INCREASED INFESTATION OF WHITE GRUB CONT...

shoots whilst the first instar feeds on soil organic matter. Heavy infestations cause loss of plant vigour and ratoon failure which results in no regrowth of aerial plant parts after harvest (Prinsloo and Uys, 2015). Heavy infestations in mature sugarcane result in poor growth, with leaves turning yellow, and even death of the plant stool.

Figure 4: Larval stage of White grub

H. licas adults cause damage to young plant and ratoon sugarcane by chewing through the sides of the tillers, just below the soil surface into the meristematic area of new shoots killing the still unrolled new leaf in the whorl and creating typical 'dead heart' symptoms.

Observed infestation levels in 2016 and 2017

Current results showed that the average infestation level of 0,14 grubs per pit was a rise of 180% compared to same time last year. The infestation level vary each month. The highest larvae this year were recovered in April when the larvae per pit was 0,23 and the lowest so far was in May at 0,08 grubs per pit (**Figure 5**). Of the white grubs collected, the most common were the unknown species classified as "other" (51.56%), followed by *Asthenopholis* spp (16,44%), *Heteronychus licas* (14,03%) and *Anomala* spp (13,98%) and the least was *Adoratus* spp (3,64%). *H. licas* used to be the most prevalent species in Swaziland in the 1960s, but of late the *Asthenophilis* spp have become more abundant together with the unknown species which was consistent with the current survey results.

In June, the composition of *H. licas* was high at 27,94% and the density of 0,04 larvae/pit. This is of concern since *H. licas* is the species most likely to cause severe economic damage to sugarcane due to its capability to damage both roots and underground stems and causes damage both in the grub and beetle stages. The industry threshold level for *H. licus* is 0,5 grubs per pit. The average industry *H. licus* infestation level was 0,04 grubs/pit. An average of one grub per soil pit is regarded as a heavy infestation (30 can occur in a single pit) and a threshold for control.

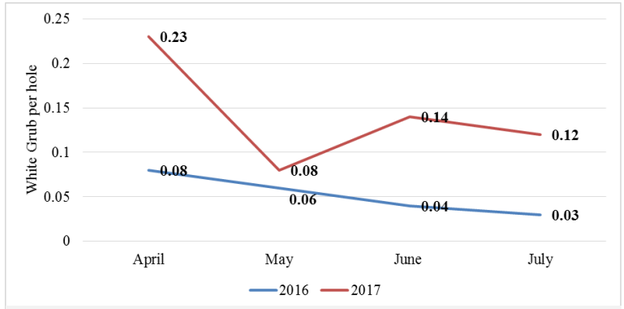

Figure 5: Industry average white grub infestation level (per hole) trends for 2016 and 2017

The infestation also varied by region. Despite the marked increase when compared to same time last year, the highest total number of grubs per hole was 0,5 (recorded in the north) and 0,35 *H. licus* grubs/hole (recorded in the north) in June.

Control/Management

Cultural measures- since damage is usually localized, the affected area should be targeted. Hoeing out affected stools or remove stools using a hand held rotovator will kill the white grubs and reduce their populations. Replanting can be done a week after working the soil (Conlong, up).

Plough out late cut badly attacked fields and replant so that they become early harvested fields.

Retaining trash as mulch. There is evidence of low white grub populations when trash is retained versus bare soil.

Chemical control- is expensive and chemicals are very toxic. Current research on controlled release insecticides, such as a formulation of systemic imidacloprid in an inert carrier is being done. Applying (2L/ha) and incorporating it into the root zone, the current imidacloprid formulation produces positive results.

Biopesticides- a lot of research has been done in commercializing biopesticides. This provides a safer alternative to chemical control as they are regarded to be safe to the human to handle. At present, these are not available for commercial use, however, growers will be informed accordingly once they become accessible.

By Mphumelelo Ndlovu (Crop Protection & Extension Officer)

SWAZILAND SUGAR ASSOCIATION TECHNICAL SERVICES

EXTENSION NEWSLETTER

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"If the cane remains uncut for a longer period, the sucrose content in the stalk will start to decline"

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"This has become a necessary operation in summer when rains are pouring"

White grub infestation

"Reports from the region (South Africa & Swaziland) suggest an increase in the infestation levels of white grubs"

PROFUSE FLOWERING OF CANE THIS SEASON

Introduction

Profuse flowering of cane was witnessed this season especially on prone varieties such as N23 and NCo376. Scattered flowered stalks were also seen on N25 fields. In essence, one grower in the South admitted that they had a flowered N25 field this time around, a very rare occurrence. Some dispersed flowering was also seen on variety N36 as well.

Factors

Flowering in sugarcane is largely dependent on the interaction of variety and environmental factors such as day length/ photoperiod and temperature. Additional factors cited in literature that influence flowering are physiological maturity of the sugarcane stalks, soil moisture, light intensity, humidity, altitude and nutrition. A correct combination of these factors is more likely to initiate flowering, and photoperiod is the most critical of these.

Figure 1: Flowered sugarcane stalks

Flowering in sugarcane is induced when day length shortens from 12.5 hours in autumn provided the shoots are old enough to respond to the flowering stimulus. An average optimum day temperature of 28°C and an average night temperature above 18°C during the inductive photoperiod, which lasts for about 15 to 30 uninterrupted nights, produce the strongest stimulus for flowering. Little or no water stress and humid and cloudy days during the photo inductive period favour flowering, while excess nitrogen can hinder or prevent flowering.

