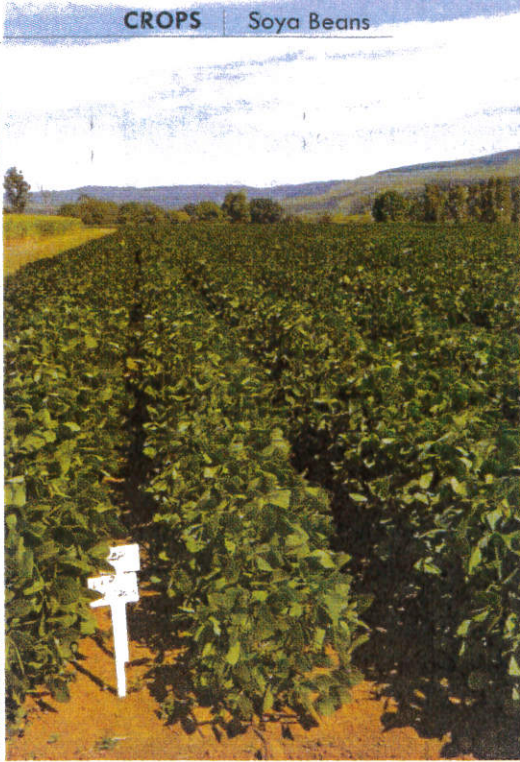




ARC's soya bean cultivar recommendations

The soya bean cultivar best adapted to a specific area will provide the best yield and quality. The ARC national soya bean cultivar trials are valuable in determining the most suitable varieties. **Annelie de Beer**, researcher at the **ARC Grain Crops Institute in Potchefstroom**, explains.

Although soya beans are grown worldwide, individual cultivars have a limited adaptation to specific geographical areas. Therefore, the cultivar best adapted to a specific locality will have the best yield and quality in the long term.

CULTIVAR CHOICES

When choosing a soya bean cultivar, the length of the growing season is a crucial consideration. Unlike other crops, soya beans are sensitive to day length. A specific cultivar may ripen later, depending on how far south in Southern Africa it is planted, as this will determine the length of the growing season.

The planting date also has a great influence on

the length of the growing season, and soya beans planted at a later date could flower much earlier.

Temperature, too, plays a role. Soya beans grow much more slowly on the Highveld than in the warmer Lowveld (see Table 1).

Experienced producers can use soya beans' photoperiod sensitivity and genetic variation with great success for a large part of the growing season. This can, for example, be used for soya bean hay production (a long growing season cultivar), to schedule harvesting (plant cultivars with different ripening dates), or for drought avoidance or emergency planting (plant relatively short growing season cultivars).

TOP FROM LEFT:

- The best soya bean cultivar is the one that produces the best yield and quality.

- Standability, pod height, herbicide resistance and yield are a few of the criteria for soya bean cultivar selection.

- In South Africa, soya beans should ideally be planted in November, but in warmer areas the crop can be planted until the first week of January.

PHOTOS COURTESY OF ARC

Choosing the wrong cultivar presents a risk for inexperienced soya bean producers and could result in the cultivar not ripening at the correct time. For example, a 'too-long grower' could be ready for harvesting during rainy periods or when the temperature is too high.

required for acceptable statistical analysis. These trials were conducted in warm, moderate, and cool production areas (see Table 2).

Cultivars with a longer growing season will generally perform better in warmer growing areas, while cultivars with a medium

CONSIDER POD AND PLANT HEIGHT WHEN SELECTING A CULTIVAR

And a 'too-short grower's' quality may be compromised if it cannot be harvested because of low pod height.

GROWING SEASON

Thirty one cultivars were included in the 2013/2014 trials, although only 19 localities are

growing season do better in moderate growing areas, while cultivars with a shorter growing season perform well in cooler production areas. There are, however, exceptions and it is recommended that producers use yield performance and cultivar adaptation in

Table 1: Average number of days to 50 % flowering and harvesting of cultivars during the 2013/2014 growing season for warm, moderate and cool production areas

