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DISEASES OF ROOT CROPS IN JAMAICA

A. G. Naylor

Chief Plant Protection Officer
Ministry of Agriculture
Kingston, Jamaica

DISEASES OF YAMS (DIOSCOREA spp.)

Yams are somewhat disease tolerant, and although they are affected by many diseases, farmers are usually able to obtain a crop with few disease control practices. As more attention is given to the crop it has been realised that diseases and pests particularly anthracnose and nematodes cause severe loss yams crops in Jamaica. Loss in storage is also high.

Nematodes which are mostly carried on the planting materials or remain in the soil from year to year constitute a severe threat to the profitable growing of the crop in many areas of the island. A separate paper deals with the problem of these pests on yams.

Some of the disease problems of yams and methods of control are as follows:-

Anthracnose which is caused by a species of Colletotrichum fungus produces black necrotic areas on leaves and vines. The tips of affected vines usually die back and growth may be greatly restricted. The disease is often severe on white yams and to a less extent on other varieties especially when they are growing under wet conditions.

Staking the plant and spraying with a copper fungicide (such as Kocide, Cupravit Blue and Perenox), with Captan 2½ lb/acre or Benlate 1 lb/acre helps in controlling the disease. Five or more treatments at two weekly intervals should be applied, depending on severity of the disease. The white yam (D. alata) is much more susceptible than the yellow (D. cavenensis) or negro (D. rotundata) varieties and the former should be avoided in wet areas.

Black rot is caused by a fungus Rosellinia sp. which produces a white mycelial mat and black slightly raised structures of the fungus on the outer portion of the tubers. If affected tubers are cut, fine black streaks will be seen radiating from the outer portion to about 1 inch into them. The disease is usually observed at high elevations and in heavy or poorly drained soils.

Removal of all infected material from the soil, trenching the area, applying white lime to the soil and rotation with a non root-crop will help to control the condition. Care must be taken in planting not to use affected tubers. No chemical soil treatment appears, so far, to control this disease.

Leaf spots caused by species of Cercospora fungus are quite common but are not generally serious. Yams maturing at higher elevantions sometimes become severely spotted and the leaves die prematurely. Some varieties are more susceptible than others and

these should be avoided in wet areas or at high elevations. This condition is not much of a problem if it occurs on plants nearing maturity but young plants should be treated with fungicides as recommended for anthracnose, if the disease is observed on them.

Viruses - Yams, in particular yampiee (cush-cush), Dioscorea trifida, are often affected by viruses which produce mottled and distorted leaves. Infection, however, does not appear to reduce plant growth severely. As no work has been done on this problem in Jamaica the amount of loss or the extent of occurrence of the disease is not known.

The occurrence of diffuse dark brown spots inside yam tubers is suspected to be associated with virus infection. A condition in which the underground portion of the yam becomes rounded like a pumpkin and is inedible is also thought to be caused by a virus.

Planting materials should not be taken from affected plants to establish new fields.

DISEASES OF SWEET POTATOES

Sweet potatoes in Jamaica appear fairly free of serious disease problems. The crop is affected by a rust fungus which produces brown pustules covered with yellow spores on the underside of leaves. There is also a condition known as white rust, caused by a Cystopus species of fungus, which is often observed but does little harm to the crop.

Symptoms of virus diseases are sometimes seen on sweet potato plants. Affected leaves are mottled with yellow white and green colours and are crinkled and deformed. No work has been done on this condition as it is not commonly observed.

Sweet potato tubers are seriously affected by soft rot which is caused by the mould fungus Rhizopus stolonifer. Proper curing and storage appear to control this condition adequately.

The major problem of growing sweet potatoes in Jamaica is the high incidence of the sweet potato weevil Cylas formicarius.

IRISH POTATOES

This crop in Jamaica suffers from a number of serious diseases and great difficulty is encountered when it is grown in wet areas, under very damp conditions or when replanted in same field for successive years. Some of the principal diseases of the crop are as follows:-

Late blight

The fungus Phytophthora infestans causes this condition which can destroy a field in one week. The disease first appears on the leaves as watersoaked areas that quickly develop into irregular brown shrivelled patches, usually at the edges. In wet

weather or with heavy dew the white fluffy growth of the fungus may be seen on the lower surface of affected leaves. The fungus not only affects the leaves but also the stems, so that the whole plant may become dark brown and die. The spores of the fungus may be washed into the soil by rain, affecting the tubers which become brown with a purplish discolouration below the skin. These tubers are liable to rot in storage, and must never be used as seed for planting as the fungus will be carried in them to the new field.

Disease development can be controlled by regular weekly applications of fungicides such as Maneb and/or Zineb, Polyram-Combi, Difolatan and Copper (Kocide or Cupravit Blue) at 2-3 lb/acre. Application of the fungicides with low volume mist sprayers is usually more effective than with high volume equipment. Care must be taken to protect the lower surface of leaves. If the weather is wet, spraying may have to be done twice a week starting as soon as the plants germinate.

Early blight

This disease is caused by a fungus (Alternaria solani) which produces small brown spots on affected leaves and stems. These spots enlarge to form circular lesions up to ½ inch in diameter with a series of concentric rings.

Some varieties such as Red Pontiac are very susceptible. The more resistant varieties such as Aran Consul, Kennebec and Sebago should be planted in areas subject to this condition. The same spray treatments recommended for the control of late blight will also control early blight.

