Information Sheet

8.9 Longhorn Beetle

Introduction

The incursion of the longhorn beetle (LHB) (*Cacosceles newmannii)* (Coleoptera: Cerambycidae) (Figures 1a and 1b) into the South African sugar industry in the eNtumeni district of KwaZulu-Natal, necessitated an extensive containment exercise by the sugar industry.

First identified in October 2015, efforts to contain the incursion have focused on eradicating fields of sugarcane where the pest was found, as well as adjacent pest-free "buffer" fields.

Damage symptoms included lodged stalks in patches of stunted sugarcane, with basal borings and an associated red colouration around the feeding tunnels. Plant and ratoon crops of varieties N12, N21, N39, N41, N47 and N48 ranging in age from one to 22 months old, were attacked. Generally, only one larvae per stalk was found during surveys.. Tunnels made by LHB larvae were visible in stubble of recently harvested crops, and in stalks stacked in loading zones.

The dramatic host shift of LHB from indigenous vegetation to sugarcane may have been driven by declines in alternative and previously relied-upon nutritional resources, (possibly indigenous tree species) or by other anthropogenic pressures such as informal logging. These factors, combined with favourable environmental conditions for population growth could likely account for the incursion experienced in the sugar industry. However, with so little known about the biology and length of the lifecycle, research efforts remain ongoing.

▲ **Figure 1:** (a) Longhorn beetle adult (male); (b) Biosecurity personnel at an infested field during surveying protocols.

Biology

Cacosceles newmannii (Thomson 1877) (Coleoptera: Cerambycidae, Prioninae) is a southern African species that had been poorly studied prior to its invasion of South African sugarcane in 2015, with very little published about its biology and ecology. Observations have revealed the following aspects of the life cycle (Figure 2).

LHB appears to have a two-year life cycle, most of which occurs in the larval stage, where larvae from overlapping generations range greatly in size from 2 to 9 cm in length within the same field. The lengthy larval stage comprises of neonate larvae of *C. newmannii* that feed on the roots of sugarcane stools and eventually, as older larval stages, enter the stalk bases, where they grow and feed by moving upwards through two to four internodes from the base that they entered. Only one larva is found per infested sugarcane stalk because of their large size, with larval incidence appearing higher in sandier soils (clay content below 25%) derived from Natal Group Sandstone.

When ready to pupate, the final instar larva will leave the stalk it has been feeding on through its base. Once in the soil under the stool, it will form an earthen cell, inside which it pupates. Adults emerge from mid/late January to the end of March, are relatively short-lived (3-4 weeks) and probably do not feed. Females attract males for mating, likely through a long-distance sex pheromone (a natural product released by the insect for communication between, and location of, mates) and a contact pheromone (which stimulates mating when males make physical contact with females – this was tested and demonstrated in laboratory experiments). Mating flights, wherein males actively seek females for copulation opportunities, were observed in sugarcane fields in the eNtumeni area during every year of the project, from 2017 to 2019 on warm, sunny days (starting at about 9a.m.) and were apparently associated with good rainfall that preceded hot and dry conditions.

Males were more active fliers than females and are probably critical in species dispersal; females were found mostly on the ground. Eggs are laid in the soil and decomposing plant material around the base of mature sugarcane stools. Females observed in the laboratory laid up to 2 450 eggs.

