MEETING AT SPIER WINE ESTATE WITH DR. DAVID BOWRAN AS KEYNOTE SPEAKER
- SOUTHERN CAPE AND SWARTLAND VISITS -27 to 29 AUGUST 2014

Attendance

Dr D Bowran – Director Northam Agricultural Research Centre, DAFWA, Northam, WA.

Mr G Scholtemeijer – PRF (Chairperson)

Mr A Theron – PRF

Dr J de Kock – PRF

Mr G Keun – PRF

Mr C Cumming – PRF

Mr J Loubser – PRF

Mr J Bruwer – Bayer AgriSci

Prof GA Agenbag - PRF

Mr Scholtemeijer welcomed all attendees and thanked Dr Bowran for his willingness to come all the way from Western Australia to share his expertise with the PRF and the canola industry of South Africa. Dr Bowran was introduced and given the opportunity to present his views on canola production in the Western and Southern Cape and recommendations for future improvements .

Dr Bowran was generally impressed with the canola crops he saw:

- early planting which allowed pod filling while temperatures were still relatively cool which would maximise yields, and
- good stand numbers in most fields.

The following aspects were highlighted and discussed:

1. Management assisting models

Rather manage the crop according to conditions than use a recipe approach to growing your crop. A recipe approach can work in low rainfall areas but in higher rainfall areas one must be able to adjust according to conditions for both nutrient levels and disease\insect control. Using models to help in decision making can be very useful. Models are available in Australia that is used for running courses for growers and advisors.

The South African (SA) weather services and their ability to forecast 3, 4, 5 and 6 months rainfall outlook should be investigated. In Western Australia (WA) they use the BECAM 4.5 model and it is remarkably reliable and could be useful in SA. The model assists in determining required nutrient input, insect pressure forecasting and can eliminate unnecessary sprays. The Blackleg sporical model helps understand when spores occur.

Financial management is also an area where Australia can assist by using BFAP to include comparisons between WA farms (low rainfall areas and high rainfall areas) with SA growers to get a feeling of where you are in this process. You can benchmark some of your canola based cropping systems against the Australian canola based cropping systems.

2. Swathing versus direct harvesting

In Australia there is a strong move to direct harvesting due to:

- 10% higher yields from direct harvesting vs swathing and better oil content
- new, shorter cultivars that are better suited to direct harvesting
- better resistance to shattering in new cultivars
- use glyphosate as crop desiccant at end of the season to get a uniformly dry crop
- glyphosate spray helps to sterilise ryegrass seed.

Products used in Australia for plant desiccation at the end of the season to dry out plants for direct harvesting include:

- glyphosate – relatively cheap, effective against important weeds (ryegrass \ ramenas) . Takes 20 days from application to harvest. Danger of resistance build-up due to over use.
  glufosinate ammonia – more expensive than glyphosate and only effective against ryegrass and ramenas at much higher rates. An important advantage with glufosinate ammonia is, because of its faster working than glyphosate within the plant, only 4 days are required between application and harvest.
- paraquat\diquat – effective desiccant but not as good as glyphosate on ryegrass. Contact action means requires better coverage for good control. Can result in poorer efficacy in leafy crop.

Very few growers in Australia use desiccants. Only those in the high rainfall areas are starting to use them.

3. Water holding capacity of soil as indication of yield potential

It is important for growers to know the water holding capacity of the soil to help in production planning.

- dig profile pits in lands in canola year to determine the depth of penetration of roots. Show producers how roots have grown and identify compact layers which prevent roots from growing straight down.
- lot of rocks in SA soils and if 50% of profile is rocks, only 50% of soil can actually hold water.

Canola uses about 40 mm of water per month up to the end August but this increases as temperatures rise in September. About 70 mm of stored water plus post flowering rain is required to maximise yield. Once signs of wilting occur and it continues for a time the plant is struggling to survive, drawing nutrients from the leaves and not adding to yield.