Cultivar	Days to 50% flowering			Days to harvest		
	Warm ¹	Moderate ²	Cool ³	Warm ⁴	Moderate ⁵	Cool ⁶
Sonop	43	62	76	131	157	170
LS 6240 R	34	48	53	125	136	147
LS 6444 R	37	47	55	126	136	144
LS 6146 R	37	47	56	127	136	144
PAN 1454 R	37	50	57	123	140	144
PHB 94 Y 80 R	39	53	61	125	137	144
LS 6248 R	43	66	71	132	152	164
Highveld Top	45	66	79	135	156	170
Knap	51	66	76	131	158	169
PHB 95 Y 20 R	45	71	84	143	161	172
PAN 1583 R	39	67	76	142	169	166
LS 6453 R	39	67	70	130	153	163
PAN 1664 R	47	64	76	142	160	166
PHB 95 Y 40 R	51	67	78	140	163	173
PAN 1521 R	45	69	80	132	155	163
PAN 1500 R	43	68	81	142	162	173
Marula	51	68	79	127	161	172
PAN 1513 R	51	67	78	131	160	172
Dundee	45	70	79	137	160	176
S 722/6/1E	54	73	88	145	162	177
LS 6261 R	51	60	73	132	157	169
PAN 1666 R	51	69	77	136	155	167
PAN 1623 R	51	68	76	132	162	171
LS 6164 R	45	67	75	135	160	170
DM 602i RR	45	70	77	131	162	176
LS 6161 R	45	69	78	132	159	168
PAN 1614 R	53	68	79	132	161	174
Egret	52	73	86	140	165	175
Heron	38	71	86	136	159	175
Ibis 2000	50	73	76	138	166	173
PAN 1729 R	57	73	85	140	162	174

1 - AVERAGE OF 2 LOCALITIES
2 - AVERAGE OF 8 LOCALITIES
3 - AVERAGE OF 5 LOCALITIES

4 - AVERAGE OF 2 LOCALITIES
5 - AVERAGE OF 8 LOCALITIES
6 - AVERAGE OF 5 LOCALITIES

DAYS TO HARVEST – AVERAGE OF PODS THAT ARE MATURE, BRITTLE AND DRY

FAST FACTS

- Choose a cultivar adapted to a specific area.
- Cultivar choice is determined by yield and quality results.
- The correct cultivar choice will determine profitability.

recommended for higher-altitude areas where soil and air temperatures reach acceptable levels early in the growing season.

Another consideration in cultivar selection is pod and plant height, as these affect harvesting. There is a correlation between pod and plant height and the length of the growing season. Under similar growing conditions, cultivars with a shorter growing season tend to have lower plant and pod heights compared with longer growing season cultivars.

Both characteristics are also influenced by production practices.



ANNELIE DE BEER

combination with length of growing season.

Planting date influences the adaptation of soya bean cultivars and therefore also cultivar choice. An earlier or later planting date will thus affect the choice of cultivar. The optimum planting time is in November, but in warmer areas soya beans can be planted until the first week of January. Narrow rows, higher plant populations and shorter growing season cultivars are recommended for later planting dates. An October planting date is

Narrower inter- and intra-row spacing will significantly increase pod height.

INCREASED PLANT GROWTH

Standability is determined by the number of overcast days during the growing season. Plant height tends to increase during overcast weather and could result in a higher lodging percentage.

Growth habit distinguishes between determinate and indeterminate genotypes. Cultivars with a determinate growth habit should be planted under irrigation, while indeterminate cultivars (that do not stop growing vertically during flowering) do better in dryland conditions. Row width should also be taken

into account in cultivar selection. Cultivars with more side branches and leaves are better adapted to wider rows, while cultivars with fewer side branches and leaves are better for narrower rows.

SEED-SHATTERING RESISTANCE

Seed shattering resistance should also be considered. The National Soybean Cultivar Trials indicated that cultivars with a relatively short growing period tend to shatter more than cultivars with a longer growing period.

HERBICIDE SENSITIVITY

In some cases, sensitivity to herbicides can also influence cultivar choice. No soya bean cultivars are

ABOVE LEFT:
The length of the growing season will determine pod and plant height.
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CONTINUED ON NEXT PAGE →

Table 4: Yield reliability at the different yield targets for the cooler production areas, 2011/12, 2012/13, 2013/14

