



**Kirkhouse
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**WEST AFRICAN COORDINATED MARKER ASSISTED SELECTION
RESEARCH AND TRAINING PROJECT FOR COWPEA**

Final Report of the Burkina Faso Component

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I – REPORT OF THE PROJECT PHASE ONE 2006-2009

The objective of the project was to contribute to the cowpea improvement in Burkina Faso and to help build the local capacity in plant breeding using the biotechnology tools. The activities involved the following:

- **Develop molecular laboratory facilities and capabilities as well as methodology development**
- **Train students at the MSc level**
- **Develop a marker assisted selection programme for cowpea.**

Initially, the project was planned for three years, running from 2006 to 2009.

1.1- Development of a molecular laboratory facilities and capabilities as well as methodology and man power.

The support of Kirkhouse Trust has made it possible for Burkina Faso to start the first genetic and biotechnology laboratory work. By providing all the required equipment for DNA marker methods for plant breeding as well as the reagents, our laboratory was fully operational by the end of 2006.

The financial support allowed the recruitment of technician of high level (MSc). Three of them are concerned but the first one left for PhD studies in Canada. Today our laboratory is well provided in man power. The only constraint is how to maintain the technicians because after one to two years they acquire high level skills and need to get higher degrees.

1.2- Training students at the MSc level

One of the important mandates of our laboratory is training of young scientists and students.

Two MSc students have successfully completed their degree in our laboratory with the support of KT (see their success certificates Figure 1). Bationo Joseph and Thio Gilles were the first students to benefit from the KT scholarships in Burkina Faso. They worked on Aphid resistance in cowpea and Striga marker-assisted selection respectively. Both are on the way to undertake PhD studies.

The these on aphid resistance titled « **Détermination du mode d'hérédité et identification de marqueurs microsatellites liés au gène de résistance du niébé (*Vigna unguiculata*) aux aphides (*Aphis craccivora* Koch)** » “**Inheritance of aphid resistance and Identification of SSR markers linked resistance genes in cowpea**” revealed a monogenic dominant gene inheritance but lacked to come out with a tightly linked marker. The marker placed on the existing genetic map is at 23 cM. More SSR primers are needed to continue searching for more tightly linked markers.



Figure 1: Certificate of success to the MSc degree of Bationo Joseph and Thio Gilles.

The study on striga “**Validation de marqueurs d’ADN dans l’étude de la résistance du niébé (*Vigna unguiculata* (L.) Walp.) au *Striga gesnerioides* (Willd) VATKE**” “**Validation of DNA markers in striga resistance in cowpea**” showed the efficacy of the existing markers in a marker-assisted selection programme. Two markers were identified to be efficient at more than 90 % in determining the resistant/susceptible plants. The existence of more than five striga races as shown in figure 3 requires the identification of more markers linked to all races.

