



**IFAR 2006 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 three months after the completion of the fellowship.

Please check if Thalwitz Scholarship

Yes

Name of Applicant *Dr. Samuel I. Kamara*

Sponsoring CGIAR Center **AFRICA RICE CENTRE (WARDA)**

I. Work Program goals achieved (maximum length: 200 words)

1. Natural enemy diversity and abundance

Natural enemy diversity, abundance as well as the dominant species in each of the following five different rice – based cropping systems, viz rice –grass fallow – rice, rice – vegetable – rice, rice –legume – rice, rice – root crop – rice and rice – maize – rice in rain fed lowlands in Sierra Leone was established. Five predators belonging to three insect orders, viz. Coleoptera (*Epilachna similis*), Orthoptera (*Concephallus longipennis* and *Anaxipha Longipennis*) and Araneae (*Lycosa sp.* and *Tetragnatha maxillosa*) were present in all the cropping systems. Their numerical and proportional abundance however varied in each of the cropping systems. The rice-legume-rice and rice – root crop – rice cropping systems, had the highest total species abundance and species density per unit of habitat with a species diversity index of Simpson's D: 1.1 ± 0.07 and 1.2 ± 0.01 respectively compared to the other cropping systems.

2. African rice Gall midge (ARGM) Infestation level

Infestation levels of ARGM in the five rice-based cropping systems were established. The lowest level of ARGM infestation was recorded from the rice – legume –rice and rice – root crop – rice cropping systems with mean infestation levels of $13.9 - 18.0 \pm 0.3$ per cent and $11.2 - 20.1 \pm 0.2$ per cent respectively.

3. ARGM Parasitisation in each System

The level of ARGM parasitisation was established in each of the cropping systems. ARGM parasitisation was highest in the rice – legume – rice and rice – root crop –rice cropping systems ($66.7 \pm 2.4 - 86.4 \pm 4.1$ and $65.5 \pm 2.4 - 81.3 \pm 4.1$ respectively) than all the other cropping systems, particularly at the mid to late vegetative growth stages of the rice crop.

4. Relationship between ARGM infestation levels, natural enemy diversity and abundance and their interactions

Relationships between ARGM infestation levels, natural enemy diversity and abundance were established. ARGM infestation levels declined with increased abundance and diversity of natural enemies as evidenced in paragraph 1 above.

5. Determination of organic matter levels in each cropping system and relationship between habitat organic matter level and natural enemy species diversity and abundance over time

Soil organic matter levels in each cropping system and relationship between habitat organic matter level and natural enemy species diversity and abundance was determined. The highest soil organic matter level was recorded from the rice-legume-rice (8.12 %), followed by rice-root crop-rice (7.96 %) and rice-maize-rice (4.36 %). Natural enemy species abundance and diversity increased with increased habitat organic matter level. In essence, the rice-legume-rice and rice-root crop-rice cropping systems with high levels of organic matter had the highest total species abundance and species density per unit of habitat than all the other cropping systems.

II. Plans for follow-up (maximum length: 200 words)

Five predators, namely *Epilachna similis*, *Concephallus longipennis*, *Anaxipha Longipennis*, *Lycosa sp.* and *Tetragnatha maxillosa* which are potential natural enemies of ARGM were found in all the five rain fed lowland rice-based cropping systems. Though present in all the cropping systems, the predators however varied in their numerical and proportional abundance in each of the systems. It is unclear whether this guild of predators plays the same role in the various rice ecosystems in controlling ARGM, in which case there is functional complementarity or synergy among species or the interspecific diversity may be impacting negatively on ARGM control as a result of intraguild predation. Knowledge of the functional role of the predators in the different rice habitats will help us understand the relationship between ecosystem functioning and species diversity in the different cropping systems, which will lay the bases for developing appropriate techniques for manipulating the natural enemies for effective suppression of ARGM in the rice environments. The next phase of this study therefore aimed at elucidating the functional role of the predators, individually in isolation as well as in various numerical combinations both at the egg and adult stages of ARGM. This will entail both field cage and screened house experiments.

III. Report budget utilization including whether budget was spent as planned (maximum length: 100 words)

Budget utilization for the period: July – December, 2006 is as follows:

Labour: six (6) @ Le255, 000.00 (\$85) x 6 months (July - Dec) =	Le9, 180,000.00	(\$3060)
Per Diem: One (1) Scientist: 5 days @ Le150, 000 (\$50) =	Le750, 000	(\$250)
Two (2) Technicians: 10 days @ Le75, 000 (\$25) =	Le1, 500,000	(\$500)
Fertilizers: Urea: 2 bags @ Le180, 000 (\$60) =	Le 360,000	(\$120)
15:15:15 NPK: 1 bag @ Le150, 000 =	Le150, 000	(\$50)
Polythene bags: I box @ Le30, 000 (\$10) =	Le30,000	(\$10)
Jute bags: 60 @ le5,000 (\$1.7) =	Le300,000	(\$100)
Stationary: Field note books, Duplicating paper, Printer ink	Le450, 000	(\$150)
Soil analysis: 25 samples @ Le90, 000 (\$30) =	Le2, 250, 000	(\$750)
Fuel and lubricants: Diesel: 80 gallons @ Le13, 500 (\$4.5) =	Le1, 800,000	(\$360)
Equipments: Laptop (TOSHIBA) and Printer: 1 @ Le11, 346,000 (\$3,785)	Le11, 346,000	(\$3,785)
Administrative Charges: 10% x \$7,700 =		(\$770)
Bank Charges: 3% x \$7700 =		(\$231)
Travels: WARDA Research Days =		(\$867)
	TOTAL EXPENDITURE =	<u>\$11,003</u>

NOTE: Slight adjustment was made in the budget to accommodate Soil analysis cost and Travels

IV. Assessment of the fellowship experience and general comments.**(maximum length: 300 words)**

The fellowship according to my personal experience teaches one to be very concise and precise in writing research proposals and reporting findings. It also poses the challenge of working strictly within a prescribed time frame, which I think is an important attribute in science. The funds provided are fairly adequate to carry out detailed and meaningful research that would subscribe to a country's or regional development. It accords one the opportunity of conducting detailed research which could be published in refereed journals, thereby promoting one's scientific carrier. Most importantly, the fellowship empowers one for future research work by providing basic equipments, literature and working facilities. My personal comment is that funds should be made available to the Awardees early in the season, preferably early June so that project work could commence on time.