

FINAL REPORT - EXECUTIVE SUMMARY

PROJECT TITLE: Seed germination and vigour of South African soya bean cultivars

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This executive summary contains the conclusions based on the results obtained during the full support period.

The trials were conducted on seed produced in the National Soya Bean Cultivar Trials obtained from the Oil and Protein Seed Centre of the. ARC.

1. It can be stated unequivocally that there is a problem with germination percentage of some soya bean seed lots. Seeing the trials were conducted with seeds harvested from research plots, it can be expected that seeds from commercial production sites will fare no better.
2. One of the major reasons for poor germination is the presence of seed-borne- pathogens. *Fusarium equiseti*, which has not previously been identified as a pathogen of soya bean seed in South Africa, was by far the most prevalent pathogen. *Phomopsis sojae* and *Phomopsis logicolla*, which present severe problems in countries such as the USA and Brazil, were not found to be significant in South Africa.
3. Germination percentage is also reduced because of the presence of abnormal seedlings caused by seed coat damage. It is recommended that the moisture content of seeds be monitored carefully as very dry seeds are very susceptible to mechanical damage. It is also recommended that a more accurate assessment of the correct harvest time be made so as to minimise the effects of field weathering. Direct seed moisture content determinations prior to harvesting are suggested, so that harvesting is carried out when the moisture content is 14% , and not below, which would leave them susceptible to weathering and greater fungal infection. At stage R8, moisture content can range from 11 - 28%, making harvesting at a stage when 95% of the pods have their mature colour simply not accurate enough.
4. No recommendation can be made with regard to identifying a specific locality or localities as being ideal for soya bean production. The climatic conditions in South Africa are too unpredictable and erratic and a site producing good quality seeds in one year may produce poor quality seeds in the next season.
5. No evidence was found of a relationship between cultivar growing period and seed quality.
6. Apart from germination problems, it was evident that certain high germinating seed lots also have a field emergence (seed vigour) problem and it can be recommended that seed vigour tests be conducted. Both the accelerated ageing and conductivity tests appeared to have significant predictive value with respect to relative emergence of seed lots, with the accelerated ageing test probably being preferable.
7. The use of K_i as an index of potential longevity has shown differences in storage potential of South African soya bean cultivar seed lots which were not evident in the results of the

standard germination test. Use of this index can be advocated in assessment of seed lot storability. Large differences in storage potential were evident in seeds of the same cultivar produced at different sites. Application of K_i in the viability equation can be useful for predicting germination after periods of storage under known conditions of temperature and seed moisture. The theoretical values obtained, however, need to be verified by further investigations. K_i did not appear to have predictive value for field emergence.