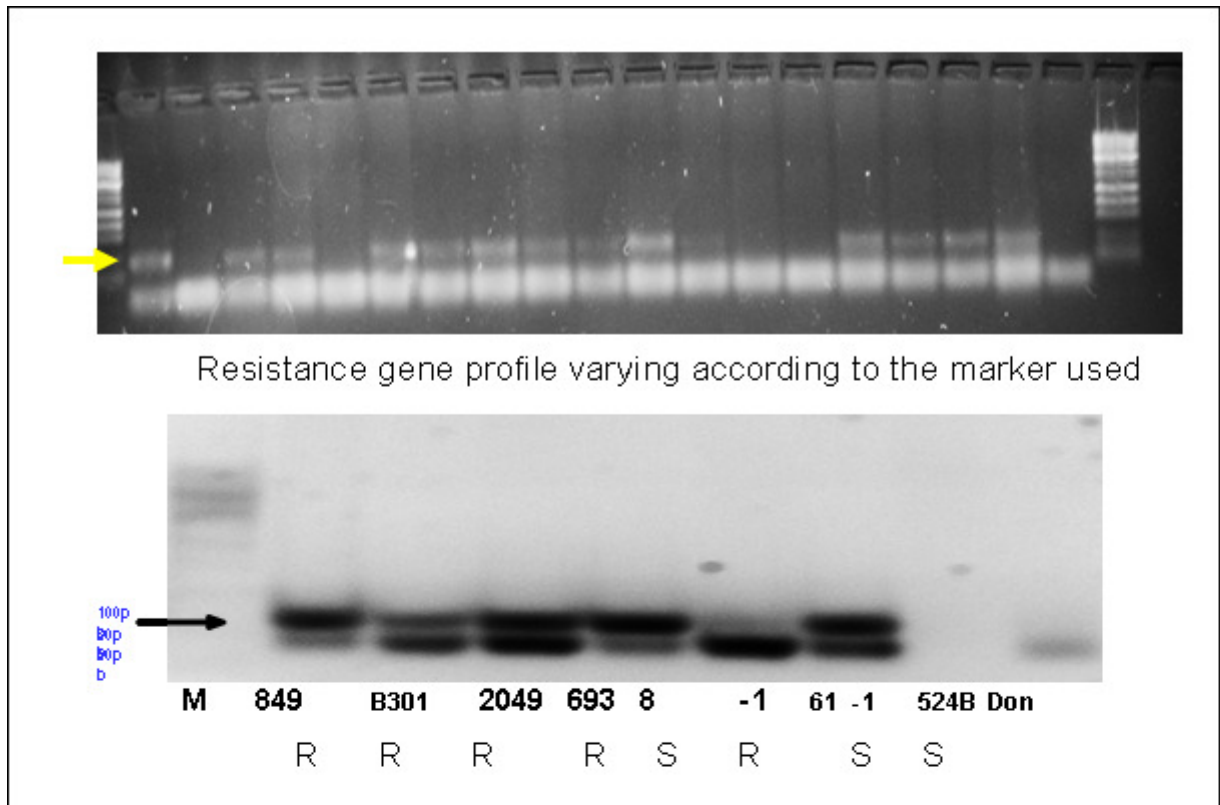


Figure 2 : Profile of Resistant plants using two different markers

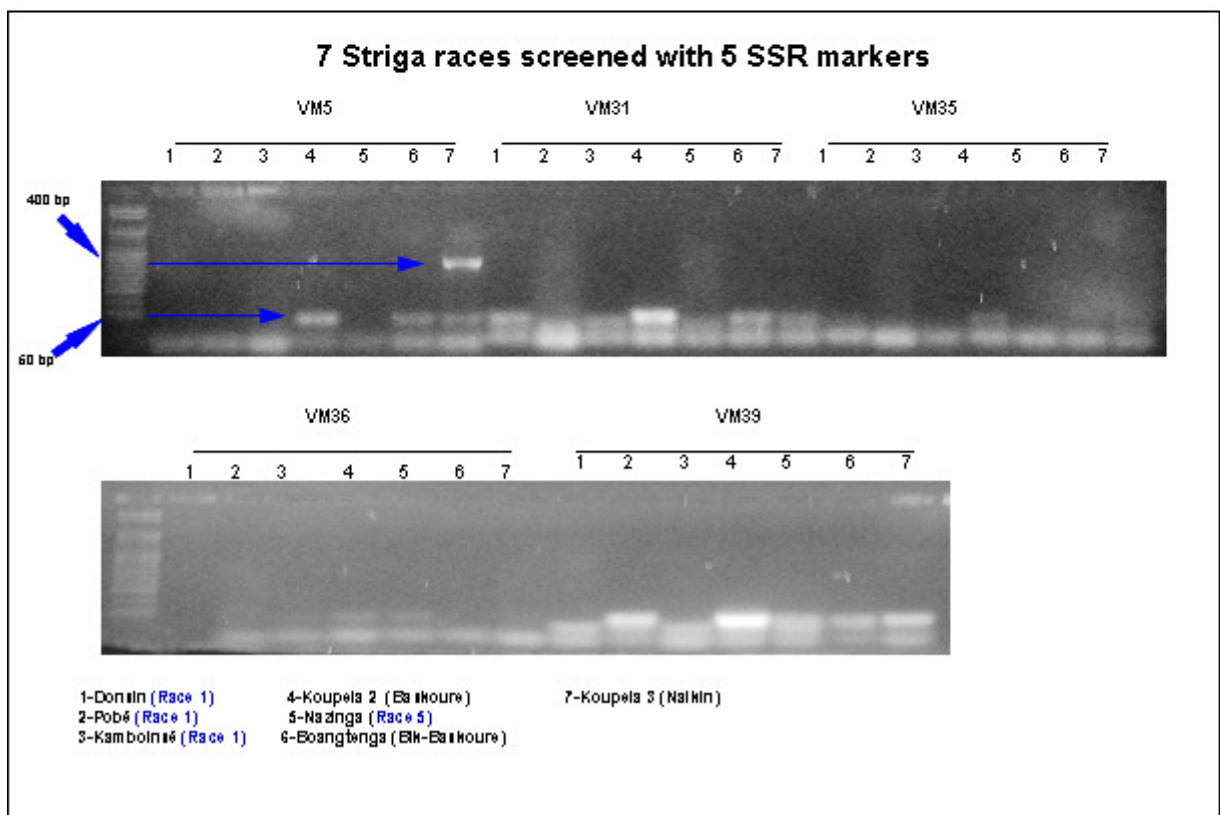


Figure 3. Striga characterized using SSR primers.

1.3- Development of a marker assisted selection programme for cowpea.

Based on the existing markers linked to race 1 striga resistance genes and the validation by the MSc student, marker assisted backcross selection programme has been undertaken.

For training purpose, we had to use screen house test to identify resistant plants under striga seed infestation at the same time we were using SCAR markers in laboratory. The cross involved a well adapted and accepted released variety, K VX 414-22-2 striga susceptible cross with a resistant to all 5 