Cultivar	Yield targets ton ha ⁻¹							Mean 3 years	D ²
	1,00	1,50	2,00*	2,50*	3,00*	3,50*	4,00*		
PAN 1454 R	1,40*	1,52*	1,60*	1,76	1,87	1,99	2,11	2,78	0,51
LS 6161 R	0,19	0,75	1,32	1,88*	2,45*	3,01*	3,58*	2,62	0,24
LS 6164 R	0,45	1,06*	1,66*	2,27*	2,88*	3,48*	4,09*	2,87	0,15
LS 6146 R	0,77*	0,98*	1,21	1,43	1,65	1,87	2,08	2,76	0,86
PAN 1666 R	0,25	0,69	1,13	1,57	2,02	2,46	2,90	2,41	0,32
Sonop	0,47	0,92	1,38*	1,83	2,28	2,73	3,19	2,57	0,24
PHB 95 Y 20	0,44	0,91	1,38*	1,85	2,32	2,79	3,26	2,49	0,18
Heron	0,00	0,54	1,14	1,75	2,36	2,97*	3,57*	2,32	0,14
Egret	0,00	0,09	0,75	1,40	2,05	2,70	3,35	2,24	0,31
Ibis 2000	0,38	0,80	1,22	1,64	2,06	2,48	2,90	2,21	0,14
PAN 1664 R	0,14	0,76	1,39*	2,01*	2,63*	3,25*	3,87*	2,75	0,24
Dundee	0,03	0,60	1,17	1,74	2,31	2,88	3,45	2,28	0,12
LS 6444 R	1,36*	1,37*	1,37	1,38	1,38	1,38	1,39	2,72	0,90
LS 6248 R	0,01	0,58	1,15	1,71	2,28	2,85	3,42	2,58	0,33
PAN 1583 R	0,43	0,96*	1,50*	2,04	2,58*	3,11*	3,65*	2,75	0,22
PHB 95 Y 40	0,03	0,61	1,19	1,77	2,35	2,93	3,51*	2,61	0,31
Highveld Top	0,05	0,62	1,19	1,76	2,33	2,91	3,48	2,44	0,20
Knap	0,20	0,75	1,30	1,85	2,40	2,95*	3,50*	2,47	0,17
Marula	0,34	0,81	1,27	1,74	2,21	2,68	3,14	2,35	0,15

HIGHER THAN COLUMN MEAN.

D² VALUE INDICATES THE STABILITY OF A CULTIVAR. A SMALLER D² VALUE INDICATES A MORE STABLE CULTIVAR.

← resistant to atrazine-type herbicides and the full waiting period has to be enforced before planting. Also check the herbicide label to see whether it is suitable for the specific cultivar.

TEMPERATURE, RAIN AND STRESS CAN AFFECT SEEDS' PROTEIN LEVELS

ENVIRONMENTAL INFLUENCE

Seed size, hilum colour, protein qualities and GMO status are important characteristics. Seed size is genetically regulated, but is greatly influenced by environmental conditions. Favourable conditions during the seed filling period will have a positive

influence on seed size. Seed protein content, which is also genetically regulated, can be adversely affected by rainfall, temperature and stress. Ineffective crop management, poor or no nodulating, acidic soil and low soil fertility also play a role in soya bean quality.

PROTEIN CONTENT CALCULATION

A protein content lower than 36% is unsatisfactory, while protein content above 40%, on a moisture-free basis, is excellent. Seed yield indicates the genetic adaptation and suitability of a cultivar for a specific area.

It is recommended that yield results be used in conjunction with yield-reliable values for a more accurate cultivar choice.

ABOVE:

The best soya bean cultivar produces the highest yield and the finest quality.
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YIELD-RELIABILITY TABLE

Table 2 indicates whether the area to be planted is a warm, moderate or cool locality. The yield-reliability table can be used to select cultivars' yield potential for a specific farm.

Yield-reliability values provide valuable information for cultivar planning. These values are found on the lower reliability band of the regression graph, at a level of 90% probability (available on the *Farmer's Weekly* website).

The yield-reliability value of a particular cultivar at a given potential is the minimum yield obtainable in nine out of 10 seasons. When calculating yield-reliability values, take the yield tendency, average yield and stability into account.

The following information is outlined in the yield-reliability tables:

- Yield-reliability values at different yield potential levels.
- The average yield of the cultivar for the set of trials used.

• Yield-stability is indicated by D²-values. A cultivar with D²-values approaching zero can be expected to be more stable and predictable in terms of yield. The greater the D²-values, the more the yield will vary between seasons.

CHOOSING A CULTIVAR

Follow these procedures to choose a cultivar:

- Determine for what yield potential recommendations must be made.
- Consult the yield-reliability table for information on the desired yield potential. Select cultivars with the required yield potential and the highest yield-reliability values. The cultivars with the highest values should have the best chance of a stable, successful yield.
- Phone Annelie de Beer or Mary James at the ARC Grain Crops Institute on 018 299 6100.
- Find the full ARC National Soybean Cultivar Trials report at www.farmersweekly.co.za. ■ FW