



SOUTH PACIFIC COMMISSION

SWEET POTATO SCAB



Above: Typical scab symptoms on a sweet potato shoot: infections along veins have caused leaves to curl and tear. Lesions between veins are also shown.

SCAB of sweet potato is caused by the fungus *Elsinoe batatas*, sometimes known by the name *Sphaceloma batatas*. The disease was first described from Taiwan, but is known to occur in Brazil, Brunei, China, Indonesia (Irian Jaya), Japan, Malaysia, Philippines and in the following countries of the SPC region: Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, New Caledonia, Niue, Palau, Papua New Guinea, Solomon Islands, Tonga and Vanuatu.

SYMPTOMS

As the common name implies, a characteristic symptom of the disease is the appearance on the leaves of small, brown, scabby areas which become lighter with age. The scabs on the leaf blades mostly occur along the midrib and veins as small oval spots, 1-3 mm long (Fig.1), which often join together forming lesions of several centimetres. Numerous, pin-point-sized spots occur in patches between the veins. On the petioles and stems the individual scabs are 1-5 mm long, more elongated than those on the leaf blade, and slightly sunken. Here, too, they may join together.



Fig. 1: Under-surface of young sweet potato leaf with individual scab lesions along veins; some of those along the mid-rib have joined together.

Infection mainly occurs when the leaves are still young. Damage to the veins prevents normal leaf expansion and consequently, they are severely deformed (see front cover): leaf blades are small, curled and have deeply torn edges. Curling exposes the under-surfaces of leaves (see Fig. 2). Petioles are shorter than normal and tend to twist. Shoots become more erect. On susceptible varieties, the growing points may be killed; on those with some resistance, only the upper petiole and lower parts of the midrib become infected.

Tubers are not infected by the fungus.

INFECTION AND SPREAD

The fungus produces minute spores in the scabby areas and these are spread by rain-splash to healthy shoots. Temperatures between 13° and 26°C are said to favour the disease, although in the tropics rainfall is probably foremost in determining disease severity. For this reason scab is worse during the rainy season.

Most commonly, scab is spread to new crops when infected cuttings are used as propagating material. The fungus probably survives between crops in the decayed vines of harvested plants, but survival of this kind is only important where sweet potatoes are grown continuously on the same land, as happens in the Highlands of Papua New Guinea, for instance.

EFFECT OF THE DISEASE

Crop losses due to scab have been assessed in Fiji, Papua New Guinea and Tonga. In each of these countries yields from infected plants were much lower than those of the same varieties kept healthy with fungicides. In the Highlands of Papua New Guinea the reduction in yield was almost 60 per cent. Fewer tubers were produced and they weighed less than those from healthy plants. In Fiji and Tonga some varieties are so susceptible that diseased plants fail to produce tubers.



Fig. 2: Scab causing leaves to curl, exposing under-surfaces (left). A scab-resistant variety is on the right.

When diseased cuttings are used for propagation, new shoots develop slowly. Consequently, vines take a long time to form a canopy and weeds become a problem.

CONTROL

Cultural methods

Sweet potatoes should not be planted continuously on the same land. It is best to practice crop rotation or fallow the land for at least 12 months between crops. If this is impractical, then the old vines, which may harbour the fungus, should be destroyed. New plantings should not be made near those already infected with the disease.

It is important to select planting material that is free from the disease. It may not be possible to find healthy plants. In this case growers should be encouraged to produce disease-free cuttings by planting small tubers in nursery beds. After one month the sprouted vines can be cut and planted in the field. It is unlikely that plants grown from these cuttings will stay free of scab throughout the cropping period, but epi-

demics of the disease will be delayed, and yields will be higher.

Resistant varieties

Varieties differ in their reaction to the disease. Most of the many hundred varieties in Papua New Guinea and Solomon Islands have good resistance or are immune. In neither of these countries is scab a problem, except, perhaps, in the Highlands of Papua New Guinea, where conditions are cooler. Some resistant varieties also occur in countries where scab has become a major problem in recent years. However, the taste of these is not liked as much as those susceptible to the disease. For this reason new varieties are being bred in Tonga by crossing popular local types and those with resistance, imported either as seeds from Solomon Islands, or as pathogen-tested tissue cultures from the International Institute of Tropical Agriculture (IITA), Nigeria.

Resistant lines from IITA may be obtained from the South Pacific Commission. In ad-

dition, favoured varieties from Papua New Guinea, Solomon Islands, Tonga and Western Samoa are now available as tissue culture from the Department of Agriculture and Rural Affairs, Plant Research Institute, Burnley, Australia. These can also be obtained from the Institute of Research, Extension and Training in Agriculture, University of the South Pacific, Western Samoa, or from the SPC.

Chemical control

Fungicides can be used to control scab disease, but can only be recommended for crops grown commercially. They might be used to control scab on susceptible varieties grown because of superior taste, or some other preferred quality, which commands a high market price. Fungicides should be used together with the cultural control practices outlined above.

Just before planting, dip vines for 15 minutes in a suspension of mancozeb 80 per

cent wettable powder (3 g/l). At the first appearance of symptoms, spray plants with mancozeb. If a hydraulic knapsack sprayer is used, apply 3 kg in 1000 litres of water per hectare; alternatively, if a motorised knapsack mistblower is used, apply the same amount of mancozeb per hectare in 250 litres of water. Repeat treatments, at 10- to 14-day intervals, until two months before harvest.

Quarantine precautions

Scab is not present in American Samoa, Kiribati, Marshall Islands, Tokelau Tuvalu, Wallis and Futuna, and Western Samoa. For these countries the disease is a major quarantine threat. Introductions of vegetative propagating material should not be allowed. Any transfers of sweet potato should be as sterile, pathogen-tested, tissue cultures, or as cuttings taken from such disease-free plants, or as true seed.

This leaflet was prepared by Graham Jackson, Plant Health Officer, South Pacific Commission, Suva, Fiji, and Eric McKenzie, Plant Pathologist, DSIR Plant Protection Division, Auckland, New Zealand. Further information can be obtained from the SPC Plant Protection Service. The photograph on the front cover was taken by Brian Thistleton.

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