Leaf stripes resembling those caused by the gumming disease bacterium were observed in Mauritius in 1989 in several sugarcane varieties including the commercial varieties M 13/56, M 2173/63, M 3035/66, M 695/69, M 292/70, M 1557/70 and the promising clones M 1205/70, M 298/71, M 1236/71 and M 791/75. The stripes, cream yellow in color, began at the tip or margins of the leaf blade and sometimes reached the sheath. The leaf scald bacterium, _Xanthomonas albilineans_, was isolated from these stripes and was diagnosed by immunofluorescence in apparently healthy tissue up to 30 cm from the extremities of the stripes. Identification was carried out by serological, biochemical and pathogenicity test. The leaf scald bacterium was also recovered for the first time in Mauritius from maize, whether growing in sugarcane interrows or in full stand. Symptoms previously undescribed included leaf striping, stunting and death of plants in several maize hybrids. The bacterium was isolated on agar medium from guttation droplets from infected sugarcane leaves. Positive results were obtained when its pathogenicity was tested in young sugarcane plants and in maize seedlings. Diagnosis in guttation droplets was also carried out by immunofluorescence. Because of the presence of viable bacterial cells in guttation droplets, it is concluded that the leaf scald bacterium is, like the gumming disease bacterium, _X. campestris_ pv. _vascularum_, airborne and infects sugarcane and maize probably through wounds, especially at the leaf tip or along the leaf margin. The severe leaf scald epidemic in 1989, the worst for the last 60 years, is attributable to such aerial dissemination of the pathogen. It has therefore become apparent that there are two mechanisms of transmission, hence of resistance to leaf scald, namely foliar infection and mechanical inoculation. This finding necessitates assessment of varietal reaction not only by decapitation but also by the exposure method. It may be necessary to avoid cultivation of leaf scald susceptible varieties in the humid zone where aerial transmission is likely to occur most readily, as happens with gumming disease.

Key words: Sugarcane, maize, gumming disease, stripes, guttation, immunofluorescence, mechanisms of resistance.
INTRODUCTION

Leaf scald caused by Xanthomonas albilineans (Ashby) Dowson is one of the most important diseases of sugar cane. It is widely distributed, having been reported in 44 countries (Anon⁴) and can cause important economic losses (Bates¹, Egan¹²). The adverse effects of the disease become more pronounced under stress conditions such as drought (Anon⁵), high and low temperatures (Persley¹¹).

In Mauritius, leaf scald was first found in the 1920s on noble canes, especially Tainas, in which losses of 11% were estimated by Shepherd². With the replacement of susceptible clones, the disease became insignificant until 1964 when two important commercial clones considered as resistant were found with widespread infection (Antoine and Perombelon⁷). The latter speculated that variation had occurred in the pathogen with the appearance of a new virulent strain. It is only recently that definite proof for the existence of races of the pathogen as it is the cane for gumming disease (Xanthomonas campestris pv. vasculorum) has been obtained (Autrey et al¹⁰). Besides, three serotypes of the organism have been identified (Rott et al⁸) indicating the high degree of variability of the bacterium.

Leaf scald is known to be mainly transmitted by setts and cutting implements. The occurrence of leaf scald under natural conditions in various graminaceous hosts such as Imperata cylindrica, Panicum maximum, Paspalum spp., Pennisetum purpureum, Rottboelia exaltata and Zea mays (Rott et al⁹) suggests that other mechanisms of transmission could exist. This is further reinforced by the presence of leaf scald bacterium in guttation droplets of sugarcane and sweet corn infected by the bacterium as reported by Sordi and Tokeshi. Furthermore, in Mauritius it has been observed that a higher incidence of the disease occurred following the passage of cyclones in 1964, 1970, 1975 and 1980-81 (Antoine and Perombelon⁷, Ricaud¹⁴, Annon², Autrey and Sullivan, unpublished). In 1989, the worst epidemic of leaf scald for the last 60 years occurred in Mauritius with widespread infection in several varieties, especially in the newly released M 1557170, M 292/70 and M 695/69, the latter having been found slightly susceptible to the pathogen in disease resistance trials. Detailed surveys showed that the level of infection in commercial fields of the new varieties was out of proportion with the negligible level of disease found in nursery plots. Simultaneously, the presence of atypical foliar stripes resembling those induced by the gumming bacterium in sugarcane, as well as the isolation of the leaf scald bacterium from maize for the first time, triggered investigations aimed at determining whether X. albilineans was aerially transmitted. Some of the results obtained in this research project are presented in this paper.