Tikka Disease of Groundnut: Symptoms and Control

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In this article we will discuss about:- 1. Symptoms of Tikka Disease of Groundnut 2. Causal Organism of Tikka Disease of Groundnut 3. Disease Cycle 4. Control.

Symptoms of Tikka Disease of Groundnut:

All parts of the host plant above soil level are attacked by the disease. The first visible symptoms appear on the leaflets of lower leaves as dark spots which at a later stage, are surrounded by yellow rings. The spots are circular. They appear in a large number on the leaves. Mature spots are dark-brown to almost black, particularly on the upper surface of the leaflets (Fig. 379A).

Whereas, on the lower surface they are lighter in colour. The spots are few on the leaf petioles and stem. Sometimes spots coalesce resulting in the defoliation. The shedding of leaves is a characteristic feature of the disease. Due to excessive spotting and consequent leaf fall, smaller and fewer nuts are formed.

In cases where young plants are attacked by the disease, nuts fail to develop in them. But the mature plants when attacked by the disease produce immature nuts which are shrivelled and become loose in the shell. The total effect is the loss in yield.

Causal Organism of Tikka Disease of Groundnut:

The spotting is due to the attack of Cercospora personata (Berk. & Curt.) Ell. & Ever., the conidial stage of Mycosphaerella berkeleyii Jenkins; and Cercospora arachidicola Hori, the conidial stage of Mycosphaerella arachidicola Jenkins.

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Cercospora personata possesses mycelium which is entirely internal and ramifies intercellularly by developing haustoria in the palisade and spongy mesophyll cells of the host. The mycelium forms dense stroma which produces long septate to non- septate geniculate hypophyllous conidiophores (Fig. 379B).

The conidiophores emerge in tufts by rupturing host epidermis. Conidia are pale-brown, obclavate or cylindrical, septate, measuring 30-50 μ in length and 5-6 μ in breadth (Fig. 379D & E).

Cercospora arachidicola has both internal and external, intera- and intercellular mycelium without haustoria. The mycelium produces scanty stroma (Fig. 379C).

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upper surface. They are geniculate, non-septate to septate and produce, hyaline to slightly olivaceous 4- to 13-septate, often curved, conidia measuring 38-108 μ in length and 2-5 μ in breadth (Fig. 379D).

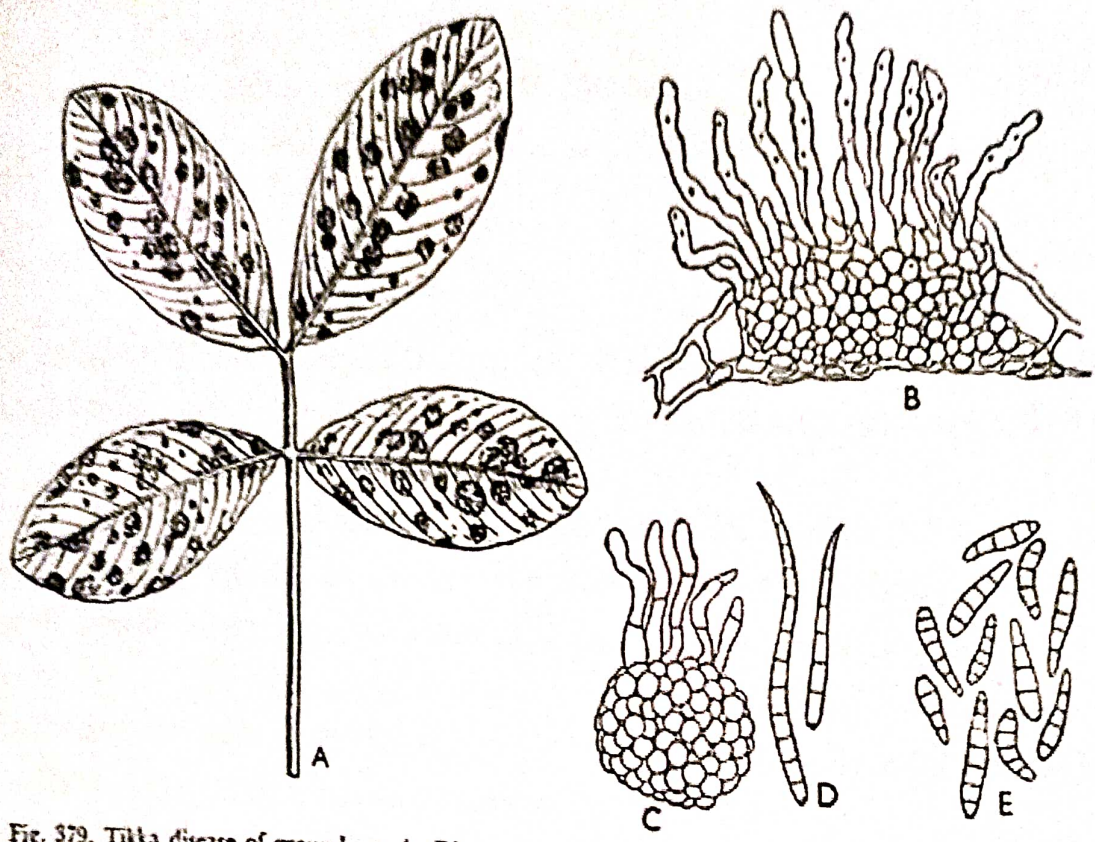

Fig. 379. Tikka disease of groundnut. A. Disease symptoms. B. Section through infected host tissue showing geniculate conidiophores. C. Stroma bearing conidiophores. D. and E. Conidia.

