SPIKINESS DISEASE OF GUATEMALA GRASS (*TRIPSACUM LAXUM* NASH): A VIRUS DISEASE?

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Introduction

Although research on the cause of a complex of disease symptoms of Guatemala grass (*Tripsacum laxum* Nash) which was called 'spikeness' after its most conspicious characteristic, has not been concluded yet, it is thought proper at this stage to publish the results obtained so far.

Since 1959, an abnormal growth of certain Guatemala grass plants has been noticed both up-country and in the low-country.

Symptoms

The symptoms vary with the age and the level of nitrogen nutrition of the plant. Two or three months after planting the cuttings, the plants show a stunted growth and a marked upright position (spikiness) of the leaves (Figs. 1 and 2). On the upper surface of the leaves a wax-like deposit can be seen (Fig. 5). At the base of the leaves a narrowing of the lamina is apparent and a particular pattern of green and yellow streaks occurs (Fig. 4). This last symptom is more marked on plants that suffer from nitrogen starvation. Some plants may show a marked ridging of the tips of the leaves (Fig. 7).

With more nitrogen available the leaves may show a break in the lamina on one or two sides (Fig. 6) and above and below this break, the same pattern of chlorophyll distribution as was mentioned above. Older plants show less stunting, but still the leaves may stand abnormally upright and may show the wax-like deposit.

Young developing leaves of older plants can show a certain yellowing due to lack of chlorophyll. On tall mature plants, the only symptom left may be the wax-like deposit on young leaves besides a certain depression of growth.

Occurrence

The distribution of this disease in Guatemala grass fields on St Coombs, and on neighbouring estates on which it is also fairly common, has no distinct pattern. No patches are discernible. In some fields it is more common than in others. Sometimes individual plants are diseased, sometimes it looks as if a row is planted with diseased cuttings. The disease does not seem to spread easily from one plant to the next.

Cause

The symptoms are reminiscent of a virus disease. It has not been possible to find any pathogenic organism, either fungus, bacterium, insect or mite by direct

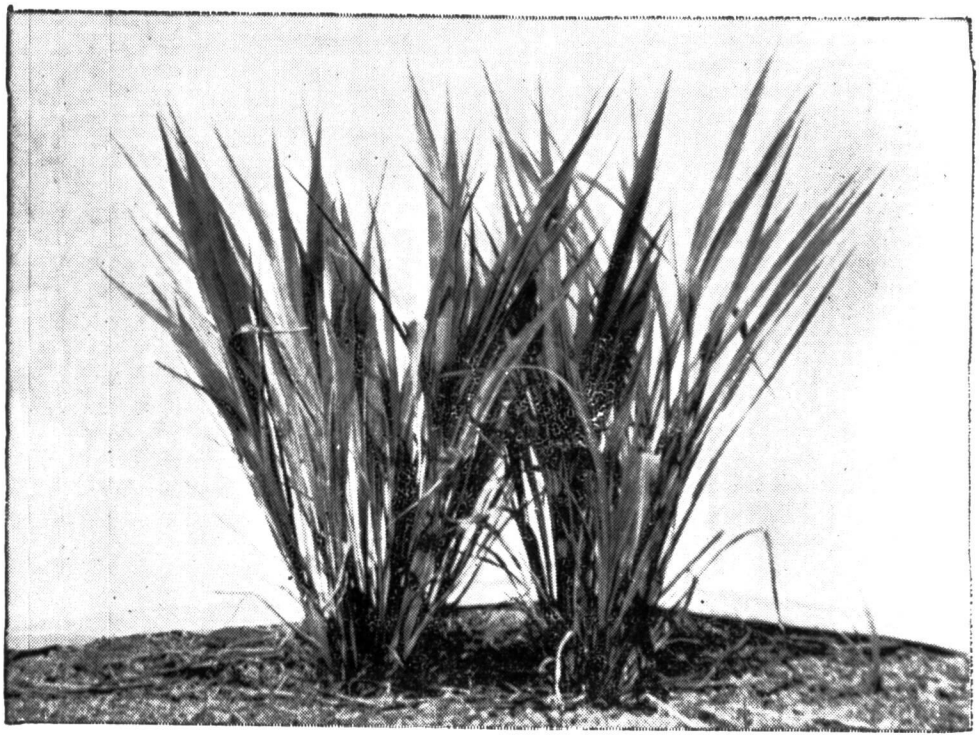

Figure 1. Spikiness disease of Guatemala grass: plants showing the symptoms of stunted growth and spiky leaves.

