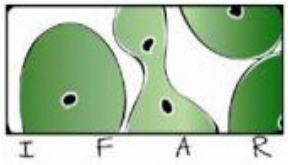

IFAR 2007 Professional Development Program
Completion Report

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

Please check if Thalwitz Scholarship ***__No***

Name of Applicant **Dr Papa Madiallacké Diédhiou**

Sponsoring CGIAR Center	**INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE (IITA)**

I. Work Program goals achieved

The project had two deliverables: (i) compare the influence of the crop species on the distribution of *Aspergillus* section *Flavi*, and (ii) quantify aflatoxin production and toxigenic potential of *Aspergillus flavus* associated with sesame and maize grains. We collected 20 samples each of maize and sesame from five districts (Nioro, Kaffrine and Tambacounda in the Sahel-Savanna and Sedhiou and Kolda in the Guinea-Savanna zone). Aflatoxin content and the extent of contamination with *Aspergillus* species and their identity and toxigenic potential were determined.

Maize harbored more *Aspergillus* propagules (up to 1.1 million colony-forming units (cfu) per gram seed) and had more aflatoxin contamination (up to 853 ng/g; accepted safe limit is 20 ng/g) compared to sesame (up to 42,800 cfu/g and 1.2 ng/g). Therefore, all the sesame samples would meet export standards but several maize samples are unsafe for human consumption. *Aspergillus* and aflatoxin contamination and frequency of toxigenic strains were higher in Sahel-Savanna compared to Guinea-Savanna zone. L-strains of *Aspergillus flavus* strains were most prevalent (75-97%) followed by the unnamed West African *Aspergillus* taxon S_{BG} (2-25%), and *A. tamarii* (up to 2%). No other *Aspergillus* species were found. Harvesting and storage method had significant influence on *Aspergillus* and aflatoxin contamination.

II. Plans for follow-up

The study of population patterns and toxigenicity of *Aspergillus* section *Flavi* in various agroecological zones and crops is important for understanding population dynamics of the fungus and devising suitable control measures for reduction of aflatoxin contamination. Our study demonstrated that control measures should be targeted against the toxigenic L-strains of *A. flavus*, the major agent of aflatoxin contamination in Senegal. During this study, we scanned the diversity of Senegalese *Aspergillus* population and identified nearly 1000 atoxigenic (non-toxin producers) isolates of *A. flavus*. Biological control of *A. flavus* in agricultural fields through application of atoxigenic *A. flavus* strains to the soil is a possibility that will be tested by using isolates identified in this study. In addition, highly toxigenic isolates will be used to challenge germplasm in resistance breeding programs as well as in research activities to identify resistances genes. These studies are planned on groundnut and maize. Storage conditions will be monitored and appropriate management practices will be developed and delivered to growers and the extension services as a training module, and also used for the awareness campaign to mitigate the potential of aflatoxin contamination in foods and feeds. IITA scientists would cooperate in these studies.

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

The budget utilization was more or less as per plans. Part of the budget was used to collect samples in various study sites in Senegal. It was used to buy chemicals, petri dishes, and culture media constituents for the laboratory work at IITA. I purchased 11 scientific books and a Malassez counting cell with the grant amount set aside for professional development. The rest was used for accommodation and living expenses at IITA. Before leaving, I was given several chemicals to carry back to my lab in Senegal. These supplies helped me to continue the research I started at IITA.

IV. Assessment of the fellowship experience and general comments.

The fellowship provided me a lifetime experience that cannot be forgotten. I want to thank the sponsors for giving me this great opportunity by awarding this fellowship. As a result, I am now trained to identify *Aspergillus* section Flavi and analyse mycotoxins using several methods. It broadened my perspectives of the field of mycotoxicology and food safety and yielded at least 2 to 3 publications, which is enormous in this short time. I am in a much better position to train my students in the University on mycotoxins and food safety. The credit of this success goes largely to the International Institute of Tropical Agriculture, Ibadan, where most of the work was carried out.

I isolated, identified and characterized 2000 isolates of *Aspergillus* section Flavi during this stay. I learnt various protocols used for *Aspergillus* identification such as culture techniques, morphological methods, fermentation methods, aflatoxin analysis, data handling and analysis. This was possible because of the expertise and the experience of IITA staff not only on scientific methodologies but also on logistic aspects as well. All the supplies were readily available whenever needed. This enabled me to actualise the objectives of this study by performing thousands of fungal isolations, fermentations, and chemical analysis.

Working late into the night was made possible because I stayed close to the lab inside the IITA campus where the security was in place; and access to Internet facility right there helped a lot. I would therefore make an appeal to the IFAR to continue sponsoring programs like this in order to improve scientific capacity in sub-Saharan Africa, which is a key factor for food security and availability in our developing countries.