NOTES ON THE MECHANICAL SUGARCANE PEST CONTROL OPERATIONS AND PRACTICES IN BANGLADESH

Mohammad Shahjahan
Sugarcane Research Institute, Ishurdi,
Pabna, Bangladesh.

INTRODUCTION

The Sugarcane Plants are attacked by a variety of pests and about 1500 species have so far been recorded in this crop all over the world (Long and Hensley, 1972). In Bangladesh, the stem borer, **Chilo tumidicostalis,** top shoot borer, **Scirpophaga excerptalis** and the root borer, **Emmalocera dipresella** have been reported to be very damaging (Alam, 1967; Shahjahan, 1974a 1974b, 1976). Other insects like termites, **Odontotermes** spp; white grubs, **Holotrichia** spp., Leaf-hopper, **Pyrilla perpusilla pusana**, Wooly aphis, **Ceratovacuna lanigera,** and scale insects, **Melanaspis glomerata** also attacks sugarcanes and cause considerable loss in yield.

The chemical control of borers of sugarcanes is not satisfactory despite considerable development in the field of pesticides (Long and Hensley, 1972). Hence this method of control is not extensively used in any region of the World except in Louisiana (Singh **et al,** 1956; Siddique **et al**, 1959; Long, 1969; Long **at al,** 1959; Hensley, 1971; Hensley and Concienne, 1968).

Therefore, more emphasis is given on the Mechanical, biological and cultural methods of borer control in different parts of the world.

Charpentier and Mathes (1969) reviewed the cultural practices for sugarcane pest control in various countries and recommended this method as an adjunct to other control measures. The planting of uninfested cane seeds and the use of light traps in combination with manual collecting of adult moths and egg-masses would greatly minimize the level of borer populations (Gupta and Avasthy, 1959).

MATERIALS AND METHODS

The following materials and the methods are in practices in this country for carrying out mechanical operations for borers and other pest control in sugarcanes.

Removal and Destruction of Borer-Infested Plants :---The borer-infested plants, especially by the Top Shoot and Stem borers, are removed and destroyed. During the initial stage of attacks, the infested settlings are cut 2 inches below the soil level, removed and the larvae are immediately destroyed.

Spike-thrusting method :---Mere cutting of the infested plants, during early stage, and their destruction does not guarantee the killing of the insects inside, especially in case of attacks by the early shoot borers and the root borers. In such cases, the spike-thrusting practices are extensively carried out after cutting the plants at soil level.

Hand and Hand-net Collection of insects :---The adult moths of the top shoot borers and the adult beetles of the white grubs are usually collected by hands or Hand-nets. The sugarcane leaf-hoppers (Pyrilla) are conveniently collected and destroyed by sweeping in hand-nets. The young boys are employed to collect and destroy termite-queens.

Light Trapping :---The adult moths of the top shoot borers, stem borers, adult beetles of white grubs, the winged termites and the adult hoppers are collected by light trapping method and destroyed. This practice is carried out, especially at peak period, for 2 hours after evening.

Hand collection of Egg-Masses :---The egg-masses of the adult of the top shoot borers and the sugarcane pyrilla are very prominent and laid on the leaves. The young boys are economically employed to collect and destroy these egg-masses.

Leaf-Clipping :---The infestation of the sugarcane thrips and the wooly aphis on the sugarcane leaves are very prominent and easily detected from a considerable distance. Such thrips-and wooly aphis-infested leaves are usually clipped in the morning and the pests are destroyed by dipping the leaves in the kerosinized water (1 chattak kerosine in 1 seer of water).

Spading Method :---A soon as the symptoms of damage of the termite and white-grubs are observes in the fields, the soils around and under the infested setts, shoot or plantsdre spaded up along with the insects and immediately killed by crushing or dipaping them in an emulsion of pesticde (4 ounce pesticide in 20 seers of water).

Water-Proof Mud-Barrier :---A water-proof mud-barrier are usually created around the white-grubs-infested field during July or August to hold natural rain water at least for a week, and then drain out the water to avoid bad effect of water-logging. The accumulated rain water are usually treated with pesticides (1 lb/acre).

