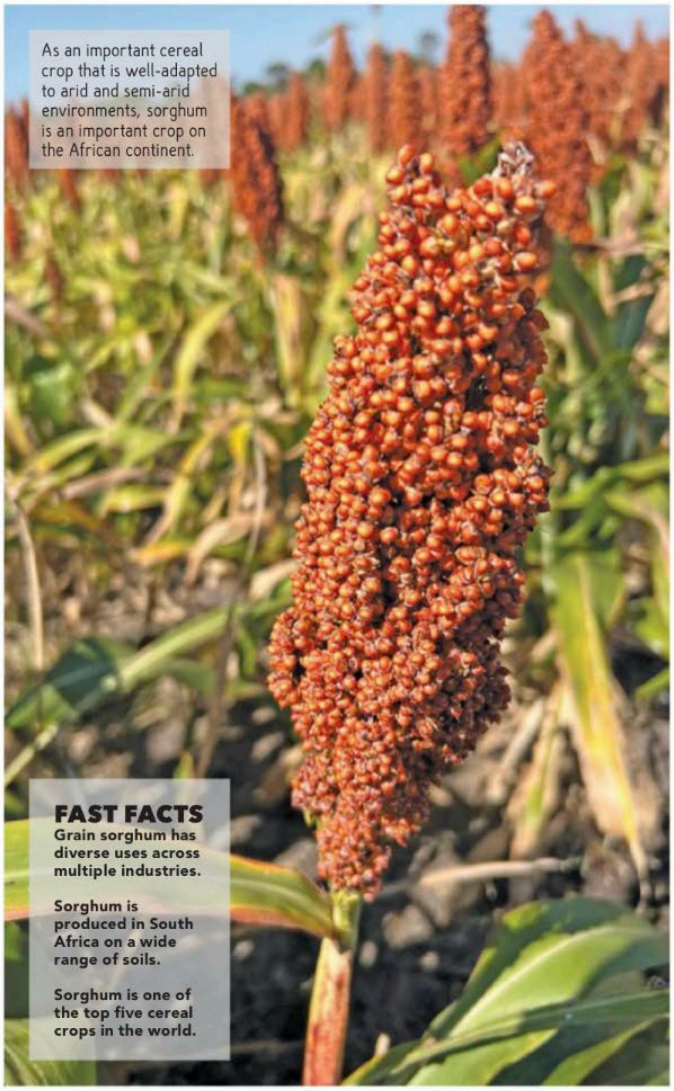
Promising new cultivars on show at sorghum demonstration day

Magda du Toit recently attended a sorghum cultivar demonstration day and takes a look at the exciting new products making their way onto the market.



As an important cereal crop that is well-adapted to arid and semi-arid environments, sorghum is an important crop on the African continent.

FAST FACTS

Grain sorghum has diverse uses across multiple industries.

Sorghum is produced in South Africa on a wide range of soils.

Sorghum is one of the top five cereal crops in the world.

Sorghum is an important cereal crop in Africa and a staple grain for millions of people. It is well adapted to arid and semi-arid environments and has the ability to thrive in relatively poor soils, low rainfall and high temperatures. Grain sorghum also has diverse uses across multiple industries.

Sorghum is used to make bread, porridges, soups and cakes for human consumption and as malt in the production of alcoholic beverages such as opaque beer, traditional sorghum beer (*umqombothi*) and non-alcoholic drinks (*mageu*). Additionally, sorghum is also used for livestock and poultry feed due to its high nutritional value and digestibility.

Speaking at a cultivar demonstration day organised by Grain SA and the Sorghum Trust on the farm Hamburg near Settlers in Limpopo, farm owner Willem Groothof expressed his optimism regarding the broader sorghum industry in South Africa. "I am positive that the sorghum industry will grow, especially if one looks at the new cultivars coming through. We must, however, also develop the market and promote sorghum as a healthy food."

According to Groothof, who is also chairperson of the Sorghum Working Group in Grain SA, the creation of the Sorghum Cluster Initiative (SCI) is a light in the dark tunnel of sorghum production in South Africa. He pointed out that the SCI is busy with the following projects:

- The evaluation of exotic germplasm as a precursor to sorghum pre-breeding;
- Alternative quelea-control methods;
- Policy aspects: asking for the exemption of VAT on sorghum;
- An awareness campaign to support the market for sorghum;
- Establishing an agro-processing facility; and
- An analysis of the sorghum value chain.

