

**PRELIMINARY REPORT FOR THE 1997 IMPERIAL COLLEGE
EXPEDITION TO THE GAMBIA**

Introduction

On the 15th of August 1997 a scientific expedition sponsored by Imperial College of Science and Technology, the Gambian Ministry of Agriculture and additional support from the charity Action Aid started a month survey of the agricultural pests of The Gambia. The members of the expedition were B. Woodcock, D. Mann, J. Christopherson and G. Knight.

The tasks performed during the expedition are summarised below.....

- Broad scale collection of insect crop pests encountered on the North and South banks of the Gambia River, The Gambia. This included those insects particularly associated with the crops sorghum, millet, rice, maize, and groundnut, the main economic and sustenance crops of the Gambia although other crops such as tomato were also surveyed.
- The collection of shoot fly galls and inquiline species associated with the initial parasitic event were made from both crops and surrounding natural vegetation, all of these were reared to adulthood. Saprophytic species were also retained and reared out.
- Secondary survey made in conjunction with the above looking at so called 'reservoir population' of pest insects seen on both natural vegetation surrounding fields as well as residue crops remaining after harvest.
- The collection of species of cockroaches (Blattaria) in order to establish which species are present, to compare species in the different regions of the Gambia, and to develop knowledge on the associations seen with man.
- Natural predators present in the surveyed crops were also retained.
- In response to a request by the Gambian Ministry of Agriculture the members of the expedition provided lectures and training session on practical monitoring techniques in a four day farmer education course in Kuntar (Central River Division North) on the predicted economic problem of the locust species *Acanthacris ruficornis* and *Ornithacris turbida turbida* in future years.
- General collections of non economic species were made in all the sites visited. This included recording a large amount of ecological data associated with them.
- Emergency curation of the Gambian national insect collection (present in the Yundum agricultural research centre) was made due to severe damage resulting from the effects of the museum beetle.

In addition to the financial support provided by Imperial College the Gambian Ministry of Agriculture Generously supported the expedition by providing transport,

a driver, and an additional member of their staff. The Ministry of Agriculture also allowed the expedition the use of lab space. In return for helping the charity Action Aid (as described above) accommodation was provided during the locust training course as well as transport on the return journey to Banjul.

Preliminary results

Attached to this sheet is a brief outline of the major pest types found in the Gambia as well as the beneficial species that were found associated with them. The main bulk of the results will take some time to be obtained since a vast quantity of insects were collected throughout the expedition. On completion of these results copies have been requested by the heads of the Ministry of Agriculture for each of the five provinces visited.

Curculionidae (Coleoptera) collected on the expedition are presently being used by staff of the Natural History Museum, London in their research into the higher classification of the weevils. To date two new species to science have been determined from the material collected. The first is a fly of the of the genus *Hydrellia* (Ephydriidae) which is a possible new species of rice pest, the second is a weevil beetle.

SITE	DISTRICT	DIVISION	Subjects Studied	NOTES
Jenoi DEC	Jarra West	Lower River Division	Groundnut; Early Millet; Melon; Rice (Nursery); Sorghum	crop pest survey ; farmer/extension worker training; Millet damage by stem borers and earworm
Abuko Forest Park	Kombo	Western Division	Natural Vegetation	
Lamin Bridge	Kombo	Western Division	Rice; Sweet Potato	crop pest survey ; Y undum Agricultural workers training
Lamin Bolan	Kombo	Western Division	Mangrove	
Kabafita Forest Park	Kombo	Western Division	<i>Gmelina</i> Plantation, Swept Natural Vegetation, Searched Fro Insects Feeding On <i>Gmelina</i> ; African Copal (<i>Daniella Oliveri</i>) Recently Felled	Tree pests; <i>Daniella</i> is a tree with a variety of uses in The Gambia, including herbal remedies; incense and firewood.
Kuntaur Agricultural Station	Naini	Central River Division (North Bank)	Locust Control Project	Stop Over; Ministry of Agriculture and Action Aid (one of Africa's largest charities, which is based in UK) joint project. The group gave lectures and practical demonstrations on taxonomy, biology and field techniques of Acridoidea.
Kuntaur Agricultural Station	Naini	Central River Division (North Bank)	Collected Insects From Artificial Lights; Marginal Vegetation Of The River Gambia; Donkey Dung	
Manjumba	Naini	Central River Division (North Bank)	Savannah Woodland/Grassland	part of the field demonstration in collecting methods for acridids
Sinchu Madina	Naini	Central River Division (North Bank)	Savannah Woodland/Grassland	part of the field demonstration in collecting methods for acridids

