



**IFAR 2005 Professional Development Program
Completion Report
[800 words]**

Instructions:

Please submit the completion report by email, using this form, through the sponsoring CGIAR Center to ifar@ifar4dev.org within two months after the completion of the fellowship.

Please check if Thalwitz Scholarship

Yes

Name of Applicant

Dr. A. MUIMBA-KANKOLONGO

Sponsoring CGIAR Center

INTERNATIONAL INSTITUTE FOR TROPICAL AGRICULTURE (IITA)

I. Work Program goals achieved

24 villages have been surveyed and 120 households interviewed about pre- and post-harvest handling of maize and sorghum. Storage structures vary according to the location and they are all in a very poor state that is conducive to fungal contamination. All households store the crop after harvesting by maintaining it for some time in a temporary structure before the final storage destination (house) where it is kept either for consumption, marketing or for planting the next season. Nearly all grain samples from the various ecosystems (forest, valley and plateau areas) of the different agro-ecological zones (high, mid and low rainfall) are damaged by weevils and beetles, and infected by molds. Most prevalent fungi, even in the Cooperatives and Food Reserve Agency (FRA) storage facilities, include *Aspergillus flavus*, *A. niger*, *Aspergillus* spp., *Fusarium verticillioides*, *F. solani*, *Fusarium* spp., *Rhizopus stolonifer* and *Penicillium* spp. Toxic mycotoxins such as fumonisins and aflatoxins are produced by some of the above fungi. Of major concern is grain contamination from FRA storage as these are used for emergency food distribution. A trip was undertaken to Ghana to attend the workshop on mycotoxins and to IITA in Cotonou and Nigeria for a hands-on field and laboratory acquainting of similar research.

II. Plans for follow-up

Northwestern and Western Provinces will be visited early January. A survey for the prevalence of stalk and ear rots, and the nature of pathogen/insect pest associations in fields is planned for February and March 2006 when the current crop is in its reproductive stages, which coincide with increased susceptibility to stalk and ear rots. In addition to a remaining small balance of funds, the University has just provided additional funds equivalent to about US\$3,080.00 to continue

with field investigations. When the pre-harvest factors that influence fungal colonization and development are determined, then appropriate management practices will be developed and delivered as a training module to growers and the extension services, and also used for the awareness campaign to mitigate the potential of mycotoxin contamination in foods and feeds in the country. A request for aflatoxin standards has been sent to IITA to initiate locally the bioassay for the toxins in the various samples. It has also been planned for Dr. K. Hell from IITA to visit Zambia in February 2006 to backstop on-going activities, visit some storage facilities, discuss with policy makers and rural households, and assist in the writing up of a paper on the findings for possible publication.

III. Report budget utilization including whether budget was spent as planned

Part of the budget was diverted to the survey to cover as many areas and households as possible. CBU rather than UN rates were used for local travel and modest accommodation was secured. Laboratory work was obtained from the University of Zambia at half than normal cost and funds used served to acquire reagents and media, and other needed items. Meetings were held with collaborators for priority setting and reviewing of the results. Some equipment and tools were purchased, a questionnaire processed, and communication made to arrange trips. A mycotoxin workshop was attended and a study tour visit made at IITA.

IV. Assessment of the fellowship experience and general comments

IITA is the home of research upon which our activities were modeled and our activities largely depended on IITA for technical expertise. Collaborating with IITA has increased our intellectual investment in research for agricultural development. Through the fellowship, we interacted with several IITA scientists and technical staff specialized in various fields. We visited their respective laboratories and experimental fields, which has provided for valuable hands-on experience on the methodological approaches used, and relevant information and expertise essential for developing and implementing improved agricultural technologies. This has ensured accuracy and validity of the scientific analytical procedures to follow. A national team operating in an inter-disciplinary manner for diagnosis of pest and fungal problems in storage has been established. A digitized database of quantified survey results will now be developed providing the country with broader based information on food contamination for future comparisons.

Standard procedures for analytical and quantification of fungi and mycotoxins, and management strategies to mitigate mycotoxins discussed at the Ghana meeting were beneficial. A visit at IITA considerably enhanced our familiarization with recent approaches in mycotoxin analysis and characterization. Some equipment and tools were purchased including a refrigerator to maintain samples and reagents, a digital camera for scientific pictures during investigations, a computer memory stick for data and information storage, a cooler box and plastic and paper bags for sample collection, small vials for insect specimen conservation and reagents for processing the samples. Generally, the IFAR fellowship was instrumental in the implementation of the activities. It is now evident that crop grains for food and marketing are widely infected by mycotoxin-producing molds. We are currently working towards establishing the levels of mycotoxin contamination. The information gained will greatly help regulatory policies and producers to develop detection methods and offshore production standards that could reliably prevent fungal contamination of foods and feeds in Zambia.