CROP CIRCULAR

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Please forward your contributions to elriza@croplife.co.za

WELCOME

Rod Bell
Chief Executive Officer
CropLife South Africa

It is hard to believe that the first quarter of 2021 is already behind us and that we have been under some form of Covid-19 lockdown for more than 12 months now. Interesting times indeed!

Even though we have faced many challenges in the recent past, we are extremely grateful for the continued good rainfall that many parts of our country have received to date in 2021. The summer rainfall region is ending well, and a good winter rainfall season is expected too.

At the Association level, we conducted another successful virtual AGM in March. In addition to the standard AGM processes of approving the Chairperson's Report and the Association's budget for 2021, the AGM also accepted the proposal that the ExCo be rolled over for another cycle.

Given that the 2020 AGM was postponed due to the first hard lockdown, the current ExCo had not been in office for very long by the time of the 2021 AGM, so it made sense to have some continuity and roll the ExCo over until the 2022 AGM.

March is also the time of year when member companies are required to submit their annual membership declarations and pay their membership fees. Sincere thanks to all those members who manged these tasks timeously for the next cycle.

The CropLife SA team, and the ExCo members who assist with the training committee, signed off on the move of the Continuous Professional Development (CPD) programme to a new platform. We are extremely excited about the prospects for the new platform, including key new features such as live CPD points totals and electronic membership cards.

In addition, after inputs from distributor members companies and proposals from CropLife SA to reduce workloads in March of each year, it has been decided that going forward, the CPD programme will run from 1 May to 30 April for the new CPD points cycle.

Regulatory matters continuously draw the Associations' attention and during the first quarter of 2021, there have been numerous interventions on the regulatory front. We regularly report to our members with regards to progress and will continue to drive this important facet of the industry towards a sustainable and time efficient regulatory process in our country.

The CropLife SA team continues to look for ways of improving the image of the industry, as well as supporting our members wherever possible and we look forward to working with our members during the next quarter. Best wishes to all for fantastic summer season harvests and a wonderful winter rainfall season ahead.

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Message from CropLife SA President "Bouncing Back, Being Bold"

Quintin Cross
President
CropLife SA

At the beginning of 2020, I recall lamenting the fact that agriculture had just experienced its longest downward cycle since World War II and growth rates in negative territory. The horizon at the time wasn't looking too positive either, with concerns regarding a potential pandemic, junk status, the revelations around state capture and the crisis surrounding a number of state-owned enterprises all looming large.

How the industry has bounced back! Good rains throughout most parts of the country and the resulting yield improvements have certainly contributed to a more buoyant industry where growth rates are now reported at 13.1%. Being classified as an essential service during lockdown and the affirmation by various authorities of the value that agriculture brings to the economy have also helped to lift industry performance. I am not sure that too many people expected the industry to recover to the extent that it has, but we have certainly been blessed. Spare a thought though for some of the areas still affected by drought and severe weather conditions and let us pause to remember those friends, colleagues and family members that have succumbed due to Covid-19.

Even when the industry is growing, success is not automatic. It still takes bold decisions, good structures and agile execution in order to rise above the tide. Despite the volatile and uncertain environment, both the operational team under Rod Bell's leadership, as well as the CropLife SA Executive, have demonstrated this and so it is with great pride that I deliver this message as the President of CropLife South Africa.

It is important that all members of CropLife SA appreciate the achievements of their Association and fully understand the value their involvement holds. Listing the successes is therefore relevant.

Shortly after the election of the Executive in June 2020, I delivered a message highlighting the key focus areas for 2020 and beyond. Although a full year has not yet passed, it is good practice to assess our current progress on the journey.

In terms of Stewardship, the Extended Producer Responsibility Regulations have been published and so it is pleasing that members have agreed to a revenue-based levy of 0,075% to fund a self-regulated programme. Additionally, the proposed introduction of a Stewardship Charter that seeks to promote greater responsibility toward stewardship on the part of supplier and distributor members, has been well received.

Marketing activities to promote the image of our industry have gained further momentum, particularly through social media and digital media platforms. The CPD programme has undergone some improvements and it is expected that greater emphasis will be placed on the quality of training content and developmental curriculum in the future. Agri-intel offers a valuable and unique digital platform for easily accessing comprehensive information on chemical, biological and natural crop protection and public health products.

Unfortunately, all the good that CropLife SA is doing is all too often overshadowed by frustrations relating to a dysfunctional regulatory system at DALRRD. It is sometimes concerning that CropLife SA receives the blame for this situation. I can assure you that this matter receives constant attention. It is disappointing that we started out in 2020 with so much hope that our new collaborative approach with the Department would bring about change. Unfortunately, this has not materialised. We have also joined the Strategic Agricultural Inputs Forum (SAIF), a collection of industry associations, in order to apply collective pressure.

To date the situation has still not improved and all other associations affiliated to SAIF are reporting the same frustrations. While we need to act prudently, there is a growing consensus that a bolder move is going to be required sooner rather than later if we are to see any tangible progress at DALRRD.

Despite the regulatory challenges, 2020 has been an interesting, yet positive year and we look forward to realising the plans laid out for 2021. I can only repeat what I wrote in June last year. As members, you are CropLife SA! I therefore invite each of you to become more involved. Participate in our committees and working groups. Engage with the Executive. Constructively criticise. After all, it is your ideas and your energy that will move this Association forward and enable all of us to live our vision...

"to be the absolute proponent of responsible production, distribution and application of crop protection and public health solutions across the entire value chain. We will continue to enable our members to be providers of environmentally compatible solutions that ensure sustainable, safe and affordable food production, and therefore food security, in South Africa".

CropLife South Africa Hosted Another Successful Virtual Annual General Meeting

For the second consecutive year, CropLife South Africa conducted its Annual General Meeting seamlessly via teleconference on 16 March 2021. The meeting was opened by CropLife SA CEO, Rod Bell, after which Quintin Cross, CropLife SA President, gave a summary of the challenges and progress made throughout the year based on the four strategic pillars defined by ExCo, namely stewardship, regulatory, marketing and communication and education, training and skills development.

Rod Bell continued with the agenda, providing an overview of the Association's performance and future planned initiatives, such as the extended producer responsibility scheme and the establishment of a BBBEE guideline for member companies. In addition, he announced that prior voting indicated a preference to keep the current Executive Council and leadership the same as the previous year, due to the postponement of the 2020 AGM, resulting in a shorter than usual term.

