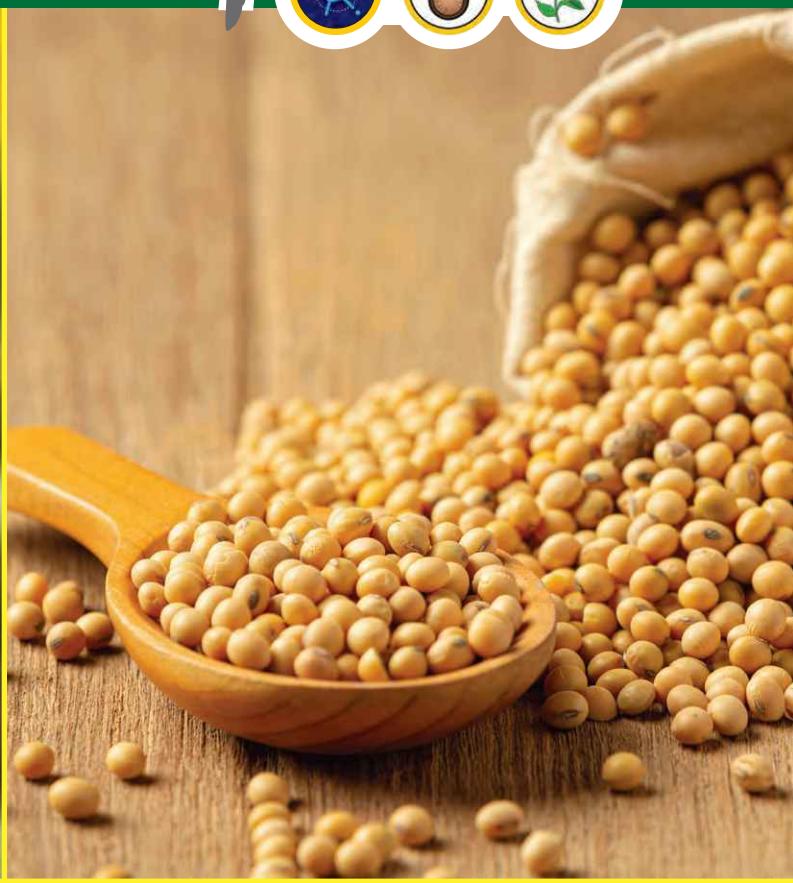
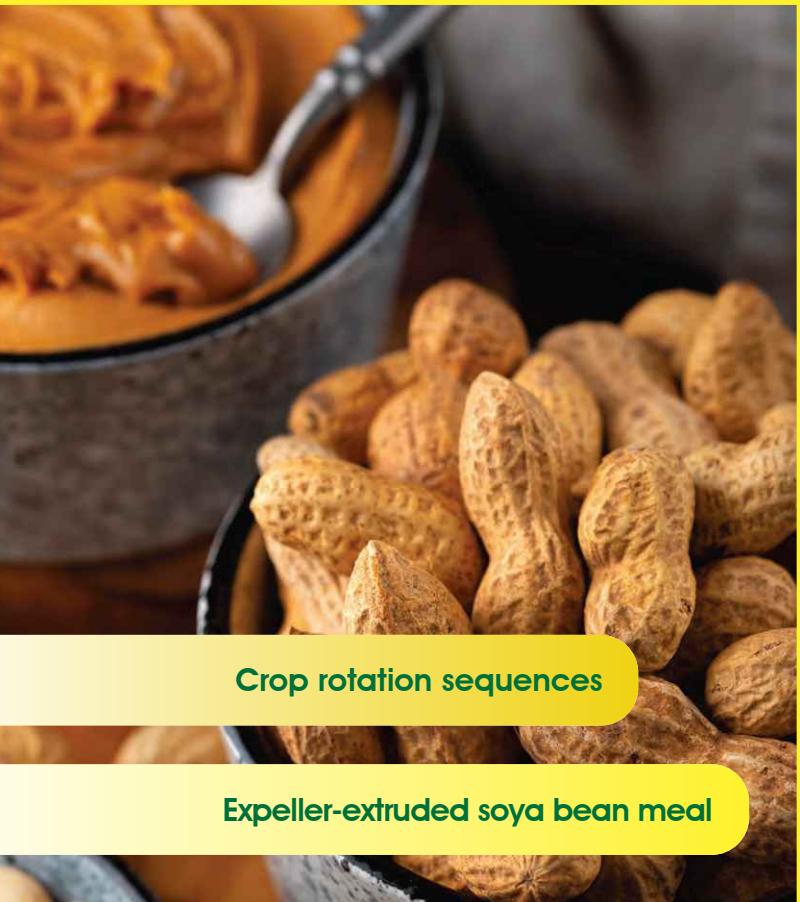
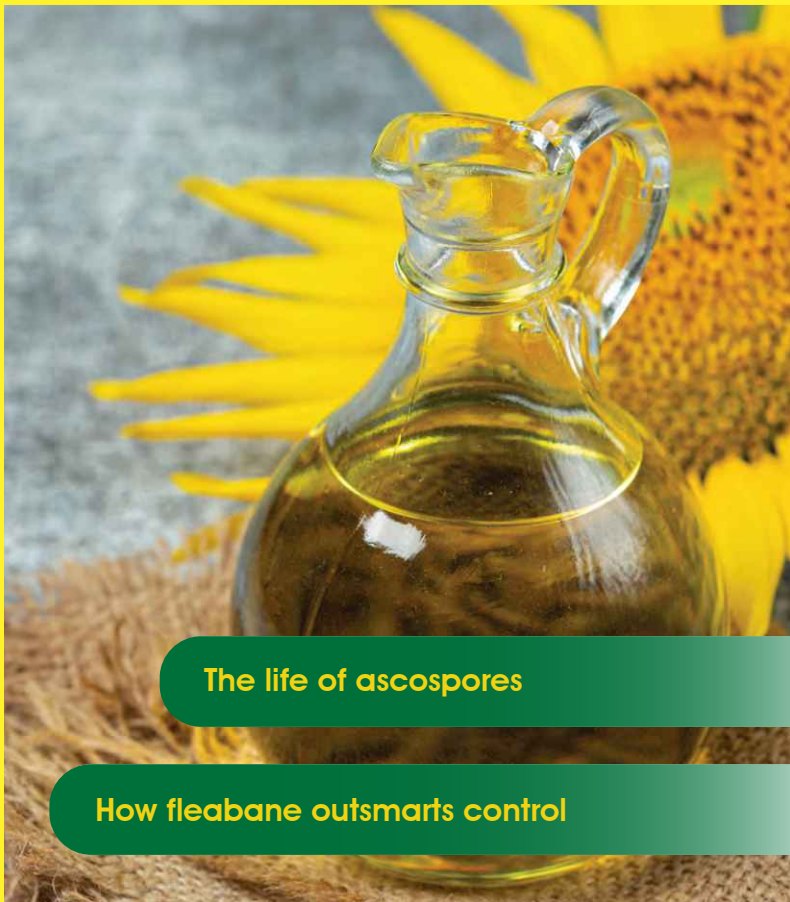
Vol 9 No 4 • December 2023
ISSN 2410-1206

OILSEEDS focus

Protein Research Foundation • Oil & Protein Seeds Development Trust • Oilseeds Advisory Committee







Crop rotation sequences

Expeller-extruded soya bean meal

The life of ascospores

How fleabane outsmarts control

Trots Suid-Afrikaanse **sonneblomgenetika**

Clearfield® Plus
Produksiestelsel

AGSUN 5103CLP
AGSUN 5106CLP
AGSUN 5108CLP
AGSUN 5109CLP

KONVENSIONELE PAKKET
AGSUN 5270
AGSUN 5278
AGSUN 8251

Clearfield®Plus is 'n geregistreerde handelsmerk van BASF.

Plant in die kol, plant agricol
aan die groei

South Africa's agricultural growth story

By Wandile Sihlobo, chief economist, Agbiz

Agriculture remains one of the success stories in South Africa's economic progress, irrespective of the various challenges the country has been facing these past few decades. The success story encompasses all subsectors of agriculture – field crops, livestock and horticulture.

While primary agriculture's share in the economy has declined from around 10% in the 1960s to just under 3% today, the sector has grown tremendously in real terms. This share decline illustrates the classic narrative of how the South African economy advanced over time and industries such as finance, manufacturing and transport have grown faster than agriculture. Still, the interlinkages of primary agriculture with manufacturing (agro-processing) make it an integral part of this economic transformation story.

Over the past decades, production growth has been underpinned by the adoption of new production technologies, better farming skills, growing demand locally and globally, and progressive trade policy. This was made possible by a range of trading agreements the South African government secured over the past couple of years, the most important being with the African, European and Asian regions. The African continent and Europe now account for approximately two thirds of South Africa's agricultural exports. Asia is also an important market for our exports, demanding a roughly 25% export share.

Factors of production success

The private sector is a core component of South Africa's agricultural success story, while the government must ensure that policy remains favourable to investors and producers. The priorities of the government are to ensure that there are no interventionist trade policies blocking exports or price caps, that infrastructure (roads, rail, water and electricity) is in place, there is strong protection of property, proper land governance, openness to scientific advancements in seed breeding and agrochemicals, as well as genetics. This is all anchored in the sound financial system that supports commercial production and international trade.

For the first two decades since our democracy, infrastructure was fully operational and supported the sector. However, the past nine years have seen deteriorations which have led to even greater reliance on the private sector, and which presents long-term risks if not addressed.

Private sector efforts, in collaboration with an advantageous policy environment, ensured that the country's agricultural sector thrived during the Covid-19 crisis. Favourable weather conditions also contributed. In 2021 and 2022, South Africa's agricultural exports, in volumes and value, broke the record, reaching US$12,8 billion in 2022. Our export basket is diverse, with fruit, wine, grains, beef and wool at the top of the list.

These policy measures and strong private sector participation differentiate South African agriculture from most of the rest of the continent. For example, the South African agricultural food system's (AFS) share of primary agriculture and agro-processing of gross domestic product (GDP) adds up to around 10%, with the private sector leading it. In most African countries, the AFS share of GDP is well above 30 to 40% and most of the development is driven by the government.

Opportunities and challenges

The South African government supports private sector investments by providing essential service delivery that any government is supposed to deliver. Inclusivity is crucial, and here the government has a tremendous opportunity to engineer the development of a multitude of business people already part of the sector, but who require support in terms of extension, credit and infrastructure. This 'hidden middle' holds potential for employment generation and will bring vibrancy to rural towns. We hope through the country's newly launched Agriculture and Agro-processing Masterplan (AAMP) this can be realised.

The agricultural sector in South Africa doesn't have all its houses in order. We have our challenges. For example, the government has fallen short in delivering basic services. Water, roads, rail, and ports are posing risks for the long-term growth prospects of the sector and urgent intervention is required. Crime is another risk to investment. And I am sure people are aware of our energy challenges, which create challenges for producers and the food sector.

That said, in South Africa, both the government and private sector have a plan for the next decade through the AAMP, which addresses direct value change and regional requirements to boost the growth of this crucial sector. This will entail resolving policy ambiguity, creating enabling infrastructure, providing producer support, supporting research and development, financing through a blended finance structure, and expanding export markets.

While export markets are largely dominated by fruit, wine and livestock, grains and oilseeds are part of South Africa's export market success story. This subsector is currently exploring new export avenues to China, with volumes that will likely continue to increase in the next decade.

For more information, send an email to Wandile Sihlobo at wandile@agbiz.co.za.

Climate change strategies

The last nine years have been the warmest on record since 1880. This is mainly due to global warming. Going forward, we can expect even more extreme temperatures with a higher variability. Climate change in South Africa is leading to higher night temperatures and less frequent, more unpredictable rainfall than previously experienced.

Normal crop prediction becomes more complex under these circumstances, and extremely wet days add to the challenge. Soil moisture also fluctuates every year. However, globally a concerted effort is being made to alleviate global warming.

In the long term we can expect a shift in agricultural production – production will expand more northward in the northern regions (areas where production is currently not possible) of countries such as Russia, Canada and the Nordic countries. It will likely become more challenging to produce in countries such as South Africa and South America as well.

The solutions

The short-term solution lies in genetic improvements and management strategies such as adjusting planting dates. Research is required in respect of multiple stress factors and simultaneous effects instead of single events. The increase in grain weight amid a reduced number of grain kernels should also be a focal area.

Bioceres in Argentina has made excellent progress by commercialising the first-of-its-kind drought-resistant wheat and soya bean products. This has been widely accepted and registered in several countries, including China and now also South Africa. This is an important intervention. At the same time, however, we must improve rain forecasts and adopt simulation models, which have been successfully used in other countries such as Australia.

Next seasons for South Africa

Even though we experienced major flooding in the Western Cape, the probability is there that South Africa could be entering some dry years in especially the northern parts of the country. Given that we know these conditions are looming, it is crucial that strategies be put in place to mitigate the effects of these drier conditions.

Enjoy this issue of *Oilseeds Focus* which addresses a number of the aspects referred to. Also feel free to suggest topics you feel should receive attention in our pages.

Dr Erhard Briedenhann

Send us your contributions and suggestions to make *Oilseeds Focus* an enjoyable and valuable publication for the oilseeds industry.
Contact Dr Briedenhann at erhardb@netactive.co.za for more information.

Editor: Dr Erhard Briedenhann
+27 82 551 1634
erhardb@netactive.co.za

Associate editor: Gerhard Keun
+27 11 803 2579
oliesade@opot.co.za

Published by: Plaas Media (Pty) Ltd
217 Clifton Ave, Lyttelton, Centurion, RSA
Private Bag X2010, Lyttelton, 0140, RSA
Tel: +27 12 664 4793 • *www.agriorbit.com*

Chief editor: Lynette Louw
+27 84 580 5120
lynette@plaasmedia.co.za

Deputy editor: Jayne du Plooy
+27 82 414 0151
jayne@plaasmedia.co.za

Sub-editor: Nanette Botha
+27 82 307 9421
nanette@plaasmedia.co.za

News editor: Elmarie Helberg
+27 73 339 2920 · elmarie@plaasmedia.co.za

Design & layout: Inge Gieros
+27 82 959 9607 • inge@plaasmedia.co.za

Advertising:
Karin Changuion-Duffy
+27 82 376 6396 • karin@plaasmedia.co.za

Susan Steyn
+27 82 657 1262 • susan@plaasmedia.co.za

Zona Haasbroek
+27 82 960 7988 • zona@plaasmedia.co.za

Accounts: Marné Anderson
+27 72 639 1805
marne@plaasmedia.co.za

Subscriptions: Beauty Mthombeni
+27 64 890 6941
beauty@plaasmedia.co.za

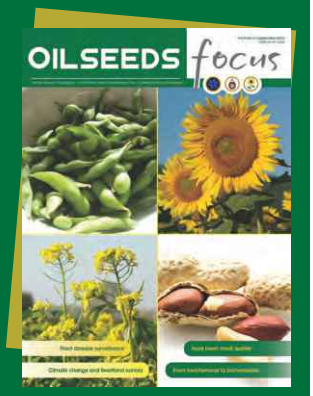
Printed and bound by: Typo
+27 11 402 0571

Oilseeds Focus, Plaas Media and its staff and contributors do not necessarily subscribe to the views expressed in this publication.

Published on behalf of:
Protein Research Foundation
PO Box 1564, Rivonia, 2128
Tel: 011 803 2579
Fax 011 803 2287 / 086 634 8067
Enquiries: gkeun@proteinresearch.net

To subscribe

Oilseeds Focus is a magazine aimed at addressing issues that are relevant to the canola, soya bean, sunflower and groundnut industries. To subscribe, please contact Beauty Mthombeni at 064 890 6941 or email beauty@plaasmedia.co.za. Subscriptions are free.



CONTENTS

NEWS

Canola waste for cattle

Pioneering an investigation into the potential use of discarded canola as a dietary supplement for pregnant cows, Erika Cornand, a graduate student at the University of Saskatchewan in Canada (USask), aims to enhance both their health and the wellbeing of their calves.

Canola seeds, when processed into pellet form, offer an easily administered fat supplement for inclusion in cows' diets, notes a recent article from the USask. Cornand's primary objective is to determine if these canola seed-based pellets can positively impact cattle body condition and reproduction rates, while also establishing the optimal dosage for effectiveness.

Cornand, currently pursuing her master's degree in animal and poultry science at the College of Agriculture and Bioresources, is collaborating with her research supervisor, Dr Bart Lardner, at the USask Livestock and Forage Excellence Centre in Clavet in Saskatchewan.

The preliminary findings of the study suggest that administering the canola seed-based pellet during the second and third trimesters of pregnancy improved both the body condition scores of the cows and their pregnancy rates.

This discovery holds promise for beef producers as well as grain producers who may have canola to dispose of. In the article, Cornand emphasises: "Instead of selling off-grade canola at discounted rates, grain producers may now have the opportunity to supply their product to cattle producers. This could yield benefits for the cows and their offspring, potentially leading to improved economic profitability." – *Drovers*

Ukraine sunflower seed yields looking better

The International Grains Council (IGC), according to its latest information, said global production of sunflower seed will probably amount to 56,1 million tonnes in 2023/24. The IGC lowered its forecast by 300 000 tonnes. The previous year's output was exceeded by only 2,6%. The downward adjustment was mainly due to a prospective smaller crop in the EU-27.

The sunflower seed harvest in the Union, the world's third most important supplier, was expected to reach around 10,3 million tonnes, which is 100 000 tonnes less than projected in August. Nevertheless, the previous year's figure will presumably be exceeded by 12,4%.

The harvest area in Ukraine expanded significantly this year. Due to favourable growing conditions, yields are expected to increase on 2022. The IGC projects production to reach 15,3 million tonnes. This translates to an 8,9% rise on the past year.

In Russia, where harvesting commenced at the end of September, the output of sunflower seed is expected to remain at the previous year's level of 16,4 million tonnes. – *Biofuels International*

Record canola crop for Ukraine

Ukraine harvested what analysts expected would be a record canola crop. Svitlana Kupreeva, oilseed market analyst with UkrAgroConsult, said producers planted record acreage of the crop and final yields were expected to also set a new high.

The firm forecasted 4,2 million tonnes of production, shattering last year's record of 3,5 million tonnes. Kupreeva said there is also potential for record exports of canola, oil and meal from the country. MarketsFarm analyst, Mike Jubinville, saw reports calling for an even bigger Ukrainian crop of 5,4 to 5,5 million tonnes. The obvious market for that crop is the European Union, where it is weighing down rapeseed futures prices. – *The Western Producer*

China approves GMO seed varieties

China is closer to commercialising genetically modified (GMO) maize and soya beans. According to a report by Reuters, China has approved 37 GMO maize seed varieties and 14 GMO soya bean varieties, taking it close to commercial planting of GMO maize and soya beans.

This is not the first time China has made headlines regarding its path towards the potential commercialisation of GMO maize and soya beans for domestic cultivation. In June 2013, the Chinese National Crop Variety Approval Committee released two standards that cleared the path for cultivating GMO crops in the country. This was the missing piece in the regulations for the commercial production of GMO maize and soya beans in China, as the government has two steps in these regulations, namely, a safety certificate and a variety approval before crops can be commercially cultivated.

Various GMO maize and soya bean varieties have received the safety certificate since 2019, and the missing piece was the variety approval, which was approved in June 2022. Thus, at the time, we already believed that the full approval and commercialisation of GMO crops in China was a real possibility. The news this past week that the Chinese Ministry of Agriculture and Rural Affairs approved further varieties of GMO maize and soya bean seeds further underscores China's determination to plant these varieties.

However, commercial cultivation is not yet approved. The timing for wide-scale commercial release is still unclear, although some speculate it could be closer as China aims to boost its crop yields as part of the food security drive. The area plantings for the recently approved varieties are still reasonably small, estimated at 267 000 hectares. – *Farming Portal*

Carryover reduces China's imports

The USDA's Foreign Agricultural Service (FAS) expects China to import slightly fewer soya beans this marketing year. The FAS pegs 2023/24 purchases by the world's largest buyer of beans at 100 million tonnes, 860 000 below the 2022/23 record high due to a larger carryover. That would still be up approximately ten million tonnes from the 2021/22 marketing year as China tries to meet the feed demand for its domestic livestock industry.

China's domestic soya bean crush is seen at 96 million tonnes, which would be up two million on the year. China buys most of its soya beans from Brazil, with the United States (US) taking the number two slot. – *Brownfield*

Record canola exports for Australia

Australia exported a record six million tonnes of canola in the year up to 30 September, according to the latest data from the Australian Bureau of Statistics.

Belgium on 946 539 tonnes, the United Arab Emirates on 896 184 tonnes and Japan on 894 038 tonnes were the three biggest markets for Australian canola shipped in the 2022/23 marketing year. For the July to September quarter, Japan on 407 719 tonnes was the biggest market by far, followed by the United Arab Emirates at 217 506 tonnes and Pakistan at 148 828 tonnes.

The quarter's major destinations show the normal downtrend in demand from Europe as its crushers focus on processing the region's own new crop. Australia's canola exports in 2022/23 are up 11% from the record 5,4 megatons shipped in 2021/22. – *Grain Central*

Weak market drives down sunflower prices

There has been a weak global market for sunflower seed and vegetable oils which has put pressure on sunflower prices.

