



## SOYBEAN CULTIVAR RECOMMENDATIONS 2016

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A national soybean (*Glycine max* (L.) Merrill) cultivar evaluation project is conducted annually in the major grain producing areas of South Africa. The project is co-ordinated by the Agricultural Research Council – Grain Crops Institute in Potchefstroom. However, the KwaZulu-Natal Department of Agriculture and Rural Development is a co-worker of the trials conducted on the Kokstad, Cedara and Dundee Research Stations, whilst Pannar Seed and Link Seed are co-workers of the trials conducted in the Greytown area.

The primary aims of the project are:

- i) To compare cultivars for agronomic and economic performance;
- ii) To test the adaptability of cultivars and new releases for specific areas and cultivation practices.

The trials were planted in rows spaced 0.45 m apart in Kokstad and Cedara, 0.75 m and 0.90 m apart at two sites in Greytown, and 0.9 m apart in Dundee in the 2011/12 and 2012/13 seasons, but 0.45 m apart in the 2014/15 season.

The seeding rates were 400 000 seeds/hectare in the high rainfall areas of Kokstad, Cedara and Greytown and 350 000 seeds/hectare in Dundee. The crops were grown under dry-land conditions and were fertilized for optimum grain yields, based on soil analysis recommendations conducted by the Cedara Analytical Laboratory. As soybean is a legume crop, no nitrogen was applied at the four sites. Registered agro-chemicals were used to control weeds, insects and diseases throughout the growing-season.

Successful soybean production is based on:

- Fertilizing the crop according to the soil analysis recommendations
- Thorough land preparation
- Optimum planting period
- Cultivar selection
- Control of weeds, insects and diseases.

Climatic conditions depicting cool (Kokstad), moderate (Cedara) and warm (Dundee) conditions are shown in Table 1. No climatic data is available for Greytown.

**TABLE 1** Climatic conditions depicting the cool, medium and warmer production areas

Month	Kokstad		Cedara		Dundee	
	Heat Units	Rain (mm)	Heat Units	Rain (mm)	Heat Units	Rain (mm)
November	195	95	237	112	288	99
December	257	103	291	127	335	120
January	279	129	313	135	350	134
February	244	125	286	127	319	106
March	233	101	288	113	310	80
April	132	49	201	52	219	42
<b>Total</b>	<b>1340</b>	<b>602</b>	<b>1616</b>	<b>666</b>	<b>1821</b>	<b>581</b>

However, when comparing the production areas in South Africa, Dundee is considered to have a moderate climate. Due to differences in the environmental conditions at each locality and within each season, individual cultivar performance may be affected.

The ten highest yielding cultivars at the four locations are shown in Table 2. Ideally, cultivar recommendations should be based on three or four seasons' data for reliable information. Many new cultivars were evaluated in the 2014/15 season and older cultivars were omitted. Therefore, at Dundee only the yield of nine cultivars is available over the three seasons. The crop failed at Dundee in the 2013/14 season.

The short-season cultivars, PAN 1454R and LS 6444R, yielded best with the cool climate experienced at Kokstad. The medium-long season cultivars, LS 6161R and LS 6261R yielded well at Cedara and Greytown. Low mean yields were obtained at Dundee, due to dry conditions in the 2011/12 and 2014/15 seasons.

Although the cultivars were only evaluated at these four sites, farmers intending to plant soybean in other areas should consider planting those cultivars with consistent performances at all the evaluated sites. Selections could then be confirmed by advisors with local knowledge or seed company representatives.

While grain yield is rightly considered an important factor, other characteristics should also be taken into account. These include:

#### **a) Growing-season length – planting details**

Soybean is sensitive to day length (photoperiod) and, due to longer summer days at higher latitudes, will therefore mature later the further south it is planted in Southern Africa. Planting date and temperature will also influence the duration of the growing-season. Due to shorter days, soybean will flower earlier when planted late, whilst in warm areas the growth rate will

be quicker than in cool areas and therefore the crop will mature sooner.

Guidelines for optimum planting dates are:

Cool areas: 20 October to 30 November

Moderate areas: 01 November to 15 December

Warm areas: 15 November to 30 December

#### **b) Maturity group (MG)**

Maturity grouping is an index for the differentiation of cultivars according to their photoperiod requirements.

In South Africa maturity groups 4 to 7 are usually planted. Short-season cultivars (MG 4) require a relatively longer period of daylight to initiate flowering, whereas long-season cultivars (MG 7) require relatively shorter days before they will switch from vegetative to reproductive growth.

#### **c) Genetic modification**

All the cultivars listed in Table 2 are Roundup Ready and therefore the herbicide glyphosate can be sprayed to control weeds without adversely affecting the crop. However, there are cultivars available that are not Roundup Ready.

#### **d) Pod and plant height**

Pod and plant height affect the harvestability of soybean. Pods placed very low on the plant (< 0.12 m) may not be harvested mechanically, whilst very tall plants may be more susceptible to lodging. In general, short-season cultivars have lower bottom pod heights and shorter plant heights than cultivars with longer growing-seasons. Plant height will increase with plant population and intra-row spacing.

#### **e) Pod shattering**

Pod shattering at maturation can cause substantial losses. Cultivars with a short growing-season are usually at a higher risk of shattering due to anticipated higher rainfall and warmer conditions at maturation. However, genetic variation among the cultivars for shattering does exist.

**TABLE 2** Maturity group, yield and ranking of the cultivars at the four localities

Cultivar	MG	Kokstad*		Cedara*		Greytown*		Dundee#	
		(t/ha)	Rank	(t/ha)	Rank	(t/ha)	Rank	(t/ha)	Rank
LS 6444 R	4.0	2.91	2	3.42	-	2.74	9	1.96	3
PAN 1454 R	4.3	2.99	1	3.90	4	2.31	-	1.93	5
LS 6146 R	4.4	2.68	5	3.79	7	2.68	10	1.60	9
LS 6248 R	4.8	2.59	7	4.03	3	2.74	8	1.96	2
PAN 1583 R	5.0	2.63	6	3.59	-	2.98	2	1.94	4
LS 6453 R	5.0	2.22	-	3.68	10	2.60	-	-	-
PHB95Y20 R	5.2	2.35	-	3.43	-	2.62	-	1.84	6
PAN 1664 R	5.3	2.49	9	3.80	6	2.90	4	2.08	1
PAN 1500 R	5.8	2.81	3	3.58	-	2.51	-	-	-
LS 6164 R	6.0	2.23	-	3.77	8	2.89	5	-	-
LS 6261 R	6.0	2.51	8	4.04	2	2.99	1	-	-
PAN 1666 R	6.1	2.75	4	3.73	9	2.75	7	1.73	8
PAN 1614 R	6.2	2.34	-	3.80	5	2.88	6	-	-
LS 6161 R	6.3	2.46	10	4.21	1	2.94	3	1.82	7

\* Seasons 2012/13 to 2014/15

# Seasons 2011/12, 2012/13 and 2014/15.

No data was collected in the 2013/14 season at Dundee and therefore some cultivars were not evaluated over three seasons. Hence no yields are presented for those cultivars.

MG = Maturity Group

The ranking indicates the highest to the lowest mean yield of the ten highest yielding cultivars at each locality.

## Acknowledgment

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## References

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