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# OILSEEDS focus

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# SA feed sector stabilises
## after facing conundrum of challenges

*By De Wet Boshoff, executive director, AFMA*

South African feed sales are showing signs of stabilising after having faced several challenges over the past three to four years. It also recorded a smaller than expected drop in sales for the 2017/18 Animal Feed Manufacturers' Association's (AFMA) statistical year.

AFMA feed sales for 2017/18 showed negative growth of only 0,7% compared to the enormous drop in sales of 6,2% during 2016/17 – the highest percentage decrease in feed sales AFMA members have ever experienced.

The dramatic feed sales losses in 2016/17 was the direct consequence of the challenges faced by the livestock and poultry industries. Initially, the focus fell on the poultry industry that had to deal with the dumping of cheap imports from the European Union (EU) within the EPA free-trade agreement – the duty-free quota allowed under the AGOA agreement from the US in 2016/17. This was followed by cheap dumped product from Brazil in the latter half of 2017, which continued into 2018.

**Table 1: AFMA feed sales – 2015 to 2018 (AFMA statistical year Apr-Mar). (Source: AFMA Stats)**

| AFMA feed sales 2015-2018 | Total YTD 2015/2016 | Total YTD 2016/2017 | Total YTD 2017/2018 | % Difference |
|---|---|---|---|---|
| Dairy feed | 912 312 | 925 185 | 950 245 | 2,7 |
| Beef and sheep | 1 030 101 | 861 792 | 871 417 | 1,1 |
| Layer feed | 951 535 | 885 676 | 846 694 | -4,4 |
| Broiler feed | 2 808 360 | 2 652 906 | 2 583 946 | -2,6 |
| Breeder feed | 499 307 | 468 431 | 477 249 | 1,9 |
| Other | 706 810 | 682 944 | 699 081 | 2,4 |
| **Total sales** | **6 908 425** | **6 476 934** | **6 429 081** | **-0,7** |

### Hard hit by AI

If the challenges in the trade arena weren't enough, the poultry industry was further struck by deadly avian influenza (AI), and vast numbers of birds had to be culled during 2016/17 to stop the outbreaks from spreading.

The culling had the largest influence on broilers and layers, with the Western Cape hardest hit by the AI outbreaks. According to the World Organisation for Animal Health (OIE), approximately 2,5 million birds died or had to be culled to stop the spread of the disease. The direct effect of these actions on animal feed sales is clearly indicated by *Table 1*.

Following the 2017 winter season and after vigorous biosecurity measures applied by poultry and related industries brought an end to AI outbreaks, matters eventually started to settle and the industry began its recovery process.

While South Africa dealt with the AI outbreaks that started in 2016, imports continued. During 2017, outbreaks of AI in the EU and US resulted in a slowdown of imports from these regions, allowing Brazil a field day in filling this gap. Imports were thus kept at the same levels as in 2016.

Although the focus was directed towards the poultry sector, feed sales experienced a double blow with the worst drought in South African history having devastating effects on other livestock species, specifically beef and sheep, due to the lack or absence of grazing. Producers therefore had no other option but to dramatically reduce their herds and to retain only their breeding stock, so as to rebuild their herds again after the drought.

### Full recovery from AI

*Table 1* contains a short summary of AFMA feed sales for the last three statistical years. The impact of the drought on beef and sheep saw feed sales dropping by 16,3% (±170 000 tons). It is encouraging that this category has already started recovering in the last year, although it will take three to four years to fully reach previous levels.

The drop in layer feed sales was 100% due to AI and a full recovery of these lost volumes is expected by the end of the next financial year, if we can remain AI-free during this period. The drop in both broiler and breeder feed was due to AI and poultry imports. While a full recovery from the impact of AI is expected, the negative effect of poultry imports will remain.

The animal feed sector is anxiously, although positively, awaiting outstanding outcomes of the special Poultry Task Force initiated by government, under the co-leadership of the Department of Trade and Industry (dti) and the poultry industry, in late 2016. These outcomes still need to be agreed upon and implemented.

# Global food demand

At a recent meeting of the OECD-FAO Agricultural Outlook 2017-26, it was concluded that the demand for grain, meat and fish is expected to grow at half the pace of the previous decade and equal to the global population growth of 1% per year.

The drop in vegetable oils is expected to be even greater. Dairy will increase, and sugar will grow at the same rate. Sub-Saharan Africa needs more protein, but lack of income and food expenditure is likely to result in a low growth in demand in the short term.

A slowdown in food demand in China can be expected, where the potential for increased food demand is not as strong as in previous years. The second change is that biofuel production will no longer increase demand for additional maize, sugar cane and vegetable oil, as was experienced in previous years.

## Rand/USD exchange

The president's announcement that the ANC will likely vote for expropriation without compensation weakened the rand and is bound to affect agricultural production, employment, economic growth and financial markets.

In the short term, trade wars between the US and China could continue to influence rand/USD levels. A weakening rand will assist in exports but at the same time continue to increase import parity, leading to an overall firming of prices.

## Technology levies

South Africa is fortunate that it has entered an era where it can, in the long term, be self-sufficient not only in maize production but also oilseeds. This requires that we must be globally competitive producers. Given the country's below average rainfall compared to major exporting countries, this becomes a challenge. To be globally competitive, we need to continuously increase yields. The role that improved genetic material of crops play in this regard is therefore significant.

The successful application for a soya bean technology levy will make a significant contribution to the appetite of seed companies to bring new technology to South Africa; it will also fast-track this process. The soya bean industry has grown substantially, and part of this success has been increased hectares and yields. A jump in yields that can be achieved will contribute further to the economic advantages of planting soya beans.

## Challenges in disease/pest control

*Sclerotinia* and root-knot nematodes have been identified as two of the more important challenges we will need to address in the short term in oilseed production. Fortunately, there seem to be products and management strategies in the pipeline that can assist in containing these two debilitating problems. In the longer term, the risk of weed resistance to herbicides that are used repetitively remains a risk and needs attention.

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.

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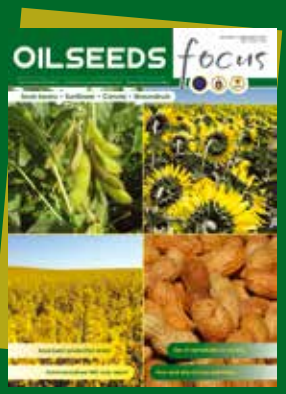


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# NEWS

## Trump to assist farmers affected by trade war

The Trump administration has approved $12 billion in federal assistance to farmers negatively affected by the ongoing trade dispute between the US and China. President Trump has travelled to Iowa to speak with farmers in person to quell any concerns.

The financial assistance will be provided through three vehicles by the Department of Agriculture: direct assistance, a food purchase and distribution programme, and a trade promotion programme, all largely targeting soya bean farmers. However, China accounts for the purchase of 25% of all US soya beans grown, which means that any orders cancelled will result in a large surplus.

In the past, the government has managed the surplus of other commodities, such as dairy (in the form of cheese) or pork, through buying up supplies to be distributed to food pantries, or to be used by the school lunch programme. But the US government has not held stored grain for about 20 years, so it is unclear what will be done with soya beans that are largely grown to be used in animal feed or oil. – *www.oilseedandgrain.com*

## US soya bean prices reach a nine-year low

Soya bean prices collapsed in June under the combined pressure of favourable US growing conditions, an increase in sown acreage, large old-crop stocks, and China's tariff hike on imports from the United States.

On 1 June, cash soya bean prices for central Illinois were $9,86 per bushel but, by early July, had plummeted to just above $8. Not since December 2008 have prices for the crop been that low.

Following China's recent implementation of an additional 25% *ad valorem* tariff on US soya beans, the USDA lowered its 2018/19 export forecast by 250 million bushels this month to 2,04 billion. Lowered export expectations – along with a very bright outlook for soya bean crop conditions and for estimated acreage harvested – lowered prices.

As a result of the outlook for crop conditions and for estimated acreage harvested, the USDA raised its production forecast to 4,31 billion.

Only last year's record harvest of 4,39 billion bushels would be larger. Provided the crop continues to develop without major difficulties, post-harvest prices during autumn are likely to be even lower.
– *www.deltafarmpress.com*

## The future is now for CRISPR technology

By now the majority of the farming community has heard of CRISPR (clustered regularly interspaced short palindromic repeats), the latest gene editing technology expected to save researchers and farmers time, money and regulation. Until recently, CRISPR was a talking point, something explained to farmers at field days as the future of research. For Iowa farmers, the future is now.

In 2016 and 2017, the Iowa Soybean Association (ISA) funded research at Iowa State University (ISU) with the goal of improving plant disease resistance and protein levels in a non-transgenic way using CRISPR technology.

"I used CRISPR as a tool to target and delete portions of the genome that repressed the genes we were looking at," says Ling Li, principal investigator. "Then the genes could be overexpressed, increasing protein accumulation and broader disease resistance."

Through overexpressing certain genes, Li could increase the protein levels in soya bean by 15-20%, increase disease resistance against sudden death syndrome, and increase resistance against pests such as soya bean aphids. The genes also showed improvement in the plants' susceptibility to additional viral, bacterial and fungal diseases, as well as other pests such as soya bean cyst nematode.

"The results of this research demonstrate how basic research with a focus on potential applications can bring big dividends," said Ed Anderson, ISA senior director of research.
– *Allie Arp, ISA*

## 2019 Sansor bursary applications now open

The South African National Seed Organisation's (Sansor) bursary call is open for 2019. Postgraduate students studying in the following fields are welcome to apply: plant breeding, plant pathology, entomology, soil science, agronomy, pasture science, biotechnology, plant physiology, crop science, genetics, and molecular plant biology.

For application forms or any questions in this regard, email Magdeleen Cilliers at projects@sansor.co.za. Please note students applying should start with their degree in 2019. – *Press release*

## Novel blackleg resistance for canola in Australia

Corteva Agriscience, Agriculture Division of DowDuPont and Agriculture Victoria Services Pty Ltd. (AVS), the commercial arm of Agriculture Victoria, announced a license agreement for a novel source of blackleg resistance in canola (*Brassica napus*) developed by AVS using Optimum Haploid Value (OHV) technology. The OHV technology was developed under the long-standing and productive strategic collaboration between AVS and Corteva Agriscience.

"This announcement further illustrates the value of external collaborations to not only develop new tools and technologies, but also their application to create novel sources of resistance. We look forward to rapidly enhancing our portfolio of integrated solutions for growers who continue to face increased blackleg pressure in their canola fields," says Dr Steven Webb, R&D director – External Technology at Corteva Agriscience.

Through the application of OHV and genomic selection, AVS identified new sources of blackleg resistance for canola that will help combat a fungal pest that causes significant annual losses to canola growers. Per the signed agreement, Corteva Agriscience will license the technology to begin testing and development using traditional breeding to incorporate the stronger blackleg resistance genetics into canola varieties sold under both the Pioneer and Nexera brands. – *Press release*

## Increasing cost burden of importing food

Food imports are placing an increasing burden on the world's poorest countries, a new FAO report says.

The world food import bill has broadly tripled since 2000 to reach $1,43 trillion in 2017, while it has risen around fivefold for countries that are the most vulnerable to food shortages. The global food import bill is likely to rise by around 3% to about $1,47 trillion this year.

This year, the FAO took a longer-term view of that trend and found that countries may indeed be "paying more for less food", even though global production and trading conditions have been quite benign in recent years.

The analysis focuses on both the trend and the composition – animal proteins, fruit and vegetables, cereals, beverages, oilseeds, and coffee, tea and spices – of food import bills over time. Food imports have risen at an annual global average rate of 8% since 2000, but that pace has been in the double-digits for the vast majority of the poorest countries. In a "stark contrast", the share of cereals compared to higher-value foods in the import basket has not declined in poorer countries, while it has declined considerably in wealthier ones.

The food import bill now accounts for 28% of all merchandise export earnings for the group of least-developed countries (LDCs), nearly double the share of 2005. Developed nations not only have larger GDP per capita, but they typically only spend around 10% of their export earnings on food imports. – *www.fao.org*

## No area differential for soya beans

Requests for the implementation of a soya bean area differential was submitted to the JSE by role-players in the industry. Following these requests, the JSE on 13 August presented a workshop on the matter, inviting all industry role-players to attend. Members of Grain SA's top management, staff and producer members all participated in the debate, as the GSA annual congress decided during March this year not to support such an area differential.

The JSE workshop yielded very little support for the implementation of a soya bean differential and a recommendation was made not to implement it. Grain SA explained that there are various question marks regarding the current area differential system and that it can have a major impact on the entire value chain, should errors creep into the process and calculations. A 5% faulty calculation can give rise to an estimated impact of R200 million rand in the value chain.

Requests were made that the JSE facilitate similar workshops in respect of the other commodities, as this would assist in addressing problems and uncertainty.

With current surpluses in the soya bean industry being common knowledge, stocks are now being retained in silos. While this is not a trading instrument problem, it does indicate issues relating to local demand due to factors such as the importation of soya oilcake. When surpluses arise in certain areas, supply and demand challenges have to be addressed via the free market system. Once an area differential is implemented, the incentive for capital investment in order to utilise surpluses disappears, as stocks are then moved artificially.

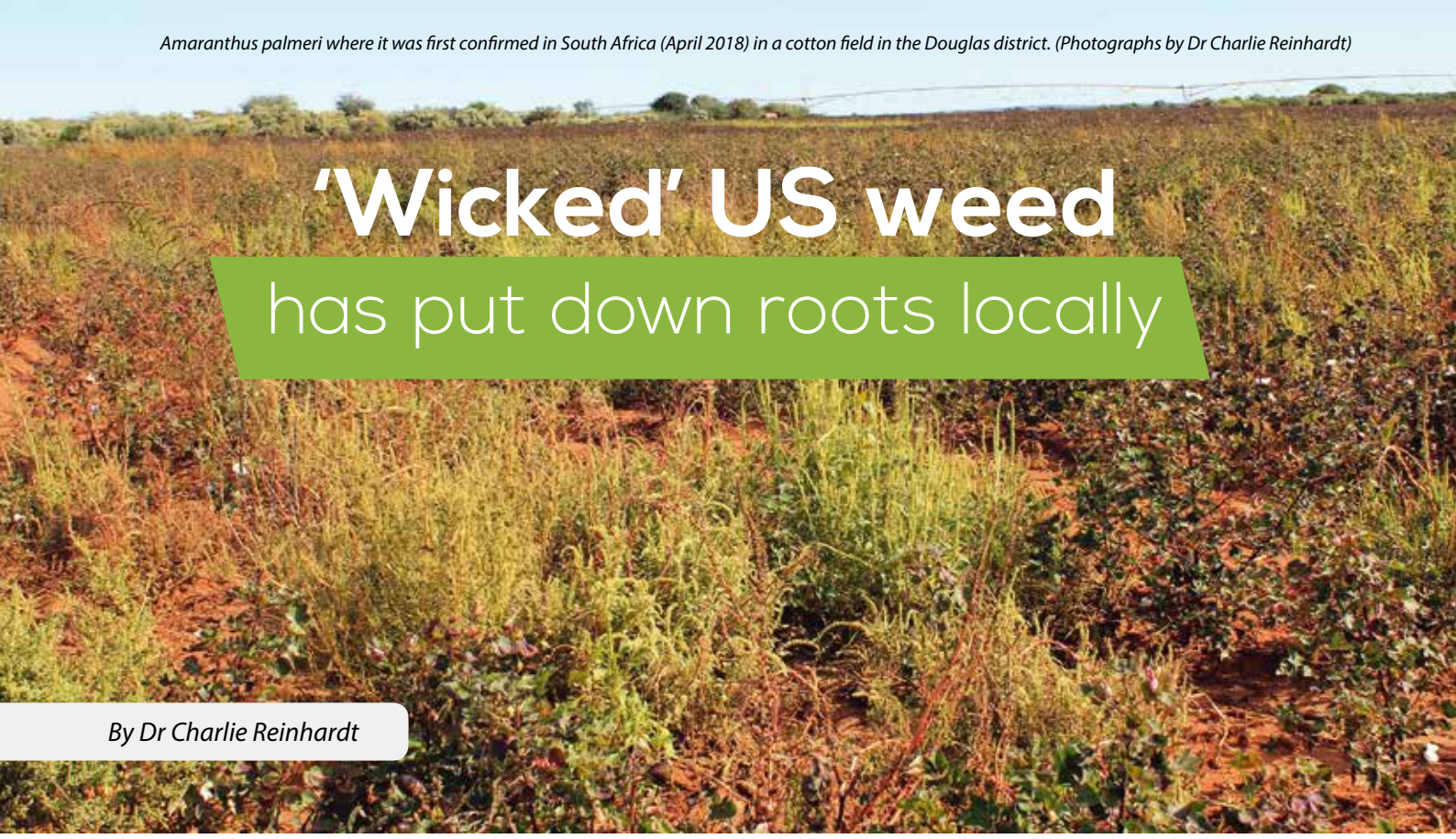
In addition, the implementation of the area differential also limits opportunities for basis trading in the physical market. According to Jannie de Villiers, CEO of Grain SA, it is very important that the market system strives to meet free market principles according to which supply and demand determines the direction of stock movement and realisation of price levels.

Producers from the western production areas explained that surpluses constantly presenting itself in certain areas, will automatically be resolved by the free market. Thus either fewer plantings will realise in the area or investment will be directed at processing. Production areas located close to processing plants will also enjoy the benefits of location and its accompanying premiums.

The workshop agreed that many of the challenges experienced can also be addressed by developing an effective system for the trading of futures contracts. A request was made that the JSE spends time and energy in this regard. In general everyone who attended the workshop felt that it was positive for grain farmers, while Grain SA was satisfied that the organisation could make a positive contribution.