"Sunflower prices at the crush plants are feeling the spillover effect from weakness in global sunflower seed and oil values," commented John Sandbakken, executive director of the US National Sunflower Association. "Vegetable oil prices have trended downward as the result of ample supplies, especially sunflower oil on the global market."

The ongoing conflict in Ukraine, the world's largest exporter of sunflower oil, continues to impact the sunflower market. – *Farm & Ranch Guide*

China purchases record amount of soya beans

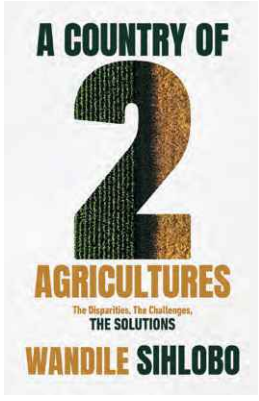
China recently booked its largest single-day US soya bean purchases in at least three months, traders said, offering a glimmer of hope for the most valuable US farm export after overseas sales of the 2023 harvest had fallen well behind the normal pace.

Chinese importers bought around ten cargoes of soya beans, or approximately 600 000 metric tonnes, for shipment from Gulf Coast and Pacific Northwest export terminals between December and March, trade sources said.

The sales would be a relief to US producers, who have seen Brazil dominate the global export market for soya as well as maize for longer than usual this year. They were the latest in a series of soya import deals by Sinograin, China's state-owned importer, according to three export traders with knowledge of the deals. Total purchases over that time were estimated at as much as 20 to 25 cargoes, two traders said. – *VOA News*

A country of two agricultures

Well-known agricultural economist, Wandile Sihlobo, recently launched his second book, *A country of two agricultures*. Sihlobo is the chief economist at Agbiz and is known for his regular communications with the broader media to report on agricultural trends and movements.



The book tells the story of the current and future agricultural situation in South Africa, and explains why dualism has persisted in the democratic era in South Africa's agricultural landscape and what it would take to overcome this. The book has enjoyed instant success and has been hailed by many an industry role-player as a must-read for anyone interested in or involved in agriculture in South Africa.

The book does well to explain the various factors that influence the South African agricultural landscape, especially political and economic factors. It is, however, not a criticism of current or past situations, but rather strives to give context and, along with that, create an understanding for what was, what is, and what can be.

Plaas Media attended the launch of Wandile Sihlobo's new book in Pretoria in September this year. During the launch, Plaas Media had the opportunity to talk to him about the book. Scan the QR code to watch the interview.

The life of ascospores:
Their origin from sclerotia, destiny through air, and host infection pathway

By Lisa Rothmann and Kwanele Sabela, Department of Plant Sciences, Plant Pathology, University of the Free State

Approximately 90% of the lifecycle of *Sclerotinia sclerotiorum* is spent in the form of sclerotia, a survival structure attributed to the pathogen's ability to remain viable and persist for prolonged periods. Viability refers to the in-season capacity of sclerotia to germinate and produce inoculum, contributing towards successful infection and disease initiation. Persistence refers to the capacity of sclerotia to survive across seasons under non-conducive environments or periods where susceptible host plants are unavailable.

Sclerotia formation occurs in three key stages: initiation, development, and maturation (*Figure 1*). Small white hyphal clusters on the plant's surface, accompanied by the secretion of a mucilage-like substance (acting as a hyphal 'glue'), can be observed at the initiation stage. The development stage follows with marked clustering and compaction of hyphae, resulting in clumps of mycelia. Increased sclerotial size and the deposition of melanin, resulting in the dark brown to black colour, is established during maturation.

The outermost layer, known as the rind, is heavily melanised and is pivotal in enhancing endurance against harsh environmental factors, ultraviolet (UV) radiation, and competitive micro-organisms, thereby bolstering its viability and persistence. The cortex, positioned beneath the rind, acts as an intermediary layer, separating the rind from the innermost medulla. The medulla, comprising aggregated hyphal tissues within an extracellular matrix, forms the core of the sclerotium, contributing to its overall structural integrity and long-term viability (*Figure 2A*).

Sclerotinia disease cycles are initiated when sclerotia completes either carpogenic or myceliogenic germination, generating primary inoculum. The former process results in the formation of apothecia (*Figure 2B*), the focus of our discussion: the life of ascospores.

Apothecia and 'puffing'

Apothecia are cup-like structures that are filled with asci and contain ascospores (*Figure 2C*). Carpogenic germination of sclerotial populations co-occurs in the field, meaning that sclerotia do not germinate simultaneously. Flushes of carpogenic germination are caused by variations in the interactions of air and soil temperatures, relative humidity and soil moisture.

'Puffing', the forcible ejection of spores, results in the airborne inoculum of ascospores from the apothecia (*Figure 3*). Ascospores enter airways by being actively discharged between four and nine days following apothecium development and can be ejected approximately 3 to 4cm from their apothecial cups. The greatest concentration of ascospores, ~77 to 90%, was detected within 100m, although a sharp decrease at 400m from their apothecial point source was reported. However, there are reports of ascospores within 'several miles' (one mile is equivalent to 1,6km); therefore, the assumption of possible dissemination across at least 3,2km was made by Brown and Butler in 1936 from lettuce fields.

Temperature and humidity

Puffing can occur continuously while the apothecia remain viable; consequently, the amount of inoculum in the air is not uniform during the season. Upon successful entry into airways, ascospores are exposed to the elements, potentially reducing their competence to cause infection.

Figure 1: Stages of sclerotia formation on a dry bean pod. (Source: Odendaal, 2022)

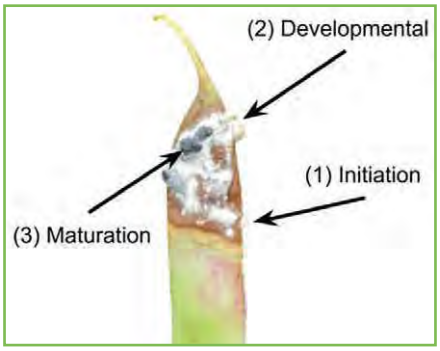
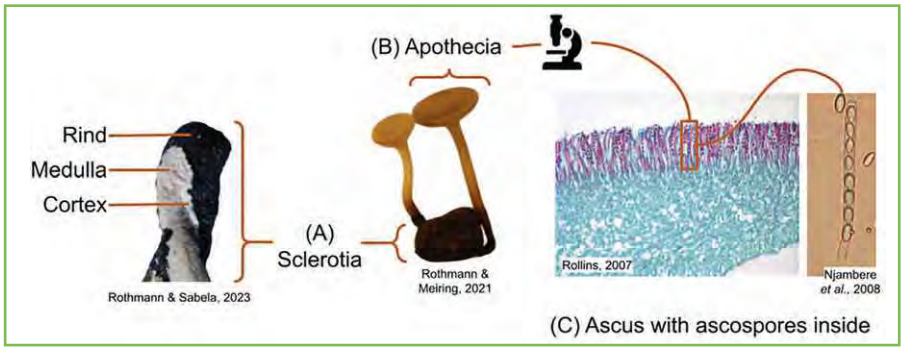


Figure 2: Sclerotia (A), apothecia (B) and ascus (C) structures of *Sclerotinia sclerotiorum*. (Source: Rothmann and Sabela, 2023)



In laboratory studies, the continuous puffing of ascospores occurred across three days in saturated air (90 to 95% relative humidity) at 15°C. A significant decline in ascospore concentration was seen when the relative humidity was reduced between 65 and 75% at 15°C, 36 hours after germination. The interaction between air temperature and relative humidity is critical for the viability of ascospores, and contrasting combinations of these parameters result in varying durations of ascospore survival.

In the field, ascospores are also exposed to UV, which is also known to reduce their ability to germinate and infect the host tissue successfully. Flushes of ascospore release, continuous puffing events, were observed between 09:00 to 13:00 and 02:00 and 07:00 in American canola fields across two seasons.

Increases in temperature by 3 to 5°C, with a ten unit drop in relative humidity, initiated puffing events, and prolonged saturated air promoted the continuous flushes of ascospore release. Fluctuations in the time patterns of ascospore release and concentrations of available inoculum add to the complexity of successful timing of fungicide applications. Additionally, rainfall events can maintain or advance high relative humidities, alter air temperatures, or, in scenarios where greater volumes of rainfall occur, wash ascospores off and prevent their adhesion to the plant surface.

Figure 3: Puffing of apothecia releasing ascospores into the airway under a sunflower canopy. (Source: Rothmann and Meiring, 2021)

Disease initiation relies on viable ascospores exiting airways and being deposited onto susceptible host tissue to start ascospore germination (*Figure 4*). A single ascospore is required to stick to dying tissue (i.e., senescent or wounded), where free moisture is available, which provides a nutrient source before any infection occurs. As the ascospore germinates, the germ tube gradually extends along the plant surface and a tiny structure called an appressorium is formed to attach the ascospore to the surface of the plant to aid in the penetration process.

Ascospores of *S. sclerotiorum* have two manners to invade plants: the first is through spreading between living cells (intercellular) to keep the pathogen alive in the presence of living host tissue, and the second mechanism is where hyphae enter the plant cells (intracellular) to invade and kill the host tissue.

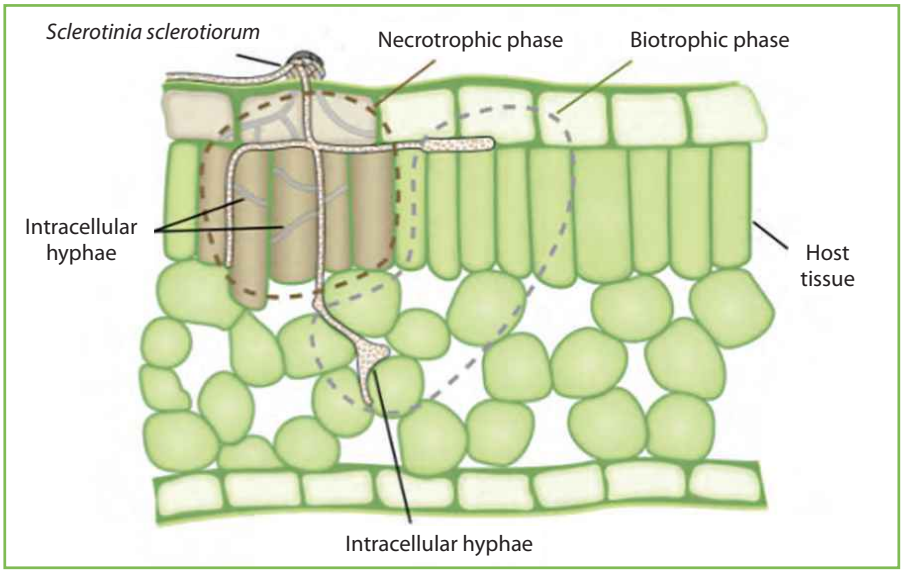
These infection mechanisms are what contribute to the complexity of understanding and managing *S. sclerotiorum* as the pathogen can shift between two different lifestyles, i.e., biotrophic (requiring living host tissue) and necrotrophic (making use of senescent/dying tissue).

During infection, cell wall degrading enzymes are released to break down plant cell wall components for pathogen establishment, resulting in water-soaked lesions, i.e., symptoms of *Sclerotinia* stem and head rot. As the invasion progresses, *S. sclerotiorum* produces oxalic acid, which lowers the pH inside the host, enhancing the activity of cell wall degrading enzymes and colonisation of the host tissue, developing into fluffy white mycelia patches, i.e., the signs of sclerotinia head and stem rot.

The white mycelial masses eventually mature and transform into sclerotia, completing the disease cycle and preparing the pathogen for a season of survival. Understanding the life of ascospores provides information on how to quantify the pathogen, determine the disease severity and when to interfere with the disease cycle.

Our research group at the University of the Free State looks forward to starting a season of research on the 'quantification of sclerotinia head rot and preservation of at-risk sunflower through premature desiccation.'

Figure 4: Ascospore germination and the biotrophic and necrotrophic phases. (Source: Kabbage *et al.*, 2015)



Sclerotinia sclerotiorum *grows between plant cells during the initial infection (i.e., intercellular) keeping host cells alive; this is known as the biotrophic phase. However, necrotrophic growth occurs within the cells, where hyphae penetrate plant cells (intracellular), resulting in dead cells and the appearance of symptoms. Once disease has been established, colonisation can continue resulting in visible mycelial growth on host plant surfaces.*

For more information, contact Dr Lisa Rothmann on 051 401 3666 or lisa.ann.rothmann@gmail.com.

Building crop rotation sequences to cut down your carbon footprint

By Lisa Matthews, Department of Agronomy, Stellenbosch University

Deciding what to include in a crop rotation sequence is an important decision that impacts management, pests and diseases, the infrastructure or machinery that will be needed and, as we found, it also impacts greenhouse gas (GHG) emissions. We saw that replacing synthetic nitrogen (N) with nitrogen-fixing legumes and using diverse rotation systems integrated with cover crops or livestock effectively cut down on emissions.

Agriculture is unique as an industry because it involves one part human action and two parts nature. A producer selects the seed, oversees the planting, fertilises or sprays, but after that, it is up to natural processes for produce to grow. It is common knowledge how much production is impacted by the environment. Moderate temperatures and the right amount and distribution of rain throughout the season are needed. What is not well known is how much agriculture impacts the environment. Farming uses the most land globally and is responsible for approximately a quarter of human caused GHG emissions.

Crop-rotation systems

Different dryland crop rotations in the Swartland in the Western Cape were studied. The trial, situated on Langgewens Research Farm, is a conservation agriculture trial where different rotation combinations of cereals, canola, lupins, and sheep have been followed for over 20 years. To determine the carbon footprint, an inventory of all the emissions was collected.

The annual changes in soil organic carbon and biomass production and yield were also observed. Some GHG emissions were measured directly from the soil. The closed chamber method was used whereby a section of soil is enclosed, and air samples are taken over time to detect flows of nitrous oxide and methane (two potent GHGs). The rest of the emissions were modelled through activity data and emission factors.

Three four-year rotation sequences were investigated. The first crop rotation system was three years of wheat, followed by one year of canola. This system produces cash crops every year and relies fully on fertiliser for nitrogen demands. The next system was a sequence of wheat, canola, wheat and cover crops. Here one year of producing cash crops is traded for a very diverse mixture of forage cereals, legumes, and Brassicas that fix nitrogen (replacing 15kg of nitrogen the following year) and boost the soil.

The third system was integrated with livestock. Every second year a medic pasture is established and grazed by Dohne sheep, a wool and meat breed. The sequence is wheat, medic pasture with sheep, canola, medic pasture with sheep. In this system, the medic pasture fixes most of the nitrogen required by the cash crops, lowering the application of fertiliser to 26kg N for wheat and 48kg N for canola. This is a significant reduction from the nitrogen used in the cash crop-only system of 87kg N for wheat and 80kg N for canola.

There is a connection between N fertiliser and GHG emissions. It takes a lot of energy to manufacture nitrogen fertiliser, and by the time it has made its way onto the farm every kilogram of N could represent anything between 3 to 10kg of CO_2 that was released during its production and distribution. This is an example of an indirect or embedded emission, where GHGs are released during the manufacturing of an input or material. Other than its embedded emissions, once N is applied, it contributes further because some of it forms nitrous oxide. Nitrous oxide is a GHG along with carbon dioxide, methane, and fluorinated gases.

Nitrous oxide emissions

Agriculture is responsible for approximately 80% of human-caused nitrous oxide emissions. Although it is released in small amounts, it is a potent GHG as 1kg of nitrous oxide causes as much warming as 273kg of carbon dioxide. Any additions of N to the soil, regardless of whether it is in the form of fertiliser, nitrogen fixed by legumes, compost or animal manure, could potentially increase nitrous oxide emissions.

Estimating exactly how much nitrous oxide is released is difficult. This gas is formed in the soil by microbes and is strongly influenced by changes in temperature, and N and water available. There is a lot of variability in how it forms so weekly to biweekly samples were taken to best capture what was occurring. Throughout the year emissions remained very low, and then following an unusual summer rainfall, a burst of nitrous oxide was released. What is even more interesting is that this burst only occurred in the systems that had livestock or legumes.

In systems reliant on fertiliser, following application, the plant quickly uses it up, and by the end of the season very little remains. In systems that rely on organic forms of N, these forms must first be mineralised before the plant can take it up. It essentially acts as a long-term storage of N that drips nutrients to the plant over the season. However, after the plant is harvested, the sudden availability of moisture releases a bit of N into the soil leading to the nitrous oxide burst.

Although releases of nitrous oxide contribute negatively to the carbon footprint, it points out an important difference in how rotations can affect the quality of the crop. There was a steadier supply of N throughout the season – especially towards the spring when the wheat was in its nutrient-hungry grain-filling stage in systems that had organic sources of N such as legumes or animal manure.

Differences in quality

Between 2000 and 2020, the average protein content of wheat remained at around 13% in the wheat-pasture-canola-pasture rotation. In the rotation that had one year of cover crops in between wheat and canola phases, wheat protein content dropped roughly 1% to just under 12% in 2020.

Finally in the wheat-wheat-wheat-canola system, despite having the highest usage of N fertiliser, the wheat protein content dropped by almost 2% from 12,5 to 10,5%. Another way to look at it was that over 90% of the wheat harvested from the two rotations that had legumes incorporated were bread grade, while only 75% of the wheat from the wheat and canola-only rotation made bread grade.

Having higher-quality wheat is a definite economic benefit; in addition, the yields were also higher. In the wheat-wheat-wheat-canola rotation, the average yields for 2021 were 3,2t/ha for wheat and 1,3t/ha for canola. In the wheat-canola-wheat-cover crops rotation, the yields were 4,6t/ha for wheat and 2,2t/ha for canola. Finally, the yields for the wheat-pasture-canola-pasture rotation were 5,4t/ha for wheat and 2,9t/ha for canola. These yield benefits are so significant that in the end sacrificing one year of harvesting crops for a cover crop phase is worth it.

Other sources of emissions that differed between rotations were fuel and agrochemicals. Due to some phases not requiring a tractor to spray or apply fertiliser frequently, fuel usage was essentially diluted over the four years. For this reason, less fuel was consumed in the crop-livestock rotation system, and the most fuel in the cash crop-only system.

Looking at soil carbon levels, no difference was found between rotation systems; however, all systems increased over 20 years from 0,9 to 1% to 1,4%. This positive increase is attributed to conservation agricultural practices of no tillage, crop rotation, and permanent soil cover.

So, putting it all together: Compared to the rotation system of wheat-wheat-wheat-canola, rotation wheat-canola-wheat-cover crops had 35% less GHG emissions per product output and 15% less emissions per hectare, and rotation wheat-pasture-canola-pasture had 11% less GHG emissions per product output and 7% less emissions per hectare. If the medic pastures were grown as fodder production phases and the emissions from the livestock not included, this rotation would have had 55% less GHG emissions per product output, and 35% less emissions per hectare.

Cutting emissions

Emissions were cut by replacing fertiliser with legumes that fix N, either through the medic pastures or cover crops. Yields were increased by improving the soil. N fertiliser alone was responsible for almost 70% of the GHG emissions in the wheat-wheat-wheat-canola system. In the crop-livestock system, emissions from livestock (enteric fermentation and excreta) were the main source of emissions.

Other inputs that caused smaller amounts of emissions were fuel, seed and agrochemicals such as herbicides and fungicides. Soil carbon sequestration was an additional climate mitigation benefit in all systems. Diversifying the rotation by incorporating livestock and legumes into rotations decreased the global warming potential of wheat and canola production.

The main benefit of the sheep was to ensure the medic pasture phases were profitable. It is also important to remember that livestock cause emissions too, so stocking at too high rates or causing overgrazing would probably increase GHG emissions instead.

The different phases of a rotation system should not be managed individually. Each year impacts the next. Different rotation phases can be used to support your system and build it up over time. Yield is not the only thing being produced; N, manure, soil carbon, and ecosystem services which can act as home-grown inputs are also produced. Long-term yield differences are sometimes difficult to see but over time they can make a huge difference to productivity, profitability, and sustainability.

To summarise the findings:

- Reducing emissions can go hand-in-hand with reducing costs.
- Why buy N when you can fix it yourself? Reuse resources across the farm as much as possible.
- The benefits of well-designed crop rotation and taking care of your systems take time to realise, but it is worth it in the end.

This research, supervised by Prof Pieter Swanepoel and Dr Johann Strauss, was supported by the Western Cape Agricultural Research Trust, the Protein Research Foundation, the Agricultural Sector Education Training Authority, and Christian Albrechts University. This article is published as a reprint, with permission by *Landbou.com*.

For more information regarding the study, email pieterswanepoel@sun.ac.za.

Optimeer jou Kanola-oes vir langtermyn sukses met ondersteuning van 'n Nexus^{AG} Gewasadviseur.

Ons bied ondersteuning in die effektiewe bestuur van jou Kanola-produksie wat jou landbouonderneming se langtermyn sukses en volhoubaarheid bevorder.

Ons omvattende produk- en diensaanbod sluit die volgende in:

Optimale Kultivarkeuses
Ons help jou om die regte Kanola-kultivar vir jou spesifieke omgewing te kies wat 'n direkte impak op jou opbrengste het.

