

Effect of Methods of Inoculation in Developing Red Stripe/Top Rot Disease Symptoms in Sugarcane

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ABSTRACT

To develop symptoms of red stripe/top rot, three methods of inoculation viz. hand-spray, hypodermic syringe and needle-prick were tried on four and a half months' old cane in twenty varieties/strains. Success was gained with hypodermic syringe method only. The other two methods failed to develop symptoms. The varieties/strains of Isd. 1/53, Isd. 2/54, Isd. 9/57, Isd. 16, L. Jaba-C, Co. 975, Co. 1158, BO. 70, BO. 71, I-18/74, I-60/74, I-96/74, I-106/74, I-45/74, I-59/74, I-21/75, I-45/75, I-79/75 showed red stripe symptoms in the first week following inoculation whereas I-29/75 showed symptoms in the second week and I-59/75 in the third week respectively. Top rot did not develop until the third week when there were 20%, 15% and 10% infections in Isd. 1/53, BO. 71 and L. Jaba-C respectively while the rest of the varieties showed 5% infection. In the varieties/strains of Isd. 16, I-18/74, I-96/74, I-45/75 and I-59/75 top rot did not develop at all. But none of the varieties/strains escaped the attack by red stripe bacteria.

INTRODUCTION

The diseases of red stripes in the sugarcane leaf, red patches in the sheath, top rot, and blood red blotches in the stalk surface are caused by the same bacterium, *Pseudomonas rubrilineans* (Lee *et. al.*) Stapp. Under favourable weather conditions coupled with high temperature and high humidity the disease poses a great threat to the standing canes. Hence, development of resistant varieties through inoculation tests has become a necessity for to-day. With this aim in mind, several techniques of inoculation were tried during the crop season of 1981-82, so as to develop red-stripe/top rot symptoms. Chinea *et. al.* (1977) studied pin, hypodermic syringe and pressure-gun methods.

They found highly significant difference between the three methods and the control. Christopher and Edgerton (1930) used pin method and succeeded in obtaining symptoms of bacterial mottled stripe only in summer, when the temperature and relative humidity were quite high. Chinea *et. al.*, (1977) further

reviewed that Chona studied pin and pressure-gun methods for inoculating the causal organism of red stripe in sugarcane and concluded that pressure-gun method produced more stripes in the leaves of the inoculated plants. Bourne (1970) achieved the best results with the pin method while he was carrying out experiments on artificial inoculation in sugarcane as well as in some other Graminae with red stripe causal organism utilizing the pin and pressure-gun methods. Dange and Payak (1913) studied a combination of the spray and pin methods to inoculate sugarcane and maize with the bacterium of red stripe. The typical stripes developed only in sugarcane.

Fors (1980) stated that the disease is seasonal, normally becoming active at the beginning of the rainy season and its symptoms gradually disappear as the climate gets drier and cooler.

Wismer (1969) while working with leaf scald of sugarcane stated that it is difficult to correlate sugarcane variety performance from artificially inoculated pathogens with that from natural infection by these pathogens under field conditions.

MATERIALS AND METHODS

Three methods of inoculation were used :

- A. Hand-sprayer (Fig 1)
- B. Hypodermic syringe (Fig 2)
- C. Needle prick and the control (Fig 3 and 4)

The newly red stripe affected leaves were dipped in calcium hypochlorite and the pure culture of the bacteria. *Pseudomonas rubrilineans* was made in nutrient agar. From the agar plates a bacterial suspension having an approximate concentration of 5×10^7 bacteria was prepared in sterile distilled water (Kiraly *et. al.*, 1974). This suspension was then inoculated by the above three methods.

The control was sterile distilled water sprayed on the spindle leaves using a hand sprayer.

Nine varieties and eleven strains were inoculated in the middle of May when the plant age was eighteen weeks. Twenty plants of each variety/strains were used against each method. The observations for the development of red stripe/top rot were started at an interval of 7 days since inoculation and continued upto 35 days.