Therefore, the Executive Council for 2021 remains as:

Quintin Cross (President) - AECI Plant Health
Antonie Delport - Syngenta
David Wood - Farmers Agri-Care
Henk van der Westhuizen - Philagro
Kobus Steenekamp - Bayer Crop Science
Niel Kruger - InteliGro
Rod Bell - CropLife South Africa

Kobus Meintjes (Vice president) - Corteva
Chris Thompson - Laeveld Agrochem
Gerrit Badenhorst - Rolfes Agri
Jan Botha - UPL
Marius Boshoff - Villa Crop Protection
Paul Roux - Avima

The meeting concluded with Rod Bell thanking each member for their commitment to the industry and the Association, as well as the Executive Council for volunteering their time for a second term. Quintin Cross officially closed the meeting as President of CropLife South Africa.

Available Support Materials

Members are reminded that the following materials are available on the member portal, web-site or on the CropLife SA YouTube channel in the case of videos.

- Triple rinse posters in English, Afrikaans, Northern Sotho, Tshivenda, Xhosa and Zulu
- Triple rinse video
- Redesigned pollinator charter
- Pollinator do's and don'ts poster
- Pollinator safety video
- Rodenticide safety poster in English and Afrikaans
- Responsible use of pesticides poster
- Agri-Intel promotional videos

Members are encouraged to use this collateral in any of their promotional material as they see fit.

FRAC SA Leadership

After a lengthy period of being Chairperson of the CropLife SA Fungicide Resistance Action Committee (FRAC), Willem van de Pypekamp from Philagro has handed over the reins to Adri Anthonissen (Syngenta) to take on the challenges and opportunities that 2021 may hold.

Adri will be assisted by Rita van der Merwe (BASF) as vice president. The CropLife SA team would like to thank Willem for his dedicated service over the past few years and we wish Adri and Rita the best of luck with their new roles.

A Noteworthy Accomplishment

CropLife South Africa was very pleased to learn that UPL, a supplier member, was recently ranked No.1 in our sector for environmental, social and governance risk management by Sustainalytics, a Morning Star company. The CropLife SA team would like to congratulate everyone involved in this remarkable achievement.

Condolences

It was with great sadness that the CropLife SA team learned of the passing of Ebrahim Vermeulen and Johannes Ockhuis from the Innovation & Regulatory team of Meridian Agritech in January this year. Our sincere condolences to their families, friends and colleagues.

Stewardship in Agriculture

Gerrit Badenhorst
Director: Marketing & Sales
Rolfes Agri

If one looks at stewardship in a theological context and see what Wikipedia says, it reads: "Stewardship is a theological belief that humans are responsible for the world and should take care and look after it".

And what a great definition this is, even in an agricultural context. We are the custodians of the land/soil that we manage to feed the world from. So, with regards to stewardship on agricultural remedies for instance, it all forms part of a bigger scheme, looking after the world as a whole. When looking at stewardship in this context, it is key that each supplier, distributor and farmer takes care to follow stewardship programmes and guidelines for the safe handling, storage, responsible use and disposal of empty and unwanted pesticides.

There are many subsectors within the topic of stewardship in agriculture, but when focusing specifically on unwanted pesticides, here are some guidelines to follow:

1. Preliminary data/information collection
2. Remedial action initiation
3. Selection of disposal options
4. Project implementation

There are further points to consider within these basic steps:

1. Preliminary data/information collection

- Quantity and identification of products – list everything.
- Stock location – where is the stock stored?
- Condition of product – does some of the stock need to be repacked or moved?
- Photographs – take enough photos to revert to for specific details.

The first step is to determine the quantity and state of the stock. Photos are a great way of getting information about the products and easily explain to another person in what state, package and storage the product is in.

2. Remedial action initiation (the planning phase of the project)

- Outline the scope of action – put a plan together of what needs to happen, along with action lists, completion dates and responsible persons.
- Seeking assistance – find experts if you do not have the relevant knowledge.
- Stakeholder identification – get all relevant partners involved.
- Appoint a local coordinator – get the right person to take charge of the project to drive and manage the process.
- Cost estimate – determine what the entire process will cost.

3. Selection of disposal options

- Is the stock still usable – does it still meet all criteria for use or not?
- Could it be used elsewhere – can it be moved to an area where the product can still be used?
- Can it be returned to the supplier and reformulated – reused to a certain extent?
- Can it be incinerated – if it needs to be destroyed, can it be incinerated?

4. Project implementation

- Project approval and verification – ensure all processes are correct and comply with all the necessary laws.
- Transport and movement – actual movement of stock.
- Disposal – final process to dispose of stock.

As one can see there are many factors and aspects that need to be considered when dealing with unwanted or obsolete pesticides. But if we all play our part in reducing any obsolete stock and optimising the usage of what we have, the entire large-scale stewardship plan will be easy for all.

For detailed information regarding the disposal of empty containers and obsolete stock, visit croplife.co.za/crop-protection/#stewardship

The Role of Biotech Crops to Address Food Security

Chantel Arendse
Lead: Plant Biotechnology

Feeding the world sustainably continues to be a mammoth task. The expectation is that global food production will need to rapidly accelerate to produce 70% more food (FAO) by 2050 to feed the estimated population of then 9 billion people.

To meet these pressing food security needs, producers will have to grow more food responsibly while reducing the footprint of agricultural production. With the hard-hitting reality of climate change firmly upon us, natural disasters such as droughts and floods and unpredictable weather patterns have become more common, making it even more challenging to produce more food.

While there is no single food production technology capable of feeding the world on its own, sustainable innovations in plant science – both in plant biotech and crop protection – can make a significant impact. The last 20+ years have clearly demonstrated that biotech crops have a role to play and should be part of the global strategy to improve food security. Here are just some of the ways that biotech crops are contributing to address the food security challenge by helping farmers to adapt and become more resilient at improving production efficiencies.

Producing more with less

With over 24 years of global adoption, plant biotech crops have led to the additional production of 278 million tonnes of soybeans, 498 million tonnes of maize, 32.6 million tonnes of cotton lint and 14 million tonnes of canola. This accumulated increase in crop productivity (1996-2018) has resulted in economic benefits to 18 million farmers globally, 95% of whom are smallholder farmers from developing countries (ISAAA).