Strategiese Wisselbou-Beplanning
Ons stel doeltreffende wisselbou-programme op wat die gesondheid van jou grond bevorder en jou opbrengste verbeter.

Doeltreffende Onkruidbeheer
Ons doelgerigte en effektiewe gewasbestuursprogramme wat deur ons ervare adviseurs voorgestel word bekamp onkruid wat jou gewas se opbrengs beskerm.

Effektiewe Gewasbeskerming
Ons gewasbeskermingstrategieë voorkom en bestuur siektes, wat jou oes se gesondheid en waarde beskerm.

Geskikte Voedingstrategieë
Ons spesialiste adviseer die mees effektiewe voedingstrategieë, wat 'n direkte impak op die kwaliteit van jou Kanola-oeste het.

Kontak 'n Nexus^{AG} CropLife geakkrediteerde gewasadviseur vandag om verder te gesels oor hoe ons jou landbouonderneming kan ondersteun om te floreer.

nexus^{AG}
CUSTOMISED CROP SOLUTIONS

KONTAK ONS VIR MEER INLIGTING:
☎ 021 860 8040 www.nexusag.net

Cultivating canola as part of a crop rotation system

By Wessel Cloete, commercial manager nutrition, Nexus AG

Canola (*Brassica napus*) is an invaluable crop, especially when it comes to the production of highly sought-after canola oil. It is an integral part of South African agriculture, specifically as part of a crop rotation system which includes small grains. The implementation of a crop rotation system is crucial to the promotion of soil health, reduce the risk of pests and diseases and increase the yield of crops.

Canola in a crop rotation system

The inclusion of canola in a crop rotation system has several advantages. Research conducted in Australia between 1989 and 1998 showed that canola inclusion increased wheat yields by 20% when planted in rotation with small grains – the wheat yield increased by an average 0,7t/ha when alternated with canola, and the canola yield increased by 0,12t/ha thanks to the rotation of these two crops in successive production years.

The research illustrated the ongoing positive impact of canola which could still be observed two years after the canola harvest[1].

This outcome is partly the result of biofumigation. Biofumigation is a process during which plant residues that contain glucosinulate, such as canola, are used to control soilborne pathogens.

Biofumigation, through glucosinolates from canola roots, suppresses diseases such as footrot, *Fusarium* crown rot, yellow leaf disease, eyespot and *Septoria*[2]. Canola's deep taproot system helps it to utilise the water and nitrogen in deeper soil. Canola creates a rich nutrient mixture that makes for more fertile soil and a healthier growth environment for plants. This microbial decomposition contributes to the establishment of healthy, sustainable agricultural practices by improving the natural cycle of nutrients.

Cultivar selection

Canola is a broadleaf crop that plays a key role in controlling resistant weeds within a crop rotation system. Ryegrass has been measured at 85% resistance to herbicides in countries such as Australia. Resistance to herbicides, especially ryegrass, has reached a critical level, and canola offers a solution to maintain the effectiveness of herbicides[1].

Nowadays, canola is bred to withstand certain groups of herbicides. The choice of cultivar is a key factor in the success of the harvest. Several cultivars have been developed to perform under diverse growing conditions. These include conventional cultivars with a high yield potential which are suitable for cultivation on weed-free fields, as well as specific cultivars such as Clearfield (CL), triazine-tolerant (TT), and imazamox and triazine-tolerant (CT) which demonstrate different levels of resistance to herbicides.

Conventional cultivars, for example, are an excellent choice for areas in which weeds can be effectively controlled with group A herbicides and where the environment is kept weed-free. CL cultivars are resistant to the herbicide Cysure (group B) and have a high yield potential, especially when well managed. This makes it the ideal choice for production-focussed fields, especially considering lucerne underplantings or sulphonylurea residues in the soil.

For producers targeting the effective control of triazine-resistant weeds, TT cultivars offer a suitable solution, even if it is accompanied by slight yield pressure. CT cultivars are resistant to both Cysure and triazine herbicides. These cultivars have a higher yield potential, making them an attractive option for different types of soil and production priorities.

Wessel Cloete, commercial manager of nutrition at Nexus AG.

The role of Nexus AG

Nexus AG crop advisors play an important role in the effective management of canola cultivation. Nexus AG crop advisors provide expert advice on canola cultivar selection, strategic crop rotation planning, effective weed and disease control, as well as the best nutritional strategy. By collaborating with a Nexus AG crop advisor, producers are able to successfully harvest a sustainable canola crop.

When focussing on sustainable agricultural practices, the inclusion of canola in a crop rotation system is a tactical decision. As an industry leader in crop management, Nexus AG offers a comprehensive approach to crop management that supports producers to achieve the best yields. Contact a CropLife-accredited Nexus AG crop advisor today to ensure a sustainable future in canola cultivation.

References:
1. Angus *et al.*, 2015, Crop Pasture Science.
2. Kikegaard *et al.*, 2000, AJAR.

For more information and references, contact Wessel Cloete at 021 860 8040 or cell 082 821 3254 or visit *www.nexusag.net*.

International Rapeseed Congress 2023 revisited

By Dr Erhard Briedenhann, chairperson, Oilseeds Advisory Committee and vice-chairperson, Protein Research Foundation

The International Rapeseed Congress (IRC) took place in Sydney, Australia in September this year. It was preceded by a canola field day in Wagga Wagga. Industry role-players, the New South Wales Department of Primary Industries (NSW DPI) and the Wagga Wagga Agricultural Institute collaborated for this event.

A wealth of information was shared and there were several demonstrations, including research experiments based on canola, pathology and farming systems. The canola varieties that companies offer, technology, and phenology traits, as well as the national variety trials were presented professionally and dynamically.

Research and networking

Pacific Seeds, BASF, AGT Foods, Pioneer Seeds, Syngenta, Bayer, RAGT and the NSW DPI presented research projects on heat tolerance, frost avoidance, phenology, national variety trials, and frost micronutrient interactions. Displays and presentations also focussed on, among others, farming system efficiency improvements in Southern NSW, blackleg disease and insect management that boost canola establishment, and strategic application of foliar fungicides that limit *Sclerotinia* stem rot.

The field day created an excellent opportunity to converse with seed and chemical companies, researchers, other industry role-players and academics. Moreover, it was an opportunity to learn from the excellent research that is being conducted. Australia's climatic conditions, agronomic practices, seed types, and disease challenges make the country an ideal technology partner for South Africa.

The Grains Research and Development Corporation, one of the IRC's hosts, invests in research, development and extension services, which assist in creating lasting profitability for Australian growers. They established a five-year plan to offer new solutions for growers. This includes harnessing existing potential, reaching new frontiers, growing markets, capturing value and thriving with future generations in mind. Approximately R1 billion was spent on research over the last five years and R1,6 billion is estimated for the next five years.

Focus on international trends

The Global Council for Innovation in Rapeseed and Canola and the Australian Oilseeds Federation hosted this year's congress. The congress is held every four years and focusses on global rapeseed production and utilisation. There were 158 papers presented during 88 plenary sessions and 133 posters were on display. Sessions were dedicated to keynote lecturing that focussed on research.

Some of the main themes of the congress included:

Genetics, genomics and breeding

Excellent progress is being made in terms of targeted genetic improvement. Worth mentioning are:

- The significant reduction in pod shattering, which has a positive effect on harvests.
- The development of high omega-3 canola, which has been a very successful endeavour so far.
- Improvements in the yield gains of hybrids.
- Heat and drought tolerance, which are receiving a lot of attention at the moment.
- The quality of canola received by the end consumer.

The potential of gene editing was also presented and discussed in several papers.

Positive progress has been made in respect of seed with a higher protein and lower fibre content, specifically for the production of higher-value canola meal for the animal feed industry.

Positive progress has been made in respect of seed with a higher protein and lower fibre content, specifically for the production of higher-value canola meal for the animal feed industry.

The incorporation of machine learning and digital innovation to assist in genetic progress was an interesting talking point. This technology has been utilised effectively in flowering models. It was emphasised that the maintenance of genetic diversity is important for the future.

Agronomy and physiology

Adapting crops and cropping systems to the changing environment is crucial. Genetics and agronomy management must change to adjust to a changing environment. Positive advancements have been made with other *Brassica* species that can be incorporated. According to the keynote speakers, the utilisation of digital technologies both for research and farming plays an ever-important role and is developing rapidly.

The management of greenhouse gases was highlighted in many presentations at the congress. It is a reality and legislated in many countries. However, it is escalating globally at a rapid rate.

Pests and diseases

According to research, *Sclerotinia*, blackleg and clubroot remain the most prevalent diseases. Solutions that were discussed included machine learning to determine underlying resistance and modelling to

make decisions on when to spray. This has been applied with some success. Resistance genes on blackleg and clubroot have played a critical role. Changes in farming practices have assisted in evading diseases, and sowing earlier has become common practice. This has reduced *Sclerotinia* infection; however, upper canopy infections have increased. This needs to be managed.

To control insects, new chemistry is required and the banning of certain chemicals in Europe has not assisted with this process. Intercropping, the practice of growing two or more crops in proximity, has become more important. There is an interaction between insect control and some diseases; therefore, certain management practices need to ensure that insect occurrence is reduced and that disease occurrence is not unintentionally increased.

The first and only South African to present at the IRC was Huibrecht Schreuder who gave an excellent presentation on the "Utilisation of host resistance to manage blackleg of canola in South Africa". Schreuder is collaborating with some of the best researchers in the world in Australia on this subject.

Products and quality

A major focus area is zero carbon emissions. The massive drive to move away from fossil fuels has been a stimulus for biofuels. Moving away from petrol and diesel when it comes to motor vehicles and replacing it with electric batteries is gaining popularity; however, this will not be as easily implemented in aviation and marine fuel.

End users, economy and markets

The projected Australian canola crop in 2023 dropped by 36% from last year's estimated 8,1 million tonnes due to adverse rainfall. World stocks are estimated at 14,9 million tonnes, an increase of five million tonnes, offsetting the projected four-million-tonne decline in world production.

Biofuels play a crucial role in canola demand as a substantial volume of globally produced canola oil is being utilised in biofuel. In Europe, biofuel demand has been high, but it is expected to decline. Although global demand for fuel from biodiesel is decreasing, the demand for canola oil will grow as palm oil is being phased out. The speed at which this phaseout takes place will determine the European Union's demand for canola.

Demand for renewable diesel in the United States (US) is expected to keep on rising until 2030 and sustainable aviation fuel is also on the increase in the country. The Canadian canola crush is expected to rise as the demand for biofuels increases. Most sustainable aviation fuels are based on fats and vegetable oils, thus increasing demand.

This highly successful congress is one the organisers can be proud of. A myriad of information from across the globe that was both informative and thought-provoking was shared. South Africa was privileged to have the opportunity to interact and share in this congress.

For more information, send an email to Dr Erhard Briedenhann at erhardb@netactive.co.za.

wipe pests out, double quick

rapid knockdown
stops feeding immediately with no further crop damage

DAY 1 – FIRST SYMPTOMS VISBLE IN HOURS

DAY 2 – FIRST LARVAE DIE

DAY 3 – NONE SURVIVE

Due to patented Zeon technology AMPLIGO® is formulated as unique and uniform micro capsules

Ensures better coverage

Protects against degradation by sunlight

Stabilises the product in the spray tank

Long residual
ensures effective control with less applications

controls all life stages
moths, eggs and larvae

Ampligo®

syngenta.

READ THE PRODUCT LABEL BEFORE USE.
AMPLIGO® (not restricted) contains Chlorantraniliprole 100 g/ℓ and Lambda-cyhalothrin (pyrethroid) 50 g/ℓ (Reg. No. L8685, Act No. 36 of 1947) WARNING
GHS-Hazard Statements: Harmful if swallowed or inhaled. Very toxic to aquatic life with long-lasting effects. AMPLIGO®, the alliance frame, the purpose icon and the Syngenta wordmark are registered trademarks of a Syngenta Group Company. Syngenta South Africa (Pty) Limited, Private Bag X60, Halfway House, 1685. Tel. (011) 541 4000. www.syngenta.co.za

@SyngentaSA | www.syngenta.co.za

syngenta

Sunflower can be much more than a catch crop

Muntingh Hamman, Syngenta campaign lead for row crops, says many South African grain producers view sunflower as a second-fiddle crop, instead of the star of their grain-production enterprise. "As a result not enough time, attention and resources are dedicated to it. Sunflower can, however, be much more than a catch crop. It is well adapted to cope with dryer conditions. This advantage, combined with lower input costs, reliable market prices and the option to negotiate a premium based on oil content, allows sunflower to compete on equal footing with other grain crops."

Sunflower's ability to adapt to different climate conditions is ascribed to its tolerance for high and low temperatures alike. The crop's capacity to deal with drought conditions can be a great advantage in the upcoming season, given predictions that El Niño is likely to cause below-average rainfall.

Global influences

The tragedy of the war in Ukraine initially saw sunflower prices skyrocket, as the country is one of the world's biggest producers and exporters (the other sunflower heavyweight is Russia). Agriculture in that region has since stabilised somewhat and by mid-October this year, sunflower grain traded at around R9 000/tonne. While that is considerably lower than the R12 000/tonne turning point, the price remains strong enough for sunflower to be an attractive alternative to soya beans. The latter is usually the preferred crop, but the market-price differential is currently fairly small.

Hamman points out that the market-price differential should be weighed against sunflower's lower input costs and especially its potential to be the solution to grain production under dryer conditions. "The biggest source of untapped potential is, however, the premium growers can earn for sunflower grain with a high oil content."

Syngenta and Sensako team up

Globally, Syngenta is regarded as the leader in sunflower genetics and now, following the amalgamation of Syngenta and Sensako, growers have direct access to top sunflower genetics under the Sensako brand. This offers growers the benefit of cultivars with a high oil content and herbicide tolerance.

SY 3970 CL and SNK 270 CL are two of the Syngenta sunflower cultivars that can be planted specifically with a view to deliver high oil content. "The future of sunflower lies in oil," says Charles Basson, sunflower breeder and product placement lead at Syngenta. "In the past, the focus was on grain yield only, leaving processors with the short end of the stick. The new focus is on cultivars with a high oil content, which can contribute to better profitability for growers and processors alike."

The current oil-content standard for sunflower grain is between 36 and 38%, but with SY 3970 CL growers have been achieving 42 to 50% oil in the past few years. "There are several new cultivars in the Syngenta pipeline and growers can look forward to products that will not only yield high oil content but will also perform very well in terms of grain yield."

With the right support and planning, which includes crop protection, growers can realise excellent returns on an investment in sunflower.

Syngenta's approach

"Syngenta offers a comprehensive crop-protection package for sunflower. In combination with our superior cultivars and high-quality seed, growers have just about everything they need to make the most of a sunflower planting," says Hamman.

Sunflower is traditionally grown in the western parts of the summer grain production region but can be planted successfully in other production areas. "It is understandable that some growers prefer to plant soya beans because yields are higher. However, with METAGAN® Gold to control grasses and suppress sedges pre-emergence, and CAPTORA® to control broadleaves and certain grass weeds post-emergence, it is possible to largely limit weed competition and effectively protect sunflower seedlings."

Later in the season, AMISTAR® and AMPLIGO® will control and even prevent fungal infections and insect damage respectively. Foliar feeding at the right time will make a significantly positive difference.

"A holistic approach will safeguard a sunflower crop and allow growers to maximise yield and profit," says Hamman. Such an approach includes crop rotation, specifically to combat *Sclerotinia sclerotiorum*, the fungus that causes stem rot. It is also important to plant sunflower at the right time. Although growers often joke that sunflower can be planted up to 35 January when the maize season runs late, November is the best time to plant. By planting earlier, growers can ensure higher sunflower yields and better profit margins.

Growers aiming for optimal yield and oil content cannot continue treating sunflower as a catch crop. "Sunflower requires the same careful management and cultivation practices as other crops. It is possible to make good money with the yellow flowers, provided you adhere to the optimal plant window, fertilise properly and implement solid management practices," Hamman concludes.

AMPLIGO® not restricted. Contains chlorantraniliprole 100g/ℓ and 50g/ℓ of lambda-cyhalothrin (pyrethroid). Reg no L8685. Warning/hazard statement: Harmful if swallowed or inhaled. Very toxic to aquatic life with long-lasting effects.

METAGAN® Gold not restricted. Contains s-metolachlor (chloro-acetanilide) 960g/ℓ. Reg no L5748. Warning/hazard statement: May cause an allergic skin reaction. Causes serious eye irritation. Very toxic to aquatic life with long-lasting effects.

AMISTAR® not restricted. Contains azoxystrobin (strobilurin) 250g/ℓ. Reg no L6230. Warning/hazard statement: Harmful if inhaled. Very toxic to aquatic life with long-lasting effects.

CAPTORA® not restricted. Contains imazapyr (imidazolinone) 15g/ℓ. and imazamox (imidazolinone) 33g/ℓ. Reg no L9230. Warning/hazard statement: Suspected of damaging unborn children. Very toxic to aquatic life with long-lasting effects.

Syngenta South Africa shares valuable information on sunflower production and how Syngenta supports growers to realise the full potential of this grain crop. For more information, visit *www.syngenta.co.za*.

BAYER

EverGol® Energy

FIT • FAST • FIRST

New **3-way** mix with **3-way** action

FIT = Healthier plants

FAST = Quicker emergence

FIRST = Yield advantage

SOYBEAN | MAIZE SEED

New seed treatment solution to safeguard your soybean and maize crops.

SEED TREATMENT

Protect your soybean and maize plants against harmful diseases from the get-go!

EverGol® Energy is a new fungicide seed treatment that provides soybean and maize crops with protection against some of the most important seed- and soil-borne diseases. With its combination of three actives, **EverGol® Energy** provides three-way action by helping to grow a healthier, more robust root system, leading to enhanced crop emergence and establishment as well as a yield advantage. Maximise your profit potential with a reliable seed treatment solution, developed to help you get the most out of your crops.

For more information, download the Bayer App, BayerCropSA.

That's what you call the ***#BAYERbenefit*** *...* | @Bayer4Crops

www.cropscience.bayer.co.za /// www.bayer.co.za /// Tel: +27 11 921 5002

Bayer (Pty) Ltd. Reg. No. 1968/011192/07. 27 Wrench Road, Isando, 1601. PO Box 143, Isando, 1600.

EverGol® Energy 176.6 FS Reg No. L11351. Contains Prothioconazole (triazole), Metalaxyl (phenylamide) and Penflufen (pyrazole carboxamide). Warning.

EverGol® Energy is a registered trademark of **Bayer AG**, Germany. Please use according to instructions on label. All products are registered under Act 36 of 1947.

A35711/OF

Soil-dwelling pests such as wireworms and insect larvae can cause damage during a crop's seedling stage. Seed treatment is therefore essential.

The benefits of seed treatment

Seed treatment is a safe and targeted plant protection technology that protects crops from harmful pests and diseases, so producers can deliver a stable supply of high-quality food, feed, fibre and fuel. Seed treatment allows producers to protect their crops early in the growing cycle in a targeted and resource-efficient way. This is critical as they face daily pressure from crop pests and diseases that reduce their ability to produce profitable, high-quality crops.

To ensure optimal production, various plant protection practices and technologies are available. Seed treatment is often the preferred – in some cases only – option to support successful crop establishment and good harvests.

Crop protection and biodiversity

Seed treatment is the targeted, one-time application of pesticides to crop seeds to protect crops from damaging pests and diseases in the early growth process. This targeted approach to insect and disease control protects the seed and seedlings when plants are at their most vulnerable stage of growth.

Applying seed treatment products to the seed controls diseases that can stop a crop from establishing and limit damage from below-ground pests. Some seed treatments can also stop insects from consuming seedlings. Preventing these problems before they start reduces the risk of having to replant a crop.

Spraying fungicides or insecticides at these early growth stages is unlikely to be as effective as seed treatments because sprays are less targeted than seed treatments. For these reasons, this practice is one of the most efficient crop protection technologies currently available. Seed treatments are a good fit in integrated pest management because they effectively and efficiently combat the growth of pest and disease populations and thus reduce the need for producers to resort to additional foliar spray applications.

Food security and land use

Food is the most fundamental of all human needs, and today producers face a dilemma. The global population's demand for food continues to increase, while the land available for productive farmland is shrinking. Crops are continually threatened by pests and diseases that can, without preventative action, significantly reduce crop yield and food quality. This situation is worsened by changing climate patterns that allow crop-damaging pests and diseases to appear in regions where they were not previously a problem.

Treated seeds offer a highly efficient and sustainable way to boost food security by helping crops thrive and reach their

Benefits of seed treatment

For producers: Seed treatments create more sustainable farming practices that produce higher, more stable, crop yields possible.

For consumers: Crop protection, provided by seed treatments, contributes to food quality and sufficient availability.

For the environment: The targeted approach of seed treatments helps reduce negative impacts on natural resources and non-target organisms.

HIGH-PERFORMERS THAT WILL KEEP YOU AND THE BEAN COUNTERS HAPPY

PANNAR®

Together we farm for your future™

www.pannar.com

Offering a profitable combination of yield potential and exceptional agronomic characteristics, Pannar's cultivars demonstrate stability over different yield potentials, production areas and seasons. We provide a full range of maturity classes covering almost all planting dates and densities.