The fact that sorghum is the only grain on which VAT is payable has negatively affected its competitive position in the market.

"We are hopeful that this is something that can be addressed, as this will create a platform where sorghum as a food staple can compete on equal footing with other grains."

Another important factor, especially to farmers, is to source new hybrids. "It is important to introduce new hybrids to the market and establish a sustainable pipeline of high-performing sorghum hybrids that are bred under local conditions," said Groothof.

He said that to improve sorghum yield and the adoption of newly released hybrids by producers, it is important to also look at production constraints. To this end, apart from new cultivars being evaluated, the epidemiology group of the Plant Pathology Department at the University of the Free State (UFS) has embarked on updating the status of current diseases causing constraints in sorghum production in the country.

"The research aims to identify diseases, quantify the extent thereof and offer practical advice to producers to mitigate disease risks," he explained.

The research is supported by the Sorghum Trust and the National Research Foundation. During the 2022/2023 season, a survey of foliar and panicle diseases from 25 fields in Limpopo, Mpumalanga, KwaZulu-Natal, the Free State and North West was conducted. The surveyed fields were primarily planted with different improved cultivars.

Groothof also mentioned the damage caused by red-billed quelea birds. "Quelea birds are a serious pest. The average quelea bird eats around 10g of grain per day, so a flock of two million can devour as much as 20t of grain in a single day. With an estimated adult breeding population of at least 1,5 billion, one can easily imagine the damage that can be caused by these birds."

He said during the past season, in one of his fields near Codrington in Limpopo, at least 30% of the field was destroyed by the birds.

The Department of Agriculture, Land Reform and Rural Development is responsible for the management and control of the birds and currently two control methods are used: paraffin/gasoline explosions and aerial chemical spraying. Various other quelea-control methods have also been developed in the past few decades but these techniques, such as netting, repellents, artificial scaring tactics and chemicals, are not always successful.

SORGHUM AS A CROP

(Source: Sorghum Guide: ARC-Grain Crops Institute)

Temperature plays an important role in the growth and development of sorghum. It's a warm-weather crop and requires high temperatures for good germination and growth. Sorghum is sensitive to low temperatures and frost. The minimum temperature for germination varies from 7% to 10%, with 15°C as the standard.

LEFT:
Willem Groothof farms in Limpopo and is the chairperson of the Sorghum Working Group at Grain SA. 'We must develop the market and promote sorghum as a healthy food,' he said.

BELOW:
Farmers from across the Springbokvlakte in Limpopo attended the cultivar demonstration day near Settlers.

LEFT:
To determine if the sorghum is ready to harvest, one can do a quick test in the field by rubbing the kernels in your handpalm in a simple thresing process. If the kernel's glume comes loose easily, it is an indication that the grain will harvest easily and cleanly.

BELOW:
Willem Groothof showing the open head (panicle) of a sorghum cultivar. He believes that a more open head better facilitates effective pest spraying.

ABOVE: In the demonstration trial on the Willem Groothof farm near Settlers, the difference in the various sorghum cultivars can easily be seen. On the left is a cultivar with a more open ear and to the right, a cultivar with a more closed ear. There is also a difference in the colour of the cultivar glumes, making it easy to distinguish between cultivars.

Temperatures of 27 to 30 °C are required for optimum growth and development.

Sorghum is produced in South Africa on a wide range of soils and under fluctuating rainfall conditions of approximately 400mm in the drier western parts to about 800mm in the wetter eastern parts. Planting should occur if there is enough soil moisture. Normally sorghum is planted from mid-October to mid-December.

The growth and development of sorghum are divided into the vegetative and reproductive growth stages. The identification of sorghum growth stages is done according to leaf development and that of the reproductive growth stage, the development of grain kernels.

Sorghum is a short-day plant, which means that the plant requires short days (long nights) before proceeding to the reproductive stage. The optimum photoperiod, which will induce flower formation, is between 10 and 11 hours. Photoperiods longer than 11 to 12 hours stimulate vegetative growth.

The plant has an exceptionally well-developed and finely branched root system, which is very efficient in the absorption of water. In contrast, it has a small leaf area per plant, but this is advantageous as it limits transpiration. The epidermis of the leaf is corky and covered with a waxy layer, which protects the plant form desiccation. In addition, the stomata close rapidly to limit water loss.

During dry periods, sorghum has the ability to remain in a virtually dormant stage and resume growth as soon as conditions become favourable again. Even though the main stem can die, side shoots can develop and form seed when the water supply improves.