Flooding Method :---This has been recognized as a very effective method of controlling all kinds of soil-inhabiting insects. Where irrigation facilities are available, the irrigation water is treated with pesticide to control terimtes, white-grubs and root borers.

Detrashing and Stripping :---Destrashing and stripping of the old and dry sugarcane leaves during July and August are sometimes practiced to help achieve a great success in controlling the stem borers, scale-insects and pyrilla. This not only control the insects but also increase the sugar content in sugarcanes.

Stem Cutting Method :---Cutting and destruction of both the primarily and secondarily infested stems by the stem borers and scale insects have been practiced and proved to be very successful in controlling these 2 insect-pests.

Bamboo-Tower :---This method works well especially during July and August when it is very hard to search for the stem borer-infested plants

in the heavily tillered sugarcane fields. A bamboo-tower of 10-12 feet high are usually made somewhere in the field which enable a pest control operator to have a bird-eye view of the entire field. He locates the presence of the stem-borer-damaged plants from the tower and guides the worker/workers near to such borer-damaged plants by simple direction. Such plants are cut and destroyed. A through search around 5 feet diameter of such stem borer-damaged plants is made to detect the newly stem borer-infested plants. These plants are then cut at the base, removed and destroyed along with the larvae inside.

Surgical Operation :---This technique works well in case of the top shoot borer-attacks during June, July or August when the growers are quite reluctant to cut and destroy the entire infested plants. At about 5-6 inches down from the neck of the top shoot borer-infested plants,(or at the upper base of the top most node), a small slit (about 3 inches long) is usually made with a pointed knife to detect the position of the larvae and kill it by pinching or crushing. Such practice do not usually cause any remarkable damage to the plants. This method is conveniently carried out in the 4-8 feet tall sugarcane plants.

Mechanical Manipulation of Local Parasites :---The complete destruction of the collected egg-masses and pest-infested stems would not only kill the target pests, but would also destroy a large number of parasites which could have otherwise been utilized to kill a large number of harmful insects in nature. Therefore, the collected egg-masses of the top shoot borers and the pyrilla are kept confined in a small container, covered with very finely-meshed thin cloth, for sometimes only to let the parasites out. But the newly hatched pest-larvae or nymphs are immediately killed.

Similar action are also taken with the stem borer and scale insect-infested stems. The egg-masses are also kept in a small container which are made to float in the middle of a large container having water. The later is kept in some high place near the new sugarcane fields.

Burning Stubs and Trashes :---After harvest of the sugarcanes, the left-over cane stubs and dry trashes are piled up and burnt to ashes. The fields are immediately tractor-ploughed and harrowed. This process helps destroy a large number of damaging sugarcane pests including scale insects, root borers, mealy bug, termite, stem borers, etc. etc.

Adjustment Method :---The plantation and harvesting time of sugarcanes, if adjusted accurately, would help control the top shoot borer-attacks in the new plantation by stopping their migration from the old standing canes to the newly emerged shoots. By the time the new shoots of the newly planted sugarcane emerge, the harvesting of the nearby old standing sugarcanes are completed and transported to the mills. The left over cane stubs and dry trashes are immediately piled up and burnt.

DISCUSSION

The strong mechanical control operations should continue until the key regulating or the key controlling factors are identified and an effective control

programme is evolved. In Bangladesh, this method was proved to be very useful in preventing the sugarcane pests from inflicting heavy crop damage.

For this method to be effective, the operations should timely and simultaneously be started in all the infested areas and be completed within a week from the date of commencement.

The appropriate time of application of this control measure can be determined through field samplings and the operation should be carried out at least 2 times during the season for complete success.

This method is economic and easily integrated with any other pest control operations. It works well at all stages of insect development (e.g. eggs, larva, pupa and adult). There is no danger of developing "insect-resistance" to control measures as is expected with pesticide with pesticide-applications.

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