– *Grain SA press release*

*Amaranthus palmeri where it was first confirmed in South Africa (April 2018) in a cotton field in the Douglas district. (Photographs by Dr Charlie Reinhardt)*



# 'Wicked' US weed has put down roots locally

*By Dr Charlie Reinhardt*

The term 'wicked' weed is borrowed from the field of sociology where a wicked problem is defined as one without clear causes or solutions, and thus difficult or impossible to solve (Shaw, 2016, *Weed Science: Special Issue*, pp 552-558). Herbicide resistance is considered the epitome of a wicked problem: "The causes are convoluted by a myriad biological and technological factors, and are fundamentally driven by the vagaries of human decision-making."

In advocating a fresh approach for the effective management of herbicide resistant (HR) weeds, there is a growing school of thought that HR weeds must be understood as a multi-faceted socio-economic problem, not merely a biological phenomenon, and failure to do so guarantees that lack of progress in curtailing the evolvement of HR weeds will continue.

## First population in South Africa

On 9 February 2018, I visited a farm in the Douglas district (Northern Cape) to investigate a case of an *Amaranthus* weed species that proved difficult to control in Roundup Ready™ cotton. By April 2018, this particular population was confirmed through herbarium and DNA analysis as that of *Amaranthus palmeri* (vernacular names: Palmer amaranth; careless weed), which is currently rated America's top 'wicked' weed in terms of its detrimental impact on maize, cotton and soya bean production.

Investigation on its current distribution in South Africa, its tolerance to various herbicides, and management options is underway in the South African Herbicide Resistance Initiative (SAHRI) research programme at the University of Pretoria.

Several *Amaranthus* species are common weeds in South Africa. Some types are indigenous and others are exotic (alien), but over time all have become naturalised in a variety of habitats, including crop systems. *Amaranthus* species are well known for their high nutritional value for animals and humans. The traditional name for plants in this group is *marogo* or *marog*.

*Amaranthus hybridus* (Cape or common pigweed) is the best known weedy type of *Amaranthus* in South Africa, and its origin also happens to be North America, except that it reached our shores many decades ago. Varieties of *A. hybridus* are grown as food crops for their grain and general significant nutritional benefits for livestock and humans.

*Amaranthus palmeri* is an annual (lifespan less than about twelve months) spring/summer season plant belonging to the family *Amaranthaceae*, which comprises 75 species worldwide. *A. palmeri* is indigenous in the northern parts of Mexico and the south-western areas of the US. In the past ten to 15 years of it being recognised as a particularly harmful weed in the US, it has spread rapidly to other parts of that country where it is especially problematic in maize, soya bean and cotton.

## Origins and impact in the US

In the US, *A. palmeri* is classified as an unlawful (has to be controlled), noxious weed in the states of Delaware, Minnesota and Ohio – similar classification is currently considered in other states (Murphy *et al*., 2017). Information on *Amaranthus palmeri* and guides on its identification are freely available, for example: *www.wileyonlinelibrary.com DOI 10.1002/ps.4632; www.caes.uga.edu; www.agweb.com; bulletin.ipm.illinois.edu.*

Historically, *A. palmeri* was restricted to the semi-arid and arid south-western parts of the US, from where humans and their activities disseminated the

weed seed – as contaminants of grain, through the movement of machinery and implements, as well as shifting agricultural practices – to the most important crop production areas of that country.

A national survey conducted in the US in 1989 identified it as a weed in southern US; in 1995, it was listed as the most noxious (harmful) weed in cotton in only two southern states, namely North and South Carolina; by 2009, it was recognised as the most noxious weed in cotton in nine southern states, and the second most noxious weed in soya bean. In 2014, *A. palmeri* had attained the status of most problematic and economically most important weed of maize, soya bean and cotton in the US as a whole.

## Adaptability and control

*Amaranthus palmeri* is described as the US's number one weed because of its strong competitive ability with crops, and the consequent economic losses incurred due to the cost of special control measures and crop yield losses. This formidable weed is fittingly referred to as a 'wicked' weed because of its ability to thwart the best weed control measures and to establish rapidly across diverse environments.

In 2016, it was recorded for the first time in Argentina (Berger *et al.,* 2016, *Palmer Amaranth Identification and Documentation of ALS-resistance in Argentina. Weed Science Vol 64*, pp 312-320).

Because it originates from semi-arid regions in the US, this weed has the ability to wreak havoc in most parts of South Africa where crops are produced, perhaps with the exception of the winter rainfall region. But then again, it might happen that no region in the country, or the greater part of Southern Africa for that matter, will be spared this wicked weed.

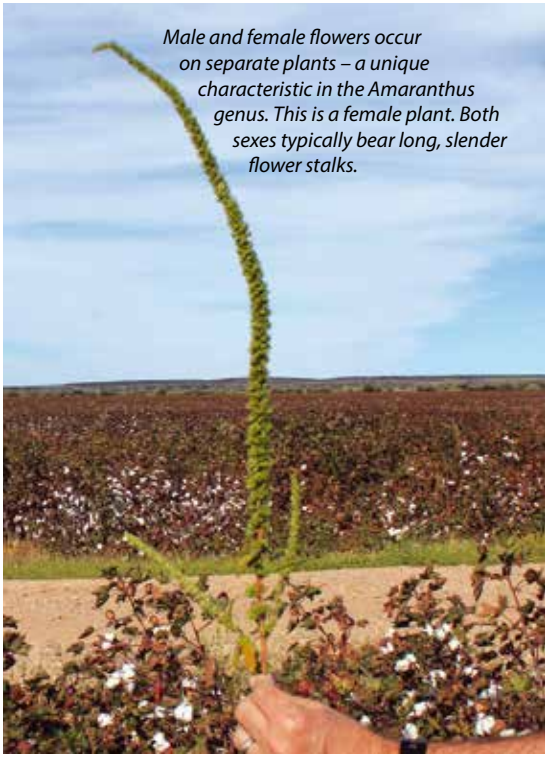
Research in the US found that soya bean yields were reduced by 78% by *A. palmeri* when present from crop emergence, and at a density of 8 plants/m$^2$. Maize yields were reduced between 11 and 91% by 0,5 to 9 *A. palmeri* plants/m$^2$. This weed reportedly produces as many as 500 000 to 1 million seeds per plant.

Seeds can apparently survive for at least three years in soil and remain viable. The photosynthetic efficacy of *A. palmeri* is reportedly three to four times greater than that of cotton, maize and soya bean, and explains its successful competition with these crops.

Experience in the US teach that successful control of this weed should be aimed at eradication and, at minimum, containment. Obviously, thorough surveys of crop fields in not only the Douglas district but also further afield, will form the foundation of management efforts. Not all is doom and gloom, because we can learn from US tactics and strategies developed over the last 10-15 years to contain this weed at levels that are manageable and tolerable at the same time.

## Ability to evolve resistance

An exacerbating characteristic of *A. palmeri* is its ability to evolve resistance in a relatively short time to a range of herbicides. Palmer amaranth is dioecious (sexes occur on separate plants), which means outcrossing is forced and makes for high genetic diversity in this species. This trait makes it highly adaptable to diverse environments and promotes rapid evolvement of herbicide resistance across herbicide modes of action.



*Male and female flowers occur on separate plants – a unique characteristic in the Amaranthus genus. This is a female plant. Both sexes typically bear long, slender flower stalks.*

At this stage in the US, the weed has developed resistance to five groupings of herbicides, classified according to their mechanism of action, namely: protoporphyrinogen oxidase (PPO) inhibitors, photosynthesis (PSII) inhibitors, acetolactate synthase (ALS) inhibitors, microtubule disruptors, and to glyphosate herbicide, an EPSPS enzyme inhibitor.

In the US, different Palmer amaranth populations show variable resistance to the aforementioned herbicide mechanisms of action, with the most common type of resistance to ALS inhibitors and glyphosate. The rendering ineffective of such major herbicide groups has had nearly incalculable crippling consequences for especially maize, cotton and soya bean production in the US. We will do well to take heed and make utmost speed with its management!

*The simplest way to identify Palmer amaranth when it is not in flower is to compare leaf stalk (petiole) length with the length of the leaf blade. It is easily done by folding the petiole over the length of the leaf blade as shown in the photograph. If the former (petiole) is longer than the latter, Palmer amaranth is virtually certain (note: not all leaves on a particular plant will have this characteristic).*

Dr Charlie Reinhardt is an academic in the Monash/Villa Partnership for training in crop protection, extraordinary professor in weed science at Stellenbosch University, and project leader in the SAHRI at the University of Pretoria. Contact him on 083 442 3427 or email dr.charlie.reinhardt@gmail.com.

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*Canola on dryland with wheat under irrigation in the background. Canola presents many benefits when cultivated under irrigation together with wheat.*

# Canola performs well under irrigation

*By Hugo Lochner*

*In the Southern Cape area canola under irrigation has traditionally not been able to compete with wheat in respect of yield and profitability. Yet canola has other benefits making it an excellent rotation crop in the region.*

Canola can be profitably cultivated under irrigation in the Southern Cape. When managed correctly, canola has the potential to deliver a yield of three to four tons per hectare.

According to Francois Badenhorst of the farm Jubileeskraal near Swellendam, canola is not as profitable under irrigation as wheat, but it does create an opportunity for controlling grasses and relieving weed pressure throughout the year.

"In my farming operation I rotate wheat and maize under irrigation, with canola breaks that serve to lower the pressure of root disease. These diseases can become a major problem where wheat and maize are cultivated in short sequence."

Badenhorst started farming on Jubileeskraal together with his father in 2004 and took over in 2007. During 2007 he effected some major changes by moving away from conventional cultivation to a no-till system. He has been applying no-till for ten years now.

Two years ago he made another major change when he switched to a track management system, got rid of his livestock (now farming grains only) and diversified by cultivating crops under irrigation (centre pivots).

He realised that he had to dispose of this livestock component if he wanted to fully refine his track management and no-till, and to specialise in grain cultivation.

"Livestock remove too much crop residues from the soil, which I cannot afford. The soil needs as much cover as possible to protect it against erosion, conserve moisture and improve soil life."

## The benefits of rotation

For example, when it rains in summer, maximum ground cover is needed to conserve soil, and weeds have to be controlled chemically in order to prevent moisture loss.

A good rotation system is important, as Badenhorst farms only with grains (continuous cropping). He plants wheat, canola and barley on dryland, with canola being planted every third year. Canola is also planted under irrigation every third year during winter, following two years of wheat. In summer he uses rotation to cultivate maize and soya beans under irrigation.

According to Badenhorst canola is an important link in his farm's rotation system on both dryland and under irrigation. The fact that it is a broadleaf crop allows him to apply good grass control on dryland every third year, especially where grasses develop resistance against certain herbicides.

The same applies to canola under irrigation, but with the added benefit that it serves to form a break against root diseases. These diseases increase where maize and wheat are cultivated shortly after one another. By planting canola every third year in winter, this cycle is broken and disease pressure is lowered.

Maize is rotated with soya beans every third year. The benefit of this crop is that it binds the nitrogen in the soil and does not transfer root diseases to maize. However, due to the fact that the heat units in the area are quite high and the water not suitable for soya beans, the yield does not compare as favourably with that of inland

Advertorial

*By Koos Nel*

# Why estate planning **matters**

Losing a loved one can have a devastating emotional impact on a family and may severely impact your farming operation and your legacy. Death can also have difficult financial and business consequences. While nobody wants to dwell on their mortality, the fact is that proper personal financial planning extends beyond the grave. With a little forward planning and some clear instructions, you can help to reduce the financial burden your family might face.

## Why do estate planning?

It's not something anyone really wants to think about, but you need to do it for the sake of the people closest to you. To minimise their stress in the event of your passing, set aside some time now for estate planning.

Estate planning must clarify the plan and vision for your family business and create certainty for your dependents, children and successors. An important part of the process is to determine the liquidity needs in your estate to make provision for taxes (income and capital gains taxes, as well as estate duty) and capital required to ensure an equitable distribution of assets.

Having a valid Will in place is the only way to ensure that your estate is distributed according to your wishes and plans after your passing. It is also important to review it regularly and to update it whenever necessary, such as when major life changes happen.

For example, you have three months after you get divorced to change your Will. Thereafter, unless you change it, it will be assumed that it was your intention not to change your Will. If you left everything to your ex-spouse, it will still apply.

Dying intestate (without a Will) can have significant implications for those left behind and the *Intestate Succession Act*, 1987 (Act 81 of 1987) will then determine who inherits what.

## Lack of sufficient cash

One of the biggest problems encountered in the wounding up of estates is the lack of sufficient cash (to pay creditors, income tax, capital gains tax, and estate duty and executors fees), forcing the executor to sell some of your assets. A solution is to have some life assurance that will pay out an amount to your estate in order to cover any cash deficit.

There are different steps and options to consider with estate planning. The best option is to let your financial planner or broker assist you in making sure that all aspects are considered and taken care of.

For more information, contact your Old Mutual financial adviser or broker, or Koos Nel at knel1@oldmutual.com or 082 459 1407.

production. Hence soya beans are used exclusively to create breaks on his land.

Badenhorst is considering replacing soya beans with a grazing mixture sold as silage to his neighbours, and which is also worked into the soil.

## Planting information

The plant densities on his land are as follows: Wheat 70kg/ha, barley 40kg/ha and canola 2,5kg/ha. In the case of the irrigated crops he plants wheat at 90kg/ha and canola at 3kg/ha. Maize must have a stand of 90 000 at a row width of 0,762m.

The wheat under irrigation is planted between 20 April and 1 May, and the maize is planted from 15 October onwards as soon as the wheat has been harvested. With the wheat he plants rapid growers and for maize ultra-rapid growers.

Fertiliser is applied on the irrigated fields based on a potential of 7,5 tons of wheat and 16 tons of maize. The fertiliser includes 5m$^3$ of chicken manure per hectare every two years.

Finding suitable irrigation cultivars was a challenge, as seed companies don't breed cultivars for irrigation in the winter rainfall areas. The wheat cultivar he plants is a dryland cultivar. To prevent this cultivar from growing too vigorously, he applies a growth regulator to manage growth. This application leads to thicker plant stems with shorter internodes and larger veins with more seed pods.

The same applies to canola. The cultivars that are planted are also dryland cultivars with good standing ability. The maize and soya bean cultivars were also bred for the summer rainfall area.

## The irrigation system

The irrigation operation is conducted with two seven-tower centre pivots. When he purchased the pivots, Badenhorst wanted certain requirements to be met. Firstly the product had to be of exceptional quality, secondly the supplier had to offer a fully automated package, and thirdly he wanted good aftersales service plus a good long-term relationship.

He bought two Zimmatic centre pivots from Lindsay Africa, as the products and the company met all his requirements. The systems are developed so that the pivots can release 10mm and 12mm in 24 hours. This is sufficient in his case, as the maximum water requirement of the maize is 8mm in 24 hours.

Because of the poor quality of the irrigation water on his farm, the water is not pumped via the pivot's pipes, but through the PVC pipes mounted on top of the pivot. Electric cables run through the pivot's pipes in a bid to prevent theft.

Badenhorst can manage the Zimmatic pivot with FieldNET from literally any place in the world – all he needs is internet access. In this way he can see where the pivot is located on the field, he can switch it on and off, determine the amount of water and fertiliser to be released, and he can see exactly how long it would take to complete the cycle. The system will also inform him should there be any errors or other problems.

Because the soil types under the pivot differ, he has divided each circle into quarters and installed a moisture probe in each quarter. The Zimmatic system allows him to manage each of the four zones differently by adapting the water and fertiliser release.

During winter he supplements irrigation on the wheat and canola fields. The crops that are cultivated under the pivot during the dry and hot summer months, are fully irrigated.

The water requirements of the crops are, among others, determined by the evaporation rate (information gained from a weather station on the farm), other information drawn from the moisture probes and field observations.

With the maize, for example, the point of departure is field capacity, after which gathered information is used to determine the irrigation levels. At Jubileeskraal the maize requires a total of 600mm which allows for an average water efficiency of 25kg per mm water.

Badenhorst believes that the ideal irrigation system is a fully automated one. The centre pivot, moisture probes and weather station must all be linked to the computer so that automatic measurements can be made. This is currently not possible, but he is in the process of testing one of Lindsay Africa's weather stations for this purpose – a step in the right direction.

*Francois Badenhorst with the Zimmatic FieldBOSS control panel, mounted against the tower of the centre pivot. With FieldNET the pivot can be controlled from anywhere in the world via the internet.*


*The centre pivot's pipes are not used to pump water, as the water quality is too poor. Water is pumped through the PVC pipes on top of the pivot.*

# Shortened canola planting periods: **Most recent results**

*By Dr Johann Strauss, Canola Focus*

The normal recommendation for canola plantings is to ensure that there are at least three years between plantings in the same field. The main reason for this recommendation is possible disease problems. Within the Riversdal crop rotation trials it was decided to look at shorter planting periods over a longer term, and specifically at yield and its impact on the systems' economy.

In 2012, the trials changed from testing the order of different crops after lucerne to testing cash crop systems. Six systems are currently being tested at Riversdal, although in this article we only focus on the systems that include canola. The different systems are indicated in *Table 1*. A note is included that indicates whether it can be classified as a shortened withholding period system with regard to canola cultivation.

The question now arises why the WLWC system is classified as short. The answer is contained in the occurrence of possible disease hosts – in this case, lupins may be a possible host for *Sclerotinia*, among others. Even the five-year system has lupins as rotation crop and is therefore regarded as medium (according to plant pathologists).

