YELLOW SUGARCANE APHIDS (*SIPHA FLAVA*) SURVEY METHOD & CONTROL CONT...

leaves are more favored by the pest.

Yellow Sugarcane Aphids (YSA) sampling method on sugarcane leaves

1. Do inspections at two-week intervals in fields with cane of all ages paying attention to cane that is between 2 and 7 months of age.
2. Use a stalk as a sample unit.
3. Pick one line in every 20 lines. Along a line, take a sample unit at every 20m/steps. Take a minimum of 20 stalks per field
4. Count and record the number of **live** leaves on the stalk starting with the top visible dewlap leaf (TVD), the uppermost fully expanded leaf with a distinct collar) and below.
5. Count and record the number of infested leaves (leaves on which YSA is present). Infested leaves are leaves with at least one colony of YSA. ***A colony is made up of at least one adult aphid and a juvenile/daughter on the underside of the leaves.***

% of YSA infested leaves calculation

$$\text{Percentage of leaves infested} = \frac{\text{Total number of leaves infested}}{\text{Total number of leaves counted}} \times 100$$

The following are recommendations to follow based on scouting results.

If the percentage of YSA infested leaves is:

- **Below 15% - no control is recommended**
- **Higher than 30% - chemical control is recommeded**
- **Between 15 and 30 % - schedule another scouting in 7 days**
- **After 7 days, if the level has increased – chemical control is recommeded**
- **After 7 days, if the level has declined – no control is recommended**
- **After 7 days, if the level has not changed – schedule another inspection in 7 days.**

High temperatures (above 35^{0}C) and heavy rainfall have shown that they suppress the pest population to a certain degree (Nuessly, 2005). Growers are encouraged to take advantage of these to minimize chemical application.

Chemical control

There are several locally available registered chemicals which growers can use to control YSA. These are Allice, Actara, Ampligo and Bandit. Timing of application is important as shown in the table below.

Control	Plant	Stage of plant	Chemical and Dosage	Remarks
Prophylactic/preventive control options	Plant crop	At planting	Apply **Imidacloprid (Bandit)at at 2,0/ha.**	Apply in the furrow on the cane sett and cover immediately
			Apply **Thiamethoxam (Actara SC) at 900ml/ha**	Apply as a single in-furrow band application (30 – 50 cm wide) at planting, after placement of the seedcane and cover
	Ratoon crop	0 – 2 months (Sept onwards)	Apply **Thiamethoxam (Actara SC) at 900ml/ha**	Apply between 7 and 30 days after harvesting as a broad band application over the cane row. Ensure that the stubble is dry before application for bee safety.
Post-infestation control options	Plant & Ratoon	2 – 8 months	Apply **Allice (Acetamiprid) at 1,0 kg/ha plus wetter (0,05% SILHOUETTE** on the foliar	**Ground application** Apply in at least 250L water/ha. Use a flat fan nozzle and direct the spray to the lower leaves.
			Apply **Ampligo at 300ml/ha (for suppression only)**	This is a contact action so direct the spray towards the parts of the cane where the aphids are present. Maximum spray per season is 4, do not apply more.

Mphumelelo Ndlovu (Crop Protection & Extension Officer)

ESWATINI SUGAR ASSOCIATION TECHNICAL SERVICES

EXTENSION NEWSLETTER

Number 80 2nd Quarter 2020/2021

INSIDE THIS ISSUE:

Organic carbon

GHGs are known to trap and hold heat radiating from the earth to space, thus increasing heat in the atmosphere

Solar energy

Investing in solar energy is the ideal alternative source of electricity in our sugarcane industry

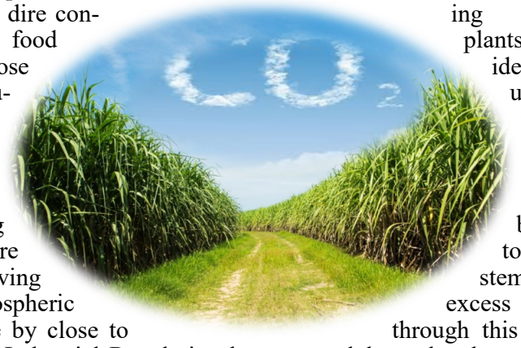
Yellow sugarcane aphids

YSA numbers build up rapidly and early detection is critical for timely control to keep the pest populations at minimum levels.

