

A new leaf spot of maize incited by *Curvularia clavata*

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Abstract

In September 1969 a leaf spot of maize 'Composite Jawahar', incited by *C. clavata* Jain, was observed at the College Farm of the Banaras Hindu University, Varanasi. The fungus seriously damages maize leaves and considerably reduces its fodder value. The symptoms of the disease and taxonomic characters of the pathogen are being described in detail.

Introduction

Various fungi, notably species of *Helminthosporium*, *Curvularia* and *Physoderma*, cause serious damage to maize leaves. Several species of *Curvularia* have been reported from different parts of the world, some of them were included under different genera prior to the erection of the genus by Boedijn (1933), such as *Helminthosporium curvulum* by Saccardo from Philippines (Mason, 1928) and *Acrothecium lunatum* Wakker (now *Curvularia lunata* (Wakker) Boedijn) from Gold Coast (Togo) (Bunting, 1926, 1927); further species occurring on maize are *C. inequalis* (Shear) Boed. (McKeen, 1952), *C. maculans* (Bancroft) Boed. from N. Carolina and Georgia (Nelson, 1956) and Brazil (Franco, 1960), *C. tuberculata* Jain from India (Jain, 1962) and *C. pallescens* Boed. from Nigeria (Mabadeje, 1969). In September 1969 maize leaf material of the cultivar 'Composite Jawahar' released recently by UP Agricultural University with leaf spots was collected at the College Farm. The disease was also observed on other varieties including local ones. The causal organism was found to be *Curvularia clavata* Jain. The fungus causes severe spots on entire leaf blade, thereby considerably reducing the fodder value. The disease appears late during the season, generally after the infections of *Helminthosporium turcicum* Pass. and *H. maydis* Nisikado and Miyake, on the well-developed leaves when plants are 90–120 cm tall. The fungus was isolated from infected leaves in a single spore culture. The isolate was tested for pathogenicity with positive results.

Symptoms

Symptoms start as minute, chlorotic, pinhead-size translucent spots on the leaf surface. Subsequently the spots increase in size and necrosis starts from the centre. The mature spots appear as minute, necrotic, straw-coloured, mostly circular, but occasionally oval lesions, 0.5–2 mm long, of reduced thickness, with dark brown peripheral rings,

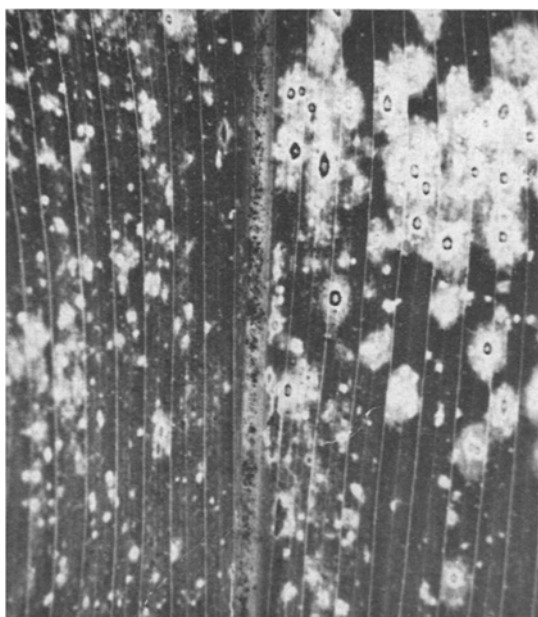


Fig. 1. Symptoms of leaf spot of maize incited by *Curvularia clavata* Jain.

Fig. 1. Symptomen van een bladplekken-ziekte op mais veroorzaakt door *Curvularia clavata* Jain.

surrounded by pale yellow translucent zones (Fig. 1). A transverse section shows constricted epidermal layers, severely damaged mesenchyma cells and irregularly scattered hyphae of the pathogen. In the stomatal cavities dark-coloured mycelial cells, resembling a stroma, are visible, from which 3–6 conidiophores arise (Fig. 2:5).

Description of the fungus

The conidiophores are simple, erect, brown with hyaline tips, closely septate, apically geniculate, of variable lengths, 5–7.5 μm wide at the base, bearing conidia on distant nodes or almost in whorls (Fig. 2: 6–8). Conidia (Fig. 2: 1–4) are produced singly and at the tip of the conidiophore or successive growing points, pale brown, clavate, straight, rarely curved, measuring 18.5–35 \times 7.5–12.5 μm (average 24.9 \times 8.4 μm), with three conspicuous septa. The central two cells are darker than the basal and apical cells. The apical cell is short and rounded, the subapical cell is largest in size of all the three cells; in older conidia it can be rounded off resembling a chlamydospore; finally this is the only remaining structure whereas the other cells are degenerating. The basal cell is pale or subhyaline, conical or crucible shaped with a distinct prominent hilum.

Discussion

A maize leaf spot frequently occurred in the Varanasi region found to be due to *Curvularia clavata*. It considerably differed from that caused by *Helminthosporium maydis* or *H. carbonum*. The symptoms resemble those incited by *C. maculans* (Franco, 1960) and *C. pallescens* (Mabadeje, 1969), except that the spots are smaller in size. Most of

Fig. 2. (1-4) Conidia; (5) Transverse section of leaf showing the origin of conidiophores ; (6) Attachment of conidia; (7 and 8) Conidiophores. Scale A: (1-4); Scale B: (5-8.)