**Table 1: Description of crop rotation systems in Riversdal.**

| System | System crops | Short rotation |
|---|---|---|
| WC | Wheat-canola | Ultra-short |
| WLWC | Wheat-lupins-wheat-canola | Short |
| WCC | Wheat-cover crop-canola | Short |
| WBC | Wheat-barley-canola | Short |
| BLWWC | Barley-lupins-wheat-wheat-canola | Medium |

**Table 2: Annual and average canola yield in the Riversdal crop rotation trial.**

| System | 2013 | 2014 | 2015 | 2016 | 2017 | Average |
|---|---|---|---|---|---|---|
| WC | 2,81 | 1,29 | 1,35 | 2,28 | 1,13 | 1,77 |
| WLWC | 2,16 | 1,46 | 1,52 | | 0,96 | 1,53 |
| WCC | 2,77 | 1,51 | 1,74 | 2,79 | 1,25 | 2,01 |
| WBC | 2,29 | 1,51 | 1,16 | 1,86 | 1,07 | 1,25 |
| BLWWC | 2,14 | 1,37 | 1,36 | 2,17 | 1,04 | 1,69 |

Blackleg is still an important disease in canola production. Fortunately, there are many good cultivars with resistance available, as well as agronomical practices with regard to preventative disease control using chemicals. The last few years, though, saw the emergence of *Sclerotinia* that caused quite a lot of damage, especially in the Southern Cape. In this article we also look at the effect of this disease on the various systems.

## Canola yield

The average canola yield is indicated in *Table 2*. We compare the yield data obtained over the past five years for canola between the five different systems. Bear in mind that the different crops for each system is present each year and the indicated yield is the average value of three repetitions.

Over the five-year period, the average canola yield within the ultra-short rotation system (WC) compares well with the other systems, although there was a slump in the yield from 2013 to 2015. This slump was probably due to the occurrence of *Sclerotinia* (as can be seen in the next section).

After these observations, as described here, we started preventative spraying against *Sclerotinia*, which had a positive effect. We believe the system must be managed very carefully to limit the effect of diseases within the ultra-short and short rotation systems. It appears as though it can be successful.

As researcher, I would like to see the system tested in more areas before a general recommendation is made. Also of importance is the

**Figure 1: History of *Sclerotinia* in the crop rotation system trial.**

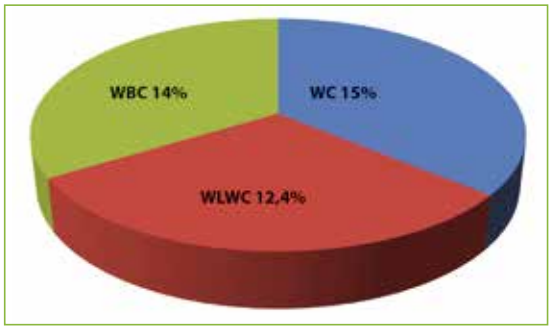


**Figure 2: Contribution of different crops to the gross margin of their particular systems in each year, and the average over time.**

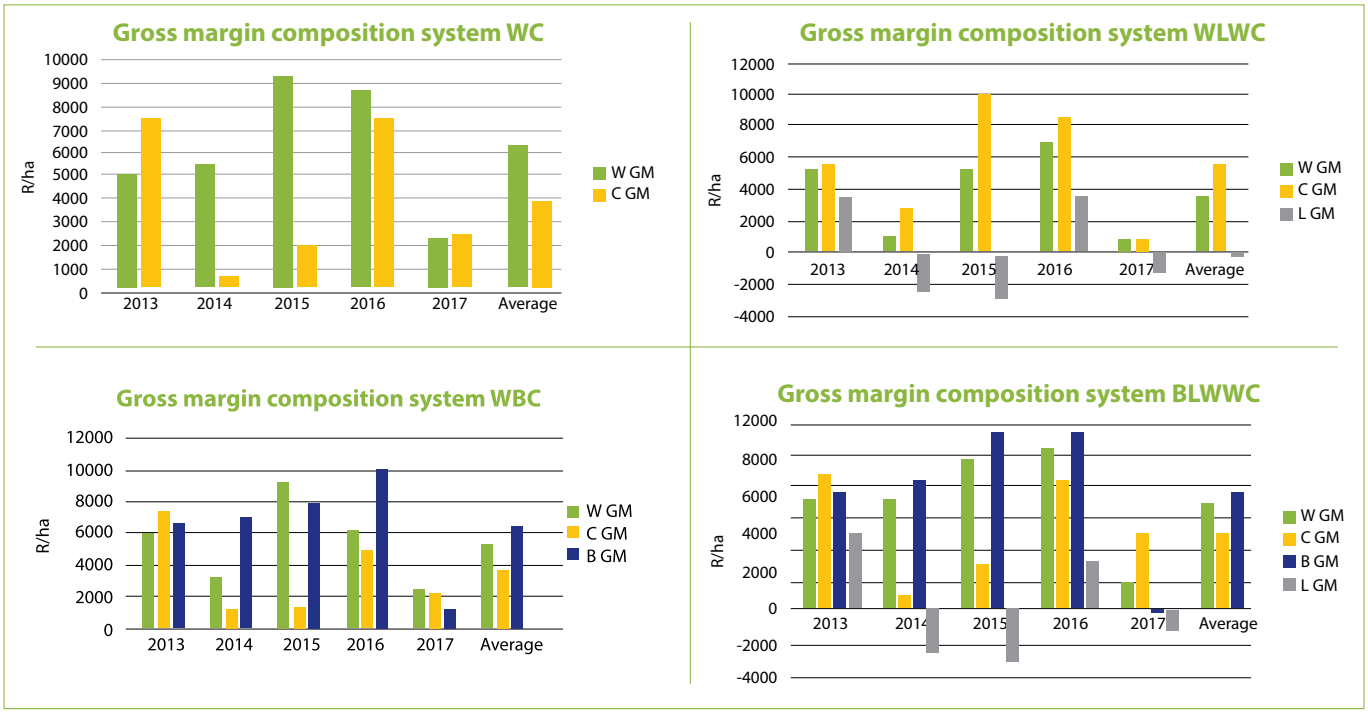



**Table 3: Average system gross margin in rand per ha for the period 2013 to 2017 for each system where canola is cultivated, excluding the system that includes cover crops.**

| System | 2013 | 2014 | 2015 | 2016 | 2017 | Average |
|---|---|---|---|---|---|---|
| WC | 6 193 | 2 555 | 5 598 | 8 050 | 2 318 | 4 943 |
| WLWC | 5 300 | 1 173 | 5 113 | 6 919 | 599 | 3 821 |
| WBC | 6 654 | 3 792 | 6 166 | 7 038 | 1 968 | 5 124 |
| BLWWC | 5 567 | 2 805 | 4 975 | 7 157 | 1 112 | 4 323 |
| (C = canola, W = wheat, L = lupins, and B = barley) | | | | | | |

canola's performance after the cover crop; the canola was planted after a legume cover crop each time.

## *Sclerotinia* stem rot

Since 2013, three different rotation systems, namely wheat-canola (WC), wheat-lupins-wheat-canola (WLWC) and wheat-barley-canola (WBC), have been monitored for *Sclerotinia* stem rot. These three systems are compared with each other in *Figure 1* over the 2013 to 2016 seasons.

Over the whole monitoring period the ultra-short rotation system showed the highest infestation figure. The data for the four years were statistically analysed (ANOVA) and the result is that there were no significant differences between the systems.

In 2016, the other two systems that also contain canola were added to the *Sclerotinia* monitoring project. Statistically the WC, WLWC and BLWWC systems had significantly more *Sclerotinia* infestation in 2016 than the WCC and WBC systems.

## System gross margin

The average gross margin of each system is shown in *Table 3*. It appears from this data that the ultra-short system, compared to some of the other systems, performs excellently. It should be remembered, however, that the WCC system cannot be applied as cash crop system as is, because the inclusion of a cover crop causes a decline in the average gross margin of such a short system.

Despite this, the canola planted after the legume cover crop performs much better in terms of yield. We also provide less top dressing to the canola compared to other systems. One of the biggest disadvantages of the system is the contribution of lupins. The yields were almost non-existent or very low in various seasons, with a resulting negative effect on the eventual gross margin.

For a more complete picture, the contribution of each crop to the gross margin within each system is indicated in *Figure 2*.

## In conclusion

The shortened canola production systems show good potential but will require very good management to control the possible negative effect of diseases. This data was collected over a five-year period, which is relatively short. It will be interesting to see if the conclusions made can be maintained in the long term.

Alternating cultivars (thus different genetic resistance sources) and chemicals to control blackleg is currently a very good option. In the case of *Sclerotinia*, only the chemical route is available as a preventative control option.

# **Effect of** moisture stress and high temperatures **on soya bean yields**

*By Mike Staton, Michigan State University Extension*

Soya bean yield losses are most likely to ensue when moisture stress occurs during germination and reproduction. Inadequate soil moisture during germination causes uneven and spotty emergence. This is why soya bean agronomists recommend placing soya bean seed into at least 1,3cm of moist soil at planting.

Excess soil moisture at planting was a problem for most areas of Michigan during May and early June 2018. However, soya beans that were planted later in June or early July may have germinated under marginal soil moisture conditions.

Soya beans can tolerate moisture stress relatively well during the vegetative stages. Stress at this time reduces shoot growth, but not root growth. These conditions diminish water use by the plants and increase their ability to extract water from the soil.

## High soil temperatures

Planting early is a recommended tactic to mitigate the adverse effects of moisture stress. This is because the plants will have deeper roots for extracting soil moisture and a larger crop canopy, which shades the soil and reduces soil moisture losses due to evaporation.

This tactic seems to be working in 2018 as the early-planted fields are tolerating the moisture and high temperature stress better than the late-planted fields.

Very high soil temperatures (32°C) can cause decreased nodulation and nitrogen fixation to occur in soya beans. High soil temperatures are most likely to have occurred in late-planted beans, due to the reduced canopy cover, and on coarse-textured soils.

Producers can evaluate nodulation by digging up some plants and inspecting the nodules. Well-nodulated soya beans should have seven to 14 nodules on the tap root at flowering. Nodules that are actively fixing nitrogen will be pink to red when cut open. Research has shown that supplemental nitrogen applications to drought-stressed soya beans are not profitable.

## Flower production

At this time, most soya bean fields are in the R2 (full bloom) growth stage. Soya bean plants respond to drought in this growth stage by aborting flower blossoms, and lower leaves are dropped in severe cases.

While flower production can occur for 30 to 40 days under good conditions, moisture stress and high temperatures will shorten the flowering period. A reduction in moisture stress any time during this period will enable the plants to produce and retain new blossoms to compensate for those aborted during R2.

During the R3 growth stage (one pod 0,5cm long on the upper four nodes on the main stem having an unrolled leaf), drought-stressed soya bean plants will abort both flowers and pods. Temperatures above 35°C have been shown to significantly decrease pod set. Leaf loss can also occur in severely stressed plants. If the moisture stress ends, soya beans will produce new flowers and pods up to the R5 stage (beginning seed).

Soya bean yield losses will be greatest when moisture stress occurs between the middle of the R4 growth stage (beginning seed swell in any pod on the plant) and the middle of the R5 growth stage (full seed in any pod on the plant).

## Number of pods and seeds

Stress at this time reduces the number of pods per plant as the plants are no longer able to produce new blossoms and pods. This is the major source of the lost yield. However, the number of seeds per pod and the size of the seed can also be reduced at this time. Leaf loss will continue in severely stressed plants.

Moisture stress occurring at the R6 growth stage (one pod having green seed that completely fills the pod on one of the upper four nodes on the main stem having an unrolled leaf) is largely due to a reduction in seed size.

A reduction in pod number per plant can occur, but is much less likely after R6. Stress occurring after the R7 growth stage (one normal pod on the main stem has reached its mature colour) does not affect yield.

For more information, visit the Michigan State University Extension website *www.msue.msu.edu*.

# Potassium for soya beans

*By the Potash and Phosphate Institute (PPI)*

*No other crop produces protein like soya beans, in both quantity and quality. It is therefore not surprising that hectares planted with soya and production continue to grow. As with many high-protein crops, soya beans are rich in potassium. It is important to consider replacing what soya beans remove.*

The North American soya bean crop removes more than twice as much potassium as it receives in the form of fertiliser. Every bushel (27,2kg) contains almost 800g potash. Planted following maize, the high removal has rarely been a problem, as maize leaves behind more than two-thirds of the potassium it takes up from the soil. The potassium left behind becomes available when rains between growing seasons wash it out of the crop residues and back into the soil. However, the incidence of soya beans following crops other than maize is increasing.

Potassium fertility therefore needs more attention. It is often observed that soil fertility determines only a small part of yield for a successful soya bean crop. That is true when soil fertility has been managed well for maize. Yet as new rotations involve potassium-hungry soya beans more frequently, the importance of soil fertility will be increasing.

Conservation tillage systems also change potassium needs. In such systems, potassium builds up near the soil surface and is depleted further down. In addition, soils may become more compacted and cooler, restricting root growth. With less roots exploring the soil volume, potassium uptake can be reduced. In clay-textured soils, wet or flooded conditions can make potassium less available by increasing soil fixation.

## Increased resistance to pests

While soya beans will respond to broadcast potassium, they respond more often when the fertiliser is placed in a band a short distance away from the seed. The most frequent responses in Iowa and Minnesota have occurred with deep banding, where potash have been placed approximately 15cm deep.

In other areas, responses were more common when the band was 5cm away from and 5cm below the seed. Fertiliser in the seed furrow does not work well. Soya bean seeds are sensitive to fertiliser salts, even with the sulphate sources that have a lower salt index.

Potassium increases plant resistance to pests and diseases that often reduce soya bean yield and quality. When soya bean plants have a low potassium status, their ability to assemble proteins from amino acids is reduced. The amino acids that accumulate make the plant more attractive to pests and disease organisms. Higher potassium levels can reduce pod rot and purple seed stain. Maintaining high soil test levels is part of an effective management strategy to reduce the impact of the soya bean cyst nematode.

## Replacing potassium is key

Deficiency symptoms are often confused with other crop stresses. Soya beans affected by ozone air pollution, leafhoppers, or cyst nematodes often show the same yellowing of leaf margins that potassium deficiency produces. Diagnose the real cause with soil and tissue tests for potassium.

Soya beans often respond to the residual potassium applied to previous crops. Even where soya beans do not respond directly to applied fertiliser, it is worth considering for the crop that follows. Base your decision on up-to-date, site-specific soil tests, and don't forget to include any diagnostic observations from last year's crops.

Replacing the potassium that soya beans remove is a key component of long-term stewardship of soil fertility.

For more information, contact Dr Tom Bruulsema, Eastern Canada and Northeast US Director, PPI, at tom.bruulsema@ppi-far.org.

# First Access to Seeds Index for Western and Central Africa

*Press release by the Access to Seeds Foundation*

The Access to Seeds Index, an initiative funded by the Bill & Melinda Gates Foundation and the government of the Netherlands, aims to encourage seed companies to step up their efforts to support smallholder farmer productivity.

"By benchmarking seed companies, the index gives credit to companies that show leadership and encourages others to follow their example," says Ido Verhagen, executive director of the Access to Seeds Index. "It also provides valuable information for governments, research institutes and donors interested in building partnerships with seed companies."

## Western and Central Africa

The regional seed sector in Western and Central Africa clearly has potential. Of the 22 selected companies, 17 originate from the region itself. An interesting finding is the countries with multiple companies represented in the benchmark, including Nigeria with five and Mali with three.

In early 2019, the first Access to Seeds Index for Western and Central Africa will be published. It will show which seed company can be named 'leading in supporting smallholders in Western and Central Africa'. The selection of the 22 nominated seed companies was based on company business models, track record and regional presence. The selection process was overseen by a committee of seven experts from the region.

"Smallholder farmers need to not only produce more food, but at the same time adapt their agricultural practices to changing weather conditions caused by climate change. By improving access to quality seeds, seed companies can make a vital contribution in supporting smallholder farmers with overcoming this challenge," says Verhagen.

Improving the productivity of smallholder farmers is one of the main targets on the United Nations' Sustainable Development Goals (SDGs) agenda. By measuring the seed industry's performance, the Access to Seeds Index aims to contribute to achieving these goals.

In addition to seed companies, seed cooperatives play a crucial role in this region. In July 2018, the Access to Seeds Index launched an additional study on 54 seed-producing cooperatives.