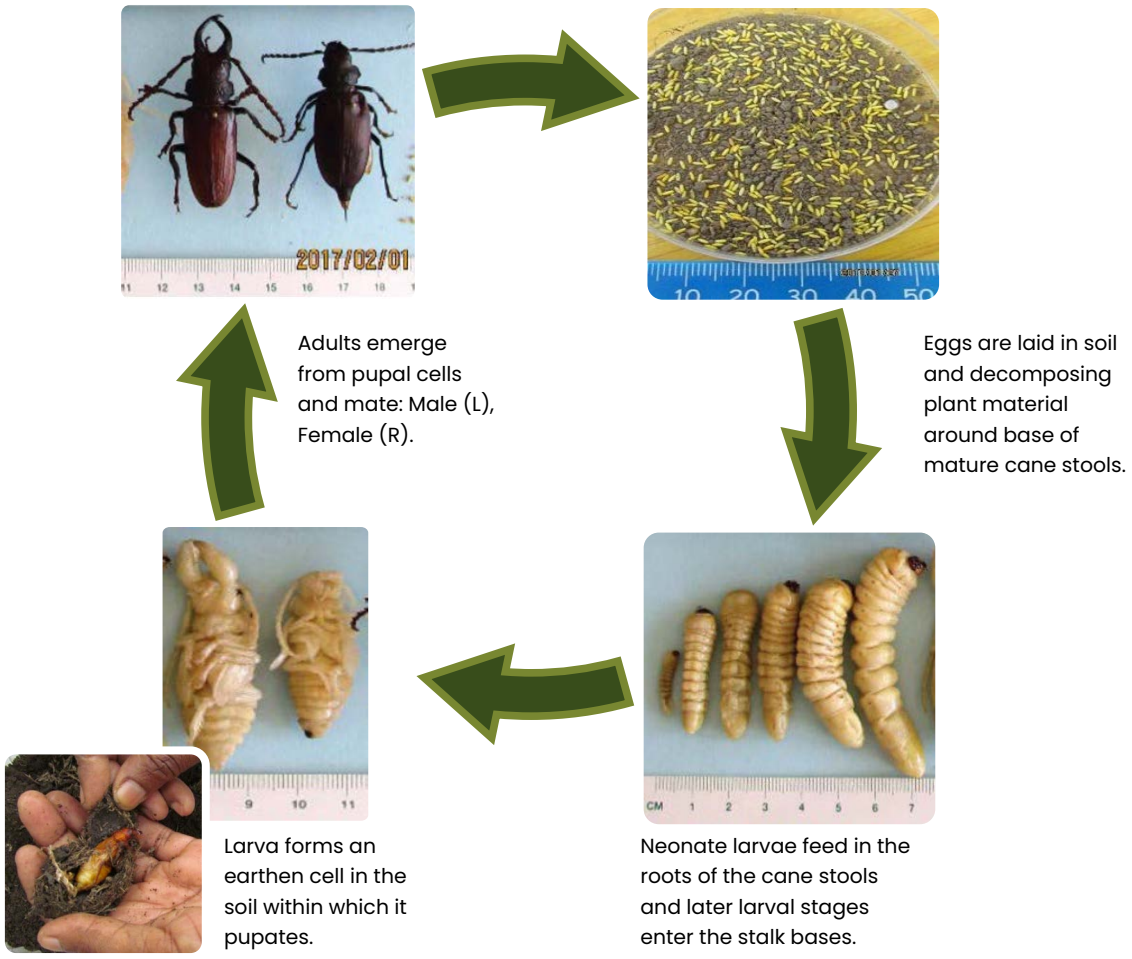

Figure 2: Life cycle of *Cacosceles newmannii*.

Symptomology

Typical symptoms of infestation by LHB include stressed cane (Figure 3a), lodged stalks, wild pig damage to stools (wild pigs feed on the larvae) (Figure. 3b), hollow stalks in harvested cane (Figure. 3c), damaged stalks and stubble (Figures. 3d and 3e), or a larva in the base of the stalk (Figure. 3f). It is also essential to distinguish between damage incurred due to *Eldana saccharina* and that due to longhorn beetle (Figure. 3g), wherein the latter forms large cavities within the bottom part of the cane stalk.

▲ **Figure 3:** Typical symptoms of longhorn beetle infestation (a) Stressed cane; (b) signs of pigs feeding : (c) hollow stalks; (d and e) damaged stalks and stubble: (f) larvae in the base of the stalk; and (g) difference between *Eldana saccharina* damage (top) versus damage due to longhorn beetle larvae (bottom).

Containment

To contain the pest, amendments were made to the Sugar Industry Agreement proclaiming the LHB a hazardous pest. Additionally, various remedial measures were gazetted, e.g. crop eradication, the registration of an insecticide treatment (active ingredient: emamectin benzoate) (Figure. 4a) and restrictions on cane movement - in particular the movement and sale of seedcane. Specific procedures to contain the incursion focussed on surveying fields (Figure. 4b and 4c), eradicating fields of sugarcane where the pest was found, as well as adjacent uninfested "buffer" fields to reduce the risk of adult beetles flying into new areas. Once the sugarcane was removed, a cover crop was planted based on the expectation that, with an extended fallow of at least two years, populations would be reduced sufficiently to not pose a threat to the industry. The cover crops planted were mainly permanent pasture, e.g. kikuyu grass (*Pennisetum clandestinum* (Hochst. Ex Chiov.)) that had been found unsuitable to support the life-cycle of the pest. Furthermore, a set of remedial measures were gazetted in March 2017, that required early harvest and eradication of the crop in infested fields followed by a one-year minimum fallow or until the pest has been destroyed.

During 2017 and 2018, when most of the crop eradication was completed, a total of 1130 hectares of sugarcane had been removed. The success of this effort can be measured by the fact that, in 2018, only two additional fields were found to be infested, and these were both within the greater containment area. Another measure of the effectiveness of containment is the extent of emergence of adult beetles. This occurs from around January to March each year. In February 2018, there was a limited emergence from one of the previously infested fields. In late February and March 2022, there was another emergence of beetles also mostly from a single previously infested field, with captures revealing only 5 females, and over 100 males. To date, a total of 1150 ha of sugarcane has been removed.

SASRI is currently carrying out research to fully understand the biology of the pest. Various control methods and means of trapping the insect are also being tested. In the meantime, Biosecurity personnel throughout the industry are on high alert for the pest.

▲ **Figure 4:** (a) Insecticide applications in infested fields; (b) and (c) Biosecurity teams during surveys.

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