Production efficiencies with the use of biotech seeds have been achieved without the need for additional land, thereby reducing deforestation and conserving biodiversity. Various studies have also documented that biotech crops provide on average a 22% yield advantage over conventional crops. This is true for biotech maize as well, providing yield advantages ranging between 5% to 25% compared to conventional maize varieties, making plant biotech an important consideration for food insecure regions or countries where maize is a staple crop. This clearly demonstrates that keeping up with global food demands will require that every hectare of cultivated land exceeds production expectations.

Mitigating the impacts of climate change

Climate change means erratic weather and natural disasters threaten to make large tracts of agricultural land unproductive, impacting the severity of food security and hunger. One of the ways in which biotech crops are helping to mitigate climate stress is through drought tolerant crops that are able to maintain crop yields with less water, as well as preserve crop productivity in times of drought.

A good example of how biotech drought tolerant varieties are making an impact on the African continent is the TELA maize project. This is a public-private partnership, led by the African Agricultural Technology Foundation (AATF) and aimed at commercialising drought tolerant and insect resistant biotech maize varieties to farmers in several African countries that are prone to annual maize crop losses due to drought.

The benefits of drought tolerant maize is already a reality for producers in South Africa following its commercial release in 2016.

In addition to drought mitigation, various biotech crops are in the pipeline to address other related abiotic stresses such as salt tolerance, cold tolerance, heat stress and nitrogen fixation.

When these biotech crop adaptation strategies become available, they will further enhance the efficiency of food production under climatic stress conditions, thereby reducing the impact on rural livelihoods and food production.

Fighting pests to reduce crop losses

Farmers worldwide have always been on the frontline to protect their crops from pests, which, if left unchecked, could lead to total decimation of harvests, reduced yields and also negatively impact the quality and safety of foods. Studies have found that the rise in temperature due to global warming could increase pest pressure as well as change their migration patterns, posing an even greater threat to global crop production.

Due to superior performance and benefits, the most widely adopted biotech traits to date continues to be insect resistance and herbicide tolerant traits. By providing effective control of weeds, herbicide tolerant traits have reduced the competition by weeds for nutrients and soil moisture, resulting in higher yielding crops. Similarly, insect resistant traits offering protection against damaging pests have reduced insect damage and crop losses with improved yield outcomes. Insect resistant and herbicide tolerant technology has also resulted in reduced use of chemical sprays and tillage practices, providing the added benefit of minimising agriculture's environmental footprint.

With the emergence and transboundary movement of pests such as Fall armyworm and locust swarms causing major crop devastation, food security and the livelihoods of millions of small-scale farmers throughout the developing world are under threat. The availability of biotech seed as a pest management tool for farmers remains an integral part of integrated pest management for crops and will continue to play a role in reducing the global pest burden.

Do biotech crops have a role to play in feeding the world?

The simple answer to that question is absolutely yes, but also to caution that there is no single solution to feeding the world's growing population. Instead, an integrated food production system is required that deploys various plant breeding and crop production technologies, as well as adherence to good agricultural practices, in order to meet the global food security challenge.

The Threat of Unregistered Plant Protection Products

Dr Gerhard Verdoorn
Operations and Stewardship Manager

Humankind is slowly moving towards greener living which should be more compatible with the natural environment. Fossil fuels are being frowned upon, agricultural production by conventional methods is no longer the flavour of the month and pressure is mounting against "chemicals", while very few people realise that the Universe is one enormous chemical factory.

There is nothing that is not chemistry. Protagonists of a "greener world" want all "chemical pesticides" to be replaced by natural and biological pesticides. It sounds great, but those very individuals express their ignorance by preaching that natural and biological is safer than chemical and man-made.

Fact is that many of the current chemical pesticides that are widely used are synthesised by none other than Mother Nature: abamectin, matrine, azadirachtin, spinosad, gibberellic acid and pyrethrins are examples of natural metabolites produced by biological organisms.

Humankind developed technology to beneficiate such substances from plants, yeasts, bacteria and fungi for plant protection. The question is, where do they fit into plant protection? How effective are they? And do they need some form of regulation?

Efficacy, safety and regulatory requirements

There is a very bold tendency in the biological and natural pesticide arena to claim super efficacy against a wide range of target organisms. The truth is that biological pesticides are effective when applied within a particular set of climatic conditions. When these conditions are not optimal, they reduce the efficacy of the substances, often to disappointing levels which leads to a distrust in biological and natural plant protection products.

A factor that plays a very important role in the performance of biological and natural plant protection products is the quality of the products. The quality is determined by the strain of the live organism, its purity and the matrix or formulation in which it is offered. It is very easy to make a claim about an organism's efficacy, but a totally different story to prove its quality. The same goes for natural chemicals that are marketed as plant protection products. There are factors to consider when working with natural and biological plant protection products, namely –

The species, sub-species and strain of the organism

Many of the biological products that are currently registered as plant protection products are selected from a range of sub-species and most often a particular variety or strain of that sub-species. This is a critically important aspect because biological organisms produce their own endotoxins that kill the target organisms.

Bacillus thuringiensis for example, produces proteins that, when eaten by insects, are activated in their gut and kill them. These protein toxins cannot be activated in mammal intestines and therefore do not affect people. Microbes (the collective term for micro-biological organisms including bacteria, fungi, yeasts and viruses) have the ability to mutate easily and if the incorrect mutant is used as a plant protection product, it may have two possibilities, namely (1) produce an unknown metabolite that may be very harmful to people or (2) not produce any metabolite of any use as a plant protection product.

The purity of plant extracts that contain natural chemicals used as plant protection products

Many plants such as the neem tree *Azadirachta indica* and chrysanthemums *Crysanthemum cinerariifolium* produce very useful secondary metabolites such as azadirachtin and pyrethrins that are proven natural insecticides. The extraction of these active ingredients from the plant oils requires great skill to ensure the final product is of high purity and does not contain harmful substances. It is known that neem oil that is not properly purified may contain aflatoxins, some of which are highly carcinogenic.

Although azadirachtin is a very effective insecticide with a very favourable environmental profile, it may be contaminated by a deadly carcinogen.

The quantity of the units in the matrix or formulation

Biological organisms such as the various *Bacillus* strains, entomopathogenic viruses and nematodes, and Trichoderma fungi are measured in international units per milligram and not in mg/kg or mg/ℓ as for the classic chemical pesticides.