## Eastern and Southern Africa

The second Access to Seeds Index for Eastern and Southern Africa will expand its scope further into Southern Africa. Seven more countries are involved and, as a result, five more companies are included in the ranking; 16 of the 22 selected companies originate from the region itself. Another interesting finding is the countries with multiple companies represented in the benchmark, including South Africa and Uganda, with four each, and Kenya with three. In 2016, the first Access to Seeds Index for Eastern Africa showed small differences between companies, with the exception of East-West Seed, whose performance significantly exceeded its peers because of its smallholder-centric business model. In early 2019, the second Access to Seeds Index for Eastern and Southern Africa will show which seed company is now taking the lead 'in supporting smallholders in Eastern and Southern Africa'.

| | Company | Country | Seed portfolio | Ownership |
|---|---|---|---|---|
| 1 | AGRIPLUS | MLI | Field crops & vegetables | Private |
| 2 | AINOMA | NER | Field crops & vegetables | Private |
| 3 | BILOHF | CIV | Field crops & vegetables | Private |
| 4 | De-Allgreen Seeds | NGA | Field crops & vegetables | Private |
| 5 | DowDuPont | USA | Field crops | Listed |
| 6 | East-West Seeds | THA | Vegetables | Private |
| 7 | Faso Kaba | MLI | Field crops & vegetables | Private |
| 8 | GAWAL | CHN | Field crops & vegetables | Private |
| 9 | Heritage Seeds | GHA | Field crops | Private |
| 10 | Maslaha Seeds | NGA | Field crops | Private |
| 11 | Monsanto | USA | Field crops & vegetables | Private |
| 12 | NAFASO | BFA | Field crops | Private |
| 13 | Pop Vriend Seeds | NLD | Vegetables | Private |
| 14 | Premier Seed | NGA | Field crops & vegetables | Private |
| 15 | Seed Co | ZWE | Field crops & vegetables | Listed |
| 16 | SEDAB | SEN | Field crops | Private |
| 17 | SEMAGRI | CMR | Vegetables | Private |
| 18 | Soprosa | MLI | Field crops & vegetables | Private |
| 19 | Syngenta (ChemChina) | CHE | Field crops & vegetables | Private |
| 20 | Technisem | FRA | Vegetables | Private |
| 21 | Tropicasem | SEN | Field crops & vegetables | Private |
| 22 | Value Seed | NGA | Field crops & vegetables | Private |

*Regional index for Western and Central Africa.*

| | Company | Country | Seed portfolio | Ownership |
|---|---|---|---|---|
| 1 | Capstone Seeds | ZAF | Field crops | Private |
| 2 | Darussalam Seed Co | SOM | Field crops | Private |
| 3 | Demeter Seed | MWI | Field crops | Private |
| 4 | DowDuPont | USA | Field crops | Listed |
| 5 | East African Seed | KEN | Field crops & vegetables | Private |
| 6 | East-West Seed | THA | Vegetables | Private |
| 7 | Ethiopian Seed Enterprise | ETH | Field crops | State owned |
| 8 | Equator Seed Co | UGA | Field crops | Private |
| 9 | FICA Seeds | UGA | Field crops & vegetables | Private |
| 10 | Hygrotech | ZAF | Vegetables | Private |
| 11 | Kenya Seed Company | KEN | Field crops & vegetables | State owned |
| 12 | Kenya Highland Seed | KEN | Vegetables | Private |
| 13 | Klein Karoo Seed Marketing | ZAF | Field crops & vegetables | Private |
| 14 | Monsanto | USA | Field crops & vegetables | Listed |
| 15 | NASECO | UGA | Field crops | Private |
| 16 | Pop Vriend Seeds | NLD | Vegetables | Private |
| 17 | Seed Co | ZWE | Field crops & vegetables | Listed |
| 18 | Starke Ayres | ZAF | Vegetables | Private |
| 19 | Syngenta (ChemChina) | CHE | Field crops & vegetables | Private |
| 20 | Technisem | FRA | Vegetables | Private |
| 21 | Victoria Seeds | UGA | Field crops & vegetables | Private |
| 22 | Zamseed | ZAM | Field crops & vegetables | Private |

*Regional index for Eastern and Southern Africa.*

# The potential impact of a breeding and technology levy collection system in South Africa

*By the Bureau for Food and Agricultural Policy (BFAP)*

Plant variety protection legislation in South Africa and many other countries allow for 'farmer privilege', i.e. a farmer's right to save and replant the grain he produced as seed. For self-pollinated crops (such as soya beans, wheat and barley) where the offspring (seed) is genetically identical to the parent, this means that farmers only have to buy seed once and can continue planting the same variety in subsequent seasons.

The South African National Seed Organization (Sansor) estimates farm-saved seed for soya beans as high as 80% and wheat 70%. Because of the low seed sales volumes and an effective seed price ceiling, the return on self-pollinated crop seed research and development is limited. The financial motivation for seed companies to invest in local long-term, expensive breeding programmes or to import new germplasm or traits is thus limited.

Continued investment in seed research, breeding and technology transfer is vital for a competitive and sustainable agricultural sector. Without a competitive and thriving agricultural industry, the targets for inclusive growth and job creation as determined by the National Development Plan 2030 will not be achieved.

In line with a number of leading agricultural countries that have implemented End-Point Royalty (EPR) collection systems, South Africa has recently introduced a Breeding and Technology Levy (BTL) whereby an agreed fee is (will be) paid on every ton of soya beans, wheat and barley that is delivered. The levies are then transferred to the seed breeding companies and research institutions, according to each company or institution's seed sales market share. The focus of this article is on soya beans.

## Increased soya bean plantings

The South African soya bean area has increased considerably over the last 50 years, from less than 10 000ha to 787 000ha in 2017/18. In 1996, the area planted by South African farmers was still less than 100 000ha.

With increased crushing capacity ensuring local demand for soya beans, the active promotion of the benefits of including soya beans into a rotational cropping system, and management ease brought by genetically modified herbicide-tolerant soya bean varieties (released in 2001), more and more farmers choose to plant soya beans in rotation with maize. In 2017, soya beans surpassed sunflower seed as South Africa's second biggest summer crop.

## Yield potential

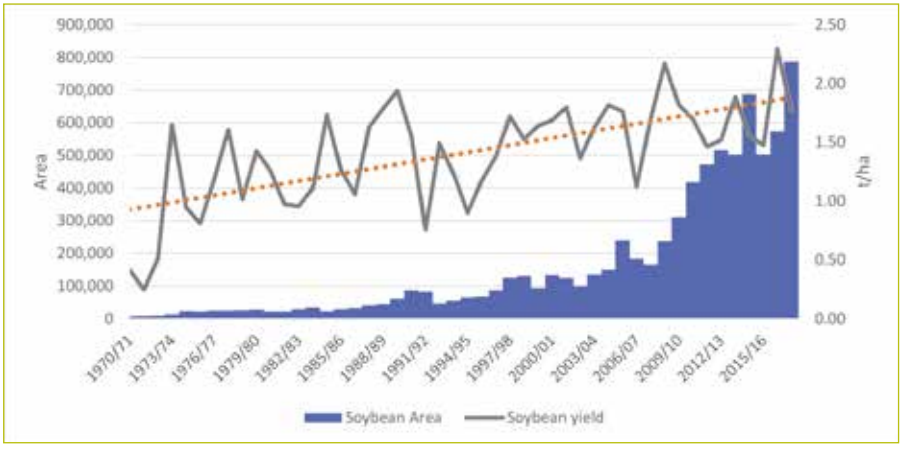
Compared to maize, the yield increase for soya beans has been significantly slower – 1,91% for 1970-2017. One important fact to consider when interpreting the lower yield for soya beans is that the area under soya bean production has increased rapidly. Western production regions that have traditionally been regarded as climatically more marginal for soya bean production are gradually coming into production.

Despite the significant variation in yields in recent years, South Africa has managed to produce a soya bean crop with an average yield of 2,29t/ha on 574 000ha in 2017. In the current season, average yields have fallen back again to an estimated 1,77t/ha due to more adverse climatic conditions (*Figure 1*).

Although average yields do not reflect the full potential of this expansion in the availability of seeds in combination with improved farming practices and investment in suitable mechanisation (planters and combines), it is expected that these investments will start to pay off in the next few years, if it can be maintained.

Although seed companies have taken the opportunity of expanding sales and market share on the back of the rapid growth of the industry, current market information indicates that companies are not willing to introduce the latest seed technology in South Africa without a guarantee that they will be able to earn a return on their investments.

**Figure 1: South Africa soya bean area and average yield. (Source: Sagis)**



This could have a significant impact on the competitiveness of soya bean farmers, who are facing very stiff competition from the major international soya bean producers not only from a yield perspective, but also from the ability to produce a consistent quality of bean. Considering the same 20-year period as for maize (1998-2017), the average annual yield increase for soya beans in the US was 1,46%, while yields increased by 1,33% in Brazil and 0,64% in Argentina.

Over this same period, soya bean yields increased marginally in South Africa, at 0,43%. Over the 20-year period, South Africa's average soya bean yield was 40% lower than the average obtained in the three leading soya bean countries. Although the recent droughts have played a role in South Africa's average yield trends, it is clear from *Figure 2* that yields over the long term have increased at a higher pace in major soya bean exporting countries, such as the US and Brazil, than in South Africa (*Table 1*).

**Table 1: Annual average soya bean yield increase between 1998 and 2017.**

| Country | Percentage |
|---|---|
| US | 1,46% |
| Brazil | 1,33% |
| Argentina | 0,64% |
| South Africa | 0,43% |

The potential economic value of yield improvements is based on alternative assumptions regarding the outlook of yields, which are introduced in BFAP's sector level model. BFAP publishes a baseline each year where a 10-year outlook is presented for 44 agricultural commodities.

> South Africa has recently introduced a Breeding and Technology Levy (BTL) whereby an agreed fee is (will be) paid on every ton of soya beans, wheat and barley that is delivered.

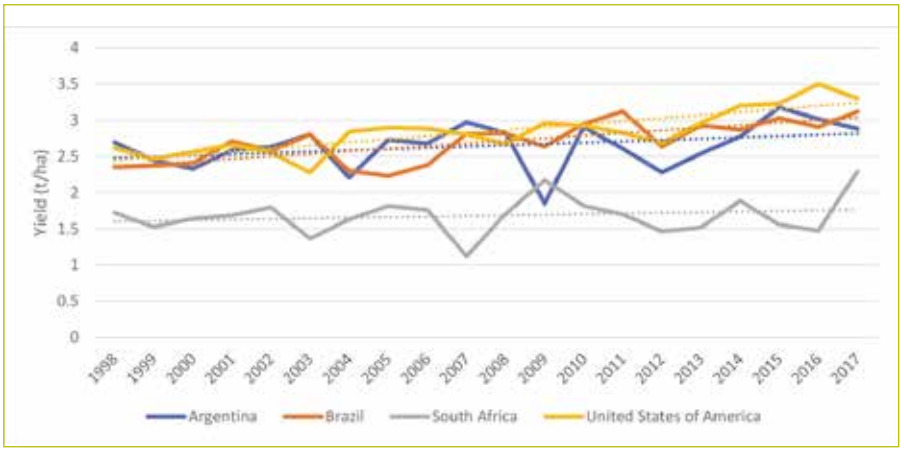
The most important assumption for this exercise is that 'normal' weather is used for the outlook, which obviously makes the outlook on yields far more stable than what the reality would be. However, it also provides the opportunity to measure the impact of various growth paths over time.

In the case of soya beans, the BFAP baseline – presenting the yields of the past decade as well as the projected yields for the next ten years – projects an average annual growth rate of 2% over the next decade compared to the growth rate of 0,33% over the past decade.

In other words, the baseline already presents a positive outlook on yield increases due to the significant investment that has taken place in recent years. Based on this growth rate, an average yield of 2,1t/ha is projected by 2027 on approximately one million hectares under production.

If it is assumed that a step change occurs in the annual average growth rate, due to increased investment in seed technology, and it increases by 1% above baseline projections to reach 3,5% over the outlook period, it implies that the average yield will be 2,5t/ha in 2027. At the projected equilibrium price, this alternative growth path in yields would represent an increase in industry revenue of just over R1 billion per annum by 2027.

**Figure 2: International soya bean average yield trend comparison. (Source: Sagis and FAO STAT)**




## Integrated value chains

The integration of the primary soya bean industry into the feed industry, and consequently the production of broilers and chicken meat, serves as a useful illustration of the importance of the competitiveness of a primary industry for the economic sustainability of downstream industries.

Since 2012, 1,75 million tons of dedicated soya bean crushing capacity was developed in South Africa, which represents a total capital investment of approximately R2 billion. Currently, the local demand for soya bean cake exceeds local levels of production. Even though the development of these new plants has resulted in an increasing replacement of imports by local production, there is still a significant amount of soya bean cake that is being imported.

Under these market conditions, the local soya bean prices are expected to trade between import parity and the derived price from cake and oil. Consequently, these newly developed crushing plants are competing directly with imported soya bean cake from major surplus producers of soya beans, such as Argentina, where soya bean prices are trading at export parity. This implies that the crushing plants in these countries are sourcing soya beans from a relatively lower cost base compared to their South African counterparts, which makes them highly competitive.

However, price is not the only driver in the evolution of the South African soya bean cake market. The current (2017/18) marketing year is a case in point – soya bean prices are trading closer to export

parity levels, with a crop estimated close to 1,4 million tons and positive crushing margins that should boost the uptake of soya beans in the crushing market.

However, the demand for locally produced soya beans remains subdued, mainly due to one of the major chicken producers in South Africa that still prefers the imported soya bean cake above the locally produced cake. According to reports, the preference is based on the consistent quality of the imported cake. The result is that around 500 000 tons of soya bean cake will be imported in the current season, despite the fact that South Africa can supply a significant share of this volume.

## Quality and consistency

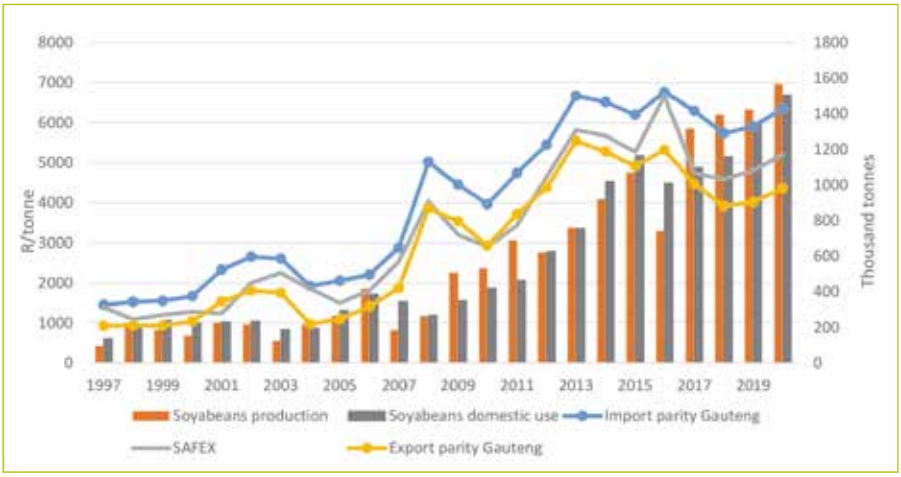
There are many arguments in the market around the local quality of soya bean cake versus the imported quality, which underlines the fact that the quality and consistency of seed delivered to the crushing plant also play a significant role in the economics of the integrated value chains.

It is anticipated that the current question around quality will be resolved, and it is only a matter of time until the major producer of chicken meat will also start consuming locally produced cake in greater quantities. *Figure 3* illustrates this scenario and presents an outlook over the next few years where soya bean prices in South Africa will again be trading between the import parity and derived price for meal and oil – this is where the pricing scenarios start playing a role.

In the alternative scenario for soya bean trend yields, the projected increase in production is large enough to result in soya bean prices trading significantly lower, in other words between the export parity and derived price for oil and cake. This will have a positive impact on the relative competitiveness of the crushing plants and will drive the demand for locally produced soya beans, and consequently soya bean cake, to a significantly higher level.

In other words, the investment in the primary seed market is also a key driver for a thriving agro-processing industry. Based on the targets set by the NDP, the agro-processing industry is responsible for one-third of all the additional jobs that must be created by the agricultural sector.

**Figure 3: Soya bean local and parity price band.**



# a new sunrise

## While a new season filled with promise awaits, it is good to pause for a moment and remind ourselves of the general guidelines that pertain to a crop that is often assigned second-rate status, namely sunflower.

During the droughts that have plagued South Africa for a number of years, sunflower has come to the rescue of farmers, hence the importance of focusing on the crop for the upcoming season.

When contemplating the general guidelines that will give you the best shot at a successful harvest, we have to consider the factors sunflower likes and those it doesn't like.

### SY 3970 CL Product features

| | |
|---|---|
| Seedling vigour | **Excellent** |
| Drought tolerance | **Good** |
| Shattering tolerance | **Excellent** |
| Sickle neck | **Excellent** |
| Self-compatibility | **Excellent** |
| Plant height | **Medium-high** |
| Oil content | **44-46%** |
| Grain colour | **Black** |

### The following are helpful hints towards growing a healthy sunflower crop:

- Start by choosing Sensako's SY 3970 CL sunflower hybrid, which comes standard with the Syngenta CRUISERMAXX® seed treatment that offers protection against a wide spectrum of insects and pathogens.
- Do not plant the same crop in the same fields year after year. For most crops, a two- to three-year rotation cycle is necessary to keep diseases, especially Sclerotina, under control.
- Although it is difficult to determine exactly when the best time is to plant, growers are advised to ensure that the cultivar's pollination and seed set periods do not coincide with too high temperatures, drought or other adverse environmental conditions, as this can result in damage and the formation of so-called pale seeds. From October to the end of November is regarded as optimal planting time for the central regions, and until mid-January in the western regions.
- Avoid poorly drained soils, as well as highly acidic soils, for sunflower plantings.

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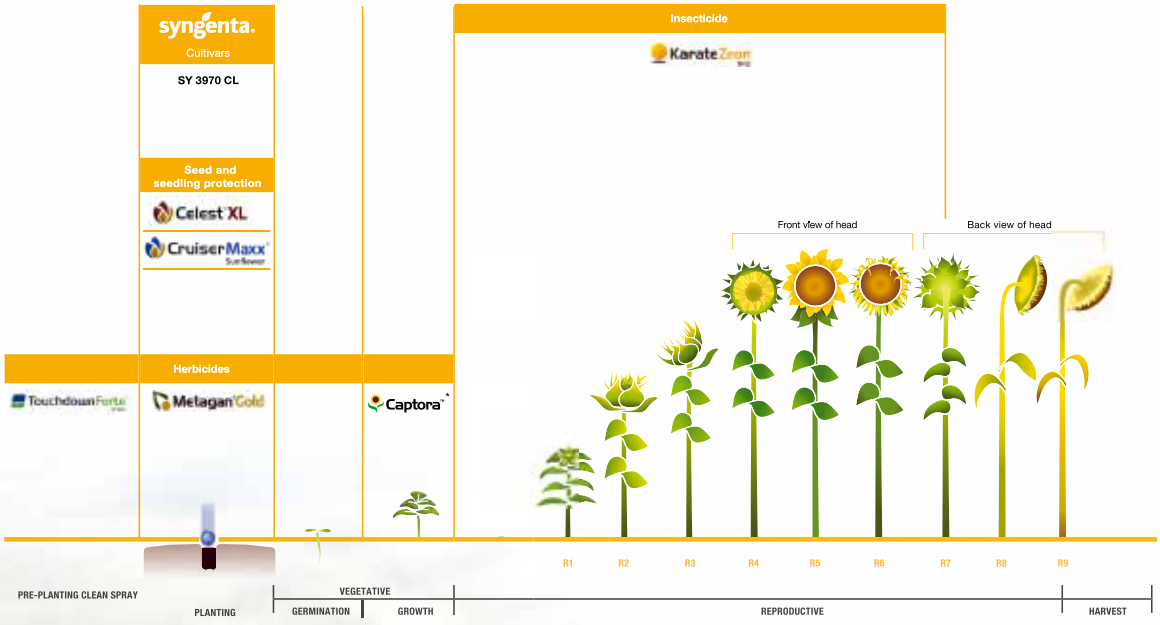
- Keep to the optimal plant stand of 35 000 to 42 000 plants per hectare and maintain a row width of 0.91cm, which works best in South Africa.