striga races variety IT89K-693-2. From BC4F3 plants, five samples were screened in our five striga hot spots (Pobe, Koupela, Donsin, Tenko and Po) during the 2008 rainy season. Ten individuals plants were selected from each site and will be advanced to new lines.

The marker assisted breeding system is routinely used as shown in figure 4.

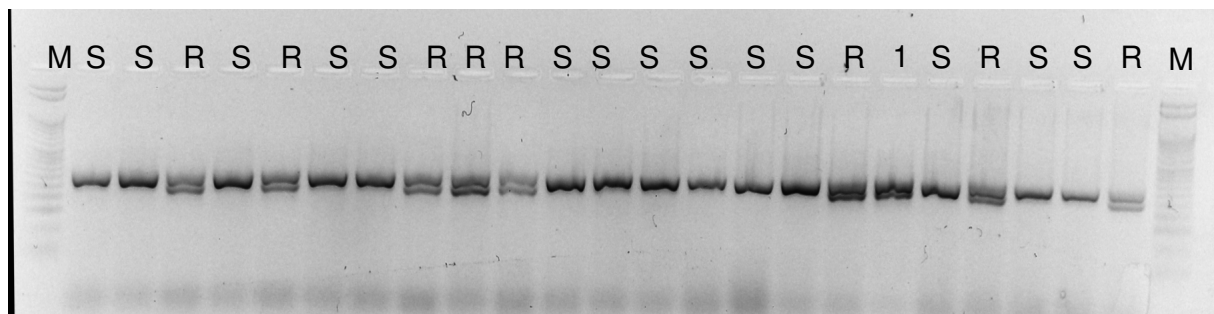


Figure 4. Resistant/susceptible plants identified in a backcross marker assisted selection programme.

The Horizontal PAGE (figure 5) was also used to screen breeding populations with acceptable results.

A students will optimise it usage through his MSc studies during 2009-2010 period.



Figure 5. Trial using horizontal PAGE to screen varieties for striga resistance.