Figure 2. A diseased plant between two healthy plants showing the stunting effect of the disease.

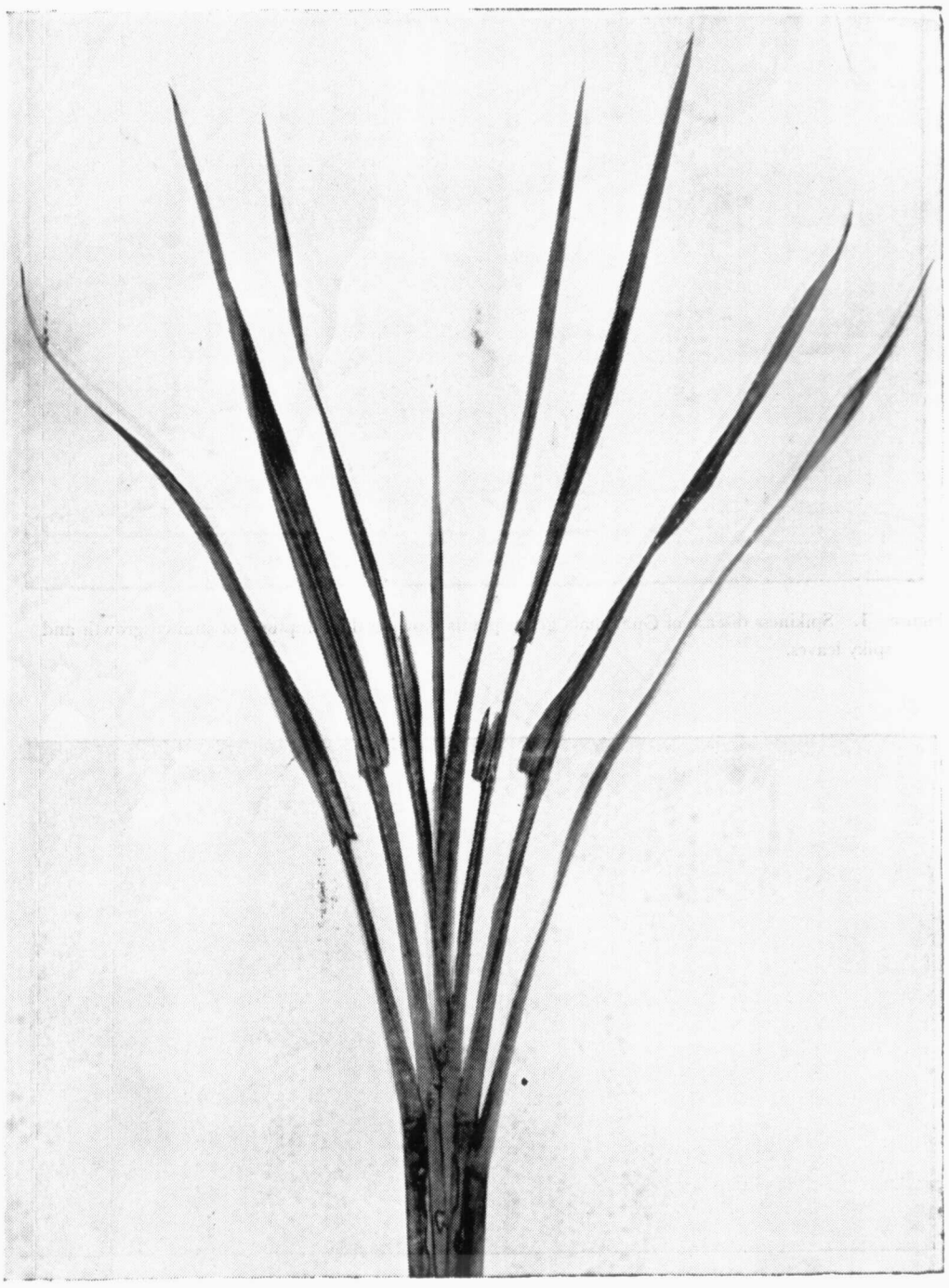

Figure 3. Part of a stunted plant showing the leaf deformation and chlorotic pattern.

