The life cycle of scarabs follows a typical seasonal pattern and those species studied have usually completed the life cycle in one year. Adults emerge and fly in spring and early summer during which time eggs are laid. Resultant larvae feed on plant tissue or on organic matter below ground through the winter months, pupating in late winter or spring. This cycle may be distorted for example under irrigation such as in the case of our industry H. _lucas_ have in the past been noted in large numbers and caused serious damage to ratoon cane in July.

**Control**

White grubs are not easy to control. In many cases the adult beetle, which is an active flier, does not damage the crop (save for _H. lucas_) but serves merely to spread the infestation by flying from its point of emergence, mating and laying eggs (ovipositing) at the base of a cane plant. The hatched larvae remains in the soil and as it develop feeds on the underground parts of the sugarcane. The damaging stages of the life cycle of the scarabs i.e. the grubs therefore are protected by being underground.

**Alternative to Chemical Control**

Biological control of white grubs is also being seriously considered. During the collection of white grubs for identification, dead and sickly grubs will also be collected to identify the microbes or any agents that killed them. These when isolated and identified could be processed into biopesticides. Biopesticides which could be from fungi, bacteria, viruses, nematodes etc are said to be safe to use and are also host specific so that they will not affect any other organisms besides the target. Biopesticides are also said to be safe for human beings so that they are not harmed during application.

**Current Research on White Grubs**

SSATS is currently involved in two research projects in collaboration with the South African Sugar Research Institute (SASRI) at Tambankulu where promising insecticides against the control of white grubs are being screened. The projects were established in August and November 2011 and it is hoped that should these insecticides prove effective, they will be safer to use compared to the old chemicals that were banned.

**The ripening of sugarcane in Swaziland is used as a routine management tool to improve sucrose content of immature sugarcane crops at the beginning and at the end of the milling season. It is a means of improving sucrose yields. Research results indicate that yield gains of up to 2 t/ha of sucrose are possible if the sugarcane crop is ripened. Worth noting is that a sucrose yield response of 0.1 to 0.3 t/ha is sufficient to cover the cost of the chemical and its application. Most sugarcane varieties, especially _N23, N25_ and _NC376_ have a relatively low natural sucrose content, hence the need for chemical ripening.**

The current system of ripener application was introduced to the industry in 1985. Since then, all three mills have seen a dramatic improvement in sucrose yields, cane quality and factory recovery.

**Until recently, only growers with large fields have been able to enhance their sucrose yields with chemical ripeners as only aerial application was the only feasible means. There is now a knapsack boom, available with Swaziland Agricultural Supplies (SAS) that can be used on small and irregular shaped fields.**

The ripener applications are introduced to the industry towards the colder months. If the application is to be followed by Fusilade Forte. Ethrel does not destroy the growing point. It causes yellowing and senescence of the lower leaves. The cane must be actively growing at application and must not show any signs of moisture or nutrient stress. Ethrel does not reduce cane yields. The ideal criteria for deciding whether or not to ripen is juice purity, which should be less than 75% at the time of application.

**Application rate:** When applied alone, a rate of 1.5 l/ha is recommended, otherwise the rate can be reduced to 1.35 l/ha if an ant-evaporant such as mist control or Li700 is used with the Ethrel.

**Recommended products**

Products for chemical ripening and their recommended use are described below. Before proceeding with a chemical ripener program, check the following first:

- The product to be used must be registered for chemical ripening - this should be shown on the label (South African registration number).
- The intended spray to harvest date must comply with recommendations.
- The product and rate of application must be compatible with the variety.
- The crop must be in suitable condition for ripener application.
- The weather conditions should be suitable for ripener application.

**CHEMICAL RIPENER RECOMMENDATIONS**

**Chemical ripeners**

1. Ethrel (Ethephon/Idapln/Ripenit)
2. Chemical ripeners
3. White Grubs

**Crop Protection and Extension Officer**

By Mr. Duma Zwane
CHEMICAL RIPENER RECOMMENDATIONS (CONTINUED)

For N19, the spray interval must not exceed 12 weeks.

**Fusilade Forte**
Fusilade Forte is a herbicide which, if applied at low rates can be used as a ripener for sugarcane. This differs from Fusilade Super in that it has an active ingredient of 150g/l while Fusilade Super has an active ingredient of 125g/l. Fusilade Forte replaced Fusilade Super and its use in Swaziland is still new.