- If at all possible, do not supply the full nitrogen requirement in one application. Rather apply half during planting and the other half at 30 to 40 days after emergence.

- The first 45 days in the life of a young seedling are crucial as far as weed pressure is concerned. If weeds are not proactively managed and controlled in this critical period, growers can suffer massive crop losses. Sensako's excellent SY 3970 CL Clearfield hybrid allows growers to address this issue shortly after emergence with the application of Euro-lightning / CAPTORA®, a post-emergence herbicide. Growers should also not neglect to apply a pre-emergence grass herbicide during planting. The synergy between pre- and post-emergence herbicides is most effective in ensuring weed-free fields.

- Growers must note the waiting period for Euro-lightning, which is up to 10 months on maize and up to 20 months on all other crops, as well as the requirement of a minimum of 300mm of rainfall during the season. However, there is little cause for alarm, given that the system works effectively and without issues during a normal season in a crop rotation system with maize.




*For use only on qualified Clearfield® sunflower cultivars..

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Contact Pieter Craven from Senseed – 058 303 4690 / 082 388 0299.
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# Impact of nematodes on soya bean production in South Africa

*By Dr Erhard Briedenhann, Protein Research Foundation*

Plant-parasitic nematodes of soya beans decrease yield by reducing root size and efficiencies, leading to shorter roots. Infected plants are stunted by various degrees of yellowing. In South Africa, root-knot nematodes (specifically *Meloidogyne incognita* and *Meloidogyne javanica*) appear to be more prevalent in certain soya bean production areas.

Once plant-parasitic nematodes infest a field it is impossible to eradicate them; management will therefore become the only option. The goal will be to minimise crop damage and keep nematode levels low. Nematodes can be brought in with infected plant material, or via equipment with infected material. It is important to clean equipment if working in infected and non-infected fields. Soya bean nematodes do not infect soya bean seeds.

## Identifying the nematodes

Determining which nematodes are present in the field and at what concentration is helpful when formulating a plan to manage nematodes.

Nematodes are living organisms, so special care must be taken in the handling, storage and shipping of soil samples sent for testing to have an accurate nematode assay.

## Field inspection

Symptoms of nematode infection are often indistinct and difficult to detect. Foliar symptoms are often very similar to symptoms of nutrient deficiencies or disease and include stunted, yellowed plants. Below ground symptoms, in particular, vary by nematode type. Root-knot nematode infection typically show irregular swelling (called galls) that are not seen with the other nematodes.

It is recommended that producers dig up soya bean plants and inspect their roots. If there is any doubt, soil samples should be sent for testing, as this allows producers to implement management strategies to reduce nematode damage. Samples can be submitted to a professional nematology diagnostic laboratory.

## Resistant cultivars

Soya bean breeding has mostly focused on cyst nematode resistance, although many cultivars have reasonable resistance to root-knot nematode. No commercial cultivars are resistant to string or lesion nematodes.

Resistant cultivars sustain little or no damage from the target nematode. Growing resistant cultivars reduces the field nematode population densities in the same way as when non-host crops are planted.

Planting nematode resistant cultivars is an effective and economical method to manage nematode problems. Resistance is, however, not complete. Resistance in the cultivar must match the nematode present on site. Very few cultivars are resistant to all species, therefore new cultivars should be screened for nematode resistance.

Planting of resistant cultivars can result in a 15 to 25% improvement in yield, although this is dependent on the severity of the problem. A further advantage of planting resistant cultivars is that they reduce the nematode population density over time, assisting in alleviating the problem. Moderately susceptible cultivars will not contribute to reducing nematode populations.

In South Africa, there is no requirement, nor has there been any major drive to promote nematode resistant cultivars. This is surprising, considering the demand for these cultivars in sandy soils and areas in the country where these cultivars are required. Furthermore, the potential expansion of soya bean production in the country is where nematode resistance is required.

The North West province only plants soya beans on 7% of the hectares dedicated to maize. This ratio has the potential to improve and if 50% is achieved, it could add 185 000 hectares of soya beans.

Seed companies have a good indication of which cultivars are root-knot nematode resistant. Indications are that some of the cultivars may include:

- DM 6.8 IR
- DM 5953 RSF
- NS 7211
- SSS 5052 tuc
- LS 6164 R
- PAN 1623 R
- PAN 1521 R
- RA 565 R
- RA 568 R

The requirement exists to verify the resistance of these cultivars. Numerous cultivars become unavailable and new ones are added continuously. It is required that cultivars are screened and the results of the resistance of cultivars published on an annual basis. Producers should be aware when selecting a cultivar if it is resistant or not.

Furthermore, there needs to be consensus that the methodology used for screening is similar and standardised, to some extent, between institutions conducting these screenings.

Results obtained from the screening of cultivars at North-West University in 2015 illustrated varied resistance to *M incognita*

and *M javanica (Figure 1)*. Results indicated that numerous commercial cultivars have resistance to nematodes and emphasised the merits of screening cultivars.

## Evaluating cultivar resistance

Methodologies to determine resistance using rapid glass house techniques need to be standardised and cross referenced. Some excellent facilities/methodologies exist that have been funded by the Protein Research Foundation. Gall rating and egg mass indices are commonly used as measurements, but egg production has been recommended as a more accurate measure. The method must be clarified.

Threshold risk levels of soya bean fields need to be determined. The level indicating a high probability of crop damage determines the risk in a field. The presence of nematodes in the soil at any level presents a problem.

## Crop rotation

Crop rotation has become an attractive proposition in the overall management of nematodes. Inclusion of a non-host in crop systems can significantly reduce nematode levels.

Planting cotton, maize and soya beans will continue to increase the problem of root-knot nematodes if the crops are continuously planted. Crops such as oats, groundnuts and sorghum in rotation will alleviate the problem.

Weed management is an important supplement to crop rotation because plant-parasitic nematode population densities can be maintained or increased on weedy hosts.

Fallow fields can assist in reducing nematodes, but only if the field is kept weed free. If cover crops are grown, it is critical to choose a crop that is a non-host for nematodes.

## Soil properties

Good knowledge of the environmental and biological properties of one's soil can aid in making good nematode management decisions. Practices that promote plant health may allow plants to tolerate nematode infections better. Soil type and texture can influence where nematode damage is likely to occur.

## Nematicides

Nematicides are chemical products intended to reduce nematode density. Nematicide application to soya beans is likely to be unprofitable in most cases. Products such as Velum Prime (Fluopyram – caution), registration no L9965 (Act 36 of 1947), from Bayer are available as nematicide – the product is effective on potatoes, tobacco and tomatoes but unlikely to be cost-effective in soya bean production.

Plant-parasitic nematodes are at their most vulnerable during their active phase in soil when reaching for the roots of host plants. Once endoparasite species have penetrated the root it is more difficult to control with chemicals. A nematicide that can be safely

**Figure 1: Soya bean genotypes resistant to various South African root-knot nematode species and races.**

| Genotype | Mi 1 | Mi 1 | Mi 1 | Mj | Genotype | Mi 1 | Mi 1 | Mi 1 | Mj |
|---|---|---|---|---|---|---|---|---|---|
| A5308[34] | √ | | | | GCI-PRF 7[27] | | √ | | |
| A5409[34,35] | | | √ | √ | Highveld Top[35] | | | √ | |
| A7119[34,35] | √ | | √ | √ | Hutton[34] | √ | | √ | |
| Bakgat[35] | | √ | √ | √ | LS5995[26,27] | | √ | | |
| Bamboes[34,35] | √ | √ | √ | | LS5995[66] | | | | √ |
| Crawford[35] | | √ | √ | √ | LS688[26] | | √ | | |
| Columbus[35] | | | √ | √ | LS666[26] | | √ | | |
| CRN2233[34] | √ | | √ | | Nyala[34] | | | √ | √ |
| D82-3298[26] | | √ | | | PAN494[34] | | | | √ |
| Egret[26] | | √ | | | PAN49435 | | √ | √ | |
| Forrest[35] | | √ | √ | | PAN581[34] | | | | √ |
| Forrest[34] | √ | | | √ | PAN723[34] | √ | | √ | |
| Gazelle[34] | | | | √ | PAN780[26] | | √ | | |
| G93-9201[26] | | √ | | | PAN790[35] | | √ | √ | |
| G93-9009[26] | | √ | | | PAN812[34] | √ | | | √ |
| G93-9106[26] | | √ | | | PAN812[35] | | √ | √ | |
| GCI-PRF 1[27] | | √ | | | PI96354[26] | | √ | | |
| GCI-PRF 2[27] | | √ | | | SCSI[34] | | | | √ |
| GCI-PRF 3[27] | | √ | | | SNK60[34] | √ | | | √ |
| GCI-PRF 4[27] | | √ | | | Talana[34] | √ | | | √ |
| GCI-PRF 5[27] | | √ | | | Zebra[34] | | | | √ |

**Table 1: Nematicides currently available on world markets.**

| Chemical name | Trade name | Formulation |
|---|---|---|
| **Fumigants** | | |
| Methyl bromide | Dowfume | Gas |
| 1,3 dichloropropene | Telone/DD-95 | Liquid |
| Ethelene dibromide[1] | Dowfume W-85 | Liquid |
| Metam-sodium | Vapam | Liquid |
| Dazomet | Basamid | Dust (prill) |
| Methyl isothiocyanate | Di-Trapex | Liquid |
| Chloropicrin[1] | Larvacide | Liquid |
| **Organophosphates** | | |
| Thionazin | Nemafos | Granular or emulsifiable liquid |
| Ethoprophos | Mocap | Granular or emulsifiable liquid |
| Fenamiphos | Nemacur | Granular or emulsifiable liquid |
| Fensulfothion | Danasit | Granular |
| Terbufos | Counter | Granular |
| Isazofos | Miral | Granular or emulsifiable liquid |
| Ebufos | Rugby | Granular or emulsifiable liquid |
| **Carbamates** | | |
| Aldicarb | Temik | Granular |
| Aldoxycarb | Standak | Flowable |
| Oxamyl | Vydate | Granular or emulsifiable liquid |
| Carbofuran | Furadan/Curaterr | Granular or flowable |
| Cleothocarb | Lance | Granular |

[1]Use restricted.

**Table 2: Nematicides available to control soya bean nematodes. (See labels for species controlled by each product.)**

| Nematicide | Active ingredient | Rate per hectare for 38-inch rows | Comments |
|---|---|---|---|
| Telone II | 1,3-dichloropropene | 3-6 gallons | Release fumigants at least 12 inches from the soil surface. Must be applied 10-14 days prior to planting. |
| Temik brand 15G Aldicarb Pesticide & Temik Brand 15G Lock 'n Load Aldicarb Pesticide | Aldicarb | 3-5lbs | Apply granules in a 6-8-inch band and immediately work into the soil or cover with soil. Plant seed into treated zone. Band may be applied over an open furrow. |
| AgLogic 15G | Aldicarb | 7lbs | Apply a 4-6-inch band (T-band) over open furrow and immediately cover with soil by mechanical means. |
| Avicta Complete Bean | Abamectin<br>Thiamethoxam<br>Mefenoxam<br>Fludioxonil | 3fl oz<br>1,28fl oz<br>0,16fl oz<br>0,08fl oz<br>All per cwt of seed | Application by commercial seed treaters only. It has active ingredients to control nematodes and seedling disease problems. |
| K-Pam | Potassium N-methyldithiocarbamate | See label | Inject 12 inches below planting depth and seal immediately 14-21 days before planting. |
| Vapam HL | Sodium methyldithiocarbamate | See label | Inject 12 inches below planting depth and seal immediately 14-21 days before planting. |
| AVICTA 500 FS | Abamectin | See label | Applied only as a commercial seed treatment. Contains materials to control only nematodes. |
| Avicta Complete Bean | Abamectin<br>Thiamethoxam<br>Mefenoxam<br>Fludioxonil | See label | Applied only as a commercial seed treatment. Contains materials to control nematodes, seedling diseases and thrips. |
| Poncho/Vovito | Clothiandin<br>Bacillus firmus I1582 | See label | Applied only as a commercial seed treatment. Contains materials to control nematodes and thrips. |
| Clariva pn | Pasteuria nishizawae – Pn1 | 1-3fl oz per cwt of seed | Effective only against soya bean cyst nematode. |
| Clariva Complete Beans | Pasteuria nishizawae – Pn1<br>Sedaxane<br>Thiamethoxam<br>Mefenoxam<br>Fludioxonil | See label | Includes the nematicide Clariva pn, Cruiser Maxx Beans insecticide/fungicide and the fungicide Vibrance. The only nematode this will control is soya bean cyst nematode. |

applied to growing plants and translocated to the roots in sufficient quantities to kill the nematodes has not been discovered yet.

There are several nematicides that can be used effectively on annual crops. Since the discovery 50 to 60 years ago and after widescale use of fumigant nematicides, the dangers of manufacture and use of these products have only recently surfaced, resulting in restriction of use and in some cases withdrawal of these products. Nematicides are highly toxic compounds that have a low LD50.

This is extremely important for operators applying the product, which can lead to possible exposure. Pesticide residues are also of concern if applied incorrectly. None of the nematicides listed in *Table 1* available on the world market are used for soya beans. *Table 2* shows the nematicides available in the United States for soya beans.

New classes of nematicides are continuously being sought. Products such as Poncho/Votivo (*Clotianidin* and *Bacillus firmus*), registration no L9250, from BASF appear to deliver promising results on maize. They claim to create a living barrier preventing nematode attacks. Bio-nematicides (*Bacillus firmus*) compared with standard fumigant nematicides have been found to offer a satisfactory and effective environmental solution.

It has been suggested that few nematicides are available for use in soya beans, and nematodes can be managed much more economically using resistant cultivars and crop rotation.

## In conclusion

Crop rotation and management practices are the most effective measures against nematode challenges. The use of resistant cultivars is essential. Cultivars commercially available in South Africa need to be screened for nematode resistance. It must be remembered, though, that cultivars are not resistant to all nematodes. Resistance should be matched with a specific nematode problem. Methodologies for screening should be standardised.

Soya bean fields with potential problems must be analysed to implement suitable strategies. Traditional nematicides do not present an economical solution in South Africa, although new generation natural products present options. New products are being worked on for South Africa and will hopefully be registered in two to three years' time.

For enquiries, contact
Dr Erhard Briedenhann on 011 803 2579
or email erhardb@netactive.co.za.

# Fungal diseases cause major headaches

*By Hendrik Linde, agronomist in the Western Free State*

The season's initial dry start was followed by good, widespread rainfall over large parts of the country. Although the good rainfall had a positive effect on the growth and development of several crops, it also gave new life to many fungal diseases, such as *Sclerotinia sclerotiorum*.

*Sclerotinia* head rot (*Figure 1*) is without a doubt one of the most serious diseases when it comes to cultivation of sunflower and other broadleaf crops. The disease occurs on 370 host plants of different species and is an extremely difficult disease to control.

## Lengthy periods of wet weather

*Sclerotinia* head rot occurs sporadically and only after lengthy periods of wet weather. There is a small probability of outbreaks of the disease in dry years. The fungus produces sclerotia (survival structures) that overwinter in the soil and germinate after approximately seven to 14 days. Germination occurs during conditions of high soil moisture and temperatures of 15 to 25˚C. The sclerotia develop apothecia (*Figure 2*) and it can reach the soil surface from a depth of 2 to 5cm.

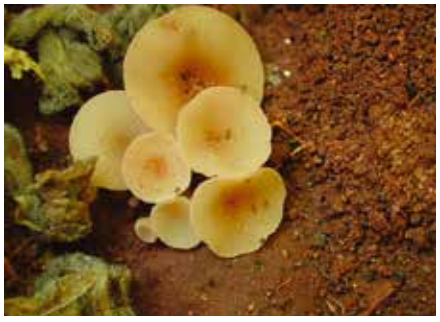
Apothecia produce ascospores for approximately a week or more if the soil moisture remains sufficient. Ascospores are released into the air and spread by the wind to nearby host plants. The spores do not infect healthy tissue, only wilted or dead tissue; the tissue can be anything from wounds caused by hail or insects to flowers that wilt or die after pollination.

**Figure 1: Sclerotinia head rot in sunflower.**

## Reduce spreading

As soon as the spores settle on dead tissue, which occurs in the presence of water (any form of free water, such as rain, dew, etc.), oxalic acid is produced. The acid digests the tissue, which becomes available as food for the fungus. Crops such as sunflower and soya beans are particularly sensitive to *Sclerotinia* during the flowering stage of the crops.

**Figure 2: Apothecia sprouting from germinating sclerotia.**



There is no exact solution for the disease, but the following practices can help to reduce the spreading of the fungus:

- The most effective way is crop rotation with a non-host crop such as maize or sorghum.
- Plant on fields where the fungus did not occur the previous year. This includes nearby clean fields.
- Keep fields clean from broadleaf weeds and other host plants during rotation with a non-host crop, because many weeds, such as cocklebur (*Figure 3*), are also host plants of the fungus.