SITE	DISTRICT	DIVISION	Subjects Studied	NOTES
Jiroba Kunda	Tomana	Upper River Division	Sorrel; Ochra; Eggplant	crop pest survey ; <i>Zonocerus elegans</i> on egg plant; <i>Ootheca mutabilis</i> ; Chrysomelidae: Halcinae a serious problem on the sorrel and Ochra
KukulKay	Tomana	Upper River Division	Early Millet	crop pest survey ; stem borers (Noctuidae) Blister beetle(<i>Mytabris</i> sp.) problem: farmer/extension worker training
Sanunding	Tomana	Upper River Division	Sorghum; Water Melon	crop pest survey
Manka Mang Kunda	Jimara	Upper River Division		crop pest survey ; farmer/extension worker training
Busara	Tomana	Upper River Division	Cotton	crop pest survey
Sapo (site 3)	Lower Fulladu	Central River Division (South Bank)	Maize; Early Millet; Groundnut (Var. Philippine Pink)	crop pest survey
Sapo, Government Rest House	Lower Fulladu	Central River Division (South Bank)	M.V. Moth Trapping; Natural Vegetation Around Station; Baobab Tree	Stop Over
Jahaly-Pecharr Project (site 1)	Lower Fulladu	Central River Division (South Bank)	Rice; Marginal Vegetation Of Rice Fields	crop pest survey ; Discussions with project leader concerning pests and control and prevention methods; farmer/extension worker training
Jahaly-Pecharr Project (site 2)	Lower Fulladu	Central River Division (South Bank)	Rice; Marginal Vegetation Of Rice Fields	crop pest survey ; farmer/extension worker training: productive site for shoot flies
Katamina	Jarra	Central River Division (South Bank)	Saltmarsh Vegetation; Dry Cow Carcass	
Sare Njoba	Jarra	Lower River Division	Early Millet	crop pest survey

SITE	DISTRICT	DIVISION	Subjects Studied	NOTES
Between Sabah Njayan and Bassynugt	Upper Baddibu	North Bank Division	Groundnut; Sorghum	crop pest survey ; Locust (<i>Ornithacris turbida</i>) present, hoppers
Bassynugt	Upper Baddibu	North Bank Division	Cassava; Early Millet; Tomato	crop pest survey
Njayan Sanjul	Upper Baddibu	North Bank	Rice	crop pest survey
Sarakunda	Upper Baddibu	North Bank	Nursery Rice	crop pest survey
Ballanghar	Lower Soloum	Central River Division (North Bank)	Early Millet; Goat Dung; Sesame; Cow Dung	crop pest survey
Kur Moali	Lower Soloum	Central River Division (North Bank)	Sorghum; Donkey Dung	crop pest survey
Porley Njoku	Upper Soloum	Central River Division (North Bank)	Early Millet	crop pest survey ; Blister beetle (<i>Mylabris/Psaldolytta</i> spp.) infestation
Kuntaur Agricultural Station	Naini	Central River Division (North Bank)	M.V. Moth Trapping; Marginal Vegetation Of The River Gambia	Stop Over
Barrajelli Tenda	Naini	Central River Division (North Bank)	Rice	crop pest survey
Wassu Rice Demonstration and Promotion Centre	Naini	Central River Division (North Bank)	Rice	crop pest survey ; farmer/extension worker training
Sukuta	Naini	Central River Division (North Bank)	Sorghum	crop pest survey
Basse, Government Rest House, Mansajang	Jimara	Upper River Division	Natural Vegetation Around Rest House; M.V. Moth Trapping	Stop Over
Manka Mang Kunda	Jimara	Upper River Division	Gmelina Tree; Cotton; Findu	crop pest survey ; farmer/extension worker training

Shoot Flies and Cockroaches of Economic Significance in The Gambia.