'ORGANIC CARBON', LET'S KEEP IT IN THE SOIL

Introduction

Carbon dioxide, alongside methane and nitrous oxide, is one of the main long-lived greenhouse gases (GHGs) in the atmosphere related to human activities. GHGs are known to trap and hold heat radiating from the earth to space, thus increasing heat in the atmosphere – a phenomenon known as greenhouse effect. The greenhouse effect, in turn, leads to global warming . This global warming disrupts natural systems, leading to more extreme, frequent and prolonged weather events such as severe droughts, flooding, wildfires, and superstorms, among many other major impacts. These are known to have dire consequences on food security and pose danger to human and animal life worldwide. Human activities, including agriculture, are reportedly having increased atmospheric carbon dioxide by close to 50% since the Industrial Revolution began.



Carbon emissions

Sugarcane growers can play a significant role in reversing, neutralizing or reducing the emission of carbon into the atmosphere. Major agricultural practices that are known to increase carbon emissions are deforestation, change in land use, burning of fossil fuels (coal, oil and gas) and plant biomass, and aggressive tillage operations. The carbon that is released from these processes react with oxygen leading to the formation of atmospheric carbon dioxide. The purpose of this article is to create awareness on best practices that growers can adopt and implement in their farms to reduce or eliminate carbon emissions.

Cover cropping

Cover cropping refers to the practice of cultivating noncash crops or grain crops such as legumes to: protect soil from erosion, weeds, pests and diseases; decrease nutrient loss; and improve soil fertility and biodiversity between crop cycles. In addition to these benefits, cover crops help with carbon sequestration as opposed to leaving the soil bare. Carbon sequestration, in this context, is the process of capturing atmospheric carbon dioxide and store it in the soil. During photosynthesis, plants take carbon dioxide from the air, and using the sun's energy, water and nutrients from the soil – transform it into carbon the plant uses to grow leaves, stems, and roots. The excess carbon created through this process is transported down the plant and is stored in the surrounding soil. This carbon in the soil feeds microbes and fungi, which in turn provide nutrients for the plant.

Where the cover crops are ploughed back into soil as green manure or, in part, as remains after harvesting the grains, these build up the organic matter content of the soil hence returning the carbon into the soil. This carbon in the soil is known as soil organic carbon (SOC). SOC is the main component of soil organic matter (SOM). The benefits of SOM are well documented, and they include improved-

Continued in the next page

P O Box 367 Simunye, Eswatini. Tel/Fax (+268) 23838998/ 23838470/ 23838731 Website: http://www.esa.co.sz

LET'S KEEP IT IN THE SOIL CONT...

-soil structure, source of plant nutrients, improved cation exchange capacity, pH buffering capacity, increased soil water holding capacity, improved resistance to compaction and build-up of soil microorganisms. Carbon can remain stored in the soil for thousands of years or it can be quickly released back into the atmosphere through the farm practices mentioned earlier.

Mulching

Mulching refers to the practice of intentionally retaining sugarcane residues infield after harvesting (or cutting if it is seedcane) as opposed to removing or burning. Maintaining a permanent soil cover and cover cropping are some of the key principles embraced by farmers practising conservation and regenerative agriculture. Mulching does not only ensure that carbon in plant material is retained in the soil, but further improves soil health by adding SOM (benefits thereof highlighted above), decreases surface temperature, reduces evaporation of soil moisture, increases soil water uptake, reduces weed infestation and increases soil microbial activity. Another advantage associated with reduced weed infestation is the decrease in use of herbicides. In the long-term, an increase in SOM leads to reduction in use of inorganic fertilizers as a result of crop nutrients being released into the soil as the crop residues decompose. Minimal use of pesticides and inorganic fertilizers reduces farmers carbon footprint. In prior publications, we highlighted that other practices such as green cane harvesting (or cool burning where green cane harvesting is unavoidable) help build -up organic carbon in the soil. The crop residues remaining thereafter are spread uniformly across the field.

Minimal soil disturbance

Soil disturbance by ploughing accelerates the breaking down of SOM and exposes soil microbes to unfavorable oxygen levels and die. As such, carbon locked in the SOM (including dead microbes) is unlocked from the soil and reacts with oxygen to produce volatile carbon dioxide which evaporates into the atmosphere. Literature indicates that this represents the greatest form of loss of soil carbon in agriculture for most countries worldwide. Luckily, in sugarcane farming, soil disturbance is not a major issue since soils are only ploughed in preparation for establishing a new crop after many years of ratooning. Moving forward, research will need to be directed at identifying opportunities and practices that will reduce soil disturbance at plough-out so that SOC accumulated over the years is not lost during this operation. Reduced use of farm machinery to plough-out fields is expected to cut back use of fossil fuels, thus reducing growers carbon footprint.