Poorly cultured yeasts, bacteria and fungi may not have the optimised number of international units and will therefore not produce the expected results.

The stability and shelf life of the matrix or formulation

Formulating and packaging a biological plant protection product is more onerous than the same development for a chemical plant protection product. Since they are live organisms, they must generally be formulated in highly sterile conditions and packed in special hermetically sealed packaging to prevent oxygen and moisture from destroying them, while packaging must block out light to prevent solar decomposition.

This is still quite a challenge for many biological products while purified natural chemicals face much less of these pressures. Natural plant extracts that contain the natural chemicals are different though and also need special packaging to prevent the harmful effects of moisture, oxygen and light.

Regulatory requirements

The Fertilizers, Farm Feeds, Seeds and Remedies Act, 1947 (Act No. 36 of 1947) does not differentiate between synthetic chemicals, natural chemicals or biological organisms when it demands that all such substances and organisms are registered.

The definitions of an agricultural remedy (pesticide or plant protection product) in section 1 in fact specifies **any chemical substance or biological remedy or any mixture or any combination of a substance or remedy intended or offered for**.... It is evident from this definition that the Act is overarching over all substances or organisms that are perceived to be plant protection products. Section 7 prohibits the sale of any agricultural remedy unless it is registered under the Act.

Unregistered biological and natural pesticides

Many manufacturers of biological plant protection products market their products without valid registration. This means that their products have not undergone the rigorous testing required by the articles and regulations of Act No. 36 of 1947 for, amongst others, efficacy, crop safety, human safety, environmental safety and stability.

A person who buys and applies such unregistered biological products has no idea whether the product is what the manufacturer claims it to be, has no guarantee that the product will perform as expected, no idea whether the product contains harmful contaminants or impurities such as aflatoxins, has no idea what the shelf life of the product is and basically puts his crop, and the consumer who buys and eats the produce, at tremendous risk. The purpose of registration is for the regulatory authorities at the Department of Agriculture and Department of Health to ascertain whether the biological product is effective, but most of all whether it holds any risk for human health and the environment.

Unregistered biological organisms are sometimes smuggled into the country from abroad, while the Directorate of Plant Health requires that all such foreign organisms be put through a risk analysis programme. The world has seen what a virus like the latest SARS CoV-2 that caused the Covid-19 pandemic can do.

Keep in mind that *Bacillus* is a genus of bacteria that harbours not only the extremely valuable *B. thuringiensis* species and its various strains, but also the deadly *B. anthracis* that causes anthrax. To think that biological is always safe may be a fatal thought if the organism that you work with has been identified incorrectly. All facilities that work with microbes such as *Bacillus*, must be registered under the Non-proliferation of Weapons of Mass Destruction Act, 1993 (Act No. 87 of 1993) as a measure to govern the cultivation and use of microbes. It sounds like an overkill, but biologicals of unknown identity can have a devastating effect on people and the environment.

The wonders of properly manufactured and registered biological plant protection products

Many South African and international companies offer registered biological plant protection products for agriculture and even for home garden use. These products have undergone rigorous testing and are formulated to give excellent control of plant pests. It helps food producers to move away from total chemical pest control to integrated pest management and offers consumers an assurance that food safety is as important to producers as it is to consumers. It does, however, demand a mind shift to adapt to the requirements for using biological plant protection products effectively, but the rewards are vast.

One of the main hurdles in the agricultural mindset is the demand for immediate results; biologicals do not act as fast as hardcore synthetic chemicals, yet upon being in contact with the target organism, they mostly terminate feeding which means the crop is saved immediately, although the target only dies a few hours or days later.

Signs and symptoms of unregistered biological plant protection products

Any plant protection product that is offered for sale in South Africa must have a registration number starting with a capital L followed by four or five numbers, e.g. L1234 or L12345, and have the exact scientific name of the organism, plus its concentration depicted as IU per mg.

If this information is lacking, the red flags are already flapping in the storm. If a biological remedy's manufacturer makes vast claims about efficacy against virtually all plant pests, it is a blatant false claim because biological plant protection products, like their chemical counterparts, can never be effective against all plant pests.

The manufacturers of unregistered biological products often claim their products are non-toxic and safe for human health and the environment. Be weary of such claims. If it is of this nature, then why is it not registered to substantiate that claim? Another false claim is that the unregistered biological product can replace all chemicals. So, if the biological replaces all chemicals, what about the endotoxins that are produced by the unregistered biological product? Are those not chemicals?

Producers should be vigilant when it comes to using crop protection products of any nature. If an unregistered biological product is used, be sure to know that your produce is likely to be rejected by the markets and consumers.

Why Stewardship is Important for Plant Biotechnology

Chantel Arendse
AgriAbout
January 2021

For plant biotechnology to continue to evolve and successfully commercialise improved crop varieties, it requires commitment to product stewardship and regulatory compliance to ensure long term utilisation and efficacy. Considering the high cost of developing biotech crops, an approximate investment of more than $150 million spanning over a decade, stewardship has become an important requirement for responsible use and management of biotech crops by innovators, plant breeders and growers alike to ensure not only a return on investment, but also product integrity throughout the product's life cycle.

Plant biotech stewardship encourages responsible management and use by:

- Ensuring safe, effective and responsible use of the technology
- Maintaining product integrity and longevity
- Maximising the benefits to consumers, farmers and the environment
- Minimising the risks associated with biotech resistance development
- Facilitating regulatory compliance and monitoring

As plant biotechnology science and innovation advance to produce crop varieties that address emerging pest and disease challenges, the global adoption of biotech crops continues on an upward trajectory. The last twenty plus years have been dominated by input traits such as insect resistance, herbicide tolerance, and resistance to environmental stresses, such as drought and nutrient-enhanced crops.

The recently released 2019 ISAAA report confirms that traits such as insect resistance and herbicide tolerance for both single and stacked events are still preferred by maize, cotton and soybean growers due to trait performance and benefits.

This is also the trend in South Africa with the adoption of herbicide tolerant (HT) crops mostly conferring resistance to glyphosate and insect resistant crops with insecticidal proteins from the soil bacterium *Bacillus thuringiensis* (Bt) conferring protection against lepidopteran pests such as maize stalk borer (*Busseola fusca*) and African cotton bollworm (*Helicoverpa armigera*).