Preliminary Report: Table of the sites visited and subjects studied

SITE	DISTRICT	DIVISION	Subjects Studied	NOTES
Yundum Agricultural Station	Kombo	Western Division	Sesame; Maize; <i>Gmelina</i> Tree; Flamboyant Tree (<i>Delonix Regia</i>); M.V. Moth Trap; Natural Vegetation; Mango Tree and Fruits; Sewerage System; Night Searching; Stored Products Pests; Carrion Traps; Dead Weaver Bird	Stop Over; <i>Gmelina</i> is an introduced species from South-East Asia and is the predominant timber tree of The Gambia; <i>Delonix</i> is an introduced ornamental Pest cockroaches found (in order of abundance): <i>Periplaneta americana</i> ; <i>Pycnoscelus surinamensis</i> ; <i>Supella longipalpa</i> ; <i>Blattella germanica</i> Curation of the insect collections
Banjul	Kombo	Western Division	Palm	Meeting with the Mayor of Banjul concerning Coccoidea problem on ornamental palm trees in city parks
Bakindik	Lower Numi	North Bank Division	Early Millet; Groundnut	crop pest survey
Chamen Centre	Upper Baddibu	North Bank Division	Early Millet; Groundnut; Maize; Cowpea	crop pest survey ; Locust (<i>Ornithacris turbida</i>) present; farmer training session
Chogin	Kaba	North Bank Division	Groundnut; Early Millet	crop pest survey
Karrpateh	Central Baddibu	North Bank Division	Groundnut	crop pest survey
Kerr Ardo	Lower Baddibu	North Bank Division	Cassava	crop pest survey ; Locust (<i>Ornithacris turbida</i> and <i>Acanthacris ruficornis</i>) present
Njawara	Lower Baddibu	North Bank Division	Rice	crop pest survey
Sabbah Njayan	Upper Baddibu	North Bank Division	Maize; Early Millet	crop pest survey

1997 GAMBIAN EXPEDITION BUDGET

<u>Item</u>	<u>Additional information</u>	<u>Total (£)</u>
<u>Wages</u>		
Ministry of Agriculture Staff Member.	150 Dalasis per day, over a 25 day period. Equivalent to £10.20/day (14.7D =£1).	255.00
Driver	50 Dalasis a day, over a 25 day period. Equivalent to £3.40/day.	85.00
<u>Transport</u>		
Gatwick Express	Travel to airport.	36.00
Aeroplane tickets	£388.00 each (4 tickets required).	1552.00
Fuel	A cost of approximately £12per day, over a 25 day period.	300.00
<u>Accommodation</u>		
Non-tent Accommodation	Recommended by Min.of Agri. staff in certain areas (safety reasons). 10 days in total at a cost of approx. 40 D./ person/ night.	140.00
<u>Entomological Equipment (as used during the expedition)</u>		
Collecting nets	10 x 14" nets, 4 x 3" handles and 4 x 14" frames. Sweep nets, Beating tray, telescopic net handle.	212.72
Additional traps	Malaise (x1), Flight interception (x2), Bait traps (x3), Pit fall traps (x10).	159.99
Tubes	Duran Bottles (x20), Polythene tubes (x200), Glass rearing tubes (x200).	57.97
Misc. equipment	See Appendix 1 for cost breakdown.	163.70
<u>Processing Costs to Date</u>		
Film	25 (7 films lost) x 36 exposure 100 and 200 ASI slide film. £3.65/film through Oxford University museum.	91.25
Slide Mounts	£ 4.99/ 100 slides.	44.91

