

**THE SELECTION, EVALUATION, BREEDING AND COMMERCIAL DEVELOPMENT
OF *CAJANUS CAJAN*, *VIGNA UNGUICULATA* AND *VOANDZEIA*
SUBTERRANEA FOR FOOD AND FODDER**

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EXECUTIVE SUMMARY

The primary aim of this report is to evaluate the three legume species in terms of:

- production potential
- preference rating
- resistance to diseases, pests and parasites
- uniformity and feeding value of promising accessions
- compatibility in mixtures

Once accessions with potential have been identified further research input will be necessary such as :

- breeding for increased disease and pest tolerance
- adaptation to marginal conditions
- cultivar registration
- seed production
- technology transfer

The objective of the research evaluation is to identify accessions for improvement and possible release as commercial cultivars to meet the need for an improved protein source for animal and human use. An increase in vegetable protein supply to the benefit of humans and animals would contribute significantly towards stabilizing household food security and improving community health and wealth. Since all three legumes are important grains for the indigenous people of Africa and as they are also grown in various rural communities throughout Southern Africa this project is of tremendous significance to the emerging small farmer community.

The past season's research activities have concentrated mainly on expansive preliminary evaluation trials in an attempt to identify accessions with potential under local conditions for various characteristics.

The series of trials conducted in co-operation with the International Institute for Tropical Agriculture with headquarters in Nigeria address no less than 7 of the aims of the project. Included in the trials are the elite cowpea lines distributed throughout the world for screening on adaptability. The trials were sited at four

different ARC institutes depending on the interest and available expertise of the institute. Apart from the data collected whatever seed is successfully produced remains within the project for further evaluation. The study initiated to determine DNA mapping techniques to distinguish between Vigna ecotypes has been completed. The primers used, although limited, do indicate relationships, but also differences between annual and perennial types. With the limited number of primers it was however not possible to determine close relationships and therefore genetic compatibility between annual and perennial ecotypes. It is therefore suggested that the study be expanded to include more primers.

A very comprehensive study was also completed on the micro propagation of the Bambara nut. A protocol for the micro propagation of Bambara nut up to rooting has been established which includes the most suitable medium for shoot production and yield as well as rooting. This study was initiated because of the difficulty experienced in identifying promising selections for seed multiplication. With this technique rapid propagation of selected promising material is possible thus eliminating the hazards of seed multiplication in field plots.

The data recorded to date have scientific value and quality. The techniques identified in both trials have academic and scientific applicability in further research actions for both students and scientists alike.

The most serious constraint in developing the research objectives of this project was the lack of seed for planned trial as well as the unsuccessful multiplication of small seed samples. The latter has been largely as a consequence of the above average and unseasonal rainfall experienced the past two seasons. The excessive moisture has caused pod rot, unripe seed to germinate in the pod, damage to blossom and the incidence of disease which restricted plant growth and development.

Despite a few initial problems the project is well advanced in the preliminary evaluation phase and equally good research progress and results should therefore be recorded in the future.

The project has initiated a research matrix between four ARC institutes viz RFI, VOPI, GCI and PPRI as well as two other parties. The series of international trials were open to visitors this past season and the detailed data has also been forwarded to the client IITA. Researchers from this institute will be preparing posters for suitable congress presentation within the next two years once repeatable results are measured. Should significant results be achieved in the project a demonstration / information day would be arranged as would further scientific publications.