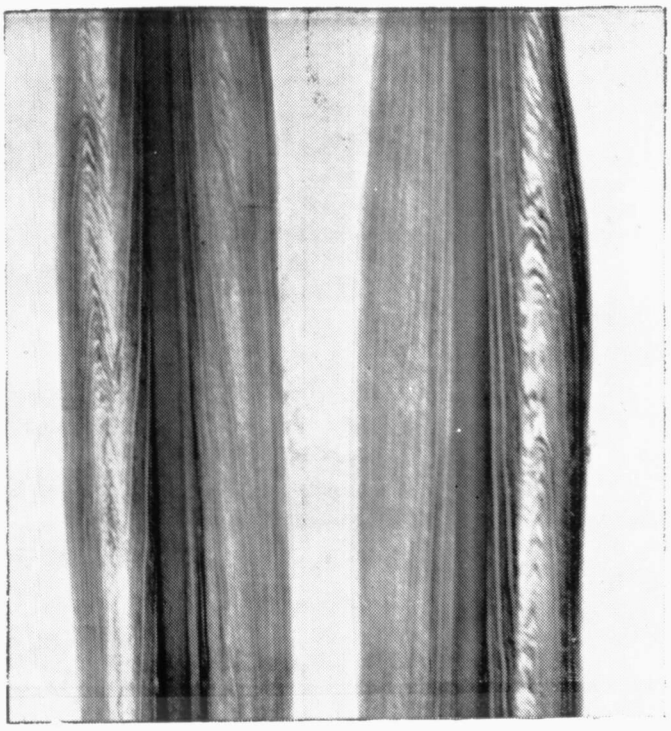

Figure 4. Pattern of distortion and chlorosis of the leaf as part of the syndrome of the disease.

Figure 5. Leaf covered with whitish, waxy deposit.

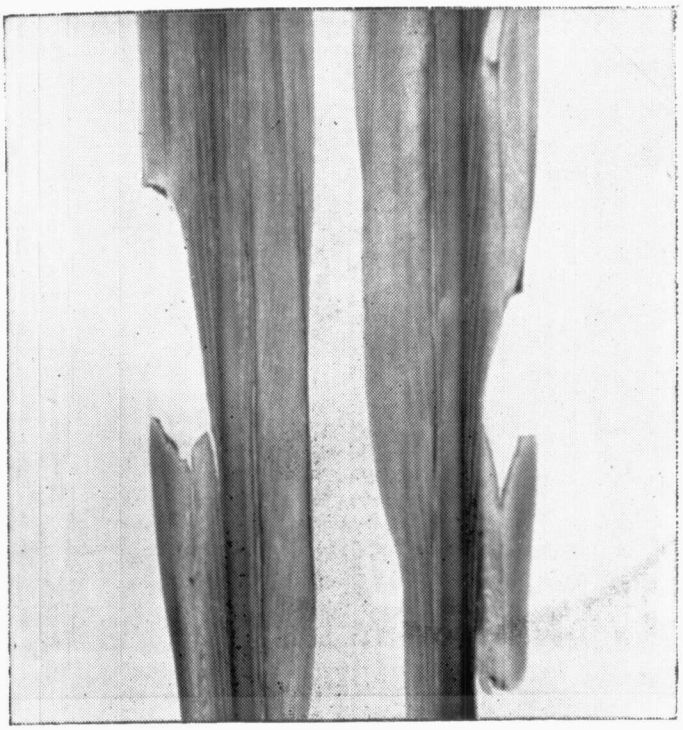

Figure 6. A common aspect of distortion on the lower parts of the leaves (cf. Fig. 3).