Weed control during the first six to eight weeks after planting is crucial, as weeds compete vigorously with the crop for nutrients and water during this period.

DURING DRY PERIODS, SORGHUM CAN REMAIN IN A DORMANT STAGE AND RESUME GROWTH AS CONDITIONS IMPROVE

One of the major pests that affects sorghum is the root parasite, *Striga asiatica* (L.) Kuntze or witchweed (rooiblom). The parasitic plants are single stemmed with bright red flowers. Most of the damage is done before the parasite emerges from the soil. The symptoms include leaf wilting, leaf rolling and leaf scorching. The tiny seeds are disseminated by wind, water and animals, and remain viable in the soil for 15 to 20 years. Rotation with cotton, groundnut, cowpea and pigeon pea will reduce the incidence of Striga. Hand pulling the plants before flowering may also help.

The inflorescence of sorghum is a compact panicle, and the shape and colour of the panicle varies between cultivars. The colour of the glumes may be black, red, brown, or tan.

It takes approximately six to nine days for the whole panicle to flower. The flowers open during the night or early morning. Those at the top of

the panicle open first. The flowers are mainly self-pollinated with a small percentage of cross-pollination. The ripe seed (grain) of sorghum is usually partially enclosed by glumes, which are removed during threshing and/or harvesting. Each panicle contains from 800 to 3 000 kernels.

CULTIVAR PLANNING

Cultivars differ in their reaction to the environment and the climate. Multi-seasonal results should be used to select a cultivar and it is advisable to plant a package including different cultivars to spread risk. Agronomic characteristics, such as disease and insect resistance, lodging and head placement, should be kept in mind when choosing a cultivar.

According to Gerhard Engelbrecht, Pannar Agronomist for the Eastern Highveld and Limpopo, the company's hybrids have been the backbone of grain sorghum production in South Africa. The company's sorghum breeding programme has been running since 1978 and is one of the oldest in the world.

During the cultivar demonstration day, the following cultivars could be observed:

PAN 8816

This cultivar has excellent yield potential and stability. The plant shows a very uniform growth habit and good standability. The grain is large with a good thresh ability. It also shows good general leaf-disease tolerance. It has an open head (panicle) that facilitates more effective pest spraying.

- Days to 50% flowering: 76-79
- Days to harvest: 135-142
- Plant height: 112-117cm

PAN 8625

This cultivar has outstanding yield performance and agronomic characteristics, and is widely adapted to various production areas. It is a plant of medium height with good standability and shows good tolerance to head smut. The grain is bitter.

- Days to 50% flowering: 79-82
- Days to harvest: 140-145
- Plant height: 120-130cm

Other cultivars that were planted in the demonstration included PAN 8951 and an experimental hybrid, P81.

Limagrain demonstrated the new Seedco cultivar, SC XH102. With its resilience, easy harvest and adaptability to various soil types, this mid-season sorghum is set to deliver high yields, they pointed out.

Agricol's Ben Pienaar talked about two of their cultivar entries in the demonstration, Cracka and Enforcer. Cracka is a short growth season cultivar, with an open head that is well adapted to utilise soil moisture, especially in areas such as the Springbokvlakte. Cracka has continued to provide reliable results. The open head, standability and regular height mean it is quicker to dry down and give a good yield.

LEFT: Cultivar demonstrations were planted to show the old stalwarts in the sorghum industry, as well as new cultivars that are coming through. These cultivars are part of the efforts to enhance sorghum industry competitiveness and sustainability in South Africa.

Enforcer is an open-headed, full-season hybrid, with a bronze grain colour, that performs well in early plantings.

- Days to flowering: 71-75
- Days to harvest: 140-145
- Plant height: 120-130cm

Duan Viljoen from Advanta demonstrated the cultivars Sentinel IG, Viper, MR Buster and MR Bazley. The MR cultivars are tolerant to midgets.

Sentinel IG is a medium-long maturity sorghum cultivar with Advanta's proprietary iGrowth technology. The addition of Advanta's iGrowth technology delivers the option for an in-crop application of registered herbicides from the imidazolinone family.

AGT Foods Africa's Gjizelle Nel discussed their entry, Gibson, that is a medium to long growth season cultivar with a very good yield potential.

Groothof cautioned that farmers should, before planting sorghum, do proper research about the market to find potential buyers or processors. "It is important to understand the market and know the grain prices. I would advise that farmers should secure contractual agreements before planting."

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