Overcoming resistance through good agricultural practices

Despite the advantages that biotech crops bring for simplifying agricultural approaches and improving efficacy of pest and weed control, one of the biggest challenges for sustainable use of the technology is the evolution of resistance. While resistance is not a new concept to pest management applications, it remains an ongoing concern for all crop protection users, including the developers and growers of biotech crops.

Herbicide tolerant crops

It is well understood that the challenges with herbicide resistance in key weed species is largely attributed to overreliance on a single weed control strategy, for example herbicide applications with the same mode of action. As the cultivation of herbicide tolerant crops goes hand in hand with the application of herbicides such as glyphosate, the use of diverse weed control strategies is crucial for reducing weed resistance and ensuring the sustainability of HT crops.

For Roundup Ready herbicide tolerant crops, diverse weed control strategies would need to include crop rotations, using multiple herbicidal modes of action, responsible use of herbicides giving special attention to label requirements (dosage rates and timing), understanding local farming conditions, and most importantly, good agricultural practices. Given the long-standing challenges with herbicide resistance, the technology offered by herbicide tolerant crops on its own will not resolve this issue. Instead, the goal for weed control should always be to combine as many weed management practices as possible to sufficiently reduce selection pressure for the development of resistance in weeds.

Bt resistant crops

Similar to other crop protection products, insects can also adapt and develop resistance to biotech crops with inherent Bt insect resistant traits. Resistance to Bt crops in the field has already been documented in several countries where biotech crops are cultivated, including South Africa.

The main factor contributing to these cases of targeted Bt pest resistance has been overreliance on Bt crops as a pest management tool without adhering to proper resistance management practices.

This reinforces the importance of farmers adopting good agricultural practices based on integrated pest management (IPM) principles for all Bt crops. In South Africa, similar to other countries where Bt crops are cultivated, resistance management is mandated in terms of legislation such as the Genetically Modified Organisms Act, 1997.

This legislation requires that appropriate cultivation practices for Bt crops be complied with by farmers and be monitored by technology developers for reporting purposes.

A key component of an insect resistance management plan for Bt crops is the cultivation of a crop refuge alongside Bt fields consisting of a non-Bt variety of the same crop. The idea behind a crop refuge is that it supports a population of Bt susceptible insects that have not been exposed to selection pressure from the Bt protein.

The planting of a crop refuge is only one part of the resistance management puzzle. In addition, management of Bt resistance also requires a good understanding of how the trait technology works in the field and the importance of diversifying Bt traits with different modes of action (single versus multiple traits). Most importantly however, insect resistance management should be approached within the broader context of IPM to include good agricultural practices.

Improving stewardship compliance for biotech crops

For biotech crops, successful implementation of resistance management practices requires a diversified approach, must evolve and be flexible. To accommodate the different agricultural conditions and multitude of farmers that have adopted biotech crops, it is important that there is adequate knowledge and understanding of the technology relative to how it needs to be integrated with agricultural practices on the farm. Improving biotech stewardship compliance requires commitment and continuous investment in advocacy and training directed at all participants in the value chain, but especially at farm level.

The effectiveness and sustainable use of biotech crops as a pest management tool needs a long-term view towards stewardship. By sharing the stewardship responsibility amongst various stakeholders, the prospects for compliance improves, thus ensuring that the benefits to sustainable agriculture, food security and farmer livelihoods are realised.

CropLife SA is committed to stewardship initiatives that ensure safe, effective and responsible use of plant biotech products within a wholistic IPM strategy as part of the product stewardship life cycle approach.

Strategie Teen Snywurms

Dr. Gerhard Verdoorn
AgriAbout
Februarie 2021

Die jaar 2020 sal seker nooit in die geskiedenis van die mensdom vergeet word nie. Die nuwe SARS-virus wat as die Covid-19 virus bekend staan het die wêreld soos 'n bom getref en die lewenswyse van meeste aardbewoners totaal verander.

Dit het ook die wêreldekonomie amper 'n doodslag toegedien met duisende kleiner en selfs groot besighede wat soos mis voor die son verdwyn het. Verstommend was dit dus dat die Suid-Afrikaanse landbousektor 'n ongelooflike produktiewe 2020 beleef het met rekordoeste, rekorduitvoere en omtrent die enigste sektor van die ekonomie wat gegroei het.

Daar is weliswaar plekke soos Boesmanland en die Oos-Kaapse Karoo waar dit nog krities droog is, maar die somerreënvalstreek se kontantgewasboere het 'n uitskieterseisoen beleef. Tog, soos die lewe maar werk, was daar etlike ernstige uitdagings wat die soet van 'n goeie seisoen amper versuur het. Die snywurm wat by alle boere as standaardplaag in feitlik alle gewasse bekend is, het sy lelike tande in November vir mielieboere gewys en aanplantings lelik geknou. Mielieboere is onverhoeds betrap en sommige moes 'n baie groot persentasie van hul landerye oorplant.

Die kern van die probleem

Daar is baie teorieë oor die skielike en onverwagse snywurminval. As mens egter na die oorsprong van die probleem soek, lê dit nie by weer of reën nie, maar by bewerkingspraktyke wat gunstige toestande vir wurmplae skep. Bewaringsbewerking is 'n groot bonus vir grondbewaring en saam met GM-gewasse wat die Bt-gene en glifosaatweerstandgene bevat, is boere se kommer oor onkruide en peste soos die stamboorders en herfskommandowurms so te sê vergete.

Tog is daar ander faktore wat in ag geneem moet word want sommige plaagspesies soos die snywurm word nie deur die Bt-gene in stapelgeenmielies beheer nie. Verdermeer is bewaringsbewerkingspraktyke baie gunstig vir die snywurm omdat hy onder die grond leef en homself amper teen plaagbeheeraksies daardeur verskans. Plantreste wat bo-op die grond lê en nie soos met normale ploeg en dis ingewerk word nie, bied ook veilige en knus oorwinteringsplek aan sommige insekspesies, soos selfs die stamboorder.

Normale diep ploeg- en disbewerking dolwe die grond om, begrawe plantreste onder die grond, vernietig in 'n groot mate eiers en larwes van wurmplae en spore van plantpatogene en begrawe ook onkruide weg van sonlig waar hulle nie verder kan oorleef en voortplant nie. Met bewaringsbewerking bly plantreste oor en onkruide word chemies doodgespuit. Die norm is deesdae om net voor planttyd die onkruide met glifosaat en ander onkruiddoders uit te wis en dan die grond net matig te bewerk voor die nuwe gewas geplant word.