Find the Pannar expert near you for customised, localised solutions.

CORTEVA™ agriscience

Pictured
Farmer: Egon and his son Tyson Zunckel
Farm: Rustenberg
Area: Bergville, KwaZulu-Natal
Pannar Rep: Dawid le Roux

Scan the code for more information on these exceptional Pannar products

full yield potential. They also protect biodiversity and soil health by significantly reducing reliance on later spray treatments. This also brings producers savings on labour costs, pesticides, and the fuel needed for spraying. For families doing their weekly food shopping, the safety and quality of produce are fundamental. Treated seeds help protect the stable supply of nutritious, high-quality, and affordable food that they expect.

Benefits for food producers

Improved crop health: Seed treatments are a highly effective strategy to protect plant health, protecting crops in a way that can be compared to human childhood vaccination. Treated seeds carry a precise amount of insecticide/fungicide that protects crops in their infancy from insects and diseases. This is the critical growth period before and during germination; and through a plant's early developmental stages, where crops need to develop into healthy, robust and high-quality plants. They are also a 'curative treatment' that protects plants against seed-borne diseases.

Increased yield protection: Research has shown that seed treatments deliver more robust seedlings to producers, quicker emergence protecting plant stand (plants per square meter) and yield potential. This secures producers' return on investment and the resources needed to cultivate the crop. Conversely, preventing producers from using treated seeds in high pest-pressure areas can lead to lower emergence, unhealthy plants, poor crop quality and finally results in yield losses of 50% or more.

Reduced impact of conditions: Field and weather conditions can prevent producers from entering the field to apply crop protection products after sowing. Applying treatment directly on the seed before planting protects the seed and young plants regardless of conditions in the field.

Lack of valid alternatives

In some cases, seed treatment is the only reliable method to protect crops, as soil or foliar treatments are less effective – for example for cabbage root fly in oilseed rape, or soil- and seed-borne diseases which attack, for example, cereal seed embryos or young plants. Inadequate or delayed pest control interventions can force growers to stop production or resort to 'rescue treatments' like subsequent spraying.

Some circumstances may require government intervention, such as the European Union's emergency authorisations of products that are no longer approved for seed treatment.

Essential seed treatments

Seed- and soil-borne diseases: Seed- and soil-borne diseases infect many row crops, and their spores can survive in the soil for a long time. Pests and diseases with no practical alternative to seed treatment include virus vectors in cereals and maize, 'sudden death' syndrome in soya beans and seed-borne diseases in cereals.

Soil-dwelling pests: Managing problems using early diagnosis remains difficult for soil-dwelling pests such as wireworms and insect larvae, as these pests only emerge to feed during a crop's seedling stage. By that time, it can be too late for intervention and the crop can be lost. The earliest possible foliar application may prove too late in the case of the American maize rootworm for example.

Certified seed production: Certified seed production must meet strict regulations aimed at preventing the transmission of economically damaging seed-borne diseases. Here, producers cannot risk not using preventative treatment on the foundation seed. The presence of disease can lead to the rejection of an entire harvest, causing economic losses and reduced seed availability for the next season's commercial planting.

Health and safety

When used according to seed product label instructions, treated seeds are safe for people and the environment. Bayer provides training for producers on the proper use of seed treatments and displays safety advice on every bag of treated seed. Product developers and regulatory authorities highly regulate and extensively evaluate every crop protection product before it is approved for use – including the small, targeted amounts applied on seeds. Developers comply with all applicable regulatory standards for maximum seed dust level, with target level significantly below the legal threshold so the active ingredients (AI) remain on the seeds.

> Seed treatments are a highly effective strategy to protect plant health, protecting crops in a way that can be compared to human childhood vaccination.

Ensuring high-quality seed treatment minimises dust off, reduces environmental exposure, and maintains the AI on the seeds. Over the past 15 years, Bayer has conducted industry-leading research to identify polymers, seed coatings, and process changes that dramatically reduce dust, particularly from treated maize seed.

Bayer has identified several key ingredients that promote seed treatment adherence and generate low amounts of dust. Bayer reports data on this topic to regulatory agencies and continues to test innovative measures to further reduce dust emissions.

For more information, contact Bayer South Africa on 011 921 5911 or visit *www.bayer.com*.

How fleabane outsmarts control efforts

By Prof Charlie Reinhardt, North-West University

The plant group (genus) *Conyza* in the family *Asteraceae* includes three weedy species that can cause serious crop yield losses in tropical and temperate regions of the world, including South Africa. These species are flax-leaf or hairy fleabane (*Conyza bonariensis*), tall fleabane (*C. sumatrensis* syn. *albida*), and horseweed fleabane (*C. canadensis*).

Of the three species, flax-leaf and tall fleabane are arguably the most common and often dominate the weed spectrum in annual (small grains, maize, etc.) and perennial (orchards, vineyards) cropping systems of both the winter and summer rainfall regions of South Africa. The weedy fleabanes are highly adaptable to a wide range of environments in which there is high variability in terms of crop species, climate, and soils – this makes them exceptionally successful plants from a botanical viewpoint, but highly problematic in crop production.

Interactions promoting fleabane

The biological characteristics of fleabane weeds and production practices influencing the environments in which they occur, can be driving forces that determine whether weed control is effective or not. Therefore, weed management strategies, in general, should recognise the need for knowledge of the biology and ecology of targeted weeds, as well as the ability to select and apply the most effective weed control methods.

Fleabane can germinate and grow in all four seasons if sufficient soil moisture is available. Even during long dry spells, such as winter months in the summer rainfall region, fleabane plants can survive in a state of 'suspended growth' during which their survival is totally dependent on a deep taproot system, as well as physiological and morphological adaptations such as increased hairiness on leaf surfaces due to contraction of underlying tissue because of water loss, closure of stomata, lowered photosynthesis because of stomatal closure, and reduced light interception by leaves.

In the suspended growth state, fleabane plants present smaller and more elusive targets for herbicide sprays. Decreased leaf surface area coupled with increased hairiness and denser wax particles on leaf surfaces cause spray droplets to make less intimate contact with actual leaf surfaces, i.e. the cell layers underlying the hairs, wax and cuticle that propel water and act as barriers for the easy entry into leaves of water-soluble herbicides such as glyphosate and paraquat.

During dry periods dust particles settle on leaves and get caught up in hairs and wax particles and, hence, act as an additional trap for herbicide molecules contained in spray droplets. Dust not only consists of clay mineral particles but also organic material and associated microbes; therefore, herbicide molecules can be bound (adsorbed) to both clay and organic particles that make up dust, plus associated microbes can use the herbicides as food. This results in reduced herbicide efficacy, and poor weed control followed by crop yield loss.

Each fleabane plant can produce tens of thousands of seeds that are small, paper-thin and float away in the wind for easy distribution across many kilometres. Seeds only germinate well when located on top of, or close (<5mm) to, the soil surface. This explains the proliferation of fleabane types on crop fields where zero and reduced tillage are practised. Burying fleabane seeds even just 10mm deep will prevent germination.

In crop fields with substantial amounts of plant litter on or close to the soil surface, fleabane seedlings, as well as other weed

A crop field on the eastern Highveld on which the next summer crop will soon be planted. The weed spectrum is dominated by fleabane species and plants are far beyond the ideal growth stage for herbicide application – the stage is set for poor weed control with any herbicide, while the promotion of herbicide resistance is a real risk.

types for that matter, can be protected from herbicide sprays that must contact plant surfaces for the herbicide to be taken up, such as in the case of glyphosate and paraquat which both have limited to zero activity once they make contact with soil.

Poor herbicide efficacy

The efficacy of herbicide can be influenced when there are: (a) insufficient herbicide molecules inside plants for full effect; or (b) herbicide resistance has developed in weeds. The two scenarios are difficult, if not impossible, to separate under field conditions. Scenario A was partially dealt with in the preceding paragraphs and essentially implies that the amount of herbicide taken up by target plants is crucial for determining the level of weed control achieved. This is old knowledge and is managed through the formulation of herbicide products that contain, or are used together with, chemicals which promote the uptake of herbicide molecules into plant foliage (e.g. 'adjuvants', 'wetters', and 'stickers').

The principle that applies in scenario A is that if too few herbicide molecules arrive at their site of action (SoA) they will not be totally effective, meaning plants could be injured but not killed, and can recover:

- The 5-enolpyruvylshikimate-3-phosphate synthase enzyme is the target site or SoA for glyphosate.
- 4-hydroxyphenylpyruvate dioxygenase enzyme the SoA for mesotrione.
- Acetolactate synthase enzyme the SoA of both sulfonylurea and imidazolinone herbicides.

Growth stage importance

Linked to insufficient molecules arriving at the SoA is the growth stage at which plants are exposed to the herbicide. The greater the biomass or age of a plant, the higher the herbicide dilution factor, resulting in lowered herbicide concentration and an insufficient number of molecules reaching the SoA, rendering herbicide efficacy inadequate. It is for this reason that herbicide labels often state that weeds are best controlled when in the seedling stage (e.g. the three- to six-leaf stage).

Own research on *Conyza bonariensis* confirmed the importance of growth stage at the time of spraying. Unfortunately, sticking to prescribed growth stages is complex, especially in the case of zero-tillage and perennial cropping systems where a lack of soil tillage results in weed plants being present in various growth stages, from seedlings to plants in seed. Soil tillage is the great equaliser because with each operation it reverts the weed community to a uniform state of young or small plants.

Glyphosate resistance evaluation with different Conyza bonariensis (flax-leaf fleabane) populations. The population in the top row is classified glyphosate-resistant because plants survive both the registered dosage (1) and even four times the registered dosage (4); untreated plants are indicated with 0. The population in the bottom row is classified as glyphosate-susceptible because effective control was achieved with 1 dosage.

Where scenario B is concerned, global research on various weed/herbicide combinations has proven that both underdosing and overdosing promote or accelerate the development of herbicide resistance in weeds. The plant mechanisms involved in resistance are well-reported in scientific literature.

Underdosing through the deliberate application of less than the registered label rate for a herbicide, would have a similar effect as what I call 'inadvertent underdosing', i.e. when herbicide application is done beyond the ideal growth stage for effective control – in both cases too few herbicide molecules reach the herbicide SoA. Carefully consider what was done in the 1980s with atrazine – its registered dosage was halved from 2kg active ingredient/ha to 1kg total triazines. Does this perhaps partly explain why certain weeds that were formerly easy to control with triazines are currently hard to kill, even with herbicides other than triazines?

A practical issue with pegging the triazine dosage to 1kg/ha is the emergence of triazine-susceptible weeds late in the summer season, such as *Amaranthus* (pigweed), *Conyza* (fleabane) and *Senecio* (ragwort) species. The risk for promoting herbicide resistance should also be considered where registered dosages of herbicides making up tank mixtures, are lowered to reduce production costs.

Measures to avoid or manage herbicide resistance in weeds are well-reported and therefore not elaborated upon here. The South African Herbicide Resistance Initiative (SAHRI) has been doing herbicide resistance research since 2012. The only conclusive way in which herbicide resistance can be confirmed or rejected, and for elucidating resistance mechanisms in plants, is to perform experiments under controlled conditions in a laboratory and/or greenhouse.

Prof Charlie Reinhardt is a professor in agronomy at North-West University, and research leader in the SAHRI at the University of Pretoria (*www.up.ac.za/sahri*). He can be reached at 083 442 3427 or dr.charlie.reinhardt@gmail.com.

Fertasa symposium shines the spotlight on boron

By Susan Marais, Plaas Media

The Fertilizer Association of Southern Africa (Fertasa)'s symposium held in September in Pretoria, focussed on various fertiliser micro-elements, new and pending legislation pertaining to these elements, and the use of new technology to optimally utilise elements.

However, the possible limitation of life-giving boron was the most pressing issue discussed on the day. Martin Botha, managing director of Nutrico and a Fertasa board member, said it is essential that South Africans take note of boron's importance, as the risk of agriculture losing this key plant nutrient due to the reclassification by South African authorities is very real. This micro-element had been classified internationally as a substance toxic to reproduction within the Global Harmonized System (GHS) classification of the United Nations.

The registrar of the *Fertilizers, Farm Feeds, Seeds and Remedies Act, 1947 (Act 36 of 1947)* notified the agricultural industry on 14 April 2022 of his intention to prohibit the use of ingredients and their formulations that meet the criteria of carcinogenic, mutagenic or toxic (CMR) to reproduction categories 1A or 1B of the GHS as from 1 June 2024.

This means that in addition to being excluded from agricultural products, boron would be excluded from all products in the country. This would be catastrophic, Botha said, and is a problem everyone must take note of. At this stage, this does not seem to be a problem elsewhere in the world.

Boron's importance accentuated

According to the estimates of global market research and consulting organisation, Precedence Research, the demand for boron fertiliser globally will more than double within the next decade. Last year approximately US$2,97 billion worth of boron fertiliser was sold worldwide and by 2032 this figure will have risen to US$6,3 billion.

Dr Koos Bornman, an independent soil scientist, said at the symposium that the extent of boron deficiency as a micronutrient in crops worldwide was second only to zinc – a situation that could be exacerbated because of the exponential increase in the demand for boron amid dwindling supply.

Boron is widely studied but, so far, research shows that boron does not have any adverse effects and is neither toxic nor cancer causing if assimilated from water or food. In fact, this micro-element is essential for humans, animals, higher plants and even the soil biome.

"As a micronutrient, boron plays a prominent role in the nutrition, physiology and biochemistry of plants," Dr Bornman said, adding that the chemistry, uptake, mobility, metabolism, and management of boron as a plant nutrient are quite complex.

Without boron, most of the major crops produced in South Africa could experience drastic yield losses (median losses of between 5 and 20%).

Some of the roles and functions of boron in plants are:

- Root elongation.
- Regulation of lignification.
- Cell wall synthesis and structure integrity.
- Cell membrane function.
- Carbohydrate metabolism and transport.
- Protein, amino acid, and nitrate metabolism (nitrogen use efficiency).
- Ribose nucleic acid metabolism.
- Influence on respiration, thus enhancing water use efficiency.

Leaves are one of the first areas to show nutrient deficiencies. In grain crops, such as maize, curled or serrated leaves are one of the first signs of a boron deficiency. (Photograph: Nutrico)

- Regulation of indole acetic acid (of the auxin group of hormones) metabolism.
- Phenol metabolism (controls phenol concentration).
- Ensuring pollen viability, flower formation, and seed production.
- Supporting disease resistance (various mechanisms) and reducing polyphenols and toxic products of phenol oxidation (reactive oxygen species), thus indirectly serving as an antioxidant.

Quality loss and yield increases

Boron is essential for all stages of growth in all of South Africa's major crops. Therefore, Dr Bornman summarised scientific research that shows what the impact would be if boron is excluded from fertilisers due to its possible reclassification as a CMR.

> International soya bean trials showed an increase of between 3 and 45% (median of 13%) when boron fertilisers were applied.

With regard to maize, it was established from South African trials conducted by Omnia Nutriology® that the seed yield of boron-fertilised crops was between 3 and 30% (median of 5%) more when compared to maize that received no boron on soils deficient of boron. International trials showing yield increases of between 6 and 35% (median of 12%) confirmed this. Furthermore, the same trials showed an average increase in seed protein of 18%; grain weight increased by 22%, and oil content by 10%.

Wheat followed the same trend as maize in international studies – the yield of these boron-fertilised wheat fields increased exponentially, even fivefold in some cases. The median yield increase was 18%; seed weight increased with between 11 and 13%, pollen germination between 7 and 63% – which explains the sizable increase in yield – and grain set improved with 10%.

Research on canola indicated that boron increased yields by between 1 and 77% (median of 8%) above that of a control group. Furthermore, oil content improved by between 0,5 and 5%, and protein content by between 0,4 and 9%.

Soya bean trials conducted in KwaZulu-Natal by Omnia Nutriology® showed seed yield increases of between 4 and 5% above the control (non-boron fertilised) group. International soya bean trials showed an increase of between 3 and 45% (median of 13%) when boron fertilisers were applied. Furthermore, the photosynthetic rate of plants increased with 33%, water use efficiency 46%, and carboxylation efficiency 50%.

In a trial conducted in KwaZulu-Natal in 1976, an increase of 38% was noted in sunflower yields, 18% for seed weight, while empty seeds decreased by 28%. International research showed a yield increase of between 9 and 25% (median of 18%) when boron was added to the crop in boron-deficient soils. Improvements were also noted in protein (between 5 and 19%), oil content (13%), and water use efficiency (between 9 and 25%).

Sugarcane yields improved by between 4 and 77% (median 18%) when boron was applied, as did sucrose production (between 2 and 20%), and sucrose purity (between 7 and 47%).

As for potato yields, boron application led to an improvement of 5 to 38% (median of 11%). Furthermore, total soluble solids increased with between 7 and 51%, dry matter 65%, hardness 34%, total acidity 19%, starch between 1 and 23%, and protein to above 71%; reducing sugars declined with between 5 and 8%.

Improvement in other crops

The presence and availability of this micronutrient in citrus crops led to a 20% decrease in fruit drop. The juice content of fruit also increased by between 3 and 4%, total soluble solids by between 1 and 4%, and up to 8% for ascorbic acid.

Similarly, table grape yields improved with up to 80% (median improvement of 14%) when fertilised with boron. Improvements were seen in bunch lengths (up to 8%), bunch weight and berry weight.

Research on tomatoes suggests an improvement in yields of between 1 and 4% if boron fertiliser is applied when deficient, with an expected median improvement of 36%; for fruit set it is between 30 and 56%, shelf life between 63 and 75%, and firmness up to 17%.

Extra-curled-up or serrated leaves in this pumpkin plant are a clear indication of a boron deficiency. (Photograph: Nutrico)

For more information, contact Martin Botha at Martin@nutrico.co.za or Dr Koos Bornman at jacobusbornman@gmail.com.

MOLBOROX®

FERTILIZER GROUP 2
Reg No. B5122, Act 36 of 1947 (RSA)
Reg No. N-F 1516 (Namibia)
Patent No. 2014/06334

Plant Nutrition with MUSCLES = Higher YIELDS and superior QUALITY SEED

- Combination of microelements in a highly available and mobile form
- **Molybdenum** (Mo) converts **Nitrogen** (N) to amino acids and optimizes Nitrogen fixation
- **Boron** (B) controls the translocation of carbohydrates, pollination process and root tip formation
- 1 L/ha contains 100g B, 40g Mo, 6g Zn, 11g Mn, Seaweed extract, auxin and cytokinin

Nutrico
Better Growth, Better Yield, Better Value

A specialist manufacturer of various multi-functional plant nutrition products and Biostimulants, including MolboroX containing high levels of **Boron** (B) and **Molybdenum** (Mo) to promote growth in oilseed crops.

(011) 392 4072/(021) 807 5922
www.nutrico.co.za
info@nutrico.co.za

Triumph in every growth stage with cobalt nutrition

Cobalt (Co) is a transition element and a lesser-known micronutrient in oilseeds cultivation. However, Co should not be underestimated as it is an essential component of vitamin B12 and several enzymes and co-enzymes that are vital in plant physiology. It plays a role in affecting the growth and metabolism of plants in different stages, depending on the concentration and status of the Co available to the crop.

The incorporation of the nutrient Co in oilseeds production has immense potential for improving the overall yield as well as quality characteristics of these crops. From enhancing seed germination and nutrient uptake to increasing oil content and disease resistance, applying low concentrations of Co at specific growth stages can contribute immensely to achieving higher profitability, producing healthier crops, and contributing to a more sustainable food system.

Growth-specific plant nutrition

Co plays an important role in the growth and development of most plants as it regulates various developmental and metabolic aspects including biological nitrogen fixation, stress management, and enzyme activation. The optimal amount for most plants is 10 to 12mg/kg of dry weight. Co is absorbed by plants in the form of Co^{2+} which is available in the soil solution and cation exchange sites, but it can also freely flow from leaves to other plant organs during foliar applications.

Soil pH variations impact Co uptake, which increases in acidic conditions, and interactions between elements may also influence its bioavailability for root uptake. Foliar spray treatments offer a distinct advantage of applying Co to crops as it not only avoids disturbances to the soil and the growing, developing seed-filled pods just beneath the soil surface, but delivers Co at the growth stage where the crop needs it the most.

Co seed treatments

Co in conjunction with molybdenum acts as a catalyst for nitrogen (N) fixation in leguminous plants such as soya beans. It facilitates the conversion of atmospheric N into a form that can be utilised by the plant. The inclusion of Co in seed treatments during N fixation by inoculated *Rhizobium* can enhance the efficiency of nodulation and N availability.

Furthermore, Co is known to stimulate the activity of enzymes involved in seed germination. Adequate Co nutrition can significantly enhance the germination rate of sunflower and soya bean seeds, leading to better establishment and uniformity, ultimately resulting in higher yields and improved crop performance.

Leaf and flower development

Co plays a vital role in the synthesis of chlorophyll, the green pigment responsible for photosynthesis in plants. This results in better carbon assimilation, improved plant growth and higher biomass production.

Flowering and pollination of plants are greatly affected by the availability of the micronutrients boron and Co. Since Co is a component of vitamin B12, it is involved in the synthesis of deoxyribonucleic acid which is necessary for cell division and growth. Healthy plants are more likely to produce flowers and attract pollinators, increasing the chances of successful fertilisation and seed development.

