

Teleomorph: *Cochliobolus* Drechsler

**Descriptions:** Alcorn (1983*b*); Ellis (1966, 1971).

*Mycelium* brown, grey or black, hairy, cottony or velvety. *Conidiophores* straight to flexuous, multiseptate, usually simple, sometimes branched, smooth to verruculose, macronematous, mononematous, often geniculate, sometimes nodose, cylindrical. *Conidiogenous cells* cylindrical, integrated, terminal and intercalary, proliferating sympodially, cicatrized. *Conidia* solitary, often curved, acropleurogenous, broadly fusoid, elliptical, obovoid or obpyriform, mostly smooth, sometimes verruculose, echinulate or tuberculate, 3 or more distoseptate, with or without a disproportionately swollen cell which is more pigmented than the other cells, septa sometimes accentuated with a dark band in some or all the cells, germinating principally from one or both polar cells with the basal germ tube growing semiaxially, hilum in a slightly protruding truncate basal section of the conidial wall and often visible as two dark lenticular spots in optical section arranged close together with a small obscure narrow separating canal between them or distinctly protuberant, first conidial septum median or submedian, second septum often delimiting the basal cell of the mature conidium, third septum then distal, conidiogenous nodes smooth to verrucose. Conidial germination and septum ontogeny are illustrated in Fig. 8.

### Dichotomous key to *Curvularia* species with and without *Cochliobolus* teleomorphs

| | | |
|---|---|---|
| 1 | Conidia with a distinctly protuberant hilum | 2 |
| | Conidia without a distinct protuberant hilum | 14 |
| 2(1) | Conidia often sigmoid, 34−47 × 11−19 μm | 17. **C. deightonii** |
| | Conidia not sigmoid | 3 |
| 3(2) | Conidia predominantly 3-distoseptate | 4 |
| | Conidia 3- or more distoseptate | 9 |
| 4(3) | Third cell of the conidium from the base disproportionately enlarged | 5 |
| | Third cell not disproportionately enlarged | 8 |
| 5(4) | Conidia less than 30 μm long | 6 |
| | Conidia usually more than 30 μm long | 7 |

6(5) Conidia 22.5−27.5 × 7.5−15.5 μm ..... 2. **C. akaiiensis (Cochliobolus akaiiensis)**
Conidia 27−29 × 15−19 μm ..... 19. **C. gudauskasii**

7(5) Conidia 28−38 × 12−16 μm ..... 32. **C. trifolii**
Conidia 24−34 × 8−14 μm ..... 1. **C. akaii (Cochliobolus akaii)**

8(4) Conidia 45−66 × 18−28 μm ..... 12. **C. andropogonis**
Conidia 20−32 × 8−15 μm ..... 13. **C. borreriae**

9(3) Conidia 3−5-distoseptate ..... 10
Conidia 3−9-distoseptate ..... 13

10(9) Conidia usually longer than 43 μm ..... 11
Conidia usually not longer than 43 μm ..... 12

11(10) Conidia clavate, sometimes ellipsoidal, 4-distoseptate, 35−60 × 14−20 μm .... 3. **C. cymbopogonis (Cochliobolus cymbopogonis)**
Conidia obclavate, elliptical or ovoid, 3−5-(usually 4-) distoseptate, 30−55 × 13−20 μm ..... 16. **C. comoriensis**

12(10) Stromata formed in culture; conidia 4-distoseptate, 27−38 × 10−14 μm ..... 28. **C. protuberata**
Stromata not formed; conidia 1−4-(mostly 4-)distoseptate, 25−43 × 10−15 μm ..... 20. **C. harveyi**

13(1) Conidia echinulate, verruculose or tuberculate ..... 14
Conidia smooth ..... 16

14(13) Conidia 3-distoseptate, 20−40 × 12−17 μm ..... 10. **C. verruculosa (Cochliobolus verruculosus)**
Conidia usually more than 3-distoseptate ..... 15

15(14) Conidia 4-distoseptate, curved, verruculose, 16−26 × 8−12 μm ..... 34. **C. verruciformis**
Conidia 3−5(8)-distoseptate, tuberculate, 23−52 × 13−20 μm ..... 9. **C. tuberculata (Cochliobolus tuberculatus)**

16(13) Conidia always 3-distoseptate ..... 17
Conidia usually more than 3-distoseptate ..... 27

17(16) Conidia mostly straight, rarely slightly curved ..... 18
Conidia usually often curved ..... 20

18(17) Conidia with mid septum often thickened and darkened, ellipsoidal or barrel-shaped, 18−37 × 11−20 μm; stromata often formed in culture ..... 4. **C. eragrostidis (Cochliobolus eragrostidis)**
Conidia without darkened and thick mid septum ..... 19