Die uitdagings van snywurmbeheer in bewaringsbewerking

Piretroïedinsekdoders wat vir die beheer van snywurms geregistreer is, is effektief, maar die wyse waarop dit in bewaringsbewerking toegedien word, is nutteloos. Die standaardpraktyk is om piretroïedinsekdoders saam met die onkruiddoders toe te dien met die hoop om die snywurms baas te raak. Daar is verskeie probleme met die benadering:

1. Piretroïede word onomkeerbaar deur plantreste en bo-grondse kleipartikels geabsorbeer en is dus teenwoordig, maar biologies onbeskikbaar om die snywurms dood te maak.
2. Daar is 'n moontlikheid dat sommige onkruiddoders die piretroïede in tenkmengsels kan antagoniseer of inaktiveer, met ander woorde die piretroïede is nutteloos en kan nie die snywurms beheer nie.
3. Digte stande onkruide verhoed dat die piretroïede op die grond land waar hulle snags die snywurms wat dan aktief rondbeweeg, moet beheer.

Dit wys dus daarop dat die huidige praktyke net chemiese insekdoders mors en gevolglik die boer se geld mors. Die volgende praktyke moet ernstig oorweeg word om 'n pandemiese snywurmuitbraak in die komende November te voorkom:

1. Landerye se onkruide moet vroegtydig met die geregistreerde onkruiddoders uitgewis word en dit behoort ten minste twee maande vóór plant te geskied.
2. Daarna behoort die grond ordentlik geskeur te word en plantreste, sowel as dooie onkruide, moet ingewerk word sodat die anaerobiese kondisies enige verdere ontkieming en hergroei van onkruide kan voorkom.
3. Ses weke voor planttyd moet piretroïede aangewend word om die snywurms wat die meganiese aanslag oorleef het, uit te wis. Logies is dit beter om daardie bespuitings in die vroeë aand te doen wanneer die snywurms kop uitsteek en bo-gronds rondsluip opsoek na kos en teelplek.
4. Wees ook daarop bedag dat grond nie totaal droog moet wees of heeltemal verdrink moet wees nie want dit gaan die effektiwiteit van die piretroïede benadeel.

Sommige indiwidue glo dat hoë dosisse piretroïede soos lambda-sihalotrien aangewend moet word en dan met oorhoofse besproeiing in die grond ingewas moet word. Dit werk bloot nie omdat grond se kleipartikels die piretroïedmolekules adsorbeer in die heel boonste grondlae en dan is die insekdoders nie as biologies aktiewe molekules beskikbaar om hul werk te doen nie.

Na-plant aanslag op snywurms

Geen voor-plant beheeraksie sal al die snywurms uitklop nie en dit is te verwagte dat sommige snywurms die boer se planne sal fnuik en oorleef. Boere moet dus verkenning doen net nadat die mielies ontkiem het. Die beste metode is om bloot vir 'n sone van 30 cm om die plantry, die grond los te wikkel en vir snywurms te soek.

As daar enige snywurms teenwoordig is, moet die boer 'n berekening maak en besluit of chemiese beheer die koste werd is. 'n Wurm of twee gaan beslis nie al die onkostes werd wees nie maar as mens soos verlede November meer as veertig wurms per hektaar waarneem, dan moet jy die peste takel. Snywurmlokaas wat net langs die jong plante aangewend word, is hoogs effektief.

Dit is nie werklik nodig om die lokaas in die grond in te werk nie, alhoewel dit raadsaam vir 'n kleinboer met 'n lappie mielies is. Indien die grond 'n goeie vogpersentasie het, kan chemiese middels soos piretroïede reg langs die mielies aangewend word, maar daar word teen standaard oorhoofse bespuiting gewaarsku omdat dit nie die vereiste dosis reg langs die plante sal deponeer nie.

Wees wakker en oplettend

CropLife Suid-Afrika is 'n groot voorstander van voorkomende beheer en dit is nie noodwendig om die peste en plae vooruit met plaagdoders te behandel nie. Dit is eerder ons filosofie om verkenning en monitering te doen deur byvoorbeeld net na sononder in nuwe landerye rond te beweeg en te soek na grys en bruin motte.

Snywurms, kommandowurms, herfskommandowurms en valskommandowurms is almal *Lepidoptera*, met ander woorde motte of skoenlappers waarvan die larwes die gewasskade aanrig. Skoenlappers is daglewend en hulle is selde plae, terwyl die klassieke landbouplae meestal motspesies is wat snags vlieg. Swerms motte wat saans in landerye vlieg behoort enige boer op sy hoede te plaas.

Ondersoek die motte, neem goeie foto's met 'n slimfoon en stuur na CropLife SA se hulplyn 082-446-8946 vir identifikasie sodat die aanslag teen die wurmplaag korrek beplan kan word.

The Basics of Managing Fungicide Resistance

Elriza Theron
CHIPS
April 2021

Fungicides are used globally by producers to inhibit the growth or development of pathogens that affect a crop's quality or yield. To put the importance of these agricultural tools in perspective, the control of fungal plant diseases can save up to 125 million tons of food each year, which is enough to feed 600 million people. The role of fungicides in producing healthy food is clearly paramount. However, there exists a threat to the efficacy of these valuable products, namely fungicide resistance. Fungicide resistance is a naturally occurring, evolutionary process during which individuals of certain species of fungi develop the ability to survive treatment of a certain crop protection product. What happens over time, is that the survivors that are resistant to the action of the chemical lead to the next generation, and the resistant population multiplies.

The evolution of fungicide resistance is, however, more complex because it is influenced by many additional factors, such as the cropping system, climate, and perhaps most importantly, the implementation of resistance management strategies by the farmer.

Fungicide resistance can often be demonstrated in a laboratory, and it is a crucial tool in the assessment of resistance, yet it does not necessarily prove that fungicide resistance exists in the field. Accordingly, resistance in the field does not necessarily mean there is confirmed control failure, referred to as practical resistance.

The moment control failure in the field is confirmed, it affects all parties involved in the production of a healthy crop, including the manufacturers of the fungicides. Although resistance cannot be entirely prevented, the proactive management thereof is certainly better than any cure.