Quantity and quality of oil

Co-nutrition is associated with improved disease resistance. Since Co is a structural component of the enzymes involved in the production of phytoalexins and lignin, it is indirectly involved in strengthening the plant's immune system and activating various defence mechanisms.

Co-nutrition also positively influences oil content in sunflower and soya bean crops. By enhancing the activity of enzymes involved in oil biosynthesis, Co helps increase the oil content, leading to improved oil yield per unit area.

For more information on how to use cobalt and other micronutrient fertilisation practices to boost oilseed yields and increase the quality of the oil produced, contact a Nutrico representative on 011 392 4072 or info@nutrico.co.za.

Evaluation of an expeller-extruded soya bean meal for broilers

By S Powell, VD Naranjo, D Lauzon, TD Bidner, LL Southern and CM Parsons

Any variation in processing soya beans for inclusion in poultry diets requires validation of the ability of the soya bean meal to sustain growth performance similar to what is achieved with solvent-extracted soya bean meal. Three experiments were conducted to investigate the effect of feeding an expeller-extruded soya bean meal versus a commercial solvent-extracted soya bean meal.

The ability of poultry to fully utilise the nutrient content of soya beans is dependent on the processing method used to produce the meal. Solvent-extracted soya bean meal (SE-SBM) is the most widely used, and the meal produced by this method is generally considered the benchmark for evaluating meals produced by other methods. Expeller-extruded soya bean meal (EE-SBM) is an alternative to SE-SBM and is mainly used in organic poultry feed. However, the literature on the feeding value of EE-SBM is not consistent, and varying processing techniques are used.

An investigation with EE-SBM produced at seven different extruder plants in the United States revealed large variations among plants in the amino acid (AA) composition and nutritional quality of the meal for use in poultry diets. In evaluating the digestibility of AA in EE-SBM compared with SE-SBM, researchers reported higher or lower values. Variation also exists in growth performance, with reports of similar or lower performance with EE-SBM. Therefore, the objective of these experiments was to evaluate the feeding value of EE-SBM for broiler chicks.

Materials and methods

All methods used in these experiments regarding bird care were approved by the Louisiana State University Agricultural Centre for Animal Care and Use Committee. Three experiments were conducted with either Ross × Ross 708 broilers (experiments 1 and 2) or Hy-Line W-36 cecectomised roosters (experiment 3). A commercial SE-SBM and an EE-SBM were obtained and analysed for AA composition and nutrient profile (*Table 1*).

Experiment 1

This experiment was conducted to evaluate the energy and protein content of EE-SBM compared with SE-SBM in zero- to 18-day-old broilers. A total of 288 female broilers were weighed, wing banded, and randomly allotted to treatment on day zero post-hatching. Broilers were housed in temperature controlled Petersime starter batteries with continuous fluorescent lighting. The experiment

consisted of six dietary treatments that were replicated eight times with six broilers per replicate pen.

Diets were formulated to be adequate in all nutrients except where appropriate for AA and ME. The SE-SBM and EE-SBM were fed at deficient and adequate levels of AA and ME. All broilers and feeders were weighed for the determination of ADG, ADFI, and G:F.

Experiment 2

This experiment was conducted to determine the feeding value of an EE-SBM in zero- to 49-day-old broilers. Broilers were housed in 1,52 × 3,05m pens at the Louisiana State University Agricultural Centre poultry farm in one tunnel-ventilated room with cool cells and fans. Broilers were given access to feed in mash form for *ad libitum* consumption throughout the experiment. The broilers were fed in a phase feeding programme consisting of starter (0 to 14 days), grower (15 to 35 days), and finisher (36 to 49 days) phases.

The experiment consisted of two dietary treatments using EE-SBM and SE-SBM that were replicated seven times with 55 broilers per replicate pen.

Experiment 3

This experiment was conducted to determine the true digestibility values of AA in EE-SBM used in experiments 1 and 2. Ten 33-week-old cecectomised roosters were deprived of feed for 24 hours. Five roosters were given 30g of EE-SBM by crop intubation, whereas the other five roosters were fasted to measure endogenous AA losses. Excreta were collected for 48 hours. Digestibility was calculated as the amount of dietary AA not appearing in the excreta.

Results and discussion

In experiment 1, increasing dietary protein and energy increased average daily gain (ADG) and gain to feed (G:F) ($P \leq 0,035$). However, there was no effect of the soya bean meal (SBM) source or the interaction of the SBM source with either ME or Lys level on growth performance ($P > 0,10$). Therefore, the EE-SBM had a feeding value similar to the SE-SBM for zero- to 18-day-old broilers when using diets formulated with the analysed AA values and the calculated values for ME.

In experiment 2, diets were formulated to meet the nutrient requirements in each phase of a three-phase feeding programme for broilers. In the starter phase (zero to 14 days), broilers fed the EE-SBM had decreased ADG ($P < 0,001$), decreased average daily feed intake (ADFI) ($P < 0,001$), and increased G:F ($P = 0,059$). However, no difference ($P > 0,10$) in growth performance was observed in the grower phase, finisher phase, or overall data. Therefore, the broilers on the EE-SBM diet were able to compensate for any nutrient difference that influenced the growth performance during the starter phase.

The source of SBM had no effect ($P > 0,10$) on hot or chilled carcass weights, breast, fillet, or tender weights (*Table 2*). However, when the yield of the various parts was calculated relative to chilled carcass weight, broilers fed EE-SBM had decreased breast ($P < 0,023$), fillet ($P < 0,035$), and tender ($P < 0,021$) percentages compared with those fed SE-SBM. The difference in yield may have been due to the lower feed intake and daily gain observed in the starter phase because no difference in growth performance was observed in the other phases. Because the diets were formulated on a total AA basis, the digestibility of the AA may be different for the SBM from the two processing methods.

True digestibility

Therefore, experiment 3 was conducted to determine the true AA digestibility of EE-SBM used in experiments 1 and 2.

Table 1: Amino acid composition of the solvent extracted (SE-SBM) and expeller-extruded (EE-SBM) soya bean meal used in experiments 1 to 3[1].

Item	SE-SBM	EE-SBM
Amino acid		
Asp	5,23	4,91
Thr	1,78	1,66
Ser	2,16	2,08
Glu	7,91	7,38
Pro	2,28	2,12
Gly	2,20	1,89
Ala	2,01	1,89
Cys	0,68	0,62
Val	2,34	2,16
Met	0,70	0,58
Ile	2,20	2,04
Leu	3,61	3,35
Tyr	1,71	1,58
Phe	2,35	2,20
Lys	3,06	2,81
His	1,22	1,16
Arg	3,41	3,18
Trp	0,65	0,57
Proximate analysis		
CP	47,17	44,93
Moisture	12,30	7,24
Crude fat	1,97	8,09
CF	3,03	5,11
Ash	6,49	6,60
Calculated Me_n[2]	2,293	2,673

[1]As-fed basis. [2]$ME_n = 37,5 \times CP + 70,52 \times EE + 14,9 \times$ nitrogen-free extract (NFE) (for EE-SBM), or $ME_n = 37,5 \times CP + 46,39 \times EE + 14,9 \times NFE$ (for SE-SBM).

Table 2: Carcass data of 0- to 49-day-old broilers fed solvent-extracted (SE-SBM) or expeller-extruded (EE-SBM) soya bean meal in a three-phase feeding programme, experiment 2[1].

Treatment	SE-SBM	EE-SBM	SEM	P-value
Weight				
Live wt, kg	2,75	2,75	0,05	0,998
Hot carcass wt, kg	2,06	2,05	0,04	0,901
Chilled carcass wt, kg	2,09	2,08	0,04	0,958
Breast, g	549	519	16	0,217
Fillets, g	439	415	13	0,234
Tenders, g	110	103	3	0,183
Yield relative to chilled weight, %				
Breasts	26,30	24,95	0,37	0,023
Fillets	21,01	19,96	0,31	0,035
Tenders	5,29	4,98	0,08	0,021
Carcass[2]	74,89	74,64	0,32	0,575

[1]Data are the mean of seven replications of six broilers per replicate pen.
[2]Carcass yield was calculated as a percentage of live weight.

Farmwise offers a comprehensive brokerage service with a diverse client base which includes producers, consumers and speculators from a wide geographical area.

This enables us to keep an 'ear to the ground' at all times. We have a low client to broker ratio, which ensures prompt and efficient service.

The company has developed an internet based trading system that enables our clients to monitor the market in real time, as well as placing electronic orders.

Farmwise was one of the founding members of the AMD Division of SAFEX,so we have stood the test of time.

T +27 11787-3666
info@farmwise.co.za
PO Box 3660, Randburg, 2125
www.farmwise.co.za

Farmwise grains

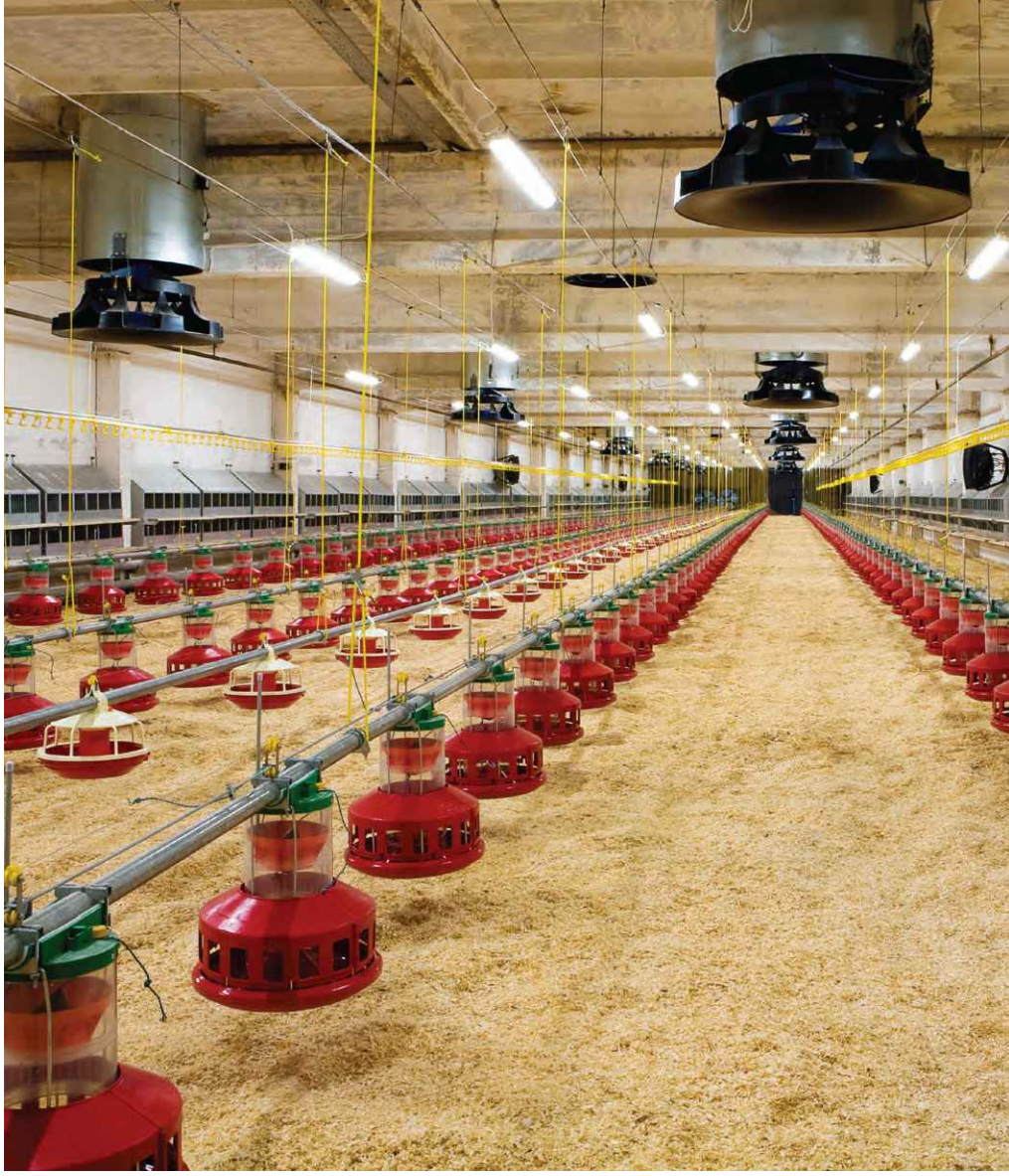
Specialised services offered by Farmwise:

- **Trading on the South African Futures Exchange (SAFEX)**
  We have a highly skilled team of professionals that provide market-based solutions to all participants.
- **Currency futures trading**
  Farmwise is a member of the Yield-X division of the JSE. Allow us to hedge your currency risk.
- **Spot trading**
  This market encompasses a wide variety of feed grains and other specialty products. To ensure successful trading in this environment in-depth knowledge of the marketplace, the counter parties involved and the risks inherent to these activities are required.
- **In-silo grain financing** provides our clients the financial flexibility to make considered marketing decisions. Cash flow constraints should not force a market participant into a marketing decision and Farmwise provides the where withal to ensure this.
- **Regular workshops and in-house training,** ensures that staff and clients remain on the cutting edge of all new developments in the marketplace.

Table 3: Percentage of true digestibility values of the EE-SBM and SE-SBM soya bean meal obtained with adult cecectomised roosters, experiment 3.

Amino acid	EE-SBM	SE-SBM[1]
Asp	87,8	-
Thr	83,5	88
Ser	85,9	-
Glu	91,1	-
Pro	89,2	-
Ala	82,2	-
Cys	81,5	82
Val	85,5	91
Met	87,4	92
Ile	86,5	93
Leu	86,7	92
Tyr	89,8	-
Phe	88,9	92
Lys	86,8	91
His	86,4	88
Arg	92,2	92
Trp	95,4	-

[1]*True digestibility values were obtained from the NRC and not from the specific SE-SBM used in the experiment.*



True digestibility values obtained with adult cecectomised roosters indicated digestibility values of 86,6, 83,5, 87,4, 85,5, 86,5, and 86,7% for Lys, Thr, Met, Val, Ile, and Leu, respectively, which are lower than those reported by the NRC for SE-SBM (*Table 3*) and are in agreement with previous research.

The true digestible Lys level of the starter SE-SBM diet was 1,16%, whereas that of the EE-SBM diet was 1,11%. True digestible Lys intakes were 0,39 and 0,32g/d for birds fed the SE-SBM and EE-SBM, respectively. However, it can also be argued that the reduced growth performance of the broiler chicks in the starter phase was directly linked to feed intake because they were able to utilise the feed they consumed, resulting in increased G:F.

The cause of the reduced feed intake in the starter phase is not known; however, it may have resulted in a reduction in breast meat yield. Other researchers have reported a reduction in breast meat based on feeding a suboptimal level of Lys in the starter phase irrespective of the levels of Lys fed in the grower and finisher phases. Why performance was reduced only during the starter phase remains unclear. In the energy-deficient diets (3 000kcal/kg) in experiment 1, birds fed the SE-SBM diet gained 1,92g/d and consumed 2,33g/d more than birds fed the EE-SBM; however, the differences were not significant.

Similarly, in the starter phase of experiment 2 (3,075kcal/kg), birds fed the SE-SBM diet gained 1,79g/d and consumed 4,46g/d more than birds fed the EE-SBM diet. Therefore, the energy content of the diet in the starter phase seems to have some factor contributing to the reduced feed intake in this phase.

In summary, the feeding value of the EE-SBM was similar to that of the SE-SBM; however, consideration must be given to the starter phase to achieve optimal breast meat production.

Conclusions and applications

On the basis of growth performance and carcass traits, the feeding value of EE-SBM was similar to that of SE-SBM. Feed intake was reduced in broilers fed EE-SBM for zero to 14 days. All birds had similar weights of the hot and chilled carcasses along with similar weights of the breasts, fillets, and tenders. Broilers fed EE-SBM had lower breast meat yield.

This article has been shortened for publication in *Oilseeds Focus*. For the full article and references, visit *www.sciencedirect.com/science/article/pii/S1056617119312577* or email LL Southern at lsouthern@agctr.lsu.edu.

ASK FOR IT BY NAME

BASF
We create chemistry

AgCelence
Expect more

Big stems, bigger roots, biggest leaves.
Bigger yield with Bellis®

Bellis® - The newest addition to the BASF AgCelence® portfolio not only ensures effective disease control for Sunflowers, it also gives additional physiological benefits for the optimum yield. We call it the AgCelence® effect:

- Increased plant growth efficiency with better photosynthesis efficiency, better use of nitrogen and increased bio-mass development
- Increased tolerance to stress in situations such as drought by inhibiting ethylene production

Get the AgCelence® advantage with Bellis®

A quick look at national and international oilseeds markets

By Johan Teessen, agricultural economist intern, Grain SA

The soya bean season is coming to an end in a few countries across the world, but for others it is the start of a new season. This creates its own set of market-related opportunities and challenges.

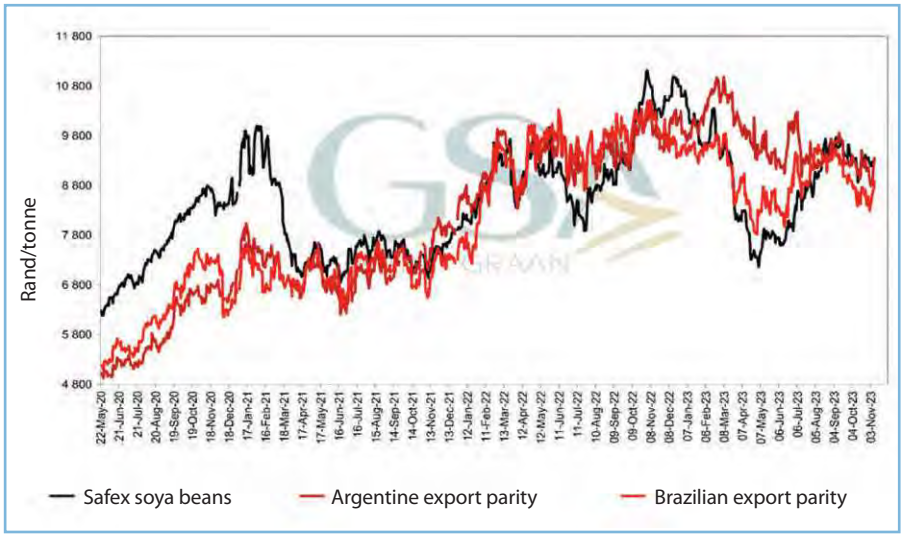
At the end of October and the beginning of November, the harvesting periods in the United States, China, India, Canada and Russia came to a close. Due to all these countries harvesting at the same time, it has a big effect on world soya bean stocks. The international soya bean price may come under pressure as a result of all these stocks coming in – a phenomenon called harvesting pressure.

At the same time, Brazil, Argentina, Paraguay, and Bolivia have started planting. Planting can have two different results depending on the success rate and incurred costs. When planting is late and the volume planted is low, this may support prices due to the fear of a shortage. On the other hand, when planting is on time and volumes are high, this can result in downward pressure. Depending on the weather and season, the price can see a slight drop or a slight increase, but based to long-term trends, we are more likely to experience slightly higher prices during this time.

Oil imports and exports

India imported a record amount of three million tonnes of sunflower oil between September and October, which is one million tonnes more than last year. Iran banned the import of soya and sunflower oils from 23 October until further notice. China has become a very good export market for Kazakhstan producers due to the geographical proximity and improved transportation routes established earlier this year. This resulted in a record number of exports of sunflower and other oils.

Figure 1: Prices of whole soya beans delivered in Randfontein. (Source: Grain SA)



Data sourced from Canada suggests that the Canadian canola crop of 2023 will have below-average oil content that is roughly equivalent to 150 000 to 160 000 tonnes of canola oil. This is due to No 1 Canadian canola oil content being 42,9%, which is 1,5% below the ten-year average of 44,4% oil content. The United Arab Emirates has announced a cumulative import of canola oil resulting in 970 000 tonnes, up 4% from last year but 1,1 million tonnes below the five-year average.

Local market

Our local market has experienced very volatile soya bean prices. *Figure 1* illustrates the export parity prices of Argentina and Brazil along with the South African Futures Exchange (Safex) soya bean price. The darker red line represents Argentine export parity, the lighter red line Brazilian export parity, and the black line the Safex soya bean price. Focussing on where the Safex price is in the market, we notice that from the beginning of August, the Argentine price and the Brazilian price decreased, with the Safex price staying at an elevated level.

In November, the Safex price was still above Argentine and Brazilian prices. This signals that South Africa's soya bean prices are currently more expensive in the international market than the other two countries. Still, with their prices increasing sharply, South Africa is becoming more competitive than before.

Sunflower prices were in the same volatile price boat as soya beans. Sunflower prices are, however, lower than the Black Sea price and therefore very competitive internationally. Unfortunately, South Africa uses and crushes almost all the sunflower seed it produces. When there is a shortage of sunflower in the country, we import sunflower oil rather than seed because of the associated costs. The same applies to canola – South Africa produces and uses large amounts of canola in the country, but in some seasons exports are possible.

