

The bulk of maize, which is the main staple food in semi-arid Eastern Kenya, is grown by subsistence small-scale farmers, and the yields are usually low, averaging 500kg/ha. Stemborers are one of the major causes of these low yields. The general goal of this project was to generate basic information for the development of a sustainable biological control programme for stemborers in this region, with emphasis on parasitoids. In a survey conducted in six agroecological zones (AEZs) in March-June, 1996, the pests reported to damage maize were: chafer grubs, stemborers, termites, 'red ants', yellow necked spur fowls, ground squirrels, monkeys, porcupines, rats wild pigs and storage insect pests. Squirrels were considered to be the most widely distributed and important vertebrate pest of maize in all the study zones. Stemborers were reported as pests of maize in all the zones, and ranked first among insect pests in AEZs: UM4, LM4, LM3, LM4 and second in LM5, but were considered unimportant in UM2. Agronomic practices that may influence stemborer infestation in maize, including cropping systems, varieties, sowing time, fertilizer/manure use, stover storage, usage and disposal are discussed. Farmers use insecticides, wood ash, soil, saw dust, chilli pepper, dry cell powder and *Tagetes minuta* to control stemborers. The spatial and temporal distribution of stemborers, and the incidence and severity of stemborer infestation in maize, was investigated in farmers' fields in six AEZs during the LR 1996 and SR 1996/97. The stemborers that infested maize in the six AEZs were: *Chilo partellus*, *Sesamia calamistis*, *Cryptophlebia leucotreta* and *Busseola fusca*. *C. partellus* was the most abundant and widely distributed, was most prevalent in the lower altitude zones, whereas *S. calamistis* and *C. leucotreta* were more common in the higher altitude zones. *C. partellus* was mainly responsible for the early to late season infestation of maize in the LM3-5 zones, while *C. leucotreta* and *S. calamistis* infested the crop mostly from mid-season especially in the UM2-4 zones. Stemborer infestation was much lower than expected for this region (1-22%), and was attributed to the unusually low rainfall received during the two seasons. Stemborers were found to be a potential major problem to maize production in all the zones, except in UM2, which had the lowest severity of infestation (1.64). A study was conducted to determine the interrelationships among stemborer density, damage and plant growth variables, at the vegetative, reproductive and maturity stages and, their effect on grain yield in maize at Katumani, in the SR 1997/98 and LR 1998. Correlations and path coefficient analysis were used. The path analysis model, which accounted for 86% of the total variation in maize grain yield, showed that, the effects of larvae and damage variables, on the plant growth variables and grain yield, were primarily through damage caused at the vegetative stage. Among the plant growth variables, plant height at maturity, had the highest direct positive effect on grain yield. Among the damage variables, stem tunneling at the vegetative stage, had the highest indirect negative effect on grain yield, larvae at the vegetative stage caused a grain yield loss of about 3g per plant. Studies conducted at Katumani, Ithookwe and Kiboko, for four seasons (SR, 1996 - Lr 1998), revealed that, the stemborers that infested maize were *C. partellus*, *S. calamistis*, *C. leucotreta* and *B. fusca*, with *C. partellus* being the most abundant (71.3% - 92.89%) and widespread species, while *B. fusca* was the least common (0 - 0.12%). A complex of upto 22 different parasitoid species were recovered from the stemborers, and the parasitism was highest at Kiboko followed by Ithookwe and Katumani in descending order. The most common indigenous larval parasitoids were *C. sesamiae* and *C. curvimaculatus*, and the pupal ones were *Pediobius furvus* and *Dentichasmias busseolae* but their effect was low. During the season of introduction of the *C. flavipes*, (SR 1997) and the following (non-release) season, *C. flavipes* was responsible for the highest parasitism of stemborers in all zones (10.33% - 25.81%). This study showed that *C. flavipes* was able to locate, parasitize and

successfully colonize stemborers (*C. partellus*, *S. calamistis* and *C. leucotreta*), at the three sites. Kiboko appeared to be the most suitable site for the survival of *C. flavipes*. Partial life table analysis of *C. partellus* showed that the highest mortality occurred on the 3rd and 4th instar larvae, and was mainly due to disappearance. However, key factor analysis showed that parasitism by *C. flavipes* on the 5th and 6th larval instars was the key factor that determined changes in the densities of *C. partellus*, during the period of this study. An on-farm study in the six AEZs from July, 1997 to April, 1998, showed that, *Pennisetum purpureum* grass was the most widespread and abundant wild host of *C. partellus* and *S. calamistis* throughout the study period, followed by *Panicum maximum*. *C. partellus* was the predominant species, with the highest number being recovered from *S. versicolor* (94.6%). Only larval parasitoids were recovered from *C. partellus* in *S. versicolor*, with *C. flavipes* causing the highest parasitism (13.64%).