Management strategies

Fungicide resistance can be managed by combining diverse management strategies such as avoiding repetitive use of one fungicide or mode of action, mixing or alternating with an appropriate partner fungicide, limiting the number and adapting the timing of treatments, as well as including non-chemical methods in the crop protection programme. The importance of reading the product label and adhering to those guidelines when developing and implementing a spray programme cannot be overemphasised. The product label contains essential information, such as the minimum or maximum number of applications per season, the spray intervals that need to be adhered to, and the Fungicide Resistance Action Committee (FRAC) group to which the fungicide belongs.

Application and dosage

Producers must ensure that they only apply the product according to the stipulated dosage, as well as the mixing and application instructions. A key objective for producers in managing resistance must be to apply the correct amount of active ingredient to the target; in other words, mixing the correct pesticide volume or mass per application volume and applying the correct application volume per surface area. The correct application technology must also be considered to ensure the precise dosage of the active ingredient is dispensed on the target. Overdosing removes all the susceptible individuals from the pest species population and leaves no susceptible genetics to maintain a susceptible population, whereas underdosing removes too few of the susceptible and semi-susceptible individuals that will procreate and develop resistance through mutation.

A producer should make use of registered tank or formulation mixtures. Some fungicides are already available as mixtures in formulations; however, it is sometimes necessary to mix two different resistance group fungicides according to the labels' recommendations in the spray tank for stubborn fungi.

Application frequency
Products should only be applied according to the specified application frequency, as well as the minimum or maximum number of permissible applications per season. The objective is to control repeat infestations of the pest while preventing resistance progression and acceleration.

Not adhering to the spray intervals could allow mutation to manifest in the population or, conversely, not allow sufficient opportunity for the influx of susceptible individuals that maintain susceptibility in the population.

Information and resources
Each fungicide's active ingredient falls in a particular group, with a particular mode of action or similar mode of action indicated by a FRAC group code. The purpose of FRAC is to provide fungicide resistance management guidelines to prolong the effectiveness of 'at risk' fungicides, and to limit crop losses should resistance occur.

The FRAC group codes are indicated on the label and fungicides from different groups should be alternated within the spray programme. The FRAC website, www.frac.info, has numerous tools available for producers to ensure they apply the best resistance management practices to their farming operations. An electronic application has also been developed to identify the various FRAC groups and is available for download from Google Play.

Another resource is Agri-Intel (www.agri-intel.com), a mobile friendly platform that contains the product label information of registered crop protection products in South Africa. Producers can search for available products by disease or pest, crop, active ingredient, registration holder, or registration number, thereby ensuring they have all the information at hand to develop an effective spray programme for the season.

Integrated pest management
The Food and Agriculture Organization (FAO) defines integrated pest management (IPM) as an approach to agricultural production that "means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures, that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimise risks to human health and the environment".

With regards to controlling disease, IPM refers to the utilisation of all suitable techniques or strategies to keep the disease below levels that cause unacceptable crop losses. These different strategies could include cultural, biological, physical, and chemical methods of disease management. The choice of which disease management method to employ will depend on the crop and disease conditions, as well as the availability of resources.

Methods of control
Cultural control methods aim to help plants avoid contact with a pathogen and to eradicate or reduce the amount of the pathogen in a field or area. Examples of cultural control methods include crop rotation, sanitation, and creating unfavourable conditions for the pathogen.

Biological control methods work by improving the resistance of the host or favouring microorganisms that are antagonistic to the pathogen. Examples include suppressive soils and trap plants.

Physical methods of control, on the other hand, are aimed at protecting the host from pathogens by using methods such as heat treatment (soil sterilisation by heat, hot water treatment of propagation material, or hot air treatments), drying of products, refrigeration, or radiation.

Chemical control methods include soil treatment, fumigation, disinfection of warehouses and packhouses, and control of insect vectors. These products must be applied according to the label instructions as mentioned.

By incorporating these best practices, a producer can decrease the acceleration of resistance development and ultimately assist in maintaining the longevity of the effective fungicides available as crop protection tools.

3 Minutes That Could Help Change the World

By Dr Katy Johnson
FSA Communication Consultant
TIPWG Newsletter 2021: Issue One

As I child, I always wanted to change the world. It started with dreams of flying high above the clouds, in tight spandex and a mask, with my cape flowing majestically behind me. Yes, at five changing the world meant being Supergirl and righting every wrong. As I grew, my dreams became earthbound but my aspirations were just as great. In my teens and twenties, I worked hard to become the next Jane Goodall or Dianne Fossy lending my voice to the voiceless species that were pushed to the brink because of human exploitation.

Now as a mother who is closing in on her fortieth year, I am still passionate about changing the world, but I have learnt you don't need to wear a cape or be the next Greta Thunberg to bring about positive change.

Small, seemingly insignificant, actions can bring about great changes. I said no to coffee pods when I saw the landfill waste they create. I ensure my shower gel and face scrub do not contain microbeads and I buy teabags that do not contain plastic. Small, seemingly futile moves if you look at the magnitude of the plastic problem we currently face, that have the potential to bring about big changes if we all get on board.

There are some instances where plastic is unavoidable. High-density Polyethylene (HDPE) products are strong, durable and able to withstand serious punishment, making it the ideal vessel for transporting and storing the chemicals the Agri-forestry Sector relies upon. However, once emptied of its precious content, the characteristics that made it the perfect pesticide container also means it could potentially be around long after our grandchildren's, grandchildren's, grandchildren have long perished.

In a wonderful article for issue seven of the Crop Circular 2020, which inspired this piece, Dr Gerhard Verdoorn stresses, "it is the duty of the agri-sector to ensure plastics do not become pollutants.". I would go one step further and say, "we are all duty-bound to ensure this".

One of the first TIPWG Standard Operating Procedures I was asked to do, by then TIPWG Chair, Jacqui Meyer, was one on pesticide disposal that included the disposal of pesticide containers. To date, it remains perhaps the simplest SOP I have been asked to deliver. There was no need to break down the science into accessible chunks – it was straightforward and simple: finish using the contents – triple rinse – recycle. Yet there are still those who choose not to recycle or send their containers to be recycled but fail to triple rinse.

Proposed legislation could mean properly triple rinsing and then recycling pesticide containers is no longer a 'nice to do' but a mandatory requirement that cannot be shrugged off because of cost implications of doing such. With a network of CropLife 'container warriors' (a.k.a. registered recycling service providers) across the country ready and approved to recycle triple rinsed containers, ensuring plastic from these essential pesticide vessels does not find its way into our rivers, streams and ultimately our oceans or into the hands of neighbours (using them to transport water), has never been easier. What is more, many of them offer this service for free, for more information on CropLife's container warriors, read the Crop Circular Issue 7 for their article in full – page 13.