For more information, email Johan Teessen at johant@grainsa.co.za.

Update: Effect of fertiliser prices on the grain industry

By Christiaan Vercueil, agricultural economist, Grain SA

Traditionally, between 30 and 50% of a grain and oilseed producer's existing input costs are spent on fertiliser. Fertiliser makes up such a large portion of input costs that any change, especially a price increase, will have a drastic impact on profitability.

The fact that South Africa is a net importer of fertiliser tends to further aggravate the situation since all imported fertilisers are not only affected by their actual price, but by a whole range of factors such as the exchange rate and transport costs.

Import volume and price changes

Figure 1 illustrates South Africa's fertiliser imports of mono-ammonium phosphate (MAP), ammonia, urea, and potassium chloride from various countries since 2009. Although not the only fertilisers imported, these are four of the five most important products imported.

As of 2009, fertiliser imports for these four products increased by 103% in total. During 2021, South Africa imported a total of 1 803 348 tonnes of just these four fertiliser products from various countries. Besides the increase in import volume, the exchange rate of the rand to other major currencies also weakened sharply from 2009 onwards, which further intensified the effect of price increases.

In August 2023, around 766 695 tonnes of these four fertilisers were imported. More imports and bigger import figures for September and October were also expected.

Table 1 contains the average price changes for nitrogen (N), phosphate (P), and potassium (K) during November last year, compared to November 2023. It is a welcome relief to see a slight price decline compared to the previous year.

Looking at the fertiliser requirements of different parts of the country, the Western Free State on average uses 72 units of N, 16 units of P and 14 units of K/ha. The Eastern Free State uses 100 units of N, 19 units of P and 27 units of K/ha. Irrigated areas use 286 units of N, 52 units of P and 80 units of K/ha.

Table 2 provides a comparison of the average fertilisation requirements for these three regions in November 2022 and November 2023. On average, the cost of fertiliser declined by 27%.

Figure 1: Four of the five most important fertilisers imported to South Africa.

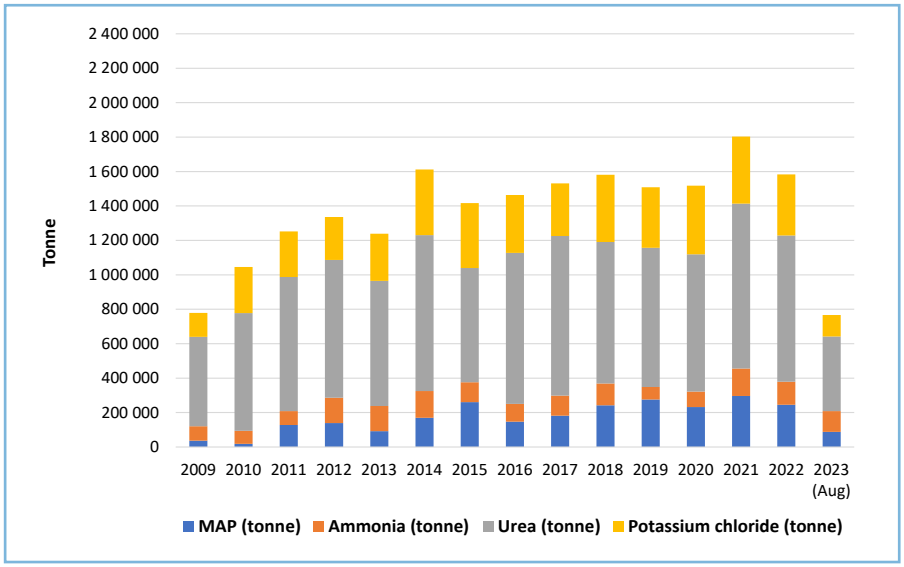


Table 1: Price comparison of nitrogen, phosphate and potassium: November 2022 and November 2023.

	Nitrogen	Phosphate	Potassium
Average price: Nov 2022 (R/kg)	R44,6	R76,2	R39,2
Average price: Nov 2023 (R/kg)	R32,1	R65,2	R22,5
Change (year-on-year)	-28%	-14%	-43%

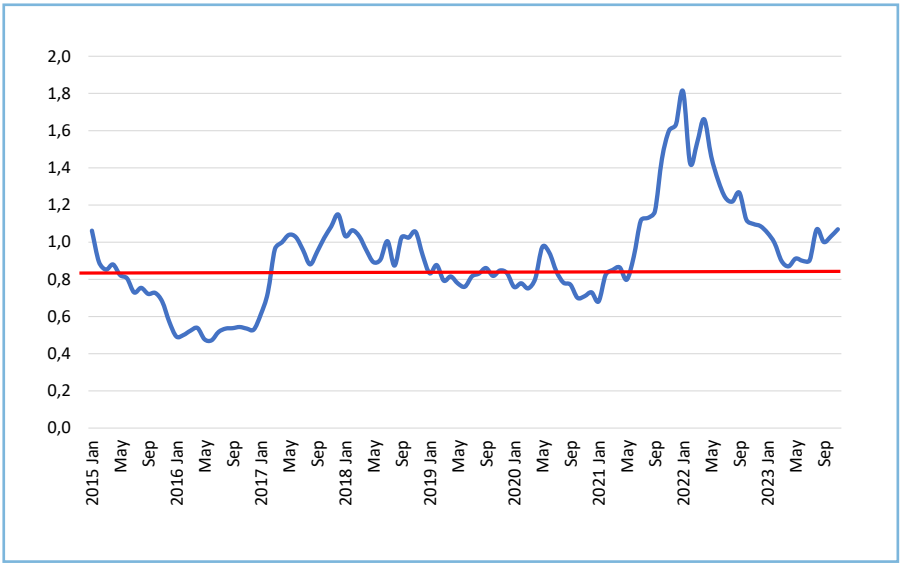
Table 2: Change in fertiliser cost per hectare for November 2022 compared to November 2023.

	Nitrogen	Phosphate	Potassium	Price: Nov 2022	Price: Nov 2023	Change
Eastern Free State: Average units (kg/ha)	100	19	27	R6 966	R5 056	-27%
Western Free State: Average units (kg/ha)	72	16	14	R4 979	R3 669	-26%
Irrigation: Average units (kg/ha)	286	52	80	R19 854	R14 371	-28%

Fertiliser affordability

Figure 2 indicates the affordability of fertilisers compared to the Safex price of maize. Fertilisers, which account for

Figure 2: The affordability of fertilisers.



between 30 and 50% of input costs, have become increasingly less affordable, which means the producer's margin for trade has weakened excessively.

This puts pressure on producers' profitability and can result in fewer hectares being planted, especially maize. Recently, fertiliser prices declined due to the market becoming more accustomed to the Russia-Ukraine war, and declining energy prices and lower transportation costs. Between July 2023 and August 2023, fertiliser prices reached a low point and started to show an upward trend.

This information paints a clear picture of the extreme daily challenges that producers face while trying to stay afloat. Fertiliser is not the only input that has seen sharp price hikes; the cost of energy sources such as fuel and electricity have also risen sharply, as has the price of seed and chemicals. It is becoming progressively more difficult for farming operations to remain profitable and sustainable.

Fertiliser prices started following an upward trend between July and August 2023. Prices have continued to increase, although marginally, and producers' bottom line remains under pressure.

Since there is little room for mistakes, producers must ensure they are not being taken for a ride by fertiliser suppliers. Do the homework, make sure the representative's prices are market related, compare offers to find the best price, and select the most suitable offer for your purposes.

For more information, send an email to Christiaan Vercueil at christiaan@grainsa.co.za or visit *www.grainsa.co.za*.

World oilseed markets and trade:
Biodiesel policies suppress US exports

Issued by the United States Department of Agriculture's Foreign Agricultural Service

Growing United States (US) demand for soya bean oil driven by low-carbon fuel mandates will continue to suppress soya bean oil exports in 2023/24, widening the trade gap and pushing the US out of the global soya bean oil export market. US production of renewable diesel has grown significantly in recent years. While new crushing facilities and expansion of existing facilities may increase domestic supplies of soya bean oil, higher biomass-based diesel demand in the US has caused major shifts in vegetable oil imports.

Until recently, the US was a major supplier of soya bean oil to the world. Exports peaked at 1,5 million tonnes in 2009/10 and averaged one million tonnes between 2010 to 2021. In 2022/23, US soya bean oil exports fell drastically to only 0,2 million tonnes. At the same time, soya bean oil imports surpassed exports, making the US a net importer of soya bean oil for the first time in history. Those shifts came as the US Environmental Protection Agency finalised higher multiyear biofuel blending targets.

The change in biofuel policies also lured imports of other feedstocks such as canola oil, tallow (rendered animal fat), and used cooking oil. US canola oil imports have skyrocketed in 2022/23 and are projected to grow even further in 2023/24. The share of Canadian canola exports that went to the US increased from an average of 56% from 2018 to 2021, to 88% in the first eight months of 2023. Other importers, such as China, shifted to rapeseed oil imports from Russia and Belarus instead of Canada. In 2023/24, US rapeseed oil imports are projected to reach a new record of three million tonnes.

Higher domestic vegetable oil prices and a strong US dollar encouraged imports of used cooking oil to meet domestic biofuel demand. In 2022/23 (October to August), imports of commodities under the harmonised system heading 1518 (processed animal, vegetable oils, industrial preps nesoi) reached almost 882 000 tonnes, valued at almost US$1,2 billion. The majority of those imports came from China (37%) and Canada (27%). This trend is likely to continue into the next marketing year.

Ukraine oil shipments rebound

In October the expectation for Ukraine sunflower seed oil exports in 2022/23 (September/August) was revised upwards from 0,4 million to 5,6 million tonnes. With this change, sunflower oil exports are roughly in line with levels seen prior to the invasion. Several shifting dynamics throughout the marketing year allowed Ukraine to achieve this volume of trade, including higher-than-anticipated sunflower seed production and crush, trading partner policies, and strong demand for sunflower seed oil from Asia.

Extraordinarily high sunflower seed carry-in from 2021/22 allowed Ukraine to crush at a strong pace. Ukraine exported an unprecedented amount of whole sunflower seed to Europe during the first half of the marketing year due to the high supplies. However, after the Black Sea Grain Initiative allowed shipments of products to resume beginning in July 2022, shipments of sunflower seed oil also picked up pace. In May 2023, several European Union (EU) member states (and large crushers of sunflower seed) placed bans on whole sunflower seed imports, which provided additional incentive for Ukraine to shift exports towards products as the former outlets for seed shipments tapered off.

Towards the end of 2022/23, producers were motivated to sell amid high transportation costs and cash shortages (*Agricultural Marketing Service Ukraine Grain Transportation Report*) and offered supplies at especially competitive prices. Sunflower seed oil prices fell drastically (roughly 70%) from their post-invasion peak in March 2022 and traded at an unusual discount to other vegetable oils. The EU, Turkey, and India made large purchases from Ukraine in 2022/23, taking advantage of the discount pricing relative to other edible oils and abundant global supplies. In the EU and Turkey, a significant portion of the imports were also refined and re-exported to partners in Africa and the Middle East.

Brazil cottonseed production

Brazil's cottonseed production was revised for 2000/01 through 2023/24 due to a series of revisions for cotton production. Over the last 25 years, a large proportion of cotton production in Brazil has moved from the southeast to the centre-west region, resulting in a shift in the timing of cotton harvest which is reflected in the series revision. (Refer to the Foreign Agricultural

Figure 1: Ukraine's monthly exports. (Source: Trade Data Monitor)

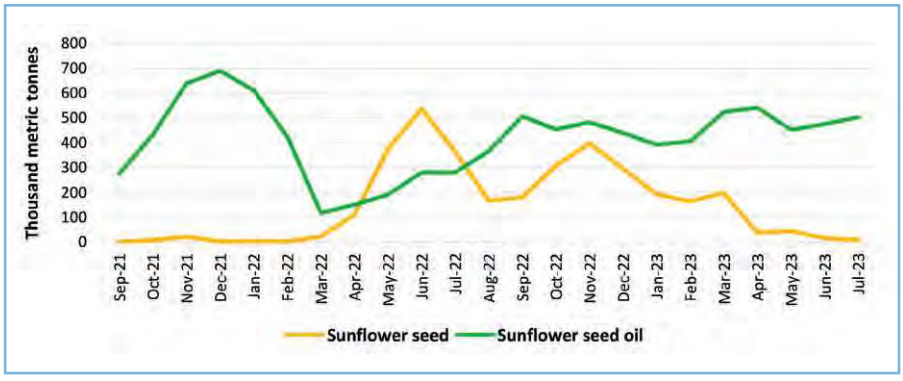
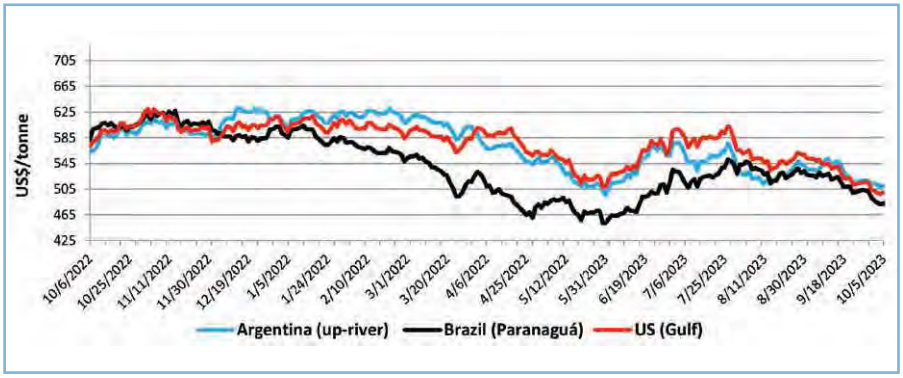


Figure 2: Soya bean export prices in 2022/23.



Service's *Cotton: World Markets and Trade* publication for further details.)

Changes in annual cottonseed production were balanced with adjustments to both feed waste domestic consumption and crush. Changes in cottonseed meal production affected feed waste for animal consumption and changes in cottonseed oil production impacted both industrial consumption and food use.

Benin soya bean additions

The United States Department of Agriculture's Production, Supply and Distribution (PSD) database was expanded to include soya beans, soya bean meal, and soya bean oil balance sheets for Benin starting in marketing year 2014/15. According to official Benin Ministry of Agriculture data, soya bean production has nearly tripled within the past decade. Prior to 2019/20, Benin soya bean exports were minimal, and domestic crush accounted for around 40% of production.

However, increased foreign investment and growing India and China demand have led to significant growth in both production and exports. Strong export growth has limited supplies available for crush, which remained relatively flat over the past five years. Domestically produced soya bean meal is used in animal feed rations and soya bean oil is consumed as food, although palm oil still accounts for most vegetable oil consumption in Benin.

Table 1: Outlook changes for imports and exports in 2023/24 (all figures in '000 metric tonnes).

Country	Commodity	Attribute	Previous	Current	Change	Reason
Brazil	Oilseed, soya bean	Exports	97 000	97 500	500	Reduced US exports
Canada	Oilseed, rapeseed	Exports	7 900	7 500	-400	Lower production
China	Meal, sunflower seed	Imports	3 300	3 500	200	Continuing strong demand for Black Sea commodities offered at a discount
	Oil, palm	Imports	6 700	6 400	-300	Weaker import demand on a shift to domestically produced soya bean oil
European Union	Oilseed, rapeseed	Imports	5 400	5 200	-200	Increased domestic supplies
	Oilseed, sunflower seed	Imports	800	500	-300	Shift to product exports from the Black Sea
India	Meal, soya bean	Exports	900	600	-300	Reduced crop prospects and lower crush
	Oil, palm	Imports	9 000	9 300	300	Continuing strong demand for vegetable oils offered at a discount to soya bean oil
	Oil, sunflower seed	Imports	2 200	2 700	500	
Japan	Oilseed, rapeseed	Imports	2 250	2 050	-200	Less exportable supplies from Canada
Pakistan	Oilseed, soya bean	Imports	1 000	500	-500	Lack of near-term resolution for genetically engineered soya bean imports
Russia	Meal, sunflower seed	Exports	2 400	2 550	150	Higher processing
Turkey	Oil, sunflower seed	Exports	975	1 125	150	Shift to product exports from the Black Sea, smaller domestic production
	Meal, sunflower seed	Imports	850	1 000	150	
	Oilseed, sunflower seed	Imports	1 200	900	-300	
Ukraine	Meal, sunflower seed	Exports	4 450	4 650	200	Shift to product exports amid strong oil demand from Asia
	Oil, sunflower seed	Exports	5 300	5 600	300	
	Oilseed, sunflower seed	Exports	950	500	-450	
United States	Meal, soya bean	Exports	13 698	13 880	182	Lower foreign exportable supplies
	Oilseed, soya bean	Exports	48 716	47 763	-953	Lower production

Overview for 2023/24

Global oilseeds production is forecast down two million tonnes mainly on smaller Indian and US soya bean crops. Oilseeds exports are down one million tonnes on lower Canada rapeseed and Ukraine sunflower seed. Global oilseed crush is up primarily on higher Ukraine sunflower seed, and China soya bean processing and meal consumption is up for the same reasons.

Vegetable oil trade is up one million tonnes on higher sunflower seed and soya bean oil exports. Oil stocks are down 0,5 million tonnes, with lower storage of sunflower seed oil in Russia and the EU and soya bean oil in China. The projected US season-average farm price for soya beans is unchanged at US$12,90 per bushel.

Export prices

Soya bean export prices moved lower in October, especially in the US where the new crop began to arrive on the market while shipments from a record Brazil crop infringed on the US export season. A higher-than-anticipated US quarterly stocks report provided additional negative pricing pressure. Argentina prices were little changed on tight supplies, while Brazil prices were down modestly.

Vegetable oil was a powerful driver of oilseed prices this month. Palm oil prices fell to a three-month low on seasonally high production and competition from other oils, including sunflower seed oil which is currently trading at an unusual discount. In the US, smaller-than-expected August crush volume, as well as lower *Renewable Fuel Standard* credit prices, moved average soya bean oil prices to US$104/tonne in October.

This article has been shortened for publication in *Oilseeds Focus*. To read the complete article, visit *www.fas.usda.gov*.

South Africa's China-bound soya bean exports

By Dr André van der Vyver, executive director, and Juan-Pierre Kotzé, research and project manager, Sacota

South Africa marked a significant achievement in its agricultural export history recently, as it successfully exported its first bulk soya bean cargo to China. Transnet Port Terminals Agriport in Durban completed loading on 15 October this year.

Heading for the Guangzhou port in China, the shipment was arranged by the Louis Dreyfus Company, a leading global merchant and processor of agricultural goods and South African Cereals and Oilseeds Trade Association (Sacota) member, which helped to open the Chinese market for South African soya beans, leveraging its presence at both origin and destination. This milestone will be followed with two more shipments.

Transnet Port Terminals Agriport during the loading operation.

Protocol established

The signing of the soya bean export protocol between South Africa and China by the minister of agriculture, Thoko Didiza, and her counterpart in June 2022, made this milestone possible for the South African oilseed industry. The protocol established the phytosanitary requirements for the export of South African soya beans to China. It inter alia requires tests to be conducted and establishes pest control measures, as well as registration of exporters and storage facilities and terminals.

This shipment is a milestone in South Africa's growing soya bean export sector. It is testament to the possibilities of growing the cereal and oilseed sector through successful collaboration between the government and private sector. The transaction also perfectly aligns with the objectives of the BRICS agreement.

With respect to other markets, the Department of Agriculture, Land Reform and Rural Development, Sacota and industry are also working together to open the markets of Indonesia and Egypt for soya bean exports.

China soya bean imports

China is the biggest consumer and importer of soya beans in the world. It is estimated that China's consumption of soya beans will be a record 116 million tonnes in 2023/24. The bulk of this, 80% or more,

Figure 1: China's yearly consumption and imports of soya bean. (Source: International Grains Council, 2023)

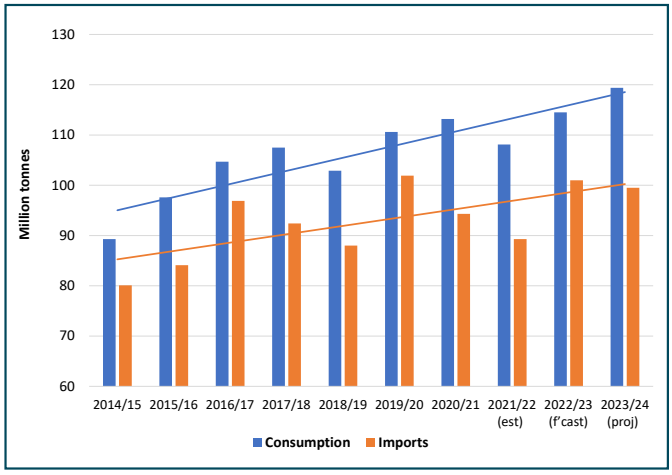


Table 1: The current profitability of South Africa's soya bean farming operations forecasted for May 2024 (Note: Free on board [FOB] price changes continuously).