19(18) Stromata formed in culture; conidia obclavate, 24−40 × 12−22 μm ..... 24. **C. oryzae**
Stromata not formed in culture; conidia clavate, 17−29 × 7.0−13 μm ..... 15. **C. clavata**

20(17) Conidia with mid septum slightly thickened and dark, 20−26 × 10−14 μm; stromata sometimes formed ..... 14. **C. brachyspora**
Conidia with mid septum not very thickened or dark ..... 21

21(20) Stromata often formed in culture; conidia 18−32 × 8−16 μm ..... 23. **C. lunata** var. **aeria**
Stromata not formed in culture ..... 22

22(21) Conidia with all cells usually pale, 17−32 × 7.0−12 μm ..... 8. **C. pallescens (Cochliobolus pallescens)**
Conidia brown ..... 23

23(22) Conidia usually not more than 25 μm long, 20−25 (29) × 13−17 μm ..... 26. **C. ovoidea**
Conidia usually more than 25 μm long ..... 24

24(23) Conidia not more than 35 μm long ..... 25
Conidia usually more than 35 μm long ..... 26

25(24) Conidia 18−32 × 9.0−15 μm ..... 7. **C. lunata (Cochliobolus lunatus)**
Conidia 25−35 × 11.0−18.5 μm ..... 22. **C. ischaemi**

26(24) Conidia clavate, 29−42 × 13−20 μm ..... 27. **C. penniseti**
Conidia ellipsoidal to broadly fusoid, 27−40 × 13−20 μm ..... 6. **C. intermedia (Cochliobolus intermedius)**

27(16) Conidia 3−4(5-)distoseptate ..... 28
Conidia usually more than 4-distoseptate ..... 31

28(27) Conidia predominantly uncinate, 24−35 × 6−15 μm ..... 33. **C. uncinata**
Conidia not uncinate ..... 29

29(27) Conidia distinctly geniculate, 4-distoseptate, 26−48 × 8−13 μm ..... 5. **C. geniculata (Cochliobolus geniculatus)**
Conidia not distinctly geniculate ..... 30

30(29) Conidia 4-distoseptate, 24−38 × 9−15 μm ..... 18. **C. fallax**
Conidia 4−(5-)distoseptate, 27−49 × 8−13 μm ..... 11. **C. affinis**

31(27) Conidia 3−6-distoseptate ..... 32
Conidia 3−8-distoseptate, septa often thick and dark, 22.5−40 × 9.0−11.5 μm ..... 25. **C. oryzae-sativae**

32(31) Conidia with central cells usually much longer than the other cells, 2−6-distoseptate, 24−45 × 9−16 μm ..... 21. **C. inaequalis**
Conidia with central cells much inflated or not inflated ..... 33

33(32) Conidia with central cells much inflated, strongly curved, 25−76 × 15−26 μm ..... 29. **C. robusta**
Conidia with central cells not much inflated ..... 34

34(33) Conidia 19−30 × 10−14 μm ..... 30. **C. senegalensis**
Conidia 24−52 × 7−13 μm ..... 31. **C. sorghina**

## COCHLIOBOLUS SPECIES WITH CURVULARIA ANAMORPHS

**1. C. akaii** (Tsuda & Ueyama) Sivanesan **comb. nov.**.

*Pseudocochliobolus akaii* Tsuda & Ueyama, *Trans. mycol. Soc. Japan* **26:** 324 (1985).
Anamorph: **Curvularia akaii** Tsuda & Ueyama, *Trans. mycol. Soc. Japan* **26:** 325 (1985).

**Illustrations:** Fig. 60; Tsuda & Ueyama (1985).
**Description:** Tsuda & Ueyama (1985).

*Ascomata* black, globose to subglobose, 560−1200 × 500−1200 μm, developing at the tip of columnar stromata or developing from flat stromata, firmly adhering to the substrate at the base. Ostiolar beaks rarely protruding, up to 1250 μm long, 200 μm wide; wall coriaceous-carbonaceous, pseudoparenchymatous. *Asci* vestigially bitunicate, cylindrical to cylindric-clavate with a short stipe, 1−8-spored, 200−400 × 14−24 μm, among filamentous pseudoparaphyses. *Ascospores* hyaline, filiform or flagelliform, 240−510 × 5.0−12.5 μm, 9−26-septate, parallel or loosely coiled into a helix in the ascus.

Colonies grey to greyish-brown, woolly. *Conidiophores* arising singly or in groups, simple, straight or flexuous, multiseptate, brown, paler towards the apex, variable in length, up to 6 μm diam, sparse among the fluffy mycelia.