What happens to the containers? They are shredded and transformed into all manner of everyday items, from bin bags and fencing materials to garden furniture and mini scooters. All of which helps reduce the amount of 'new' plastic being created and keeps pre-used plastic out of our natural spaces, rivers, streams and seas.

This means all that is left to do is ensure the containers heading to recycling are 'TRIPLE RINSED' – the CropLife infographic available on their website illustrates just how simple this is. Triple rinsing is a process that takes no more than three minutes and really could impact the world we live in for the better. It also gives you the chance to live out your childhood dreams of being a superhero (cape optional) saving the world, one triple rinsed container at a time.

Biological Industry Profile: Pioneer to Competitive

Excerpt from presentation:
Global BioControl Conference
Michelle Lesur - Madumbi CEO

The biological industry in South Africa is currently seeing a very definite shift in profile from the pioneer stage into the competitive stage. This trend being very similar to what is happening globally. Over the last 15 years in South Africa, biological solutions were very much in their infancy stage. The formulation of commercial products was still being developed, biological concepts were just being introduced to the market and there was very little adoption by commercial growers, other than those few deemed as early adopters looking for more sustainable solutions. Investment was heavily weighted in favour of R&D rather than commercialisation and brand equity. Small South African production companies focused on formulation advancements and the efficacy of their biocontrol solutions. Multinational supply companies, realising the need for new innovative products to add to their basket of solutions, started acquiring small biological companies through various mergers and acquisitions.

In the pioneer stage, grower demand for biological solutions in South Africa was limited. This was largely due to the growers being unfamiliar with the features, benefits and overall performance of biological solutions together with a lack of understanding of the science which went into the biological products. Biological products were deemed inferior products with little impact on pest management. Growers not knowing how to include them in programmes, faced application and efficacy challenges as well.

The tide has, however, turned and we are seeing more activity with regards to the commercialisation and the inclusion of biological solutions. Commercial growers are becoming more aware of biological solutions and there has definitely been a more positive mind shift towards these alternative options; more so with the younger generation who are coming out of our universities and moving into the commercial production of high value crops. The older generation in South Africa generally remains more sceptical and cautious of the change away from traditional chemical inputs.

With the focus now towards the integration of soft chemistry with biological solutions, South African growers are starting to realise it's not an either-or situation; that biological and chemical solutions can complement each other in effective soil health, plant vigour and pest management programmes. And for this reason, many commercial growers in South Africa have acquired their own internal technical teams to support their integrated programmes.

A closer collaboration between suppliers and growers is developing in an attempt to successfully understand the science behind biological solutions and how they fit into traditional, chemically dominant, programmes. Transfer of knowledge and the understanding of biological solutions and their unique modes of action on various crops and against various pests and diseases is a critical success factor for crop production and the generation of higher yields. As a supplier of biological solutions, we have to stay connected to the growers and their technical teams. From an R&D perspective we, the grower and supplier, need to be driving biological innovation together.

In this new competitive stage, we are seeing that product formulations have improved significantly and are more stable. This guarantees better shelf life from a commercial perspective. There are also further enhancements to the efficacy of the solutions through correct application methods and better chemistry compatibilities. The result being a greater acceptance of biological solutions working in collaboration with sustainable chemistry to ensure more successful integrated pest management programmes.

In conjunction with biocontrol solutions, commercialisation of biostimulant products is starting to grow in significance. This is on the back of a shift in focus from only pest and disease management to more sustainable farming by unlocking plant potential through soil and root health. If we as an industry are going to be true to sustainability then we need to focus on a sustainability pyramid which has a solid base entrenched in soil health, plant health and then finally at the apex, pest and disease management.

Our Associate Members

CropLife South Africa sent out a request to its associate members to provide a short summary of their business activities so that other members may know who to contact should they require a particular service. Below are the details that have been provided:

Apeiro AG

Registration and demonstration trials for herbicide, insecticide, fungicide, seed variety, fertilizer, PGR, Bio-stimulants (controlled environment), as well as planting and harvesting of trials.

Dr Glynn Catton

Dr Glynn Catton is a veterinarian, but consults to companies registering animal feeds/supplements, agricultural remedies (household, rodenticides, environment pesticides, swimming pools) and stock remedies.

Invader Plant Specialists

Vegetation management consultants specialising in invasive alien plants and industrial vegetation. Consulting, development of management plans and training & mentoring.

Orsmond Aviation

Over 40 years' experience in agricultural aviation, plague and pest control, firefighting and aircraft maintenance.

PCITA

Pest Control Industries Training Academy (PCITA) is a reputable training organisation, providing high-quality, industry standard training to upgrade and establish the Pest Management Industry as a registered trade.

SAPCA

The South African Pest Control Association (SAPCA) is the professional association for the South African pest control industry, acting in the interests of our members.

Subtrop

Subtrop manages the affairs of the SA Avocado, Litchi and Mango Growers' Associations.

The Residue Experts

An accredited (SANAS G0034) national CRO specialized in the conduct of field-phase residue studies according to OECD GLP principles.

TIPWG

TIPWG's role is to provide/promote (1) Technical Support, (2) Industry Collaboration, (3) Compliance, and (4) Provision of Guidelines to all in South African Forestry.

Visit croplife.co.za/associates to view all of our associate members. If you are a CropLife SA associate member and would like to feature your services, kindly send your details to info@croplife.co.za.

CropLife SA Event Calendar

Event	Date (2021)
Stewardship Forum	4 May; 3 August; 2 November
Small Pack Forum	6 May; 5 August; 4 November
Regulatory Forum	17 May; 11 August; 10 November
Distribution Forum	18 May; 24 August; 16 November
ExCo Meeting	19 May; 30 August; 18 November
International Conference on Agricultural and Biological Science (ICABS)	25 – 26 May
IRAC SA Meeting	9 July; 8 October
CRI Citrus Symposium	15 – 18 August
Nampo	17 – 20 August
FRAC SA Meeting	23 August
Nampo Kaap	8 – 10 September

We're Here to Help

If you require assistance, would like to become a member, or if you have general feedback, we would love to hear from you. Please contact any member of our team:

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