4. Crop rotation and diseases

Shortening of canola rotations would be a concern for Dr Bowran. Both blackleg and schlerotinia are very robust diseases. The danger of losing resistance genes (especially in blackleg) and of fungicide resistance developing due to overuse should be a detriment to shorter rotations. Dr Bowran indicated that a rotation system which included canola once every three years could be sustainable should all producers in a given area follow good production strategies and are prepared to work together. These strategies include rotating cultivars with different blackleg resistance genes in an organised fashion so that neighbours complement each other in cultivar choices, plant certified seed that has preferably been treated with Jockey and use fungicides to control blackleg when conditions become favourable for the disease.

It is often very difficult to get growers to co-operate on an organised scale regarding cultivar choice. Seed availability of the desired cultivars and personal preferences will more than likely play an important role.

Furthermore, seed companies might be a bit adverse to comply should they feel their cultivars are being disadvantaged when certain cultivars are prescribed due to containing certain resistance genes. In the interests of sustainable canola production Dr Bowran feels that all parties should be prepared to co-operate. He mentioned though that planting canola once in four years on the same land was certainly more sustainable and a lot less likely to run into disease resistance problems.

5. Weed control and herbicide resistance management

Wild radish (ramenas) control in canola in SA is generally good but Dr Bowran noticed ramenas escapes in other crops. Triazine resistance in ramenas developed very fast in Australia, but was identified very quickly and they were able to stop it. Hand weeding of resistant weeds before seed set is an important contributor in eliminating resistance. The practice is to spray the ramenas in a cereal phase with any\all chemistry groups available, then removing any remaining plants late in the season.

Triazine herbicides should be incorporated into the top 10 cm of soil for best weed control results, but this is not done in a no-till system. In Australia they are using more soluble forms of triazines to overcome the problem of getting the product into the weed germination zone timeously. Simazine is the least soluble form, followed by atrazine which is slightly better. In Australia they are now registering cyanazine, terbuthylazine and terbutryn which are being used in mixtures with atrazine.

Some producers that are on a no-till system have introduced mouldboard ploughing once in 10 years to address certain specific problems. The practice got attention when it was found that many growers got amazing yield responses (of up to 40%) after ploughing, with the following added advantages:

- weed seed is deep buried (resistant weed seed and especially brome grass)
- stubble and leaves that serve as hosts for certain diseases are buried resulting in reduced disease pressure
- nutrients (especially lime) can be incorporated deep into the soil – important where aluminium toxicity occurs.

Mouldboard ploughing is only done when soil is wet and a crop, usually a cereal, is planted immediately after ploughing to minimise wind erosion. Press wheel planters are used to compact the ploughed soil. Not all soils are suitable to be deep ploughed. Return to the conservation production system the year after deep ploughing.

6. Canola cultivars

On a question how Australian cultivar trial results can be used to select canola cultivars for production in South Africa, Dr Bowran answered as follows:

"Access the National Variety Testing Programme (NVT) which is grouped according to specific environmental characteristics. Find similar environments in SA to do comparisons with SA trial results. The NVT co-ordinator is Allan Bedgewood and he will be helpful in supplying the necessary information".

According to Dr Bowran, SA canola (and cereal) crops are generally more leafy than plants in Australia due to:

- lower winter temperatures in WA (go down to 1*C while Cape minimum temperatures generally run at 5 to 6* C)
- dryer climate
- lower N levels used than in SA

The danger of leafy plants is that in a drier season that they use more water initially and a late season dry spell will cause the plants to suffer at the critical pod filling stage. People selecting cultivars for SA may inadvertently be inclined to discount Australian cultivars that do not appear robust enough to their detriment. The perception that more bio-mass equates to higher yields is also not necessarily true. Cultivars are presently being bred to carry pods in a narrower band and pods are longer. The number of pods per plant determines yield and not plant mass.