**Figure 3: Sclerotinia infection on cocklebur.**

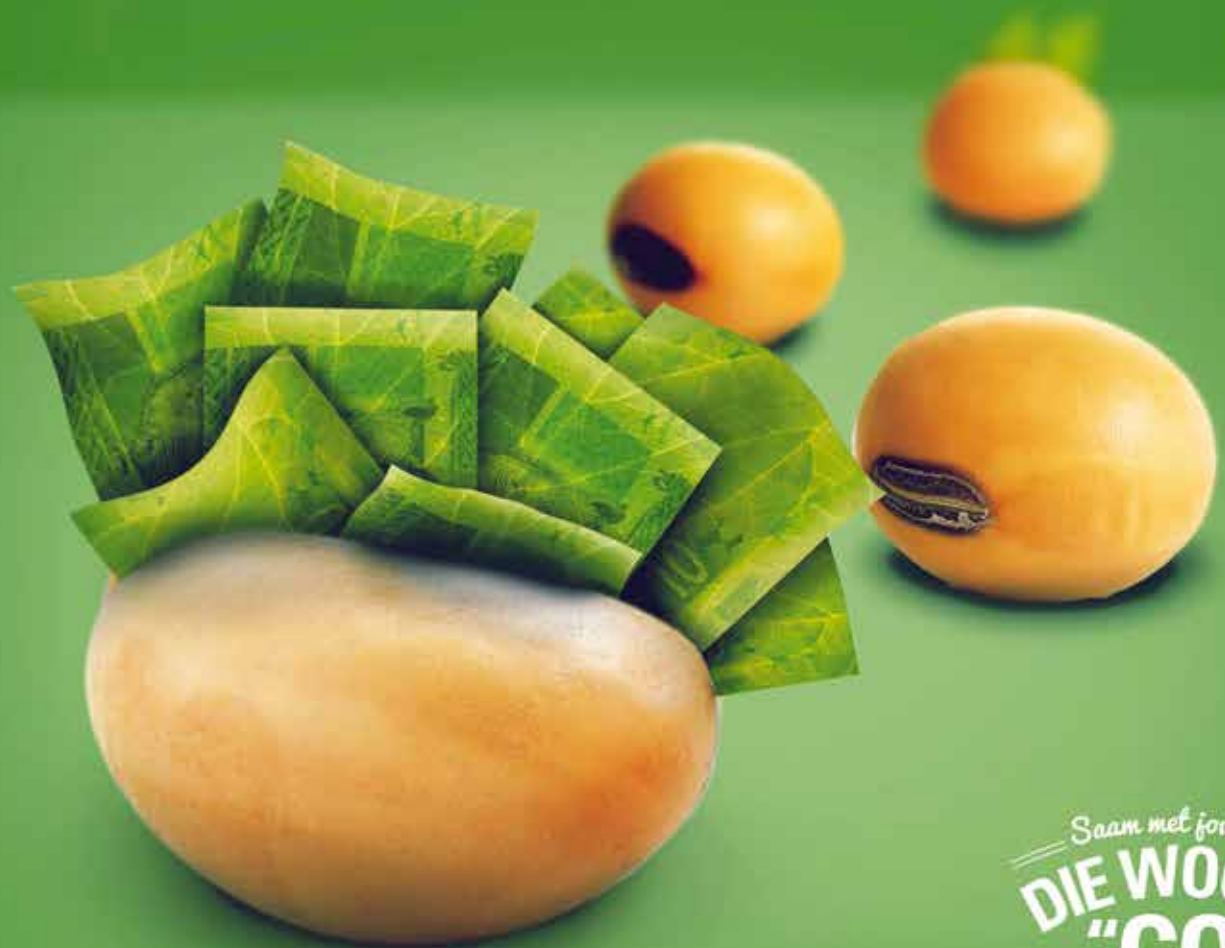
- Cultivation practices can affect the occurrence of the disease. It has been proven that minimum or reduced cultivation that keeps the sclerotia on or near the soil surface promotes the microbial breakdown of sclerotia, while deep placement of the sclerotia by means of a plough promotes its survival. If it is decided to plough the sclerotia deep into the soil, guard against deep follow-up cultivation that may bring the sclerotia to the surface. It poses a risk in that the sclerotia can be spread evenly over the field if it is cultivated.

There are registered chemical and biological agents available to treat *Sclerotinia*. However, the time of application of the chemical agents is crucial and the application of biological agents is an exceptional long-term solution.

For more information, phone Hendrik Linde on 079 527 7696.

References: B Nelson, A Lamey, *Sclerotinia* Diseases of Sunflower (2000).

# Boontjie gee
# SY LOONTJIE



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# Sclerotinia **op sojabone**

*Deur Sakkie Koster, PIONEER®-landboukundige*

Boere op die Hoëveld het die eerste keer in die vroeë sewentigerjare bewus geword van die swamsiekte *Sclerotinia sclerotiorum*, veral op sonneblom. Tans het die swam feitlik deur die hele land versprei en rig aansienlike skade aan op veral sojabone, sonneblom, droëbone en verskeie groentegewasse. Die besmetting kan so hoog wees dat vragte by silo's afgekeur word as gevolg van die sklerotiums (vrugliggame) van die swam in die saad.

## Die swam self

Die swam kan 'n verskeidenheid breëblaargewasse aanval. Volgens dr AJL Phillips van die Rietondale-navorsingstasie word soveel as 361 breëblaarspesies aangeval en nuwe gasheerplante word steeds bygevoeg. 'n Opname deur Albert Myburgh van die destydse OTK het getoon dat die meeste breëblaaronkruide op die Hoëveld ook deur die swam besmet word.

Die sklerotiums wat deur die swam gevorm word, is vrugliggame wat teen ongunstige omgewingstoestande bestand is. Drs Phillips en Bill Underwood, 'n kenner van die VSA, sê sekere grondswamme van die sklerotiums kan in die grond vernietig word, maar die sklerotiums kan tussen sewe en tien jaar in die grond oorleef.

Sklerotiums wat vlak in die grond voorkom, sal onder koel, vogtige toestande ontkiem om oorsprong te gee aan apotekiums (klein paddastoele van ±1cm hoog), wat op hul beurt miljoene spore vrystel. Tot 20 apotekiums kan uit een sklerotium ontwikkel. So 'n apotekium kan tot tien dae lank leef terwyl die askospore tot 20 dae kan oorleef voordat dit in gunstige omstandighede ontkiem, sê dr MA Holtzhausen.

Dr Underwood sê askospore kan tot 0,5km ver deur lugstrome versprei word. Dit beland op die blomdele van die sojaboonplant, waar dit die plant binnedring.

*Sklerotiums op die stam van 'n sojaboonplant.*

Sklerotiums wat dieper as 50mm onder die grond lê, ontkiem nie, of hul apotekiums kom dalk nie bokant die grondoppervlakte uit nie en laat dus nie spore vry nie. Baie sklerotiums ontkiem eers nadat hulle ná 'n aantal jare deur die ploeg weer na die oppervlakte gebring word.

## Beheermaatreëls

Die volgende beheermetodes kan die skadelike gevolge van die siekte verminder:

- Gebruik slegs gesonde, gesertifiseerde saad wat vry is van sklerotiums.
- Maak seker dat die beheer van breëblaaronkruide baie doeltreffend is en nie in die wisselbougewasse voorkom nie.
- Stropers wat in besmette lande gebruik is, moet onder geen omstandighede in onbesmette lande gebruik word nie. Indien besmette lande wel gestroop word, moet die masjiene deeglik skoongemaak word voordat die volgende lande gestroop word.
- Wisselbou met nie-vatbare gewasse soos mielies en sorghum (grasagtige gewasse) sal help om die siektedruk te verlaag. Tans is dit die belangrikste metode om die siekte onder beheer te hou, maar dan moet die breëblaaronkruide baie goed beheer word.
- Die diep inploeg van besmette materiaal sal baie help, veral as dit opgevolg word deur vlakker bewerkings daarna om nie die sklerotiums na die oppervlakte te bring nie.
- Voorkomende bespuiting met geregistreerde chemiese middels in die R1-stadium van die plant, is tans die beste voorkomende oplossing. Maak seker van die fase van die sojaboonplant vir doeltreffende beheer.
- Wyer rye help soms om ongunstige toestande te skep vir die vorming van apotekiums, maar is nie altyd doeltreffend nie.
- Gebruik van geregistreerde biologiese produkte het getoon dat dit kan bydra tot verlaging in die voorkoms van die siekte.

Navorsing deur dr Underwood het getoon dat bespuiting in die regte stadium slegs 'n verlaging van 45% van die siekte meebring. Daarom is dit noodsaaklik dat alle maatreëls gelyktydig ingespan moet word om die siekte te beheer. Genetiese weerstand blyk die doeltreffendste metode te wees om die probleem hok te slaan. Baie navorsing word gedoen om hierdie weerstandsgene in die sojaboonplant in te bring.

Vir verwysings, kontak Sakkie Koster by 083 678 8485.

# Research network aims to find practical solutions to Sclerotinia

*By Lisa Ann Rothmann, University of the Free State, and Miekie Human, Grain SA*

*Sclerotinia* diseases of soya bean and sunflower have steadily been increasing in severity and distribution, with severe yield losses reported for 2016 to 2018. Since managing *Sclerotinia* is challenging, researchers at the University of the Free State (UFS) are set on finding solutions by conducting producer-focused research.

The South African Sclerotinia Research Network (SASRN) is a virtual community of practice for *Sclerotinia* researchers in South Africa. Lisa Rothmann initiated the SASRN after attending the National Sclerotinia Initiative (NSI) in Minnesota (US) in January 2017.

## Exchange knowledge

The initial intention was to create a platform for young researchers to assist one another and share their experiences with *Sclerotinia* research in South Africa. However, there was significant interest from beyond academic institutions, and so the SASRN was born.

The SASRN is a platform where collaborations can be established, and parallel and comprehensive research goals can be met that benefit multiple investigators and the public. It aims to generate social and academic capital where experienced investigators can exchange knowledge gained with their peers.

The network had its inaugural meeting in September 2017. Grain SA works in collaboration with and endorses the SASRN. It is currently working towards applying for research funding to investigate solutions for *Sclerotinia* diseases of soya bean and sunflower. Future projects will include canola.

## Disease forecasting

Research will start soon on a key aspect of *Sclerotinia* control – disease forecasting. Disease forecast models serve as an early warning system that assists producers in optimising the timing of fungicide applications, which ensure optimal efficiency and healthy economic decisions.

In Europe, canola field experiments conducted between 1981 and 2004 indicated that fungicide sprays were only 27-33% cost-effective against *Sclerotinia* stem rot (Koch *et al*., 2007).

*Photograph: https://plantix.net*

Researchers at UFS are currently developing a prediction model to assist producers in identifying their risk for *Sclerotinia* disease development at critical growth stages during the cropping season. In South Africa, chemical agents represent a significant portion of a producer's production costs and forecast models can assist producers in either minimising fungicide applications or increasing the efficacy of the application, without compromising the degree of control.

The objective is thus to accurately predict when the host, environment and pathogen interact in such a manner that disease can occur and cause economic loss. The effects of other driving variables, such as resistance, planting dates and cropping practices, are also considered.

## Three key issues

There are three key issues that SASRN would like to focus on:

- Generate a local centre of excellence and expertise.
- Be the 'face' of *Sclerotinia* researchers internationally and inform the international community on the role South Africa can play in *Sclerotinia* research.
- Finding practical solutions for South African producers against diseases caused by *Sclerotinia* spp.

While producer-focused research to develop practical management strategies for *Sclerotinia* diseases is the main focus of the network, the collaborations established by the network is also a crucial aspect. These collaborations promote communication between the parties involved, which prevents duplication and allows researchers to inform the industry directly of findings, and *vice versa*.

In addition, the network is a platform where the industry and academia can listen to the needs of producers to actively resolve issues through applied and directed research questions. The community of practice established will drive the communication between producers and network members.

If you are a researcher or producer and interested in connecting with us and growing our network, contact Lisa at coetzeeLA@ufs.ac.za. Support our Facebook page, South African Sclerotinia Research Network, tag us @sclerotiniaza, or use the #sclerotiniaZA. Alternatively, email sclerotinianetwork@gmail.com.

# China trade war could permanently **scar US soya bean industry**

*By Karen Braun, Reuters*

*As the trade fight between the United States (US) and China escalates, many agricultural market participants have taken comfort in the idea that China cannot fulfil its soya bean needs without importing massive quantities of the US product.*

Nevertheless, that situation only holds in the short term. As the world's top buyer, China needs US soya beans today, in a few months, and likely even next year. Yet it is not unreasonable for China to eventually wean itself off American beans in the longer term, which could have detrimental and irreversible effects on US markets.

On paper, a soya bean trade war involving the US and China makes no sense for either party. China imports roughly 100 million tons of soya beans each year, primarily from Brazil and the US, which together produces 70% of the global supply.

## US farmer the biggest loser

Simple math demonstrates that under the current structure China cannot avoid US soya beans right now if it is to meet its import schedule. Besides, why would China want to pay more for a product it clearly needs? Why would the US threaten its number two export (behind aircraft) to the East Asian country?

Apparently, logic doesn't matter in this case, as these are the choices that have ultimately been made under the decision to proceed with the tariff tit-for-tat, and potentially a full-on trade war. Unfortunately, the US farmer could become the biggest loser in this fight, without a resolution between both sides at some point soon as China likely has more options to work with.

No one wins a trade war in the short term, but over the longer term, the soya bean opportunity for China may be greater than for the US farmer. Underestimating China's ability to seek and develop new sources could mask the risky bigger picture for American producers.

China's own soya bean crop can cover up to seven weeks of the country's annual needs, which is why it relies so heavily on imports. The first obvious possibility is for China to materially expand production over the next several years, but variation in climate and competition with other crops could be barriers to that effort.

## Expand agricultural land use

Finding other overseas markets may be the preferred option. For one, lead exporter Brazil planted a record soya bean area in 2017/18 and will very likely top that in 2018/19. Brazil hardly has any soya beans left over at the end of its marketing cycles, so China will not be able to simply grab more exports from Brazil without a production increase.

However, Brazil has already risen to the challenge of supplying more protein to the world over the last two decades. In 20 years, the South American country has increased soya bean production by 266%, compared to 63% for the US. China's import volume has multiplied by 33 times over that period.

Brazil also has the possibility to expand agricultural land use, but it may not have to do it alone. If China wants to curb reliance on US supply, Chinese investors may be looking to buy and develop land in Brazil, another country in South America, Africa, or somewhere else that is affordable and suitable for growing soya beans and other crops.

This might be the best option for China as relying solely on Brazil as the supplier would drive up the import cost. Additionally, Brazil's agricultural minister said that a US-China trade war "will only hurt Brazil", emphasising cost strain on its animal protein producers. The Chinese land investment scenario would take a few years at least, but it could be worst case for the US soya bean industry since the domestic market would be entirely different without China.

## Forced to produce less

The US would need to replace more than 30 million tons of global soya bean business if China were eventually to walk out the door for good. Global soya bean demand is not growing at such a rate, so US farmers may be forced to cut hectares significantly due to much lower prices and lack of demand.

Maize would likely pick up a lot of the lost soya bean hectares. Over time, the huge surplus of maize that might result from this could also depress prices in that market, so the impact of a possible US-China trade war could reach well beyond soya beans.

Right now, the Chinese crusher is feeling the pain of having to buy US supply at a higher cost in a couple of months. US farmers are feeling the pain of seeing soya bean futures plunge to near ten-year lows after some optimism about prices earlier this year.

So, instead of teaching the Chinese a lesson when it comes to trade, the unintentional result over the long term might be that China learns to get along without US soya beans.

# Effects of a trade war in the soya bean market

*By Dr Dirk Strydom, Grain SA*

*In the global context of soya beans, the markets are still mainly focused on China and the US – two countries that are largely dependent on each other in terms of soya beans. China now imports much less soya beans from the US due to tariffs on imports following the trade war between these two countries. China imports most of its soya beans from other origins, especially from South America.*

If we focus on some of the biggest exporters, it is clear that China will need to source soya beans from other non-traditional destinations in the market. If China imports nothing from the US, it means that a shortfall of 37 million tons must be imported. If China imports most of the six major exporters' exportable soya beans, they will still have a shortfall of about 13 million tons of soya beans for the season.

This means that it has to be imported from the US, non-traditional destinations or alternatively replaced with other sources of oilseed or oilseed meal. Another scenario would be that China changes the diets within animal feed, reverting back to low protein-based diets. It is believed that China has a sufficient amount of amino acid sources and maize available. This could decrease the importation of soya beans by an expected ten million tons.

## US soya bean exports

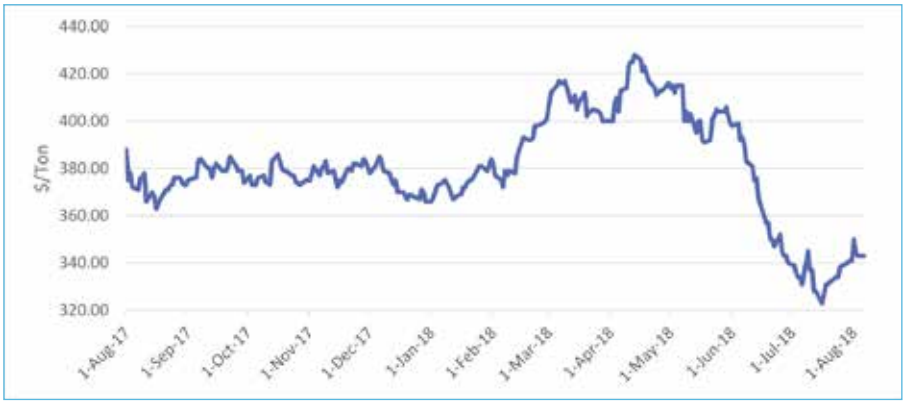
A third scenario is that the US could start to export to multiple destinations, specifically South America, and that these countries will export to China, which could result in a costly logistics and tax exercise.

In the US, the old season's soya bean export sales have started to slow down, although soya bean exports continue to grow well. The sharp decline in soya bean prices has made the US an attractive source for other international importing countries.

The expectation in the market is that Argentina's soya bean imports from the US – an estimated 1,5 million tons between September 2018 and February 2019 – will be higher this season than initially expected. In Brazil, the expected soya bean plantings in the coming season should be between 1,2 and 1,5 million hectares more than the current season's plantings. This is mainly due to the huge demand from China for Brazilian soya beans.

