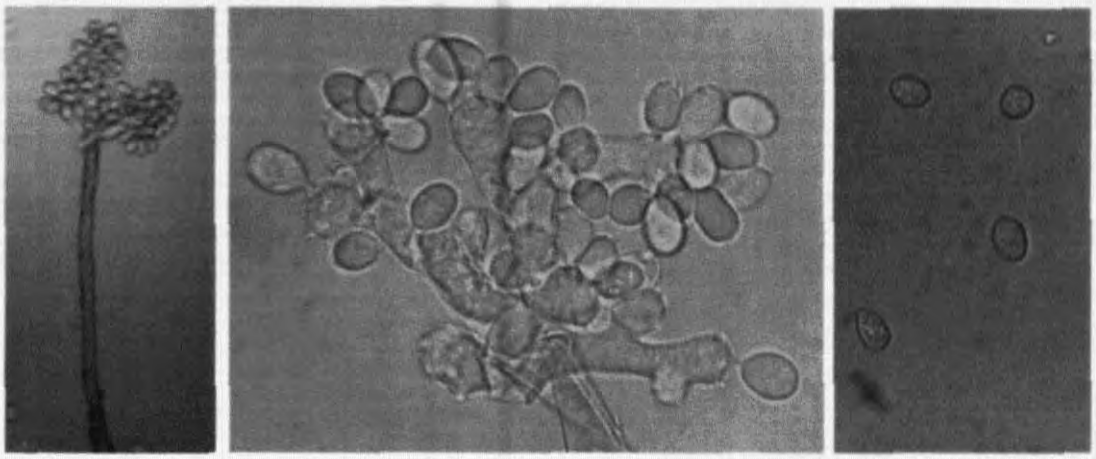

Fig. 15. Conidia of *Botrytis cinerea*. Left and center, conidia on conidiophores. (Reprinted from Compendium of Potato Diseases, The American Phytopathological Society, 1981)

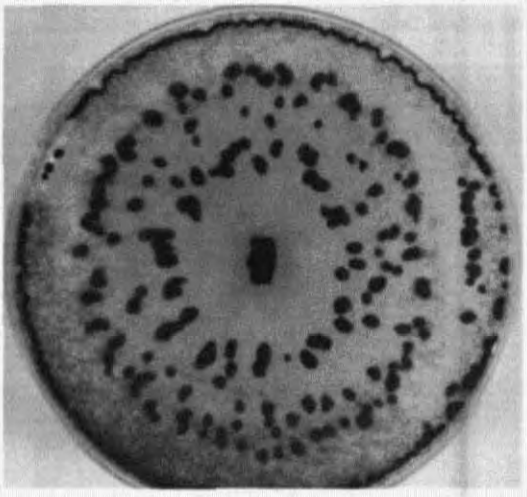

Fig. 16. Culture of *Botrytis cinerea* on potato-dextrose agar showing sclerotia.

appears to be mycelium originating from germinating sclerotia or omnipresent conidia. Conidia are dispersed by wind and rain.

Control

Foliar sprays with fungicides such as benomyl and chlorothalonil offer some protection against *B. cinerea*. The use of early-maturing peanut cultivars might lessen frost damage and thereby reduce disease severity.

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(Prepared by D. M. Porter)

Charcoal Rot

Charcoal rot, caused by the common soilborne fungus *Macrophomina phaseolina*, is widely distributed in most peanut-producing countries. The fungus is distributed throughout the world and causes diseases in a wide range of crops. In peanut, it is responsible for seed and seedling rots, wilt, root and stem rots, leaf spot, rotting of developing pods and seed, and concealed damage. The term "charcoal rot" is used to describe the damage done to roots and stems of seedlings and older plants. Charcoal rot is of only minor importance in the United States, although occasionally it can greatly reduce plant stands. In India, it is the most common disease of peanut seedlings.

Symptoms

The occurrence of water-soaked lesions on the hypocotyl near the soil surface is a characteristic sign of this disease. After the hypocotyl is girdled, the seedling dies. Similar symptoms are observed on older plants at the soil line, although all plant parts at all stages of growth are susceptible. Stem and root lesions appear water soaked at first, but infected tissues later become a dull light brown (Plates 12 and 13). The infection extends down into the taproot and up into the stem and branches (Plate 14). When lesions girdle the stem, the plant wilts, and the fungus rapidly colonizes the branches, which turn brown and die. The dead tissues rot and turn black as sclerotia of the fungus develop profusely. Roots, pegs, and pods also rot and become covered with sclerotia. In some cases, the disease is at first restricted mainly to the roots, which become rotted and blackened and the taproot shreds. The foliage of such plants turns yellow and wilts, and the typical symptoms of stem blight and charcoal rot appear.

Causal Organism

M. phaseolina (Tassi) Goidanich, the pycnidial state of *Rhizoctonia bataticola* (Taubenhaus) E. J. Butler or *Sclerotium bataticola* Taubenhaus, was derived from *Macrophoma phaseolina* by Tassi in 1901. The sterile mycelial phase of *M. phaseolina* was first named *S. bataticola* by Taubenhaus but was later transferred to the genus *Rhizoctonia*.

