



- Permit Title** : Confined Field Trial Application for Genetically Modified, Insect (Maruca) Resistant Cowpea Research
- Tracking Number** : 2011-124-SARI-001-C
- Name of applicant** : Savannah Agricultural Research Institute of the Council for Scientific and Industrial Research.
- Permit start Date** : November 16, 2012
- Permit Duration** : Three (3) years
- Extension** : The research has been extended on three times consecutively. It is currently at its final stage.

Rationale of Studies

The applicant proposes a confined field trial to test cowpea (*Vigna unguiculata* (L.) Walp) plants that have been genetically modified for resistance against a serious insect pest of cowpea in Africa, *Maruca vitrata*. Cowpea line IT86D-1010 from IITA accessions was genetically modified to express the Cry1Ab protein encoded by the cry1Ab gene (synonym: Bt gene) sourced from *Bacillus thuringiensis*, a commonly occurring soil-borne bacterium. The resulting *Maruca*-resistant cowpea plants will facilitate R&D efforts geared towards enhancing productivity of cowpea by smallholder farmers in Sub-Saharan Africa. The proposed trial will be conducted at SARI, Tamale, in a specially designed confined field trial (CFT) facility to be overseen by the following institutions:

- CSIR-Savanna Agricultural Research Institute
- Commonwealth Scientific and Industrial Research Organisation (CSIRO, Australia)
- African Agricultural Technology Foundation (AATF, Kenya)
- Network for the Improvement of Cowpea in Africa (NGICA, USA)
- Programme for Biosafety Systems (PBS, USA)

These genetically modified cowpea plants has been genetically modified to confer resistance against *Maruca* Pod Borer (MPB), a serious field pest of cowpea that is responsible, together with other insect pests, for yield losses as high as 90 percent (Murdock et al., 2001) in major cowpea producing countries including Nigeria, Niger and Ghana. Expression of the cry1Ab gene in cowpea, which confers resistance to the MPB, is expected to substantially reduce the need for costly insecticide sprays often required for cowpea production. This will also reduce the risk of exposure of the farmers and environment to toxic pesticides. With the improved

cowpea variety, smallholder farmers who grow cowpea stand to protect their cowpeas from often substantial yield loss associated with MPB feeding, and this, in turn could greatly enhance their nutritional well-being and economic status. The initiative to improve cowpea productivity or to reduce grain yield losses in cowpea in Africa is being spearheaded by a coalition of institutions. This effort is currently at the advanced research and proof-of-concept phase and hence this new application seeks to test the genetically modified cowpea plants for their efficacy against MPB under field conditions in Ghana.

Project Objective

The overall objective of the *Maruca*-Resistant Cowpea project is to contribute to food security and to improve livelihoods of small-holder farmers in sub-Saharan Africa by generating improved, high yielding farmer-preferred cowpea varieties that are resistant to infestation by *Maruca vitrata*. The proposed trial aims at conducting a confined field test for the genetically-modified cowpea lines in order to evaluate their efficacy against the *Maruca* pod borer under field conditions in Ghana.

Specific Objectives of the proposed trial at CSIR-SARI

- i) To evaluate the agronomic performance (e.g. germination rate, phenotype, grain yield etc.) of the transgenic cowpea lines vs. the non-transgenic lines
- ii) To evaluate the efficacy of tested transgenic lines expressing the Bt protein against *Maruca vitrata*.

The trial will be conducted at the 1000 hectare CSIR-SARI Research Farm (Fig. 1). The site was chosen because of its relative isolation (>200 from any other cowpea plantings, thus precluding any gene flow from the genetically-modified plantings. (see Annex 3). The outer perimeter of the CFT field is secured with a fence and security will be provided to prevent unintended movement in and out of the trial site by unauthorized personnel or animals (see below). Further, informational signs will be posted on all 4 sides of the trial perimeter indicating that entry into this trial site by unauthorized personnel is prohibited.