Farming operations profitability: 2024 season	Soya beans (R/tonne)	Soya beans (US$/tonne)
FOB price (17 October 2023)	R9 414,81	US$499,99
Harbour costs (fobbing)	R220	US$11,68
Transport central/eastern Free State to Durban	R600	US$31,86
Storage cost*	R150	US$7,97
Total production costs*	R5 473	US$290,65
Other costs	R250	R13,28
Farming operations profitability	**R2 721,81**	**US$144,55**

**Source: Grain SA 2023/24, based on 2,4t/ha in the eastern Free State.*

is crushed for high-protein animal feed with oil as the by-product.

According to a March 2023 United States Department of Agriculture (USDA) report, China is expected to produce a record crop of 19,8 million tonnes in the coming season, but this means it will still need to import 97 million tonnes of soya beans.

In the past ten years, China has seen an average increase of 3,4% per annum in the consumption of soya beans, compared to imports that have grown at a rate of 2,8% for the same period.

China currently allows for the importation of soya beans from 15 countries, one of which is South Africa. The biggest suppliers to China are Brazil (59%), the United States (30%) and Argentina (5%), which are also the biggest global exporters of soya beans. *Figure 2* depicts the major exporting countries that supplied China during the last year.

Accessing the Chinese market is therefore an important step for the South African soya bean industry, allowing South Africa to basically sell any surplus stock. For an industry to grow, you should not only have the capability to export surplus stock, but if you are able to profitably produce for the export market, it is a win-win situation with unlimited opportunities.

Production and demand increase

Over the past nine years, South African soya bean production has increased on average by 18% year-on-year, while domestic demand grew by 8%. This allowed the country to start producing a surplus crop in the 2021/22 season. ETG, a Sacota member, shipped the first soya bean vessel to Malaysia in 2022/23. The growth in production of soya beans is likely to continue in the coming years, although at a reduced rate. This is due to the higher profitability of soya beans compared to traditionally grown maize.

The adoption of new soya bean technology, including new cultivars, has supported the industry. Production has expanded as far west as parts of North West, which was not possible and/or profitable a few years ago. South Africa's deep-sea exports amounted to 253 000 tonnes of soya beans in the 2022/23 marketing season and Sacota predicts that deep-sea exports may exceed 550 000 tonnes in the 2023/24 season. This strengthens the case for revitalising the Port of Durban but also alternative harbours such as the Port of East London.

Sacota and its members have been a driving force, together with Transnet Port Terminals East London, in the re-opening of the Port of East London for both bulk grain and oilseed exports and imports last year. Earlier this year, Ameropa, another Sacota member, exported the first-ever soya bean vessel out of the Port of East London to Malaysia, with more to follow. Both ports and terminals are in desperate need of additional investments.

The current value of a mid-size vessel of around 40 000 tonnes is approximately R380 million (US$20 million). What is of particular importance is that most of the income generated will directly benefit the rural economy, which is in desperate need of investment, job creation and growth. Soya beans are also the ideal crop for emerging farmers since it adds 50% or more value for the same hectares planted compared to maize. Already soya beans are being introduced in most development projects that are supporting emerging farmers.

Figure 2: China's soya bean import share. (Source: *Oilseeds: World Markets and Trade*. USDA Foreign Agricultural Service, 11 August 2023)

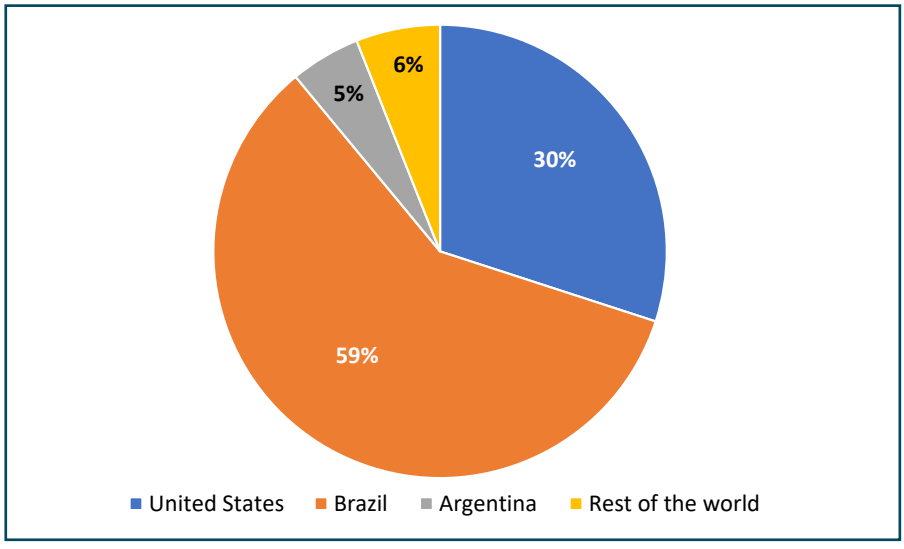
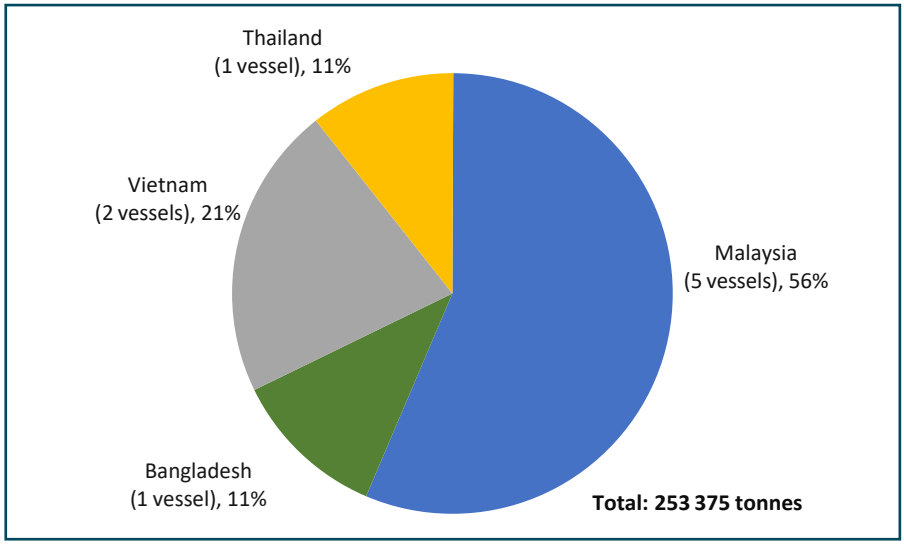


Figure 3: Deep-sea soya bean exports in 2022/23.



For more information, email Dr André van der Vyver at andre.vandervyver@sacota.co.za or Juan-Pierre Kotzé at info@sacota.co.za.

Is peanut butter good for you?

By Madison Yauger, www.health.com

We all know and love it. The gooey, creamy, sometimes crunchy, nutty spread can amplify almost any sandwich or cracker. Peanut butter, the perfect companion to chocolate, jelly, bananas, apples, or even just a spoon, is a staple in many meals, snacks and desserts.

Peanut butter can be quite healthy. It has many vitamins and minerals – including vitamins E and B6, magnesium, iron, and selenium – that can prevent diseases.

Peanut butter nutrition

There are drawbacks and benefits to incorporating peanut butter into your diet. Moderation is the key. "All you need to make peanut butter are peanuts," Keri Gans, a registered dietitian nutritionist in New York, told *Health.com*. Peanut butter comes from ground peanuts in its most basic form.

"Salt is optional," explained Gans. "Some brands add sugar, molasses, vegetable oils and even corn syrup, which minimise the health value." You can, however, get all the peanut's nutrition without the unnecessary additives.

According to the United States Department of Agriculture, one ounce of peanuts contains the following:

- Calories: 161.
- Protein: 7,31g.
- Fibre: 2,41g.
- Sugars: 1,34g.
- Fat: 13,9g.
- Carbohydrates: 4,56g.

Peanut butter is a great source of plant-based protein, which is important for people who stick to a vegetarian or vegan diet. Peanut butter is a good source of monounsaturated and polyunsaturated fats, which support a healthy heart. Peanuts don't have many carbohydrates, so the spread is perfect for people with prediabetes.

However, peanut butter contains many calories and may not be ideal if you are watching calories. Unprocessed peanut butter may contain aflatoxins, a harmful substance. Aflatoxins come from mould that potentially reaches peanuts when they grow underground. That does not mean you must avoid peanut butter.

Health benefits of peanut butter

"Peanuts are a great source of protein, fat, niacin, magnesium, vitamin E, biotin and copper," Laura Lu, a registered dietitian nutritionist in New York, told *Health.com*. Here are a few ways that eating peanut butter can positively affect your overall health.

Satiates hunger

Peanut butter is a great source of fibre and protein, both of which help satiate your hunger. "Sometimes peanut butter gets a bad reputation because of its fat content, but fat is an essential component to feeling satisfaction," explained Lu. "This means that having pretzels or fruit with peanut butter can help you feel fuller for longer."

Helps build and repair muscles

Peanut butter helps build and repair muscles. Peanuts contain all 20 amino acids and are nutritionally equivalent to meat and eggs for human growth and health. Some evidence suggests that protein intake contributes to muscle strength and preserves muscle mass throughout a lifetime. "The protein found in peanuts, around eight grams per serving, may help build and repair muscle," explained Gans.

Peanut butter may be an ideal snack for people who want to gain weight as it is high in calories and unsaturated fat.

Peanut butter is high in magnesium and potassium which are essential minerals for muscle function and development and help prevent muscle cramps and fatigue. Additionally, potassium plays a key role in muscle recovery.

Great source of phosphorus

Two tablespoons of peanut butter contain 107mg of phosphorus which is about 15% of your daily requirement (700mg). Phosphorus helps synthesise protein to grow, maintain and repair cells and tissues.

Reduces chronic disease risk

Peanut butter is a source of healthy fats which can help reduce your risk of developing type 2 diabetes. "Peanuts are packed with monounsaturated fats, which are often associated with a decrease in cholesterol and heart disease," explained Gans.

When those healthy fats replace saturated fats in your diet, they can help lower your low-density lipoprotein (bad) cholesterol levels. One example of those fatty acids found in peanut butter is omega-6. Oleic acid is a type of fat found in peanut butter that also has positive effects on the risk factors for type 2 diabetes including cholesterol, blood pressure and blood sugar. Oleic acid helps decrease insulin resistance and lowers blood sugar.

Additionally, research has found that peanuts are an excellent source of compounds called phytosterols that block cholesterol absorption from the diet.

Improves gut health

"Peanuts contain around two grams of fibre per serving, which is beneficial for gut health," explained Gans. That's because dietary fibre boosts your gut microbiome, the balance of healthy and harmful bacteria in your digestive tract. Your gut microbiome regulates digestive health, helps support a strong and healthy immune system, and lessens inflammation, per one study published in 2022 in the journal *Cell Host & Microbe*.

Further, a healthy gut microbiome protects against harmful pathogens that you might consume through contaminated water or food, making you sick.

Helps reduce your risk of cancer

Peanuts pack a lot of antioxidants – including manganese and vitamins E and B. Antioxidants protect cells from free radical damage. Free radicals contribute to chronic diseases and are often a precursor to cancer development. "Peanut butter contains bioactive compounds like resveratrol, phytosterols, and p-coumaric acid, which can help fight cancer," said Lu. In one study published in 2014 in *Critical Reviews in Food Science and Nutrition*, researchers reported that resveratrol fights off cancer cells by limiting their growth.

Better skin, hair and bones

The following nutrients found in peanut butter may have some positive effects on your skin and hair:

- *Biotin*: This B vitamin promotes healthy hair growth.
- *Vitamin E and monounsaturated fats*: One ounce of peanuts provides about 15% of the daily recommended value of vitamin E which helps protect your skin from ultraviolet (UV) damage. UV exposure can decrease your skin's elasticity, leading to premature fine lines and wrinkles and increasing your risk of skin cancer. Monounsaturated fats may also protect your skin against UV damage.
- *Lutein*: This nutrient increases your skin's elasticity.
- *Vitamin K and copper*: These elements support bone health. Vitamin K produces proteins that aid healthy bone development. In one study published in 2022 in the journal *Biological Trace Element Research*, researchers found that increased copper intake increases bone mineral density. Researchers found that copper decreases the risk of developing osteoporosis.

Soothes premenstrual syndrome

The monounsaturated and polyunsaturated fats found in peanut butter aid your body in absorbing vitamin E. Vitamin E is a fat-soluble vitamin that might help ease premenstrual syndrome (PMS) symptoms according to a study published in 2016 in the *Iranian Journal of Nursing and Midwifery Research*. Researchers reported that vitamin E might help reduce symptoms of PMS including abdominal cramps and tender breasts.

Helps you sleep

Peanut butter contains tryptophan, an amino acid your body utilises to manufacture melatonin which regulates your body's sleep/wake cycle. So, if you struggle to fall asleep at night, your body might not produce enough melatonin. The magnesium in peanut butter also has a calming effect on your body, which may help you fall asleep at night. One review published in 2022 in *Biological Trace Element Research* found an association between magnesium status and sleep quality.

What are the risks?

Although peanut butter has several health benefits, it also poses some risks. One of the most common and serious risks involves peanut allergies. If you have a peanut allergy, your immune system mistakes peanut proteins as harmful invaders. Your body releases chemicals into your bloodstream that cause symptoms to attack those invaders, such as skin reactions (hives, redness, or swelling), itching, difficulty breathing, digestive problems (cramps, diarrhoea, or vomiting) and anaphylaxis, a life-threatening reaction that requires an immediate epinephrine injection and will likely result in a trip to the emergency room.

Less expensive brands that advertise as 'no-stir' peanut butter often use palm oil to prevent the oils from separating. "While palm oil will not hurt you, its production risks the environment," warned Lu. "Ninety percent of the world's palm oil comes from burning down rainforests, displacing indigenous people and endangered species, and contributes to greenhouse gases."

Choose a peanut butter that does not include palm oil and try some alternatives, like almond or walnut butter, if you are allergic to peanut butter. Almond butter contains mostly monounsaturated fat, while walnut butter is an excellent source of omega-3 fatty acids.

What do nutritionists recommend?

The healthiest kinds of peanut butter will often advertise themselves as the 'natural' kind – ones that contain peanuts, maybe salt, and nothing else.

"I suggest to my clients that they look for brands that contain peanuts and salt only. Plain and simple," said Gans. Past that, though, your taste buds will likely be the deciding factor. "But if you're feeling daring and creative, making peanut butter is a cost-effective and healthy option," recommended Lu. "All you need is a blender or food processor, peanuts, and a little salt." Just be patient for all those ingredients to come together to make the familiar treat.

Eating more peanut butter

Do so mindfully if you want to incorporate more peanut butter into your diet. Spread a tablespoon of peanut butter onto a peanut butter and jelly sandwich for lunch. Or, add a tablespoon of it to a smoothie. You can also dip slices of apples or whole grain crackers into peanut butter as a snack.

Peanut butter packs many good, health-promoting benefits. Use natural peanut butter to help protect the environment and to maximise the health benefits to you.

This article has been shortened for use in *Oilseeds Focus*. For the complete article and references, visit *health.com/nutrition/is-peanut-butter=healthy.*

Modern producer development in South Africa

By Dr Sandile Ngcamphalala, Farmer Development Lead, Grain SA

The Oil and Protein Seeds Development Trust (OPDT)/ Oilseeds Advisory Committe (OAC) has continuously demonstrated a commitment to developing new entrants to the grain industry in South Africa. The OPDT/OAC collaborates with Phahama Grain Phakama (PGP), a producer development entity of Grain SA, to support the productivity of active oil and protein seed producers through top-up funding, cover soil corrections (chemical and physical), agribusiness coaching and mentorship, as well as crop insurance.

The advanced producers' support is extended as complementary funding to producers who have access to input funding. The funding is used to cover costs related to soil correction, insurance and mentorship support.

This collaboration is purposed to assist producers in addressing any problems that could make it difficult to achieve commercial yields. As producers exploit their soils, there is an increasing need to support soil health and ensure good soil pH for efficient utilisation of available nutrients. Knowledge transfer through professional mentorship is part of the support that Grain SA provides to participating producers thanks to the OPDT/OAC funding.

The OPDT/OAC further supports training through capacity-building programmes that include theoretical and practical training. The planting of trials to demonstrate advanced technologies during farmers' days, as well as capacity development through Grain SA's producer development magazine, *Pula/Imvula*, also serves as support.

Soil corrections

Protein and oilseeds farming is a difficult, tight-margin business, especially in the developing sector in South Africa. Conditions are especially pronounced for developing producers who generally operate on small-scale and marginal soils, and demand precision and efficient performance to ensure sustainable profitability.

Over and above market access and favourable grain prices, soil care and quality are foundational qualities. Ensuring good soil management practices is, however, an expensive exercise that most producers delay. Soil correction support is therefore a critical component between the OPDT/OAC and PGP. This involves both chemical (soil analysis and liming of soils) and physical soil corrections where producers get to renew contours and create waterways to protect their soils and nutrients from washing away.

Coaching and mentorship

Many producers in the PGP farmer development programme have grown beyond the study group support where they are grouped for information sharing and capacity building. These producers have demonstrated commitment, competence and growth. They are farming each hectare to achieve the highest possible yield. These producers have acquired knowledge through training courses, but they are still, at times, unsure of themselves and hesitant when it comes to some practices or unaware of their negotiating power.

> *Simon Sinek said: "A mentor is not someone who walks ahead of us and tells us how they did it. A mentor is someone who walks alongside us to guide us on what we can do."*

We believe there is a distinctive role for dedicated mentorship from one who can walk beside them and support them. This is a surefire way of ensuring long-term success for these producers. Through their generous funding support, the OPDT/OAC makes mentorship and business coaching capacity possible.

Producers who have advanced are therefore visited on a one-on-one basis for targeted support towards commercial sustainability. Visits not only include mentoring on a wide range of topics throughout the season, but also include checks to assess soil health and crop progress.

Often, we assist in identifying mechanical problems and help producers find the best repair solution. Our mentors

Lime application supported by the Oil and Protein Seeds Development Trust/Oilseeds Advisory Committee.

FT-NIR SPECTROSCOPY

Rapid Oil Analysis

- **Edible Oil Analysis:**

  Measure important quality parameters like fatty acid profile, FFA, TFA, IV and various other parameters in seconds.

- **Quality Control of Olive Oil:**

  Assess the fatty acid and TAG profile as well as acidity, oxidation parameters and indicators for thermal treatment simultaneously.

- **Degradation Testing of Frying Fats:**

  Check for polar compounds, polymerized triacylglycerols, acid value and anisidine value to optimize the frying process.

FT-NIR is a powerful and effective technology for control of raw materials, intermediates and finished products. The major application areas of NIR spectroscopy include edible oils and oilseeds, but also dairy, meat, beverages, grain & bakery ingredients as well as condiments.

In contrast to most wet-chemical and other reference methods, FT-NIR technology is quick, cost-effective, non-destructive and safe, since it does not use chemicals, solvents or gases.

Bruker Optics has the industry's most comprehensive FT-NIR product-line; from the very intuitive FT-NIR spectrometer TANGO to the versatile Multi Purpose Analyzer MPA II and award-winning MATRIX-F system for real-time process measurements.

Contact us for more details:
info.za@bruker.com | www.food-analysis-nir.com

become intimately involved with planning, budgeting, troubleshooting, training, and advising producers throughout the season. In this way, PGP plays a key role in improving producers' production practices and overall business management.

Trials and farmers' days

The OPDT/OAC supports the planting of several demonstration plots which PGP uses to help accelerate the adoption of game-changing innovations in agricultural production. Here, producers can learn new ways of doing things without having to do it on their farms. Demonstration plots are used to teach various agricultural techniques and technologies, as well as showcase new or improved crops. They also serve as a space to research and test new methods alongside familiar and more traditional ones.

In addition, the OPDT/OAC supports the hosting of farmers' days which provide an opportunity for producers to visit demonstration trial sites. PGP uses farmers' days for peer-to-peer education where producers can share experiences and exchange information. They also meet input supplies representatives and technical experts, local extension officers and other stakeholders. The information to which producers are exposed to cannot be under-valued, particularly for subsistence and small-scale developing producers who are introduced to a broader support network beyond the PGP farmer development team.

Training and skills development

Producer education is not limited to developing producers; all producers require ongoing education to keep up with a dynamic and rapidly evolving environment. Technology, science, business management and more are evolving at a rapid pace. Nowadays practical knowledge is not enough.

The lack of knowledge and practical skills relating to advanced protein and oilseed production, marketing, and agri-business development in general are worrying. If there is to be sustainable development in this sector, producers need proper training and the OPDT/OAC and PGP have committed to do just that. Producers who join the PGP study groups have very poor knowledge of modern agriculture and their skills are limited. Training to address such knowledge gaps is essential if there is to be sustainable development in the sector. The PGP training programme is therefore purposefully tailored to be practical and relevant.

Practical skills courses involving planter and boom sprayer calibration teach producers the why and how of changing planter plates for different-sized feeds.