A ready and reliable means of distinguishing the spots produced by these two fungi are: spots due to C. personata are more circular and smaller than those produced by C. arachidicola. These are the typical 'Tikka' disease spots which almost cover the entire leaf surface in an epiphytotic condition of the disease. Again in the latter a yellow halo is present around spots from the beginning while in the former halo develops at maturity of the spots. Besides this, the colour of the spots on the lower surface of the leaflets produced by C. personata is carbon black and those produced by C. arachidicola are light-brown.

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Although the spots produced by C. personata appear late, yet they are more dangerous than those of C. arachidicola being rapid in their development resulting in severe epiphytotic.

The perfect stage of both these species of Cercospora has been reported from the U.S.A., but not yet from

Disease Cycle of Tikka Disease of Groundnut:

The pathogen perennates through conidia on diseased plant debris lying in the soil. The conidia may also remain adhered to shell. They have also been found to remain associated with the seeds and are responsible for primary infection. A temperature range of 26°C. to 31 °C. with high atmospheric humidity is favourable for disease development.

Prolonged low temperature and dew also favour infection. The entrance of the pathogen in the host tissue takes place either by direct penetration through the epidermal cells or by way of stomata.

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The leaf infection is largely through the upper surface of the leaflets. The fungus mycelium ramifies the host tissue in and around the infection court and aggregates underneath the epidermis and forms stroma.

During the development of stroma the epidermis is ruptured by the pressure developed in the host tissue and the conidiophores developed from the stroma emerge out, ultimately conidia are produced on them. These conidia form the secondary inoculum through which secondary infection is induced.

The disease is disseminated by wind which blows the conidia from leaf to leaf. Insects and splashes of rain have also been reported to play role in the disseminator of the disease.

Application of nitrogen and phosphatic fertilizers often makes host plants susceptible to infection.

Disease cycle of Tikka disease of groundnut is presented in Figure 380.

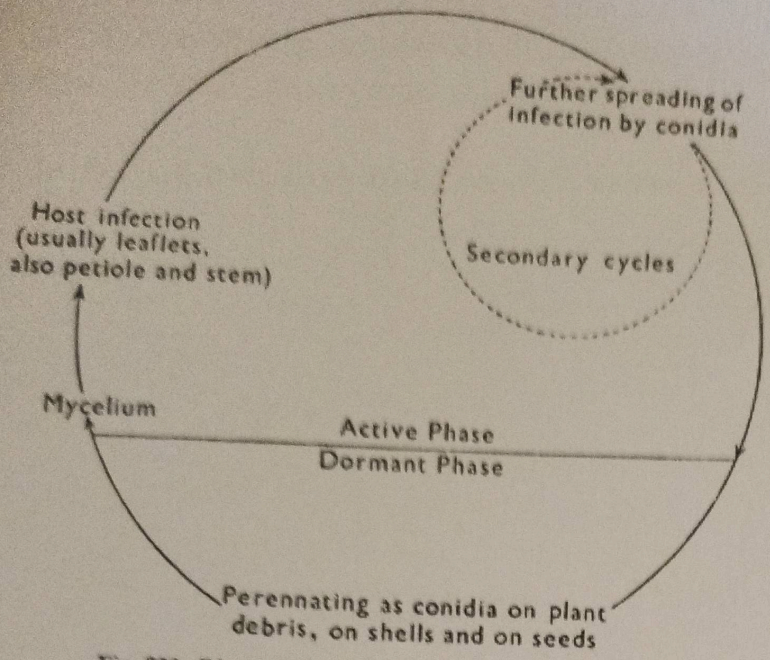

Fig. 380. Disease cycle of Tikka disease of groundnut.

Control of Tikka Disease of Groundnut:

Following are some of the suggested control measures of the disease:

(i) Burning of previous year's diseased plant debris will, to a great extent, reduce the source of primary infection.

(ii) Two to four years' crop rotation often cuts down the rate of infection.

(iii) Avoid late sowing to reduce infection rate.

(iv) Seed disinfection checks the disease incidence. Care should be taken to remove the shells thoroughly and the adhereing soil before seed disinfection. Treatment for half an hour in 0.5 per cent, copper sulphate solution is recommended for seed disinfection. Agrosan GN also is an effective disinfectant. Seed dressing with Thiram (1: 350) or Flit 406 (1: 500) before sowing prevents Aspergillus seed rot and pre-emergence losses.

(v) The spread of secondary inoculum can be controlled by spraying the crop with different fungicides. Three sprayings of Bordeaux mixture (4:4: 50) with linseed oil as sticker at an interval of 15 days are effective in checking the disease. A similar treatment with Dithane Z-78 has also produced good results.

Spraying with 0.15 per cent. Cupravit or 0.15 per cent. Perenox also produces effective results. To obtain best results, timely and thorough spraying of the crop should be done. Care should be taken that under surface of the leaves is thoroughly sprayed.