Planting trees

As indicated previously that deforestation contributes to carbon emissions, growers are encouraged to adopt the culture of planting trees especially on areas that are not suited to food crops. Trees play an important role in removing carbon from the air into the soil. Moreover, trees are also useful in keeping the soil intact, preventing soil erosion and or halting soil loss in already eroded areas.

It is encouraging that some sugarcane growers in the industry are already adopting these practices. Those who have not yet started, are encouraged to incorporate them in their long-term plans.

Njabulo Dlamini (Research Agronomist)

GO SOLAR AND CUT ELECTRICITY COSTS

Background

Growers have been battling with rising electricity prices over the past years. Special rates alone (such as S3 and T4 tariffs) offered by the energy supplier proved not to be enough to reduce the monthly bills. For a time, growers have been trying to sustain their farms by using their pumps on the cheaper off-peak tariff periods such as on weekends and or late at night. As a result, many growers are running the risk of crop failure by cutting back on irrigation because they simply cannot afford to run the pumps on grid electricity.

Solar installation

Investing in solar energy is the ideal alternative source of electricity in our sugarcane industry. Several innov-ators in the industry have already decided to embrace the call to innovation and invest in solar installation. The system is designed such that growers can go through the whole growing season with limited uptake from the national electricity grid. Solar has many advantages for growers, and they include:

- Estimated direct cost savings of up to 70% on electricity making businesses more stable and competitive.
- Increased reliability of power during power outages which is crucial for businesses functionality.

Continued in the next page

GO SOLAR & CUT ELECTRICITY COSTS CONT...

- Being an alternative source of income for the business owners.

Financing options

The availability of finance for solar irrigation installation has now become more accessible than in previous years. Currently, there are 3 financing options that are available to growers.

Option 1: Outright Purchase (ORP)

Solar providers simply provide growers with a market related price for them to purchase the system outright. In this case, grower may need to get a loan through his/her bank to be repaid by a certain date, typically at a predetermined interest rate. Some solar providers also assist growers with getting this funding approved through their banks. Typical system installation costs are from E10 500 to E12 500 per kWp, with repayment period between 5 to 7 years (as at the time of writing this article).

Figure 1: Typical solar panels used in irrigation

Option 2: Rent-to-Own (RTO)

This is a rental agreement whereby the solar provider installs the system without the grower having to apply for loan. The solar equipment is owned by the provider and the grower simply rents the system from the provider over a 5-year period based on a predetermined fee. The grower makes regular rental payments to the provider including all maintenance costs. In most cases the savings generated by the system pay for the monthly rental. At the end of the rental period, the grower will officially own the system. The advantages with this type include: no up-front cost required; no collateral /security required; fixed rental payments.

Option 3: Power Purchase Agreement (PPA)

With this option, the solar provider designs and constructs a solar system at grower's farm and operate it. All costs associated to the solar system are covered by the solar provider. The grower pays a cost per kWh price for all electricity consumed. This price may escalate during the term of the (Power Purchase Agreement) PPA. In this option, the provider installs a power meter which will be read monthly to determine how much electricity the customer needs to be charged for. There are no upfront capital requirements, no security required as there is no loan, no hidden costs involved, generation license documentations is required from the solar provider.

System maintenance

With most providers, they promise not walk away once the system is installed. They also take on the responsibility of servicing your system for a period of 5 years, at 6-month intervals. This includes washing the panels, conducting integrity checks on the structures, fuses, inverters and system components and also conducting regular heat testing. Basically, it is a *"You own the system, we manage it"* approach.

Solar installations can significantly save growers from electricity costs now and in future.

Nkululeko Dlamini (Irrigation Engineer) & Banele Mhlanga (Irrigation Engineer-Trainee)

YELLOW SUGARCANE APHIDS (*SIPHA FLAVA*) SURVEY METHOD & CONTROL

Introduction

Since the first record of Yellow Sugarcane Aphid (YSA) in 2013 in the Eswatini sugar industry, the pest has remained a problem. Annual inspection results have shown that pest populations start to peak around August to March every season (***Spring to Autumn***). Literature indicates that mild to high temperatures (>20^{0}C) and dry spells are optimal for population build-up and often result in outbreaks. YSA numbers build up rapidly and early detection is critical for tim-ely control to keep the pest populations at minimum levels. Growers are encouraged to do regular scouting in all fields and give priority to fields that had infestation in the previous season and fields with susceptible varieties (NCo376, N19, N36 and N41) as reported in the YSA variety ratings by SASRI (Link, September 2019). YSA infestations symptoms can be seen by yellowing of the affected leaves, followed by reddening and eventual dying of the leaves. The lower

Continued in the next page