Pycnidia of *M. phaseolina* (100–200 µm in diameter) are membranous to subcarbonaceous, first immersed and then at least partially erumpent, and globose or flattened globose with

inconspicuous truncate ostioles. Their walls are composed of several layers of dark, thin-walled, angular cells, 9 µm in diameter, and are lined with a hyaline layer two or three cells thick bearing simple, rod-shaped conidiophores, 10–15 µm long. Conidia (14–33 × 6–12 µm) are single celled, hyaline, and elliptic or oval.

Disease Cycle

Charcoal rot is both seedborne and soilborne. Mycelium in seed and mycelium and sclerotia in plant debris in the soil are the primary sources of inoculum (Fig. 17). The sclerotia can remain viable in dry soil for many years but rapidly lose viability in very wet soils.

M. phaseolina is commonly present in peanut seed and pods and can readily be disseminated by their movement. High soil temperatures (about 35°C) and low soil osmotic potential reduce plant vigor and favor growth of the fungus and development of charcoal rot. Fungal growth in pods is increased by rain after harvest. Damage during harvesting and shelling predisposes pods and kernels to injury from this pathogen.

Control

Crop rotation is generally ineffective in reducing soil inoculum because the fungus can grow saprophytically and has a wide host range. However, rotation of peanut with rice for 2–3 years may reduce the soilborne inoculum of *M. phaseolina*. Crop sanitation (e.g., burning crop residues) may help reduce disease levels. Providing adequate fertilizer and soil water to ensure good crop growth should reduce charcoal rot development. Frequent irrigation to keep the soil wet reduces the viability of sclerotia.

Seed treatment with fungicides such as captan and thiram can reduce seedborne infection and provide the germinating seed some protection from invasion by the fungus from soilborne inoculum. Soil drenching with pentachloronitrobenzene (PCNB) can give some control of the disease. No immune or highly resistant peanut genotypes are available.

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Singh, S. K., Nene, Y. L., and Reddy, M. V. 1990. Influence of cropping systems on *Macrophomina phaseolina* in soil. Plant Dis. 74:812-814.

(Prepared by V. K. Mehan and D. McDonald)

Choanephora Leaf Spot

Choanephora sp. has been observed on peanut leaves in the Philippines, Thailand, Senegal, and Uganda. Brown lesions originate at the leaflet margin and spread over the entire leaflet. Abundant sporulation occurs on both leaflet surfaces and down the petioles. Defoliation of infected leaflets may occur.

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Mukiibi, J. 1975. Minor diseases of groundnut in Uganda. East Afr. For. J. 41:87-94.

(Prepared by R. A. Taber)

Cylindrocladium Black Rot

Cylindrocladium black rot (CBR) of peanut was first observed in Georgia in 1965. Soon thereafter, CBR was recog-

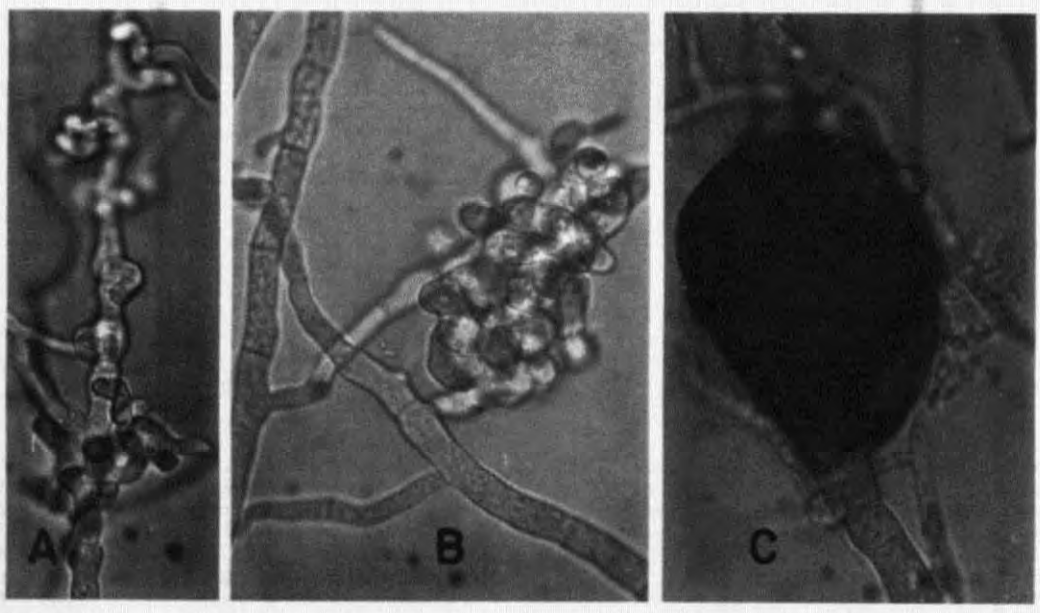

Fig. 17. Sclerotial development of *Macrophomina phaseolina*. **A**, Proliferation of a single hypha; **B**, aggregation of several hyphae; and **C**, mature sclerotium. (Reprinted, by permission, from Jackson and Bell, 1969)