INTRODUCTION

Sorghum, *Sorghum bicolor* (Linnaeus) Moench, is grown in over 42 million hectares in all the six continents and in a zone extending up to 40° on either side of equator. It ranks fourth in acreage and production among world’s major cereal crops, the others being wheat, rice and corn. In Asia, it is cultivated in 19.71 million hectares out of which 16.80 million hectares are under cultivation in India (Anonymous, 1977). The major sorghum growing states of India are Maharashtra, Andhra Pradesh, Karnataka, Madhya Pradesh, Rajasthan, Gujarat and Tamil Nadu where it is used as staple food for large population especially in rural areas and fodder for cattle (Anonymous, 1980).

India, though occupies 37 per cent of world’s total acreage, produces only 22 per cent of grain. The average yield per hectare is only 625 kg/ha as compared to the average yield of 2826 kg/ha in U.S.A. Till early sixties very little attention was paid to improve the yield of this crop, but situation since then has changed with the introduction of high yielding hybrids and varieties developed from the active programme on sorghum improvement taken under the auspices of the Indian Council of Agricultural
Research and Cooperating Agencies. The impact of high yielding hybrids and varieties is evident from the increase in their acreage during the last 5 to 6 years. Though the yield potential of the new cultivars is as high as 4000 to 5000 kg/ha, this can not be fully realised due to a number of constraints. One of the major constraints in obtaining high yields is the serious losses caused by major insect pests.

*Cnito carlettus* (Swinhoe), until recently known as *Cnito zonellus* (Swinhoe) in the literature, is the most important borer pest of sorghum and is recorded from all the sorghum and maize growing areas of India. It also occurs in other countries viz., Sudan, Uganda, Kenya, Tanzania, Ceylon, Indonesia and Taiwan. Besides sorghum, it is reported to cause serious damage to maize and a number of other alternate hosts including *Pennisetum typhoides*, *Panicum frumentaceum*, *Sorghum sudanense*, *Sorgum helepsense*, *Polytrca barbata*, *Andropogon spp.*, *Sacccharum aera*, *Eleusine coracana*, etc. It is reported to cause 55.50 to 83.70 per cent grain loss to sorghum (Jotwani et al., 1971) and is relatively more serious in northern, central and western regions of the country. Earlier workers (Rahman, 1940, 1944; Butani, 1958, 1961) have recorded that often the infestation of borer is so severe that entire crop may be lost. The improved high
yielding hybrids and varieties, developed from exotic lines, are found to be highly susceptible to borer attack. The control of stem borer is, therefore, considered to be essential for obtaining higher yields from the new cultivars.

The main thrust of the research workers engaged in control of sorghum pests has so far been towards the use of insecticides (Pradhan et al., 1959; Sivagami and Sulechana, 1965; Thobbi et al., 1968; Ahmed and Young, 1969; Jotwani et al., 1971 and Jotwani and Young, 1972). Spectacular successes have been achieved in pest control on sorghum with insecticides. This method has attracted more attention as it is effective and quick in action and therefore, it is generally considered to be the only answer for immediate control.

The various limitations and serious consequences of increased use of pesticides has brought about a complete change in the strategy for pest control. Single factor approaches for the control of pests, being inadequate, have usually been discarded and the integrated pest control has now become the universally accepted concept.

Integrated pest control has particular relevance in a crop like sorghum where modern production and protection practices have not yet been introduced to a large extent and average sorghum grower is poor and cannot
afford costlier insecticides. Teetea et al. (1963) have recently suggested outlines for developing integrated pest control programmes in sorghum. Earlier Pradhan (1966) also indicated the theoretical possibility of integrated control of stem borer, Chilo partellus (Swinhoe). However, integrated control for this important pest could not be put into operation for want of basic information on the pest and different components which can be effectively integrated.

The present investigations on "Integrate approach for the control of Chilo partellus (Swinhoe), a major pest of sorghum" were, therefore, undertaken with the following major objectives:

1. To screen and identify promising and high yielding lines of sorghum for stem borer resistance under diverse field and artificial infestation conditions and determine feasibility of utilization of the identified sources of resistance in integrated control programme.

2. To examine the stability of resistance in selected cultivars.

3. To increase level of borer resistance in sorghum by crossing agronomically suitable indigenous cultivars.
4. To find out effective and cheap insecticides which can be recommended when absolutely necessary. Also to determine the suitable crop stage and frequency of application.

5. To explore the possibilities of integrating host plant resistance and chemical control.

6. To collect quantitative data on carry over of the pest in off season, its survival and emergence. Also to study the effect of row and plant spacings and nitrogen fertilization on the borer incidence.

7. To determine the economic status of parasites of the borer, especially Apanteles flavipes Can.

8. To test the efficacy of Bacillus thuringiensis (B.t.), a biological control agent, and to determine its compatibility with an effective insecticide.

The results from these studies were expected to yield considerable data on the basis of which an operational research project on integrated control of the stem borer could be undertaken in endemic areas.