Senescence

The sugarcane flowers take about 75 to 85 days to emerge from the time of floral initiation. The emergence of flowers in the stalk apex alters the physiological processes and stops vegetative growth. As a result, older leaves senesce reducing the photosynthetic capacity of the plants, and the accumulation of sucrose in the stems continues until photosynthesis in the leaves stops. If the cane remains uncut for a longer period, the sucrose content in the stalk will start to decline.

Pithing

Flowering is also associated with pithing, the process of juice loss in the parenchyma cells of the stalk. The pith process leads to a loss of moisture in the tissues, with a consequent reduction of the juice stock and an increase in the fibre content of the stalk. While the concentration of sucrose in the stalk is increased, but the extraction of the sucrose during the milling process is difficult. *(Continued next page)*

Profuse flowering of cane... cont.

Side shooting

After September, when climatic conditions that favour vegetative growth set in, flowered stalks produce side shoots which become the source of photosynthates to prevent rapid stalk deterioration. As a result, the content of fibre increases while that of sucrose decreases.

Recommendations

Growers are encouraged to:

- Harvest flowered cane before the end of September.
- Apply ethephon as per industry standard as it suppresses flowering especially on prone varieties e.g. N23 (see **Figure 2**).
- Avoid planting varieties that are prone to flowering late season (refer to industry's variety recommendations).
- Not to apply chemical ripeners on cane fields that have more than 25% flowered stalks.
- Avoid carrying over cane with more than 25% flowered stalks to the following season.

Figure 2: Chemically ripened cane (left) and un-ripened cane (right) in the same field

By Njabulo Dlamini (Agronomist)

The importance of cane carrying out

Introduction

Cane carrying (known as *kutjakuza* in siSwati) is the movement of cut cane by people (not machinery) from infield to field edges for ease of loading and transportation to the mill when fields are wet for mechanical infield loading. This has become a necessary operation in summer when rains are pouring. Under such circumstances, instead of waiting for the field to dry up before cut cane is loaded and ferried to the mill, growers are encouraged to consider this operation due to the following reasons:

- Cane left on the ground for a longer period deteriorates in quality.
- Sucrose extraction becomes difficult in the mill on cane with poor quality.
- Cane left on the ground for longer period delays the start of post-harvest activities thus affecting yield for the next season crop.
- The milling season is maximized and cane is crushed while sucrose content is still high.

Infield roads

However, cane carrying out requires that infield roads be gravelled and well maintained. If not, the people carrying out the cane may be forced to walk longer distances to loading sites hence reducing labour productivity. From the field edge, the cane is then loaded into trucks by a grab-loader. If the infield road is not sufficiently wide to cater for this operation, the loader may damage the field on the edges as it moves back and forth loading.

Damage

Figure 3 (next page) shows a situation that was obtained in one sugarcane farm at the Siphofaneni area last season. In this farm, a three wheel loader was used to carry out cane from the field instead of labour. The farm supervisor, who is also a member of the scheme when interviewed during the operation said with a depressed voice "*This is a disaster for us. This was supposed to be a good year considering the size of the crop-stand but the rains have made it a painful year for us. We had worked very hard during the course of the year to improve our yields but now all our efforts are fruitless. A lot of our cane will be trampled upon and left on the ground. The worse thing is that we now have to consider inter-row ripping and do some gapping which was not in our budget for the season*".

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The importance of cane carrying out cont...

Figure 3: A sugarcane field damage by a three wheel loader used to carry out cane in one farm at Siphofaneni

Recommendations

- Financiers should consider supporting growers to do infield road gravelling.
- Growers harvesting from spring are strongly encouraged to budget for cane carrying-out.
- Growers are encouraged to use people for cane carrying-out not machinery to minimise field damage and costs as well.

By Mpendulo Nxumalo (Extension Officer - South)

Increased infestation of white grub on cane

Introduction

The SSATS P&D team conducts annual white grub survey between March and August of every year. The target has always been to cover at least 10% of the industry harvested area. The surveys by the team are done in out-grower fields with the mills carrying out their own surveys. Reports from the region (South Africa & Swaziland) suggest an increase in the infestation levels of white grubs. This then necessitated intensified monitoring of the pest by increasing the target area to survey from 10% to 20% of harvested area in 2017/18 season.

Survey method and materials

1. To survey, 30cmx30x30cm pits are dug beneath sugarcane stools.
2. Site selection within fields is random.
3. The recommendation is to sample one pit for every 2 ha area.
4. Count the total number of larvae recovered from each pit.
5. Count the total number of pits dug in the fields.
6. Calculate the larval density (infestation level) as follows: total number recovered divided by total number of pits sampled, to give you white grub per pit.
7. Identify the white grub using the pattern of rasters or hairs and the body size.

Life cycle

Life cycles of white grub species are long and range from one year (*H. licas)* to two years. In southern Africa, there is one adult flight period which starts with the onset of rainy season or irrigation in September and lasts until February peaking in October/November. Females lay eggs in soil close to the base of the host plant. Egg incubation lasts between 10 – 30 days. Larvae (**Figure 4)** hatch and remain in the soil for the rest of their larval stage of between eight and twenty months feeding on organic matter, roots, root hairs and underground sugarcane stool parts. The third instar larva burrows deeper into the soil to pupate for about 20 to 30 days.

Damage

The second and third instars feed on roots, root hairs and underground stools that produce new

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