Alcohol (1)	Due to the dilution of the alcohol in which the specimens are already stored (due to their body fluids) it is necessary to re-alcohol the 300 (22ml) tubes and larger Duran bottles in which in which they are stored. Aprox 12 L used so far at £2 per 250ml tin of iso propyl alcohol.	96.00
Store Boxes	Only 5 used so far, at a cost of aprox. £15 each (second hand)	75.00
Tubes	Each of the 300 alcoholated specimen tubes above is subdivided into a further 10 tubes each containing a relevant taxonomic group e.g. Diptera, Heteroptera, Homoptera, Orthoptera.....etc. As of yet only 80 of these have been done at a cost of £6/ 25 (20ml) glass polythene stoppered tubes.	192.00
Alcohol (2)	For each of the above taxonomically subdivided tubes required alcohol. Aprox 12L iso propyl alcohol.	96.00

Non-Ento. Equip.

Tents	2 x 3 man tent.	114.80
Rucksacks.	4 x 99 Litre.	420.00
Ponchos	4 required at £25.00 each.	100.00
Misc.	Water bottles, Purification tablets, Deet (insect repellant), Mosquito nets, Sleeping bags, etc.	270.00

TOTAL SO FAR. 4462.34

Predicted Further Processing Costs

Store boxes	Estimated a total of 30-40 will be required, although a number will be obtained free from museums at least 20 are expected to be purchased at a cost of aprox, £15 each.	300.00
Alcohol	Continued retubeing will require aprox. Another 10 to 15L (assume 12.5L for cost).	100.00
Specimen setting	Each alcohol yube collected in the field contains aprox. 100 specimens, each paper contains 50+ specimens and the duran bottles can contain over	???

500 specimens each.

Although many of these will be sent to the recognised expert in wet form many will still be required to be set at an estimated cost of aprox. £7.30/ 100 specimens , see appendix 2.

N.B. the above is only a brief list of the obvious predicted costs associated with the processing procedure.

APPENDIX 1

Miscellaneous Equipment and Chemical Cost Breakdown.

N.B. This list only includes materials used on the expedition, not those used in processing specimens on return to England.

<u>Item</u>	<u>Additional information</u>	<u>Total (£)</u>
Chloral Hydrate	Preservative used in pitfall and malaise traps £13.20 / 500g.	13.20
4-chloro-M-cresol	Anti fungal agent, £23.70 / 500g.	23.70
Silica gell (self indicating)	Drying agent, 2 kg used at a cost of £ 10.20/ 500g.	40.80
Ethyl acetate	Killing agent, 1L used at a cost of £3.30 / 250ml.	13.20
Alcohol	Preservative, 3L used at a cost of £2 / 250 ml.	24.00
Vapona	Killing / protection against ants removeing speimens.	10.00
Papers	For the dry preservation of specimens, 400 used at a cost of 3.45 / 100.	13.80
Additional	Bags, trowles, knives..etc	25.00
TOTAL		163.70

APPENDIX 2

Setting costs per 100 specimens

<u>Item</u>	<u>Additional information</u>	<u>Cost (£)</u>
Pins	Stainless steel No. 2 mounting pins at a cost of £1.75/ 100	1.75
Mounting cards/points.	Used as a base for atatching the insect to the pin, at a cost of 4.95/100.	4.95
Mounting glue	Aprox. 10p/ 100 specimens.	0.10
Data label card	Aprox 50p/ 100 specimens.	0.50

TOTAL

7.30

N.B. These costs do not include the eprocess of drying out the specimens (particularly important in the Diptera, and other fragile orders) by takeing them up through alcohol concentrations of increasing magnitude to ethyl acetate before allowing to dry completely.