Training includes:

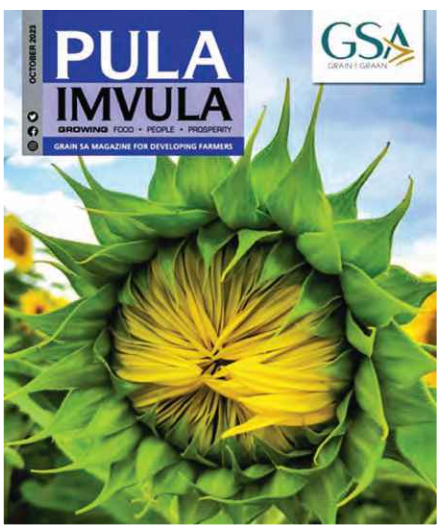
- Introduction to sunflower production.
- Advanced sunflower production and marketing.
- Introduction to groundnut production.
- Introduction to soya bean production.

Pula/Imvula magazine

PGP publishes a knowledge-sharing magazine called *Pula/Imvula* as part of its endeavours in leading successful grain, protein and oilseeds production agribusinesses. The magazine is a useful development communication tool. It is an exciting, multi-dimensional publication disseminating important information to the developing agricultural sector. It is well received by producers whose feedback is that they find the information useful and easy to understand.

The publication is recognised as a reliable source of information that is tailored specifically to the needs of developing producers. Topics cover many aspects of the production and marketing of specific crops as well as other generic information. The monthly newsletters are distributed in English as well as Sesotho, Setswana, IsiZulu and IsiXhosa.

Copies are distributed at no cost to recipients. The full version of the magazine or individual articles are also made available digitally and can be accessed online via the *www.grainsa.co.za* platform. This is our effort towards making this knowledge accessible.



Phahama Grain Phakama publishes a knowledge-sharing and information-dissemination magazine called Pula/Imvula.

Recipients are widespread and, in many instances, the target audience is the developing grain producers of South Africa. They live in remote regions where expert mentorship, advice and knowledge of modern farming and the latest technologies are scarce and difficult to access, thus making this publication an extremely significant tool.

On behalf of the benefiting producers, PGP wishes to extend a sincere word of appreciation for the collaboration and partnership which is certainly changing lives and making a significant impact in the sector.

For more information, visit Grain SA's website at *www.grainsa.co.za*. or *www.opot.co.za*.

Sacota AGM discusses South African exports

By Juan-Pierre Kotze, research and project manager, Sacota

The South African Cereals and Oilseeds Trade Association (Sacota) convened its annual general meeting (AGM) on 5 October this year. The event featured speakers Naliya Stamper, terminal manager at Transnet Port Terminals (TPT) East London, and James Holley, CEO of Traxtion.

The AGM provided a platform for industry stakeholders to gain valuable perspectives on recent achievements and future prospects in South Africa's rail transport network. It also dealt with the opportunities that East London could offer for bulk grain exports as an alternative to the already congested Durban harbour.

Progress at the East London Port

Stamper's presentation revolved around the progress made at the East London Port. She shed light on the opportunities, challenges, and her future view of the port. She pointed out that they have a silo capacity of 66 000 tonnes, and are geared for imports and exports of all commodities. The East London Port does not have berthing delays, and despite the old operating equipment, most are well-maintained.

Currently, they can achieve a loading rate of more than 5 000t/day. Stamper is confident that this rate can be increased to 6 000t/day with current equipment. She said that the port has a good geographical position to receive white maize and soya beans.

East London Port also announced that the first-ever soya bean vessel, St Columba, was successfully loaded and sailed on 5 September to Malaysia carrying around 33 000 tonnes of soya beans. The exporter was Ameropa, a Sacota member. Having loaded one yellow maize vessel last year (the first time in ten years), this year the port will handle six vessels.

Stamper highlighted the potential for improvements and increased efficiency at East London Port. She will achieve this by building strong relationships with the industry and by refurbishing the facilities at the harbour. She announced that they are now also a member of Sacota, which is a good platform to collaborate with the industry to ensure the visions of the port are aligned with what the industry needs.

She concluded by expressing her appreciation towards Sacota and the entire industry, and pointed out that the success of TPT East London would not be possible without them.

André van der Vyver, executive director of Sacota, Naliya Stamper, terminal manager at TPT East London, and Konrad Keyser, chairperson of Sacota.

Hope for South Africa's railway

James Holley, CEO of Traxtion, delivered a thought-provoking speech on the state of South Africa's railways. He emphasised the critical role that rail transport plays in the nation's economy and the need for revitalisation. Holley said that South Africa has one of the world's most extensive rail networks. There is around 36 000km of rail track in South Africa, making up more than 80% of the rail track in Africa.

He explained that Transnet Freight Rail (TFR) has fallen behind with the maintenance expenditure that should have been allocated to the rail infrastructure and the accumulated backlog in maintenance for rail infrastructure amounts to around R30 billion.

Holley believes that South Africa's railways will be restored to their former glory. To achieve this, he advocates for streamlining the railway network by reducing unnecessary lines and fostering closer collaboration with the private sector. His vision focusses on increased efficiency, reliability and cost-effectiveness.

The inclusion of the private sector in the railway industry would bring in fresh investments, innovative solutions and operational expertise. He explained that the railway industry runs on an extremely high fixed cost ratio, estimating that 70% are related to these costs. A streamlined and effective railway system would not only improve South African logistics, but it could also be done at a lower cost.

Sacota works closely with TFR and TPT to assist in maintaining or increasing operational effectiveness. Sacota implemented a security camera project on the railway line to combat cable theft, and it recently organised a block train pilot project to run from the VKB grain silos straight through to Durban. This reduced delivery time from the typical 30 to 45 days to eight days. Sacota acknowledges that public-private partnerships are the way forward, and is keen to collaborate with service providers, such as Traxtion, to maintain export competitiveness.

Life-long service award

Sacota awarded a life-long service award to Paul du Plessis, director at Brisen Commodities, for his dedication and contribution to developing and promoting the South African cereals and oilseeds industry for 37 years (1986 to 2023).

For more information, visit *www.sacota.co.za*.

Jacobus Louw from Paulpietersburg won the soya bean category in the KwaZulu-Natal region with a yield of 5,743t/ha (Agricol DM68R09).

Danie Bester from Balfour won in the soya bean category in the Eastern Highveld region with a yield of 6,24t/ha (Agri-Seed RA 565R).

Jacques Hattingh from Bethlehem won the soya bean category in the Eastern Free State region with a yield of 6,62t/ha (Agricol DM5351RSF).

Grain SA rewards cream of the oilseeds crop

By Elmarie Helberg, Plaas Media

The best of the best were recently crowned at Grain SA's Grow for Gold Awards ceremony held in Johannesburg. The awards are aimed at giving recognition to producers who realise exceptional yields. According to Caria Badenhorst, marketing manager of seed at Pioneer, the competition was developed in 2017 to provide a platform for producers to showcase their skills and dedication. "This competition is aimed at pushing the boundaries of seed production," she said.

Grain SA's Grow for Gold National Yield Competition allows producers to compete in various categories, including dry and irrigated land. Producers are further divided into both regions and national participation. Innovative production practices and smart farming plans are encouraged so that producers can achieve the highest yields per hectare, regardless of the cultivar planted. The competition is the only of its kind hosted by Grain SA and covers maize, wheat, sunflower and soya bean production.

Agricol dominated the soya bean category with a few competition records.

For more information, visit Grain SA's website at *www.grainsa.co.za*.

Steve Cave from Koster won the soya bean category in the Central region with a yield of 5,659t/ha (Agricol DM6.8iRR).

The soya bean category in the North West region, yielding 5,695t/ha (Agricol DM6.8iRR), was won by Jopie Fourie from Makwassie.

Casper du Toit from Hoopstad won the soya bean category in the Water table region with a yield of 6,133t/ha (Agricol DM6.8iRR).

Jan van Heerden from Hartswater won the soya bean and irrigation categories with a yield of 6,668t/ha (Agricol DM5953RSF).

Frik van Rooyen from Lichtenburg won the sunflower category, sunflower oil yield/ha with a yield of 4,166t/ha, and an oil percentage of 45,90% (Pioneer P65LL02). He also set a record in the sunflower grain yield/ha category.

KIMLEIGH CHEMICALS

Growing with FERTION

For *enhanced efficiency:*

nano micro-elements for *foliar applications*

Kimleigh welcomes cooperation with stake-holders within the fertilizer supply chain who are interested in one-step value adding to fertilizer blends. Kimleigh has the capacity to do the treatments either at their on-site facility in Potchefstroom or by offering mobile coating units for rental.

Kimleigh specializes in formulating custom-ised products for fertilizer, foliar and in-furrow applications for unique requirements.

SCAN ME
www.kimleigh.co.za

FERTILIN PRODUCT RANGE FOR FOLIAR (AND SOIL) APPLICATION

Concentration (g/litre)	Ni*	Co*	Mo*	Density (kg/ℓ) at 20°C	Act 36/1947 Reg. No.
Fertilin NCM	24	8	120	1.33	B6079
Fertilin Nickon	130	-	-	1.34	B5957

* Nano particles ensure effective bioavailability

Other combinations also available in the Fertilin range:

- Ca + B + Si (CalSiBor)
- Ca + P (CaP)
- Ca + S (CalForce G)
- Ca + N (Caltrix)

FOLIAR AND IN-FURROW APPLICATIONS

Metalin products	Zn *	B	Cu *	Fe *	Mo	Mn *	Mg *
Concentration (g/litre)	700	150	500	300	200	500	300
Density (kg/ℓ) at 20°C	1.71	1.40	1.51	1.41	1.37	1.66	1.44

* Nano particles ensure effective bioavailability

+

- Formulated for adhesion, spreading and efficient uptake
- Suitable for pivot application as well as tractor and aeroplane spraying
- Mixed as suspension concentrates for specific nutritional requirements

Contact Kimleigh for more product information and applications

KIMLEIGH CHEMICALS SA (PTY) LTD

INNOVATIVE CHEMISTRY

www.kimleigh.com

T I +27 18 293 1028

Liability regarding the spread of fires

By Hans-Jurie Moolman, Moolman & Pienaar Incorporated

Veldfires in South Africa are devastating and pose a threat to both lives and property. Fires arguably pose the biggest risk that requires managing in our rural areas in winter.

Given this tremendous risk, the legislature put a plan in place that forces landowners to proactively prevent fires from occurring on their property and spreading to the property of others. These measures are set out in the *National Veld and Forest Fire Act, 1998 (Act 101 of 1998)* or the *Veld Fire Act*. The nature, purpose and requirements of this piece of legislation were briefly explained in a previous article.

Fire protection associations

It is important to note that the *Veld Fire Act* serves as vehicle for establishing firefighting associations across South Africa, of which membership is voluntary. A potential snag, however, is contained in Section 34 of the *Act* where a presumption is created that a landowner who is not a member of such an association is negligent, until the contrary is proven, in the starting and/or spreading of a veld or bush fire on his or her property which leads to others suffering damage.

In an ordinary court case where a plaintiff would claim damages, the plaintiff would have to prove that the person blamed for the damage was negligent. In the *Veld Fire Act*, the burden rests on the landowner who is blamed for the damage to prove why the court should not find him or her guilty of negligence.

This presumption and the risk that a fire claim poses should be reason enough to join a firefighting association. In addition, most liability insurance policies contain specific liability exclusions if a policyholder is not a member of a firefighting association.

Leasing of land

An issue that has been raised quite often in courts pertains to the liability for damage caused by veld fires, and identifying the person who should be held legally liable as the owner of the land from where a fire originated or spread.

The problem arises when the registered owner rents out land and where control or possession of the land is relinquished to the tenant. There are several cases where fires started on the rented or utilised property and spread to adjacent properties. In many of these cases, the state was the registered owner that leased land to a person or community that was neither a member of a firefighting association nor took preventative measures in terms of fire outbreaks. The registered owner argued that control and possession had been ceded to the tenant and that the registered owner could not be held liable for the damage.

In the case of *Nieuco Properties 1005 (Pty) Ltd and another vs Inkululeko Community Trust and Others, case number 872/2017*, the Supreme Court of Appeal of South Africa considered the issue of ownership, and the relinquishment of control over land to a tenant or other land user, within the scope of the definition in the *Veld Fire Act*.

In this case, the tenant rented the farm from the Department of Land Reform and Rural Development and the community trust, Inkululeko, for five years. The tenancy agreement conferred certain duties regarding fire prevention on the tenant. During the rental period, a fire broke out that spread to the plaintiff's land, where it proceeded to damage macadamia groves.

After a claim was lodged against the registered owners (landlords), they upheld the fact that handing over control of the farm to the tenant freed them from any obligation to comply with the *Veld Fire Act*. Ultimately, the dispute revolved around the question of whether the lease agreement and the duties the agreement placed on the tenant exempted the registered owner from liability and the presumption contained in Section 34 of the *Veld Fire Act*.

Obligations of the owner

The court ruled that, in terms of the *Veld Fire Act*, more than one person can be simultaneously regarded as the owner of a specific piece of land. The court specifically referred to the relationship between the landlord and the tenant. Every person who falls under the definition of 'owner' must comply with the obligations set out in the *Act*.

Thus, the registered landowner's temporary relinquishing of control to the tenant or other land user will not exempt the owner from liability arising from the start or spread of a veld and/or forest fire. This places a major legal obligation on registered landowners who cede temporary control of land, to ensure that the *Veld Fire Act* is complied with to avoid possible consequences and presumptions in the legislation in question when concluding a lease agreement.

For more information, contact Hans-Jurie Moolman on 018 297 8799 or hj@mmlaw.co.za.

Financial obligations in the employment relationship: Who pays, and for what?

By Meyer Louw, legal advisor, LWO Employers Organisation

When it comes to the employer-employee relationship, both parties benefit but both also have duties and obligations. The essence of the relationship is that the employee completes certain tasks or provides services to the employer, and then receives remuneration in return. Regarding financial obligations, there are certain statutory contributions and deductions.

Contributions and deductions

The Unemployment Insurance Fund (UIF) involves a 1% deduction from the employee's gross salary, with a maximum limit, to contribute to the fund. Simultaneously, the employer is required to contribute 1% of the employee's gross salary to the UIF. This joint contribution ensures that both parties play a role in safeguarding the welfare of the employee.

The *Compensation for Occupational Injuries and Diseases Act, 1993 (Act 130 of 1993)*, commonly referred to as 'workmen's compensation', is another important consideration. Once an employer registers with the Compensation Commissioner, an annual assessment is conducted to determine the assessment fee and contributions to be paid in favour of the employees. This assessment takes into account various factors such as the nature of the work and potential risks involved.

By fulfilling their obligations, employers limit their liability and ensure that employees are protected in case of work-related injuries or illnesses, and receive the necessary support and compensation during such challenging circumstances.

Skills development levies are applicable to employers whose annual payroll exceeds R500 000 per year. This levy applies to most employers, with a few exceptions. It requires employers to register with the South African Revenue Service (SARS) and pay a 1% levy based on their monthly payroll. The purpose of this levy is to promote skills development initiatives and invest in the continuous improvement of the workforce.

Additional deductions

There are also additional deductions, as applicable (take note of *Sectoral Determination 13*, which regulates labour relations in the agricultural sector):

- **Housing linked to employment:** The employer is entitled to deduct up to 10% of the employee's basic salary for housing provided to the employee.
- **Water, wood and other services:** The employer is entitled to deduct up to 10% of the employee's basic salary for water, wood and other services.
- **Rations:** The employer is entitled to deduct up to 10% of the basic salary in respect of rations.
- **Loss and/or damage to property:** The employer is entitled to deduct from the employee's remuneration in the event of the following (subject to following the correct procedure):
    - Loss or damage caused by the employee's negligence (a prime example would be losing pruning shears).
    - Loss or damage caused by the employee's misappropriation of the employer's property.
    - Loss or damage caused by the employee acting outside the employee's mandate.

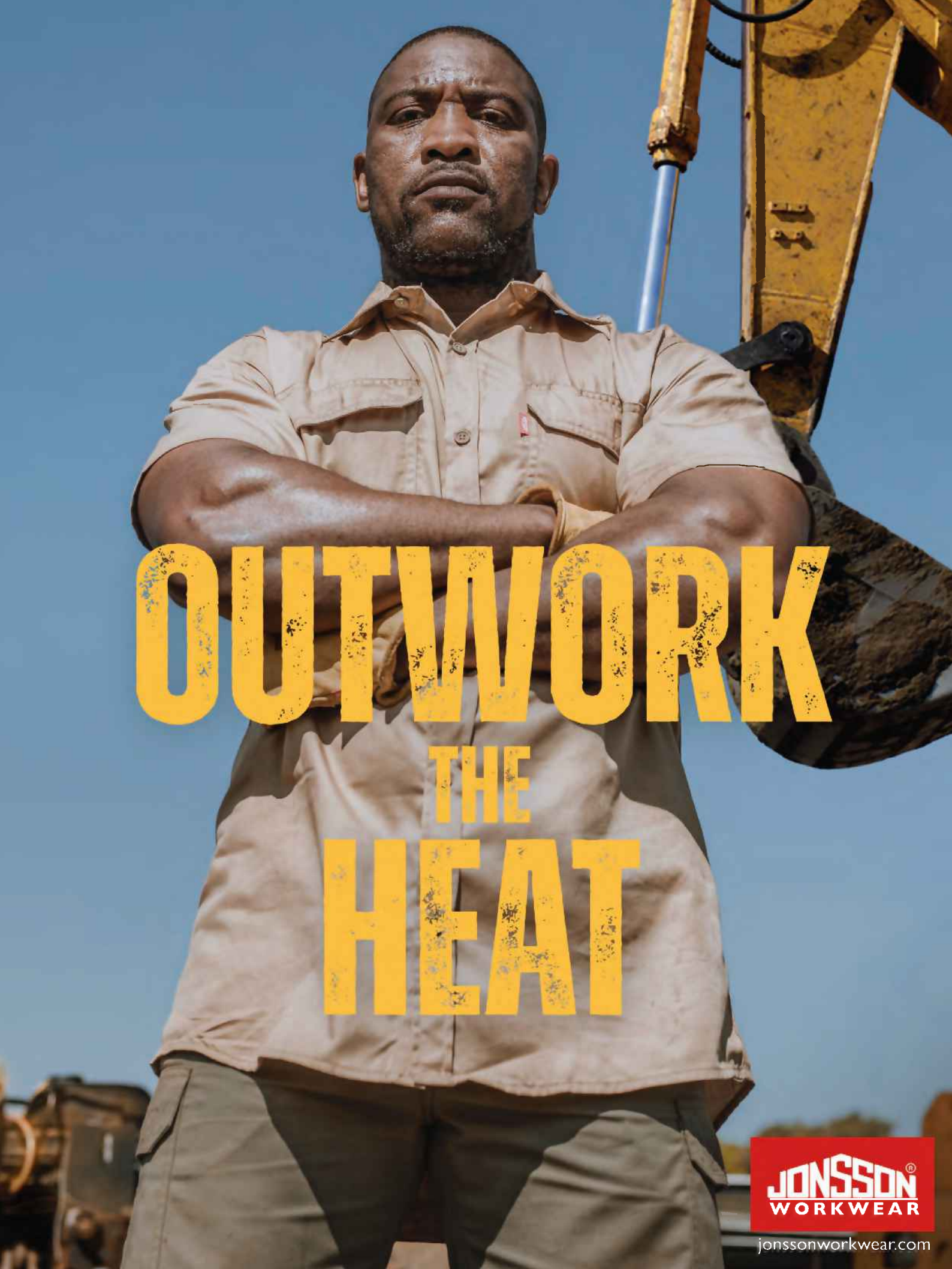
The *Basic Conditions of Employment Act, 1997 (Act 75 of 1997)* sets the following requirements before the employer can make a deduction for loss/damage:

- Written consent by the employee for the deduction and specific amount.
- The loss or damage must have occurred in the course of employment as a result of the employee's intent or negligence.
- The employer followed a fair procedure and gave the employee a reasonable opportunity to state his/her case, as well as why the deduction should not be made.
- The employer may only deduct a maximum of 25% of the employee's remuneration at a time, meaning that the recovery instalment is limited to 25% of the employee's remuneration per month.
- The total amount the employer deducts may not exceed the amount of the actual loss or damage the employer has suffered.

These contributions and deductions are crucial to ensure compliance and a fair distribution of responsibilities. This balance fosters a harmonious employer-employee relationship and supports a thriving workforce.

The LWO Employers Organisation assists employers to comply with labour law, and to use it to their advantage to protect their business. As a registered employers' organisation with the Department of Employment and Labour, the LWO has the right to represent members at the CCMA. For more information, send an email to Meyer Louw at meyer@lwo.co.za or info@lwo.co.za, or visit *www.lwo.co.za*.

LWO
WERKGEWERSORGANISASIE
EMPLOYERS ORGANISATION


OUTWORK
THE
HEAT
JONSSON
WORKWEAR
jonssonworkwear.com

NEW HOLLAND
TH7.32 TELEHANDLER

NEW!

The best solution for lifting and material handling on the farm thanks to greater lift capacity, greater reach, faster cycle time, the highest manoeuvrability and stability working with loads. Get the job done faster with the New Holland Telehandler.

Contact your nearest New Holland dealer today or phone:

Eduan Booyens (071 871 8163)
North West, Freestate, Gauteng, Limpopo and Mpumalanga

Paul de Korte (064 752 1613)
KwaZulu-Natal

Quintus Smit (082 524 7397)
Western Cape, Northern Cape and Eastern Cape

Like us on

www.newholland.com/za

NEW HOLLAND AGRICULTURE