On a question whether cultivars are being bred specifically for less shattering and is shatterproof a characteristic that is noted, Dr Bowran responded as follows:

"What`s happening is that plant breeders are breeding cultivars better suited for direct harvesting. This is specifically shorter cultivars (less bio-mass to travel through the combine) that do not shatter. It is a selection pressure being applied at the plant breeding phase. The degree of shattering is actually being reduced all the time and it is reflected in the yield. Should a cultivar show any signs of shattering more than the norm it would be eliminated from the programme. The only producers that may suffer losses are should they direct

harvest and do not use the right equipment. It is important that one uses the correct equipment for direct harvesting and the saving in time and yield increases usually pays for the equipment within one year. My advice to growers farming where wind is a problem is to plant shorter cultivars that branch more in the upper part of the canopy. They intertwine better which reduces the pods rattling around and there is less shattering".

Dr Bowran was also of the opinion that the possibility of SA sourcing cultivars from other parts of the world to increase the gene diversity against blackleg is not very good.
"Cultivars from Europe and Canada tend to have a day length responsiveness which is different to the Australian cultivars. This means you will have longer season cultivars that will form pods when it is hotter – thus increasing the danger of late season dry spells limiting yield. Australian cultivars are bred to flower really early. The other factor is to determine what gene constructs they have for blackleg. Are they resistant to the blackleg strains that occur locally?"

7. Plant nutrition

On a question why optimum N levels in Australia on soils with a 1% carbon content are about 40 kg N\ha whereas, based on SA trial results, between 80 and 100 kg N\ha are recommended in South Africa, Dr Bowran said that one explanation could be that lower levels of N leach in Australia. Most soils have a clay layer and the N tends to go down to 30 to 50 cm depth and is stored as nitrate. Most growers will use a starter N and then, depending on early season rainfall measured and the forecast for late season rain, make a decision on whether to do a top-up N application.

Under good moisture conditions the latest Dr Bowran recommends application of N to have a positive impact on yield is when the first flowers appear. Calcium nitrate is the best form of N to apply at this stage as calcium is also important to the plant and promotes better nitrogen use in the plant.

In Australia up to 50% of growers use liquid N as you get 100% uptake into the plant at a late stage. An application of 20 N in liquid form is probably equivalent to 50 kg in urea form as you lose some (bound in the soil) and urea must be converted before it is available to the plant.

Lime is generally incorporated by rainfall in a no till system. It is applied broadcast to the surface before the rainy period and will gradually move into the top 10 cm in the first year. It will take up to 5 years to move 40 to 50 cm into the soil. Some growers will apply lime on the surface one year and then use airseeders fitted with tines the next season to incorporate it to 40 cm. Even one ton\ha will do a good job.

8. Mice problems

The increase in continuous cropping systems, especially in sandy soil areas, may cause some problems with rodents such as mice and producers must be warned to be on the look out for increasing mice populations and take appropriate steps to minimise risks.

9. Nematodes

Nematode problems in canola are on the increase in Australia. Mainly it is Pratylenchus spp. that occurs and medics are a host plants, resulting in an increase of the population prior to a wheat or canola crop. Growers must be aware that if patches in a canola field are not growing well they should test for nematodes. The only effective control measure to reduce populations is a no crop fallow of 12 months where nothing must be allowed to grow on the field.

10. Bio-security

Australia has a bio-security programme in place to assist in the early identification of new problematic weeds, insects or diseases. Growers are encouraged to report any suspicious event that may fall into this category and it is followed up as quickly as possible so that measures can be taken to control or eliminate any threat that may be associated with the incident. A parasitic weed named "Broomrape" (Orobanche spp.) has been recently identified in Australia and it could easily become a problem in SA. Cape weed (gousblom) is a perfect host for the weed and it is extremely aggressive on canola and other pulse crops.
Dr. Bowran recommended that SA consider introducing a bio-security programme and identifying institutions \ individuals that growers can contact should they feel a new problem has been identified.

Most important recommendations

1) **Investigate the use of prediction models to assist growers in production planning.**

2) **Local researchers to liase with NVT co –ordinator in Australia to collaborate and made better use of Australian NVT data to select cultivars for specific production areas.**

3) **Consider the introduction of a bio-security programme to assist in early identification of new problematic weeds, insects or diseases.**