

PLANT PATHOLOGY NOTE NO. 36

Rhizome and Root Rot of Cardamom

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INTRODUCTION

Rhizome and root rot of cardamom is a serious disease occurring in the Bainings area of West New Britain. So far, it has not been found anywhere else in Papua New Guinea or in other cardamom growing countries of the world. The disease is caused by a soil-inhabiting bacterium, *Erwinia chrysanthemi*. Strains of this bacterium also cause diseases in banana, and Irish potato in Papua New Guinea and the organism is also occasionally isolated from rotting sweet potato tubers. In other countries different strains of the bacterium cause wilt and root diseases in many different crop plants.

SYMPTOMS

The disease seems to predominantly affect mature plants about four years old which are approaching maximum productivity. First symptoms are yellowing of leaves often beginning in the centre of a stand and spreading to the outer leaves. As the disease progresses rotting may spread from the roots and rhizomes into the lower stems leading to weakening and eventual collapse. Roots of affected plants are blackened and often much reduced compared with those of healthy plants and affected rhizomes show a pale brown discolouration associated with softening. Once symptoms have begun to appear nothing can be done to save the plant. Adjacent plants may also more readily become infected because of root contact with the diseased plant.

SPREAD OF THE DISEASE

No direct evidence is available on how the disease in cardamom spreads from plant to plant or field to field. However, knowledge of similar bacterial diseases affecting other plants give a good indication of how the disease in cardamom may spread.

The bacteria invade the plants through the roots and rhizomes. Infection occurs much more readily if roots or rhizomes are damaged by attack from insects or nematodes. Soil carried on boots or garden tools can also readily carry the bacteria from plant to plant and to new plots some distance away from the infected crop. When plants on the upper slopes of hillsides become infected the bacteria growing in the roots and in the soil surrounding the



Four year old cardamom plant with basal stem and root rot caused by the bacterium *Erwinia chrysanthemi*

roots can be washed down the slopes by rainfall thereby exposing healthy plants growing lower down to the disease.

CONTROL

The most effective way to control diseases caused by soil borne organisms is to develop plants resistant to the disease. Because this disease was only discovered recently no resistant varieties of cardamom have yet been identified. There is also no chemical control available for the disease.

In the absence of resistant material, good field sanitation is essential to limit spread of the disease.

Digging tools or other garden tools should be sterilised by dipping in a bucket containing 1%

sodium hypochlorite (20% chlorox) after working on diseased plants, and boots should be thoroughly cleaned before moving from a diseased garden to one in which all the plants appear healthy.

If left in the ground act diseased plants as a continuing food source for the disease causing organism, and lead to large populations of bacteria within and around these plants. Diseased plant will provide a source of spread of the disease for several months if they are left in the ground. For this reason it is better to dig out diseased plants as soon as they are identified. Care must be taken to avoid as far as possible spreading infected soil around the garden. Drenching the roots of the removed plant and the ground from which it was removed with 1% chlorox or 1% formalin will reduce the risk of spreading the infection.

Further information about root and rhizome rot of cardamom can be obtained from the Chief Plant Protection Officer, D.A.I., P.O. Box 2141, Boroko.

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ROOT AND RHIZOME ROT OF CARDAMOM
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SYMPTOMS
The first symptom of the disease is the wilting of the plant. This is followed by the rotting of the roots and rhizomes. The plant will eventually die. The disease is most common in the wet season, but it can occur throughout the year. The disease is caused by a soil-borne bacterium, *Bacterium* (or *Erwinia*) *sp.* The disease is characterized by the rotting of the roots and rhizomes of the plant. The disease is most common in the wet season, but it can occur throughout the year.

CAUSE
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