The effect of this trade war on the market is that prices decreased by 12% year-on-year within the US market; prices have decreased by 20% since mid-April (*Figure 1*).

**Figure 1: US soya bean prices. (Source: Grain SA)**




## Sunflower market

On the international sunflower market, the sunflower seed oilcake exportable stocks are relatively limited, leading to the increase in prices and consequently less world trade that has taken place in recent months. During June, sunflower seed oilcake exports from the three largest exporting countries, namely Russia, Ukraine and Argentina, decreased by 20% year-on-year, while it was 13% lower in April and 6% lower in May.

The decline in exports of sunflower oilcake is largely attributable to the strong local demand, especially in Russia. It is expected that the season's sunflower seed oilcake imports to China will increase sharply, which will mainly be obtained from the Ukraine.

## Canola exports

Within the canola industry, the Australian production conditions of canola are under pressure this season due to insufficient rainfall in many of the major producing areas. As a result, not all the intended areas were planted for the season.

**Table 1: Most important oilseed products (USD/ton and R/ton).**

| Product | Jul 2018 | Jul 2017 | % change |
|---|---|---|---|
| Soya beans (Brazil) | 415 | 414 | 0 |
| Sunflower seed (EU) | 390 | 399 | -2 |
| Groundnuts (US 40/50) | 1 380 | 1 450 | -5 |
| Palm oil (Malaysia) | 580 | 658 | -12 |
| Soya bean oil (US) | 670 | 787 | -15 |
| Sunflower oil (Argentina) | 725 | 723 | 0 |
| Soya meal (Argentina) | 417 | 352 | 18 |
| Fishmeal (Peru) | 1 250 | 1 263 | -1 |
| **Rand/$** | **13,22** | **12,86** | **3** |
| Sunflower seed | 4 687 | 4 680 | 0 |
| Derived sunflower | 5 267 | 5 051 | 4 |
| Soya beans | 4 371 | 4 711 | -7 |
| Derived soya beans | 5 969 | 6 029 | -1 |
| Soil canola | 5 400 | 5 300 | 2 |

Australian canola exports during June had again been low, with the UAE the largest recipient of Australian canola for the month. The low exports from Australia means that the country still has large canola stocks. In Canada, problems are experienced with weather conditions in some areas that are in a critical phase of the production period.

## New technology and cultivars

On the local market, the minister of agriculture, forestry and fisheries approved a statutory levy on soya beans on 22 June 2018, according to which seed companies can be compensated for their performance in the soya bean seed market. The collected levy will be paid to seed companies according to their market share.

The breeding and technology levy on soya beans has been approved for two years with effect from 1 March 2019. The levy is R65 per ton for the first year and R80 per ton for the second year. These values are calculated at 1,2% of the previous marketing year's average soya bean price and will be payable when producers sell their soya beans.

**Figure 2: Local crushing margin. (Source: Grain SA)**


**Figure 3: Local soya bean price movement. (Source: Safex)**


The soya bean levy will be administered by the SA Cultivar and Technology Agency (SACTA). SACTA is a non-profit company established to administer seed levies for all open-pollinated crops. Levies on wheat and barley for this purpose have already been collected and paid by SACTA for a second year.

This will give local producers access to the latest cultivars and technology in order to compete with other countries. There is technology available with the potential to increase producers' yields by more than 10%. This technology would not have been able to enter South Africa if these types of funding structures were not available.

## Local supply and demand

In terms of the current season's local soya bean supply and demand, the NAMC projects a supply of 1 864 335 tons for the 2018/19 marketing season. This includes an opening stock level of 330 535 tons and local commercial deliveries of 1 520 800 tons.

The total demand for soya beans is projected at 1 207 100 tons. This includes 25 000 tons processed for human consumption, 170 000 tons processed for full-fat, and 1 000 000 tons for crushing, which leaves the market with an estimated 657 235 tons of soya beans at the end of the season. As explained in a previous article the crushing demand is still limited, even with a very positive crushing margin. The limitations are due to a large number of soya bean oilcake imports (*Figure 2*).

The trade war that led to a decrease in US soya bean prices, together with a low local demand and the strengthening of the rand, created a perfect environment for local soya bean prices to decrease over the last six months (*Figure 3*). The trade war can potentially provide South Africa with the opportunity to export soya beans; however, there are still administration issues between South Africa and other exporting countries that must be aligned.

## In conclusion

It is important to note that the trade war can affect local prices and even put pressure on local prices if there is a decrease in global demand. To buffer this effect, it is important that South Africa substitute imported oilcake and increase the local soya bean demand for crushing purposes. The country also needs to capitalise on the opportunities to export the surplus production.

For more information, send an email to Dr Dirk Strydom at dirks@grainsa.co.za.

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## Farming together for the future

One of Southern Oil's greatest assets is its relationship with canola farmers. Izane Crous and Zander Spammer, Southern Oil's agricultural experts, offer practical advice and solutions for canola producers who work with Southern Oil and take great pride in assisting farmers to develop crops through sustainable farming practices.

Despite the Western Cape battling drought conditions, this year's harvest can possibly yield 90 000 tons of canola seed, thanks to the conservation agriculture practices implemented under Izane and Zander's guidance.

## Canola on the rise

The great news for local producers is that the South African middle class is fuelling the growth in popularity of canola oil. Because it has the lowest saturated fat of all cooking oils, consumers are eagerly switching to canola oil as their cooking oil of choice, which creates a need for more canola crops.

Southern Oil has partnered with over 500 canola producers and procures all the locally grown canola seed. Production at its modern extraction and refining facility continues 365 days a year. The facility has its own modern laboratory that performs 58 400 quality checks annually on both incoming canola seed and outgoing refined oil.

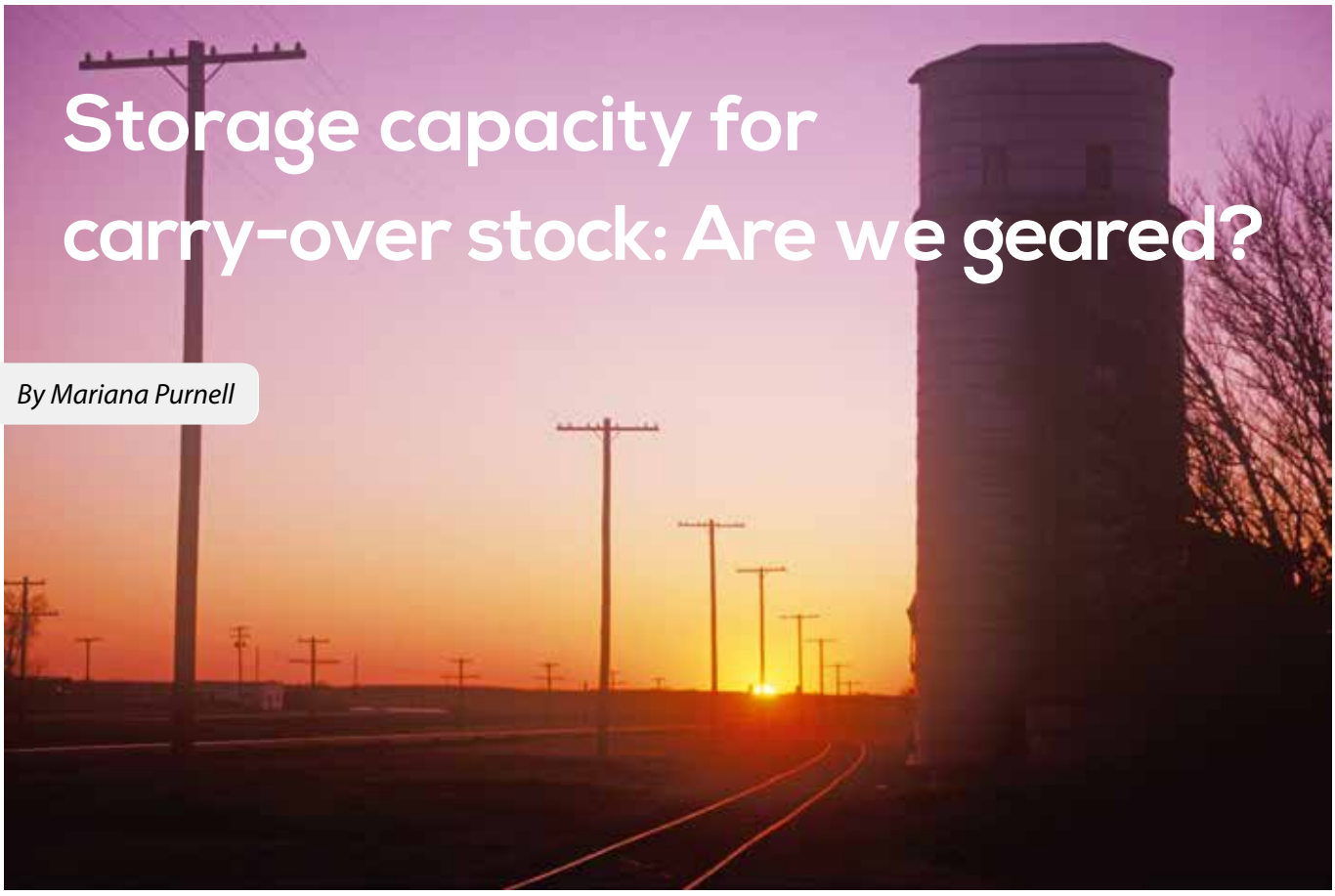
The new product development division is able to create cooking oils and salad dressings to client specifications and the on-site bottling facility allows Southern Oil to also offer specific product packaging.

## Exciting prospects

At the Swellendam plant, approximately 110 000 tons of canola seed are crushed annually, and the plant produces 45 000 tons of crude canola oil per year. Demand for seed crushing, extraction and refining continues to grow, and Southern Oil already has plans underway to meet this demand by expanding its crushing and refining capacity and increasing its supply of top-quality services.

With an exciting few years ahead for this continually growing business, the future looks blooming brilliant for Southern Oil – your canola company.

For more information on Southern Oil and its services to the agriculture and food manufacturing industries, visit *www.soill.co.za*.



# Storage capacity for carry-over stock: Are we geared?

*By Mariana Purnell*

There is a general sense of optimism in the South African maize market after the good rains received in April. The United States Department of Agriculture (USDA) increased its previous estimate for South Africa's 2018/19 maize production to 13,2 million* tons, depending on the expected higher yields in some parts of the country.

The size of the expected commercial maize crop was set at 13,207 million tons by the National Crop Estimates Committee (CEC) in July 2018. However, it is still much lower than the record crop of 17,5 million tons for the 2017/18 production season – the biggest crop ever produced in South Africa.

The July production estimate for white maize was 6,88 million tons and 6,327 million tons for yellow maize. If local maize production reaches 12,42 million tons or more in 2017/18, it will be much higher than the annual consumption of approximately 10,5 million tons. The three major maize producing regions, namely the Free State, Mpumalanga and North West, are expected to produce 81% of the 2018 crop. The current yield figures are mainly from producers in the different provinces.

## Pressure on storage

It is important to note, though, that the marketing year started with a large carry-over stock of approximately 1,4 million tons that must be added to the expected large harvest. South Africa will therefore remain a net exporter of maize in the 2018/19 marketing year, and maize prices will remain under pressure. The production estimate for sunflower seed is 792 255 tons, while almost 1,97 million tons of soya beans are expected in the new season.

South Africa has sufficient storage capacity, but the location of fixed storage facilities plays a major role. Storage in certain areas is utilised far above maximum capacity, while it is hardly utilised in other areas. The size of the total 2018/19 summer grain harvest will place pressure on the country's storage and handling if the large carry-over stock is taken into account (*Table 1*).

**Table 1: Expected summer grain production for the 2018/19 season and the February carry-over stock.**

| Grain type | 6th national crop estimate tons | February carry-over Sagis tons | Total tons |
|---|---|---|---|
| White maize | 6 879 960 | 4 204 857 | 11 084 817 |
| Yellow maize | 6 327 350 | 2 202 432 | 8 529 782 |
| Sunflower | 792 255 | 233 329 | 1 025 584 |
| Soya beans | 1 550 800 | 418 085 | 1 968 885 |
| Sorghum | 83 070 | 70 933 | 154 003 |
| Wheat | 505 000 | 1 394 460 | 1 899 460 |
| Barley | 106 150 | 393 585 | 499 735 |
| Canola | 80 000 | 79 491 | 159 491 |
| Oats | 691 150 | 51 404 | 742 554 |
| **TOTAL** | **17 015 735** | **9 048 576** | **26 064 311** |

The carry-over stock of all crops will therefore have a strategic impact on agri-businesses in the coming season. In general, everyone will have a larger carry-over stock than the previous season. It is clearly indicated by Sagis's stock figures when compared to previous seasons.

For some time now, the national commercial role-players in storage and handling have been proactively talking to clients about possibly moving their stock or earlier shipments and to create additional capacity. The issue was discussed at various forums and the process is managed at silo level to accommodate clients as far as possible. Conditions change daily, and possible exports will also affect planning.

## National silo capacity

Storage capacity is not limited to concrete silos; most agri-businesses also have silo bags and bunkers (*Table 2*). These agri-businesses provide relevant information on their websites. In addition, producers created extra storage capacity on their farms, over and above the commercial silos – the northern parts of the country have a capacity of 14,1 million tons, with capacity of more than 800 000 tons in the south.

**Table 2: Countrywide structures that increase the national storage capacity (Sagis).**

| Type of storage | National capacity |
|---|---|
| Concrete silos | 25,4 million m³ |
| Silo bags | 550 000m³ |
| Bunkers | 1,15 million m³ |
| Other | 685 000m³ |

The new harvest will be delivered from March. The wheat stocks in particular influence the storage capacity in the northern areas. Where a silo tube is partly filled with a specific commodity of specific grade quality, the available capacity is not sufficient to store another grain. This affects the national silo capacity, including the Western Cape.

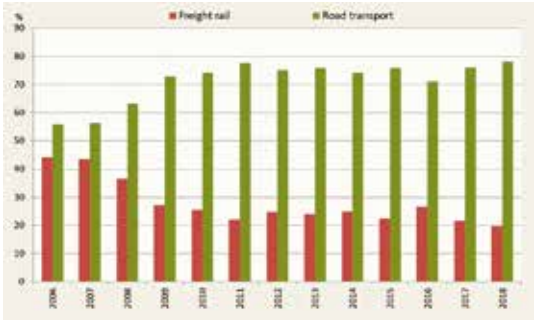
If the figures are analysed, silo owners need to plan carefully, especially because a part of the national capacity lies with processors and is not available for general storage. A total storage capacity of 27 290 000m³ is available to store 26 064 311 tons of grain plus wheat. While the new harvest is collected, old stock is fortunately still flowing to buyers and processors, which frees up much needed storage capacity.

Logistics improved a lot over the past three years, with an increase seen in rail transport (*Figure 1, 2* and *3*). Both road and rail transport are effective and can handle the expected volumes if necessary. Moving stocks between silos to create more capacity in some areas will require strategic decisions. Given the drought in Argentina and a premium placed on their maize, South African grain is closing in on the 'cheapest in the world' spot. Agri-businesses will therefore consider strategic export actions.

**Figure 1: Maize – transport by component.**

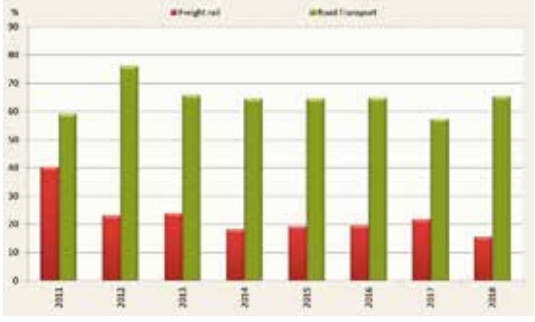

*Maize exports via Durban and other transport of maize mostly occur by road and have increased sharply since 2007, while the use of rail transport decreased. The use of freight rail fell from more than 30% to approximately 10%, but has shown an increase since 2016 (Sagis).*

**Figure 2: Wheat – transport by component.**




*The transport of imported wheat, deliveries and moving of wheat by road increased sharply between 2006 and 2011. Since 2011, between 20 and 25% of all wheat has been transported by rail annually (Sagis).*

**Figure 3: Barley, oats and soya beans – transport by component.**



*Barley, oats and soya beans transported by road and rail stablised at around 65% by road and 20% by rail the past three years (Sagis).*

After the 68 414 tons of maize exported during the first two weeks of April, it was expected that South Africa would not be able to export significant amounts of maize in the 2017/18 season that ended in April 2018 – although every little bit helps when creating badly needed capacity. It places South African exports for the 2017/18 maize marketing season on 2,1 million tons, i.e. 84% of the season's export estimate of 2,5 million tons.

With regard to transport, it helps that a significant portion of the maize destined for export by sea is transported to Durban via rail, but not all – domestic transport and transport to other parts of Africa is by road. Visit *www.sagis.org* for more information.

***Note:** The USDA covers both commercial and non-commercial production. Their figures therefore differ from the CEC's figures, which mainly focuses on commercial production. The non-commercial/existence farming production represents 6% of the estimated crop of 13,2 million tons. The USDA's estimate of commercial maize production is also 12,42 million tons.

For more information, contact Mariana Purnell, general manager of Agbiz Grain, on 012 807 6686 or email mariana.purnell@agbizgrain.co.za.

# Making sunflower great again

By Andries Wessels, Syngenta

*To make something truly great again usually relates to performance or relevance. In the case of sunflower, that component is grain yield.*

Lacking clearly defined heterotic groups, which limits significant breeding advances, and usually planted as a catch crop in marginal areas, sunflower could be seen as a crop in decline, with marginal yield gains compared to maize and wheat. On top of that, the latest Crop Estimates Committee figures show a 5% decline in hectares planted this past season compared to the previous season.