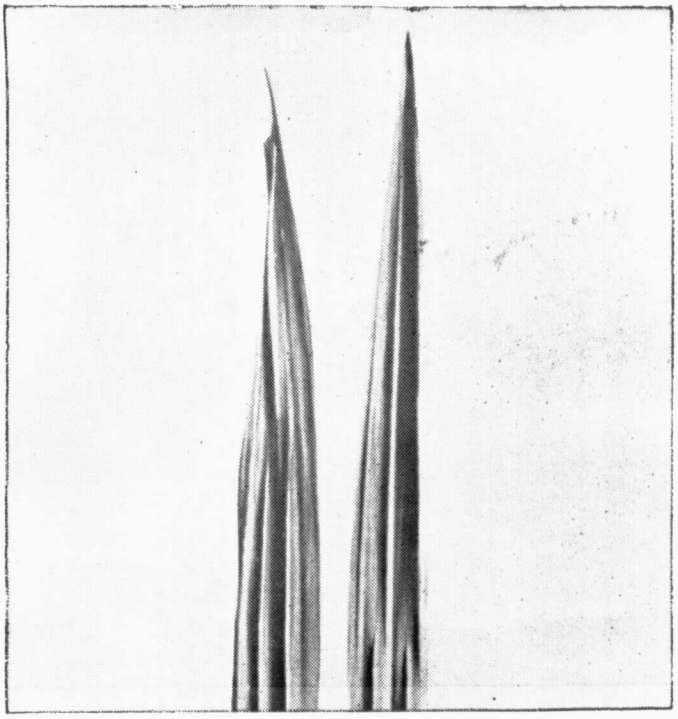

Figure 7. The tips of two leaves showing ridging, another aspect of the leaf-distortion symptoms.

analytical methods. The Entomologist confirmed that no insect or mite can be found inside the plant causing this complex of symptoms. However, attempts to control the disease in cuttings have given some information about the probable cause.

Cuttings were heated in water for 20 minutes at a temperature of 52°C. Most of the 50 treated cuttings died, but the sixteen cuttings that survived showed healthy growth thereafter. Further heat treatment experiments showed that 49°C is about the minimum temperature at which diseased plants are cured.

From this result, the preliminary conclusion is that the symptoms are caused by a virus disease.

This conclusion will, however, have to be substantiated by inoculation experiments.

Transmission

The symptoms of this disease are reminiscent of a leafhopper-transmitted virus disease but no proof of such transmission was found. In this connection it is interesting to note that the phloem necrosis virus of tea is supposed to be transmitted by a leafhopper also.

The insect responsible for the transmission of this Guatemala grass virus must be rather rare because the spread in the field is slow.

Healthy and diseased plants were planted alternately in a block of 10 × 10 plants. No infection of healthy plants was found after six months.

Economic Importance

Although it is not likely that planters have so far noticed this disease, it has, nevertheless, a potential importance. The growth of plants which are not well supplied with nitrogen is severely stunted, and even well-fed plants show a less vigorous growth if they are suffering from this disease (Fig. 2).

Symptoms are most conspicuous shortly after planting of the cuttings. Later when the field is covered the growth of diseased plants is suppressed further by healthy ones surrounding them.

Control

The disease is probably spread in the field by planting cuttings taken from diseased plants. So far no other means of spread is known but insect transmission is not excluded. One measure of control possible is a preventive measure—cuttings for planting up new clearings should be taken only from healthy plants—but because old plants show such slight disease symptoms this is not easy. Another measure of control could be the roguing of young Guatemala grass fields, when the disease is easily detectable.

Origin

No virus disease has so far been described for Guatemala grass from any part of the world. It is therefore not likely that this disease was brought into the island when the first Guatemala grass plants were imported here. The alternative is that the grass has picked up this disease from the locally growing Gramineae.

If cuttings of Guatemala grass should be exported to other countries care should be taken not to distribute this disease by sending out diseased plant material.