**Application rate:** The application rate is 0.200 to 0.225 l/ha for ground spraying and 0.225 to 0.250 l/ha for aerial spraying. The lower rates must be used if the varieties are N25, N26 and N36.

**Time of application:** The early season spray to harvest interval should be 6 to 8 weeks. If harvest dates are likely to be delayed, the lower rates must be applied.

**Other products**
Two other products available as alternatives to Fusilade Forte are Gallant Super and Volley.

There is currently a research trial looking at the efficacy of each of the available products - Fusilade Forte and Volley. The two are compared with the outgoing Fusilade Super. The other objective of the trial is to determine the appropriate rates of the products. Results of two crops have indicated that Fusilade Forte is more effective on N19 when compared to Fusilade. Irrigation must continue for at least 3-4 weeks following application and the normal dry off practice can then follow.

**Application methods**
Ripeners are most commonly applied by plane. Where fields are small or irregular, the knapsack is used. Calibration is vital to ensure that correct rates are applied. Should growers have difficulty calibrating their knapsacks, they should contact their extension officers for advice.

**Burning and topping**
Ripened cane should have smaller green tops than untreated cane. Treated cane should be topped higher than untreated cane.

**Notes**
YY Highly recommended
N Not recommended

By Mr. Bernard Shongwe
Crops Agronomist, SSATS

**Table 1: Ripener recommendations by variety**

<table>
<thead>
<tr>
<th>Variety</th>
<th>Ripener</th>
<th>Application rate l/ha</th>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCo376</td>
<td>Y/N</td>
<td>0.225 - 0.250</td>
<td></td>
</tr>
<tr>
<td>N14</td>
<td>Y/N</td>
<td>0.250 - 0.275</td>
<td></td>
</tr>
<tr>
<td>N19</td>
<td>Y/N</td>
<td>0.225 - 0.250</td>
<td></td>
</tr>
<tr>
<td>N23</td>
<td>Y/N</td>
<td>0.225 - 0.250</td>
<td></td>
</tr>
<tr>
<td>N25</td>
<td>N</td>
<td>0.200 - 0.225</td>
<td></td>
</tr>
<tr>
<td>N26</td>
<td>Y/N</td>
<td>0.200 - 0.225</td>
<td></td>
</tr>
<tr>
<td>N36</td>
<td>Y/N</td>
<td>0.200 - 0.225</td>
<td></td>
</tr>
<tr>
<td>N40</td>
<td>N</td>
<td>-</td>
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</tr>
</tbody>
</table>

**WHITE GRUBS IN SUGARCANE**

The Swaziland Sugar Association Technical Services (SSATS) will embark on the survey of white grubs throughout the industry at the beginning of March 2012. This will be following the completion of smut surveys which began in September 2011. Alongside the survey for white grubs will be the collection of these all the way to August 2012 for the ACP Project where collections will be sent to South Africa for identification. As the industry is aware from our monthly reports during the white grub survey season we can so far only identify four species being H. licas, Adoretus, Anomala and Asthenopholis. We classify all those that we do not know under “other” so that these also need to be identified.

White grubs are the larvae of some scarabeid beetles which feed mainly on underground parts of sugarcane and other plants.

**Adults do not normally attack the crop save for beetles of Heteronycus licas in Swaziland where the adults feed on young shoots causing severe damage.** Already late last year (December) reports were already filtering through on the damage caused by beetles in some farms at Vuvulane. Ubombo Sugar has also reported damages by adults in some of their fields this January (2012). These reports are not unexpected as adults fly around this time of the year.

**Patches from white grub damage**

The Swaziland Sugar Industry has a long history with white grubs. It was revealed in one paper that about 20,000 tons of cane was lost in 1967 due to white grub damage. White grubs are found throughout the industry. Their attack leads to damaged patches in the field which result in yield loss. Sometimes these patches grow so big such that the whole field needs to be ploughed out and this is very costly to the growers.

**Damage from beetles**

**Scarab beetles**

**White grub**

**White grubs are the larvae of some scarabeid beetles which feed mainly on underground parts of sugarcane and other plants.**