Introduction
Plate 1. The crop and the nematode

(A). The crop (sugarcane)
(B). The lesion nematode *Pratylenchus zeae*
CHAPTER I

INTRODUCTION

Among the 20 life sustaining crops (LSC) sugarcane (Saccharum spp.) holds an important position in world agriculture (Sasser and Freckman, 1987). India is reputed to be the country of origin of sugarcane and production of sweetening agents like unrefined jaggery, khandsari etc., from which refined sugar manufacturing subsequently evolved. The Indian sub continent being situated in tropical and sub-tropical areas is ideally suited for sugarcane cultivation. This crop occupies about 2.5% of the total area of agriculture lands and is cultivated in almost all parts of the country except in the extreme colder regions of the North. It is a matter of pride that the total production of sugarcane in India has progressed rapidly from 36 million tonnes in 1930-31 to 203 million tonnes in 1989-90. (Anon, 1990).

Though India ranks second in area under cane cultivation and production in the world, the average cane yield is only around 60 tonnes/ha compared to highest yield being 85 tonnes in Indonesia. Although many new varieties are evolved to replace the old there is a constant slow decline in yield and quality of the crop. Being cultivated under highly varied agro-climatic environmental conditions ranging from the tropics to the sub-tropics the crop is conducive to a wide range of pests and diseases. Plant parasitic nematodes are today identified as one of the major pest that attack this crop. These nematodes adopt well as successful parasites in the highly varying zones and form a part of "bioagent" in slow decline of yield and quality of sugarcane (Sasser and Freckman, 1987).

At present a total of 48 genera and 275 species of nematodes have been recorded on sugarcane from 36 countries (Spaull and Cadet, 1990). Among these, species of only five genera namely Pratylenchus, Hoplolaimus, Tylenchorhynchus, Helicotylenchus and Meloidogyne, can be listed as the major nematodes having a very wide distribution and of
common occurrence in all the sugarcane soils of the world. The total loss to sugarcane by nematodes on international basis is assessed as 15.3% (Sasser and Freckman, 1987).

Lesion nematode, *Pratylenchus* is rated as the primary nematode pest of sugarcane fields of the world (Spaull and Cadet, 1990). This nematode has been reported as early as 1887 by Soltwedel, who described *Tylenchus sacchari* from sugarcane in Java. The species was later transferred as *Pratylenchus sacchari* and at present is placed as *species inquereda*. Today 11 species of this genus has been recorded from 28 countries cultivating sugar cane and *Pratylenchus zeae* has been noted as predominant species, being recorded from 20 countries.

Preliminary survey for nematodes of sugarcane growing belts of India has indicated a widespread occurrence of different species of lesion nematode *Pratylenchus* in all the nematode infested pockets. *P.zeae* was confirmed to be the predominant species involved in causing heavy losses to many sugarcane growing pockets. The present studies were undertaken to investigate in detail the following aspects regarding the association of this crop and the nematode.

1. Distribution and spread
2. Population dynamics
3. Pathogenicity
4. Root penetration studies
5. Host range studies
6. Biochemical studies
7. Management practices

These fundamental investigations will help in assessing the damages caused by this nematode, to the crop and also the extent of losses incurred thereby. Further, these studies will also form the basis in developing strategies for prevention of spread of the nematode, evolving nematode resistant varieties and developing suitable management
practices to bring down the economic threshold level in sugarcane fields thereby ensuring increase in yield and quality of sugarcane.