Fusarium wilt and Stem end Rot

These diseases are caused by soil-borne species of Fusarium. Affected plants have discoloured stems at and below ground level, accompanied by yellowing of leaves, wilting and ultimate death. If mature plants are dug up, the brown discolouration on the stem may be seen to extend down to the point of attachment of tubers. Affected tubers have external brown stem-end lesions and such tubers usually have a pale brown discolouration about ¼ inch below the skin.

Fusarium wilt and Stem end Rot are usually worse on clay soils than on those that are free draining. If severe, the affected field should not be used for growing potato for two or three years. Diseased tubers rot easily and so should not be stored for any length of time, nor should they be used for planting . Chemical soil treatments have had little effect on controlling these diseases.

Scab

Scab of potato is caused by a soilborne organism, Streptomyces scabies. This organism lives on decaying plant materials and under dry conditions can attack potato tubers producing a "callous" or rough growth on the skin. Scab in superficial and affected tubers are safe for eating although they look unsightly and may crack and spoil easily.

Where Streptomyces scabies is present the disease is rarely serious in acid soils but can be severe under neutral or alkaline soil conditions. Affected tubers should not be used for planting and soils heavily infested with the causal agent should not be

used for potato growing for two or more years. Some varieties are much more resistant than others and should not be used in areas where the disease is prevalent. If there is rain or the soil is kept moist during early tuber formation the incidence of scab will be greatly reduced.

Black Rot

A soil-borne fungus - Rosellinia sp. causes black rot which exhibits its presence by a white growth over the tubers and black pin-like streaks in the cut tubers similar to that described as occurring in yams. Tubers from affected fields should never be used for planting.

As the causal fungus remains in the soil for years a long rotation with non-susceptible crops such as corn, grass, bananas or leafy vegetables should not be practiced.

Sclerotium or Southern wilt

Southern wilt is caused by the fungus Sclerotium rolfsii which attacks potato plants at ground level causing a sudden wilt. The white fan-like mycelium and seed-like sclerotia can be seen on the soil around affected plants. Diseased plants should be taken out of the field and destroyed. This condition is difficult to control as the fungus affects a wide range of plants.

Virus Diseases

Several viruses e.g. potato virus X, potato virus Y, leaf roll virus, mosaic and other viruses can attack potato plants resulting in mottling, spotting, crinkling or curling of leaves, retarded growth, an unhealthy appearance and reduced yields. Affected plants in a young field should be rogued, otherwise the viruses can be spread from diseased to healthy plants either mechanically or by insects such as aphids. Spraying with a systemic insecticide such as Rogor or Perfekthion to control insect vectors may help to reduce spread of the disease. All of the above mentioned viruses are carried in tubers and so the use of healthy certified virus-free seeds for planting cannot be overemphasized. Locally produced seeds are often affected by viruses and should not be used for planting. Most of the potato seeds used for planting in Jamaica are imported from Canada.

Root Knot Nematodes

Potato tubers are sometimes affected by eelworms, Meloidogyne sp., which produce 'water bumps' or galls on affected tubers. Soils known to be heavily infested with these nematodes should be treated with a nematicide before planting. Cultivating the soil a couple of times and leaving it exposed to the sun for several weeks will reduce its nematode population. Affected seeds should not be used for planting. A grass crop such as corn should be used in the rotation. Crops susceptible to attack by root-knot eelworms should be avoided.

CASSAVA

Leaf Spots

Cassava leaves in Jamaica are often affected by two leaf spot diseases. Large brown spots, up to half an inch in diameter, caused by the fungus Cercospora henningsii, are quite common. Smaller angular spots with a light brown centre and dark-brown margin, due to Cercocpora caribaea, may also be found. Neither occurs extensively except on cassava which is grown under adverse conditions. Improving the growth of affected plants by good cultural practices and application of fertilizer will help to control these leaf spots. If severe, the disease can be controlled by spraying with a dithiocarbamate fungicide, copper or Benlate.

Black Rot

Black rot disease is caused by the same kind of Rosellinia fungus that produces this condition on yams and potatoes. It is difficult to control. Fortunately it is rarely observed in Jamaica.

Leaf Mottling

A very marked yellow mottling of cassava leaves is sometimes mistaken for a mosaic disease. This may be due to thrips or other insect injury and is found chiefly on plants lacking in vigour. The exact cause of the condition has not been ascertained.

In dry weather, cassva plants may shed the greater portion of their leaves due to attacks by red spide mites which cause the remaining leaves to develop a mottled, a silvery or brown colour. With the recurrence of rain or with irrigation the plants recover. If attacks are severe the plants can be given a spray treatment with Kelthane or Rogor at 1 pint per acre or one of the other miticides.

DASHEENS AND COCOS (Colocasia and Xanthosoma, spp.)

This group of aroids does not suffer severely from diseases in Jamaica. Occasionally plants can be seen with Rosellinia black rot damage. Dry rot caused by a fungus Vasculomyces sp. sometimes occurs and leaf spotting may be seen, but these appear to do little damage to affected plants. Leaf chlorosis, mottling and what appears to be deficiency symptoms are sometimes observed but their exact cause and methods for their control have not been ascertained.

A condition has recently been encountered in which fine brown streaks occur throughout the tubers. The cause of this has not been identified.

Nematodes (Helicotylenchus, Meloidogyne and Pratylenchus spp.) have also been isolated from the roots of cocos and dasheens. Growth of plants was markedly better in a section of a field treated with DD nematicide than in an untreated section.