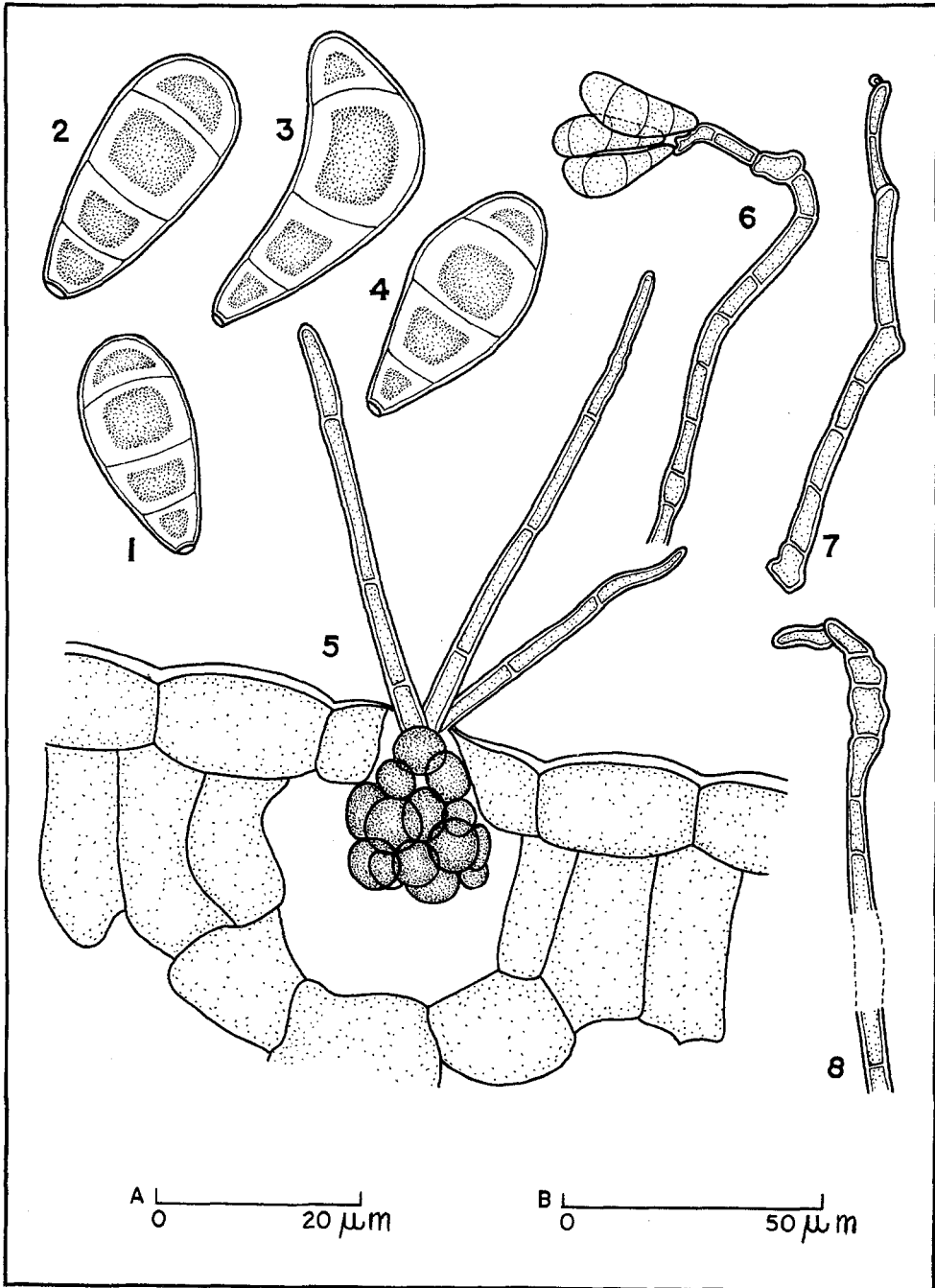


Fig. 2 (1-4): Conidiën; (5) Dwarsdoorsnede van een blad met ontstaanswijze van de conidiëndragers; (6) Aanhechting van de conidiën; (7 en 8) Conidiëndragers. Schaal A: (1-4); Schaal B: (5-8).

them are 0.5 mm–1.0 mm in size and circular. Oval lesions, which are not very common, never exceed 2.5 mm in length in contrast to those described by Mabadeje (1969) for *C. pallescens* which are 20 × 8 mm in size. In addition, presence of a dark brown ring in each lesion surrounded by a pale yellow translucent area in case of *C. clavata*, is in contrast to the two brown rings and a straw coloured zone in between them in *C. pallescens*. The conidial shape is also different: In *C. clavata* 80–90% of the conidia are typically clavate and straight, rarely curved, whereas in *C. pallescens* the majority of the conidia are slightly curved and taper at both ends (Mabadeje, 1969). To the best of our knowledge, this report is the first record of *C. clavata* pathogenic on maize.

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Samenvatting

Een nieuwe bladplekkenziekte van maïs veroorzaakt door Curvularia clavata

Een belangwekkende bladplekkenziekte op 'Composite Jawahar' maïs, veroorzaakt door *Curvularia clavata* Jain, werd waargenomen op de College Farm van de Banaras Hindu University te Benares in september 1969. De schimmel brengt ernstige schade toe aan maïsbladeren en vermindert aanzienlijk de waarde als voedergras. Een beschrijving van de ziektesymptomen en van de schimmel wordt gegeven.

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