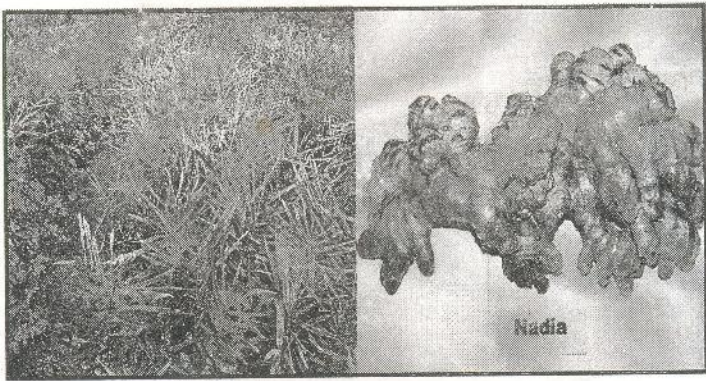


Integrated Management of Ginger Diseases



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In India, ginger is mostly grown in Kerala followed by Meghalaya, Arunachal Pradesh and Orissa. It is affected by many pests and diseases. Of these, soft rot (*Pythium spp*) bacterial wilt (*Ralstonia solanacearum*), yellows (*Fusarium oxysporium*), phyllosticta leaf spot, nematode (*Pratylenchus coffeae*) and storage rots are major diseases that cause economic losses. Integrated management involves cultural and biological control methods which helps to minimize and control the disease.

(I) CULTURAL CONTROL :-

- (i) Infected rhizomes are the primary source of infection and spread of soft rot, bacterial wilt and dry rot. The best method to manage the seed borne diseases is to select healthy seed material from disease free areas.
- (ii) One of the predisposing factors for soft rot of ginger is a ill drained field. Proper drainage for cultivation ensures healthy crop. Therefore water stagnation should be avoided. A raised bed of 30 cm height and 1m width and convenient length is recommended.
- (iii) Phytosanitary measures have to be adopted strictly in order to reduce the inoculum. Infected plants should be removed and destroyed taking care to prevent falling of soil particles from infected plant to new areas.
- (iv) Crop rotation with non-host crops like leguminous crops, maize, ragi, paddy is done not only to benefit the soil nutrient supplementation but also keeps the diseases under check.
- (v) The bacterial wilt infected fields should be isolated to prevent the disease spread to adjoining fields. The produce of such fields should not be considered for seed purpose.

(II) SOIL TREATMENT :-

- (i) The infested soil is fumigated with methyl bromide or formalin before planting.
- (ii) Soil drenching with Mancozeb (0.3%) or Metalaxyl @500 ppm is recommended in disease epidemic areas.
- (iii) Soil solarization of the beds is suggested to reduce the inoculum. It increases the soil temperature up to 12.2° C above ambient temperature. It is one of the best methods to check the bacterial wilt and soft rot diseases.

- (iv) Hot water treatment: - Rhizome treatment with 51° C hot water for 10 mins is recommended in disease epidemic areas.

(III) SEED TREATMENT :-

Here the rhizomes are covered with polythene sheets and exposed to sunlight for a period of 2 hours in order to raise the temperature to 48°C. This temperature is retained for 30 minutes. This help to kill the bacterial and fungal pathogens present on the rhizomes.

(IV) CHEMICAL CONTROL :-

Healthy seed rhizomes may also carry incipient infection. Therefore, seed rhizomes must be treated with Dithane M-45 (0.3%) or Bavistin (0.3%) in case of soft rot and with 200 ppm of Streptomycin for bacterial wilt. This must be done prior to storing and planting. The beds can be drenched with Dithane M-45 (0.3%) or chestnut compound for controlling soft rot. Spraying with

- (i) 100 ppm of Streptomycin or Agrimycin 100 helps to control bacterial wilt.
- (ii) Carbendazim alone or in combination with Ridomil MZ is used to prevent the seed borne inoculum of *Pythium* and *Fusarium*.
- (iii) In Meghalaya, the insect damage is also associated with pathogen causing rhizome diseases. Therefore, a combined treatment with Ridomil MZ (0.1%) plus Bavistin (0.1%) plus Chloropyrifos (0.05%) has been found to be very effective for controlling soft rot by dipping the seed rhizome for 30 minutes.
- (iv) Application of Bordeaux mixture (1%) at fortnightly interval also helps in monitoring foliar diseases/ leaf blight.

(V) BOTANICALS :-

The use of plant extracts such as garlic extracts has been reported to be very effective against foliar pathogens. An extract of asafetida, turmeric and water has been reported to be very effective against several plant pathogens including nematodes.

(VI) NEMATODE MANAGEMENT :-

The nematode *M.incognita* can be controlled by application of neem (*Azadirachta indica*) cake t/ha before planting followed by application of carbofuran @1 kg/ha, 45 days after planting.

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