Sunflower has, however, seen some recent technological advancements in the form of Clearfield technology, which allowed the crop to expand in areas where late season weed management has been problematic.

## Third time lucky crop

Since the introduction of this non-transgenic herbicide resistance technology, growers have been able to enjoy on-par yields versus conventional hybrids. They can also fully exploit the advantages brought about by no-till production systems. Given their yield compatibility, Clearfield hybrids will become common genetic platforms for future hybrid releases even if they are planted in conventional production systems.

"Sunflower is a third time lucky crop," was the comment of a frustrated grower who had to replant several times. There are, however, some basic guidelines to eliminate luck from the production equation that could see the crop have its rightful place in a successful crop rotation system.

Perhaps the most important factor to make sunflower great again is planting date. To fully understand the value thereof, the relevance of the three distinct growth stages must be discussed. During the first growth stage, from planting to floral initiation, the first yield component (number of heads per hectare) is defined.

Environmental stress during this stage usually has limited effect on grain yield, as the plant simply has to maintain a heartbeat to keep the yield component of total heads per hectare alive.

## Drought stress reduces yield

During the second growth period, floral initiation to bloom, the most critical 'greatness' component on yield is determined. During this sensitive stage, the number of seeds per head is determined as the floral parts develop into harvested grain and the bud develops into the flowering head the crop is so famous for. Drought stress during this stage, especially, will reduce yield more than any other phase of development.

In growth stage three, the final yield component of seed weight is determined between bloom and maturity. Stress could still reduce yield in this stage, but not to the same extent as in stage two as seed weight has a smaller contribution than number of seeds per head.

More consistent rainfall distribution during the critical second stage will have significant yield benefits. Early plantings will thus allow the crop to synchronise this critical stage with months that have more frequent rainfall patterns. Plantings during November up to mid-December will benefit yield significantly as opposed to late season plantings in January or even February. Early plantings also have several additional benefits – the first related to plant population – that links back to the yield component of heads per hectare as mentioned in growth stage one.

## Sensitive to heat

Sunflower is renowned for being sensitive to high soil temperatures as the coleoptile makes its way to the soil surface. Due to the epigeal germination process of sunflower, in which the cotyledons are 'dragged' through to the soil surface, the final population of the crop is highly dependent on soil temperatures.

High soil temperatures after germination slows down the growth of the coleoptile. It could also decrease the rate of emergence and subsequently expose the young seedling to extended periods of high soil temperatures that will reduce the final population.

A general recommendation on planting depth is a very difficult one. In most cases, sandy soils that tend to dry out quicker will necessitate slightly deeper planting depths. In this lies the challenge as these lightly textured soils tend to crust in the top layers, especially if they are planted at high moisture levels.

Planter closing wheel pressure should be minimised to prevent crusting, and a standard rotary tine roller should follow

roughly three to four days after the planter. This serves two purposes: It breaks up the physical soil crust and lowers soil temperatures (very similar to the door of an oven being opened to allow air circulation).

Seed companies will indicate the germination percentage of the seed lot on the seed label, but soil temperature has a significant effect on seed vigour right after germination has occurred. Earlier planting dates allow farmers to capitalise on cooler soil temperatures that will boost final populations.

## Additional yield benefits

Although modern-day hybrids show high self-compatibility levels, early plantings benefit pollinator activity that increases pollination and subsequent seed set. Boron application during planting or as an early-season foliar application will improve pollen viability and pollen tube development and will increase seed set.

Boron also plays a role in stalk strength, evident in the clear-cut neck breakages right below the head during flowering stages observed in boron deficient fields. Boron deficiencies might be temporary during dry spells as the plant reduces nutrient uptake. As soon as the dry spell is lifted, boron uptake will continue.

Row spacing and population is also key to unlock additional yield benefits. In reduced row widths lie the advantage of increased canopy covers that allow for better weed control late in the season. Narrowing row spacing allows more uniform stands with sunlight, water and nutrients that are better utilised.

Populations should be based on soil type, rainfall and yield potential. Final populations in the range of 32 000 to 48 000 plants per hectare in low to high potential environments, respectively, are recommended.

Although sunflower can compensate with head size in low plant populations, these oversized heads lead to underdeveloped seeds and poor seed set – particularly in the centre of the head (think stage two). In higher populations, dry-down rates are shorter and will speed up the onset of harvest as heads are smaller and more uniform.

## Choice of hybrid crucial

The choice of hybrid is one of the key decisions every grower must make every season. Growers should consider not just yield, but also yield stability, technology (Clearfield) and maturity classification. Maturity is important especially if planting is delayed, keeping in mind the onset of a killing frost. Split hybrids according to their maturity to hedge against production risk and to spread the workload during the harvest.

Sunflower has the flexibility and adaptability to add value in a changing production environment, but will require farmers to rethink planting dates, populations and row widths to restore the crop to 'greatness' and to take luck out of the success factor equation.

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# An overview of the **Polish oilseeds industry**

*Compiled by Ursula Human*

*In May 2018, the National Support Centre for Agriculture in Poland (Krajowy Ośrodek Wsparcia Rolnictwa – KOWR) hosted a tour for international media to introduce them to the country's agricultural and food industries. This annual tour is meant to promote Poland's high-quality agricultural export products.*

Although the tour itself did not place major focus on the oilseeds industry, it was evident while driving through the region that rapeseed, with fields stretching far and wide across the rural landscape, is an important crop. The tour took place in the northern, eastern and western provinces of Poland where canola is commonly produced.

The KOWR has provided *Oilseeds Focus* with information on their oilseeds industry, which also includes soya bean production. The latter often forms part of conservation agriculture as a rotation crop. The country is, however, also dependent on soya bean imports.

## Rapeseed production

In the European Union (EU) the oilseeds market includes rapeseed, sunflower, soya bean and flax. This industry is not subject to intervention or external protection, as oilseeds imports are carried out on duty-free conditions. Before the accession of Poland to the EU, the domestic market of oilseeds was protected by moderately high duty rates.

Poland is one of the leading producers of rapeseed in the EU, following Germany and France. Rapeseed acreage in Poland constitutes 95% of total oilseed plantings. Rapeseed cultivation is concentrated in nine provinces located in the northern, western and southern parts of the country.

Most of the rapeseed production is carried out in Dolnośląskie, Kujawsko-Pomorskie, Lubelskie, Mazowieckie, Opolskie, Pomorskie, Warmińsko-Mazurskie, Wielkopolskie and Zachodniopomorskie provinces, which have the most favourable climates and soil conditions for rapeseed cultivation.

> Germany will remain the main consumer of Polish rapeseed in the 2017/18 season, with approximately 91% being exported to this country in the first nine months of the season.

Rapeseed plays a very important role in the national agricultural, food economy and processing industries in Poland. It is a raw material used to produce consumer and industrial fats and is a source of feed protein.

The accession of Poland to the European Union and the EU policy on biofuels and renewable energy have boosted the development of rapeseed production in Poland. With long-term stabilisation of the demand for rapeseed oil in the food sector (at a level of approximately one million tons), a fast-growing demand for this raw material consumed in the production of biocomponents has been created.

The harvest of rapeseed increased from 0,9 million tons, on average, in the three years before the accession (2001 to 2003) to 2,7 million tons in 2014 to 2016. This is due to the more than doubling of the cultivation area (from 0,4 to 0,9 million ha) and an increase in yield of more than 40% (from 2,1 to 3t/ha).

The share of rapeseed in the national sowing area more than doubled (from 3,9% in the three years before the accession to 8,6% in 2014 to 2016). Also, the number of farms cultivating rapeseed more than doubled from 43 000ha in 2002 to 91 000ha in 2016, with a decrease in the total number of farms with an area of more than 1ha of farmland from nearly 2 million to 1,4 million.

## Rapeseed trade

The Institute of Agricultural and Food Economics – National Research Institute (IAFE-NRI), a Polish independent scientific and research centre, estimates that in the 2017/18 season domestic stocks of rapeseed production (including low initial stocks) amounted to 2 713 000 tons and were 21,4% higher than in the previous season.

The greater domestic supply translated into the increased export and reduced import of rapeseed. It is estimated that in the 2017/18 season, 330 000 tons of rapeseed will be exported (12,3% of last year's harvest, i.e. 39,2% more than in the previous season) and 520 000 tons imported, which is 19% lower.

Germany will remain the main consumer of Polish rapeseed in the 2017/18 season, with approximately 91% being exported to this country in the first nine months of the season. The biggest suppliers to the Polish market will be: Czech Republic (approximately 22%), Romania (approximately 17%), Slovakia (approximately 14%), Hungary (approximately 13%) and Ukraine (approximately 12%).

With the larger harvest and net import of 190 000 tons of rapeseed, the fat industry will process 2 800 000 tons of this raw material, 9,8% more than in the 2016/17 season. The stocks of rapeseed at the end of the season will be as low as the year before (22 000 tons, 0,8% of the annual consumption).

In the 2015/16 marketing year (MY) Poland exported 881 000 tons of rapeseed. All exports were destined for the EU, mainly Germany. During the harvest, German trucks often come directly to the fields in Poland and load rapeseed directly from combines.

For producers from Northern and Eastern Poland, transportation costs are lower when they sell rapeseed to the crushing plant in Rostock, Germany, instead of crushing plants in Poland. In the 2016/17 MY, exports of rapeseed significantly decreased in comparison to the previous year because of lower domestic production. In the 2016/17 MY, Poland exported only 236 452 tons of rapeseed, 73% less than in the 2015/16 season.

## Rapeseed oil and meal

In the 2015/16 MY, Poland exported 411 334 tons of rapeseed oil. Almost all exports were destined for the EU, with the Czech Republic as the main export destination. In the 2016/17 MY, Poland exported 185 107 tons of rapeseed oil, 55% less than in the 2015/16 season.

In the 2015/16 MY, the country exported 638 284 tons of rapeseed meal, 9% less than in the previous year. All exports were destined for the EU. Rapeseed meal is in demand in Europe because it is partially used as a protein source in pig and cattle feed rations.

Germany is the main export destination for exports of rapeseed meal followed by Spain. In the 2016/17 MY, Poland exported 711 862 tons of rapeseed meal, 12% more than in the 2015/16 season, due to increased demand from the Netherlands and Denmark.

## Soya bean meal

Soya bean meal is the primary protein feed used in livestock nutrition. Acreage of domestic production of soya beans amounted to 5 700ha in 2017, so almost the entire demand for soya bean meal had to be supplied by imports.

The share of soya bean meal in total use of protein feeds accounts for 61%, followed by rapeseed meal at 15%, sunflower meal at 10%, legumes at 13%, and others at 1%. In the 2017/18 MY, soya bean meal imports to Poland increased by 5% to 2 402 000 tons.

In the 2015/16 MY, Poland imported 2 332 143 tons of soya bean meal, 12% more than in the previous year. The value of imports of soya bean meal was close to $0,9 billion. Over 80% of imports originated from South America.

Soya bean meal remains in demand because it is a major source of protein in poultry feeding rations. In the 2016/17 MY, the country imported 2 283 297 tons of soya bean meal, 2% less than in the 2015/16 season.

# Possible new direction for **legal costs in land disputes**

*By HJ Moolman*

Equality before the law and access to the courts are part of the *Charter of Fundamental Rights* contained in the *Constitution of the Republic of South Africa, 1996* (Act 108 of 1996). It has been shrouded in controversy since the democratic changes in South Africa, because a claim or exercising of these rights are inaccessible for many people.

In court proceedings on land reform the above controversy is not surprising. It can firstly be ascribed to the fact that the relevant legislation is generally complicated, with little space to resolve disputes outside the framework of litigation. Secondly, it can be ascribed to the historical development of a policy on legal costs in the Land Claims Court, since the legislation came into force.

To institute an order for legal costs against a party has always been at the discretion of the courts, although the normal practice is that a cost order follows the outcome of the case. It means the losing party will, in most cases, be liable for the winner's legal costs, according to rates prescribed by court rules.

## Granting cost orders

With the commencement of the activities of the Land Claims Court, which was set up mainly as a specialist court to settle land reform disputes, the court adopted a policy not to grant cost orders according to this custom. The Land Claims Court will only grant cost orders if a party's actions or behaviour during the court proceedings are rebuked as unacceptable by the court.

The Land Claims Court's policy is based on the principle that proceedings before the court are regarded as litigating in social interest. In this way, and in line with the goals of the *Constitution*, the Land Claims Court wants to make the court more accessible to people who were historically disadvantaged in a previous dispensation.

> The Land Claims Court's policy is based on the principle that proceedings before the court are regarded as litigating in social interest.

Unfortunately, the policy is also based on an assumption that land owners' possession or ownership of land is sufficient reason to accept that they are able to finance expensive and complex litigation in land reform disputes.

## Financial capabilities

On the other hand, a reverse assumption is being made regarding the financial capabilities of farm dwellers or claimants involved in the same dispute. Many land owners regard this state of affairs as extremely unfair, and there are cases where land owners eventually had to sell their land due to the cost of the proceedings they became involved in.

Despite this policy of the Land Claims Court, which still applies, the situation surrounding access to the courts and legal costs changed in practice over the past few years. The position of claimants and farm dwellers improved drastically since the Department of Rural Development and Land Reform launched a special project to compile a panel of private law firms that will act, at state expense, on behalf of farm dwellers and claimants.

The unfairness the department's special policy caused is contained in the belief that claimants and farm dwellers have unlimited access to private legal aid, while the Land Claims Court still applies the former policy on legal costs.

## Litigation against land owners

The state effectively became involved in litigating land owners with state money, whereas the state, based on the status of the person on whose behalf the litigation was conducted and in accordance with the policy of the Land Claims Court, could not be held accountable for a successful owner's legal costs.

In a recent judgement both the Constitutional Court and the Court of Appeals clarified new principles regarding the role of the state (local and provincial governments, and the Department of Rural Development and Land Reform) in land disputes, and even granted cost orders in cases where the court was of the opinion that the state had not fulfilled its constitutional and legal obligations.

The judgements changed the position of legal costs in land disputes in the sense that the state can now be added in its various capacities as separate parties to court proceedings. This paves the way for land owners to request a cost order against the state in cases where the outcome is in their favour.

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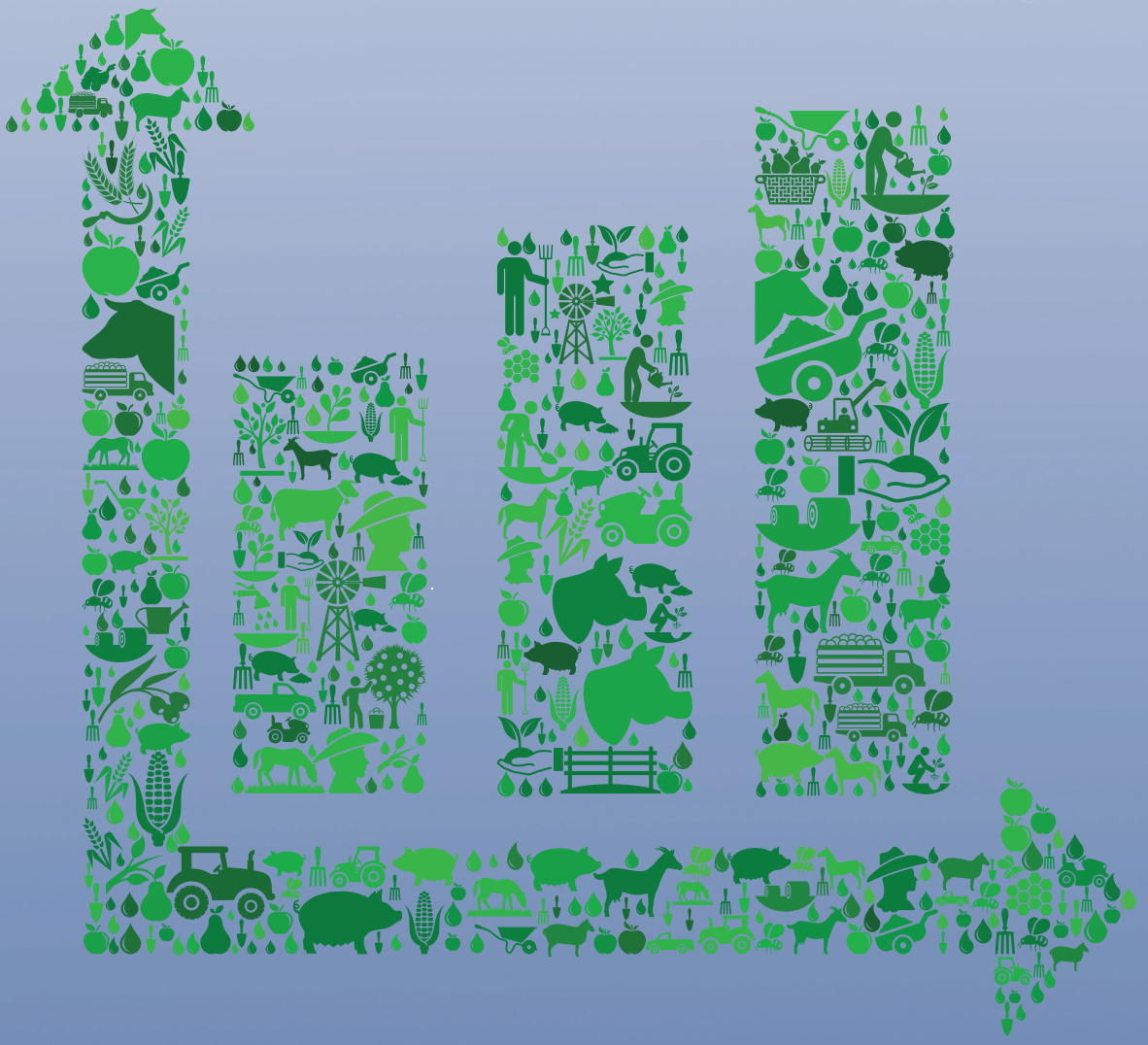

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