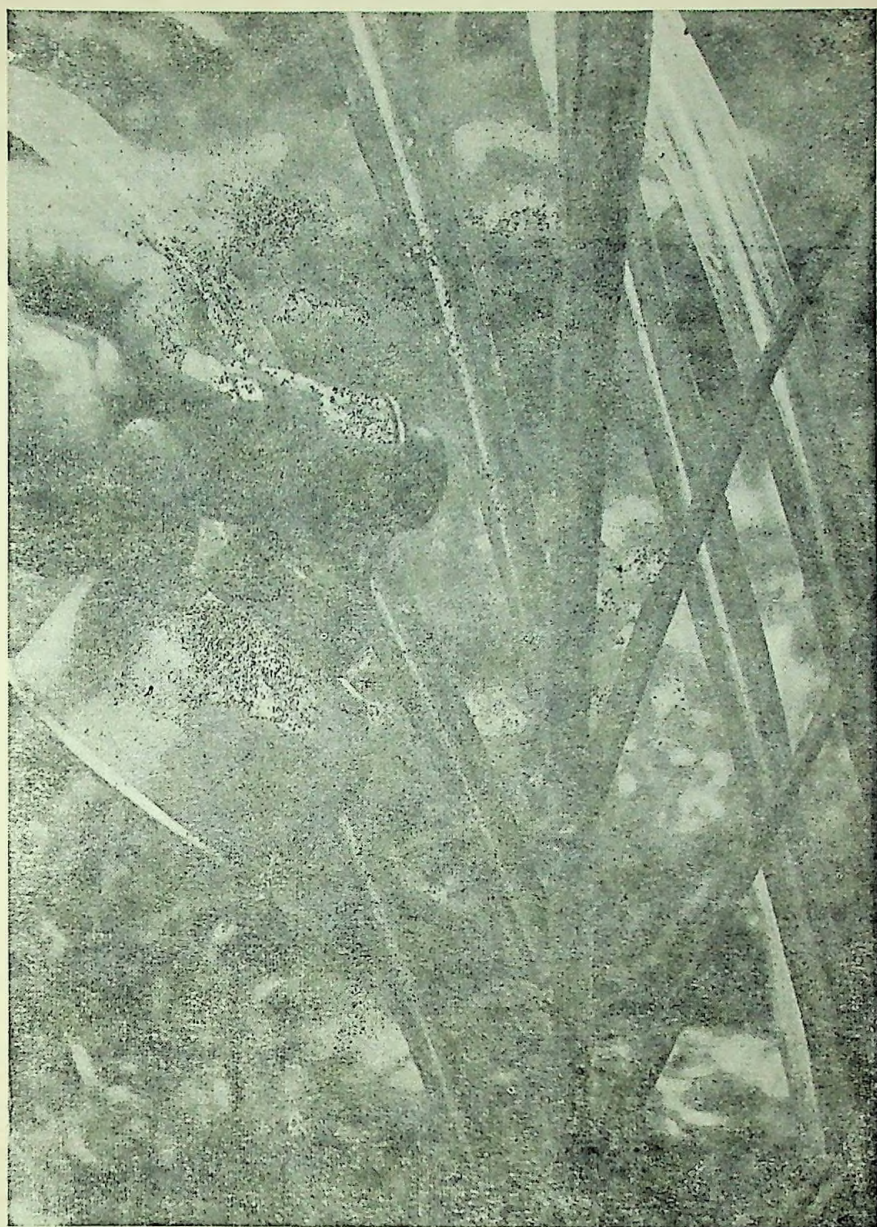


Figure 1. Hand Sprayer

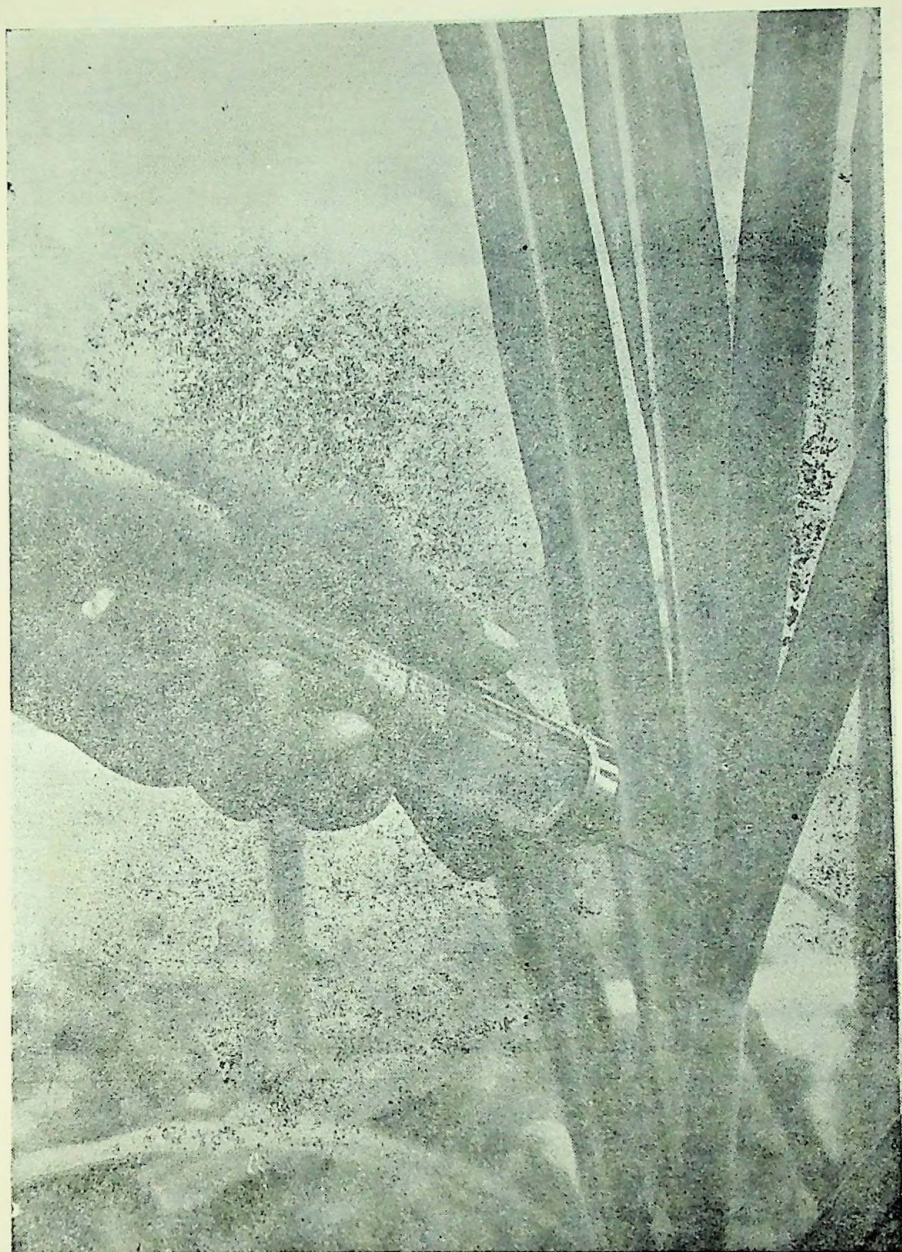


Figure 2. Hypodermic syringe