

# **African Regional Postgraduate Programme in Insect Science (ARPPIS)**

*A partnership programme between African universities and  
the International Centre of Insect Physiology and Ecology (ICIPE)*



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*icipe*

**Training  
Programmes  
in Insect Biosciences  
(2005–2007)**



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Coordinator of publication: J. P. R. Ochieng'-Odero  
Network Coordinator, ARPPIS  
Administrative Support: L. Omondi  
Copyediting: D. Osogo  
Design and layout: I. Ogendero

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## PREFACE

THE mandate of ICIPE's Capacity Building and Institutional Development Programme is to build capacity in insect science through research, training and institutional strengthening. The training programme in insect biosciences is structured along four major thrusts: (i) higher degree training, (ii) non-degree training, (iii) professional development schemes and (iv) interactive on-site training with ICIPE's national partners. Following the recommendations of stakeholders during the 2002 Strategic Review of the Centre, in 2003 we began to restructure our capacity building programme. The main objective was revitalising the capability of universities to offer quality higher education, especially in the area of modern biosciences.

This *Training Programmes in Insect Biosciences* book was written to guide the stakeholders in the African Regional Postgraduate Programme in Insect Science (ARPPIS) programme — the collaborating universities in Africa, the scholars, resource persons and administrators — towards fulfilling the goals of the restructured programme.

The Calendar contains a month-by-month schedule of events, short notes on the programmes and scheduled courses, lists of student projects and fellowships and participating universities. Also included are profiles of ten PhD graduates. Appendix 4 is an extract of Schedule 1 of the ICIPE Intellectual Property Agreement contained in *The ICIPE Intellectual Property Policy 2000* publication, to which all staff, students and collaborators adhere.

We are very grateful to the donors of the African Regional Postgraduate Programme in Insect Science (ARPPIS) for providing us with funds for this book. The ARPPIS programme, funded by the Dutch Programme for Cooperation with International Institutions (Netherlands-SII) and the German Academic Exchange Service (DAAD), has to date successfully trained over 170 PhD students from 29 African countries and 108 MSc students in the three sub-regional centres of ARPPIS at the Universities of Zimbabwe (for southern Africa), Ghana/Legon (for western Africa) and Addis Ababa (for eastern and northeastern Africa), who now hold key positions in research and education on the continent.

Christian W. Borgemeister

*Director General*

*International Centre of Insect Physiology and Ecology (ICIPE)*

# INTRODUCTION

The African Regional Postgraduate Programme in Insect Science (ARPPIS) of the International Centre of Insect Physiology and Ecology (ICIPE) was started in 1982 after extensive consultations with African universities and related higher education coordinating institutions such as the Association of African Universities (AAU).

The success of this innovative programme is predominantly due to the fact that it combines the excellence of ICIPE's research and development agenda with the academic experience of its 30 partner African universities. With very few exceptions, ARPPIS graduates have remained to work in Africa. A number of alumni have risen to policy-influencing positions and have maintained linkages with ICIPE through the ARPPIS Scholars Association (ASA). These advances have been achieved despite the continent's loss of human resource capability through 'brain drain'. The success of the ARPPIS programme has resulted in an annual increase in demand for postgraduate training with requests coming from around the continent.

In order to meet this demand, and in consultation with its stakeholders, especially the university partners, a comprehensive revised training programme has been developed that is structured to better meet the demand for highly trained indigenous researchers and to provide a cadre of well-trained integrated pest and vector management (IPVM) specialists and trainers in technology introduction and adaptation. In the new agenda, selected African universities will be strengthened, and student numbers increased. Practical skills training will be stressed for active and problem-based learning. New and rapidly evolving disciplines, such as the molecular sciences, bioinformatics and ecology, will be taught for wider use as a bridge between scientific discoveries and field problems.

This Calendar presents the training activities on which ICIPE and its 30 university partners will be focusing over the next three years from 2005–2007. During the period several key challenges will be addressed. These include strengthening institutional capacity of the universities by availing specialised research equipment and facilities to the network institutions, as well as providing financial support for staff training, infrastructure maintenance and collaboration. Another challenge is the mobilisation of additional resources for training. The comprehensive training programme of ICIPE, which includes the network activities of ARPPIS, is funded through a consortium of donors. While this support goes a long way in providing fellowships for students, there is a critical need to acquire additional funds to support research expenses (especially field work) as well as providing scholarships for interns and postdoctoral fellows. Cost of living and inflation is a major drain on students stipends and this will be reviewed from time to time.

The Calendar of Activities for the three-year period 2005–2007 is shown in the table on page 2.

## ICIPE's Board of Training and Postgraduate Studies (IBTPS)

### Annual Schedule of work

Dates	Activity
15th January	Call for project titles
1st week of February	<b>First Meeting of the Board</b>
15th February	Call for full thesis proposals
15th March	<b>Last day for submission of full proposals</b>
3rd week of March	<b>Second Meeting of the Board</b>
1st April	Public advertisement of Fellowships
3rd week of May	<b>Third Meeting of the Board</b>
31st May	<b>Final day for receiving Fellowship applications</b>
1st June	Award of Fellowships to successful applicants
1st September	Reporting date for new ARPPIS class
	<b>Deadline for receiving Annual Progress Reports from ARPPIS Scholars</b>
3rd week of September	<b>Fourth Meeting of the Board</b>
2nd week of September to end of October	Annual series of ARPPIS coursework
1st week of December	Presentation of thesis proposals
2nd week of December	<b>Fifth Meeting of the Board</b>

# STRATEGIC OUTLOOK FOR THE CAPACITY BUILDING PROGRAMME

## A. Introduction

The Sponsoring Group of ICIPE (SGI) sponsored a major strategic review exercise of the Centre in 2001. The review team undertook a comprehensive study of ICIPE's research and training agenda through a process of interactive engagement with the institution's clientele and stakeholders, including those that it collaborates with in implementing capacity building activities. Among those interviewed included universities, especially those linked through the African Regional Postgraduate Programme in Insect Science (ARPPIS) network, advanced laboratories and centres of learning in the North and South, as well as development partners and donors supporting training activities. The findings of the team, including their recommendations are published in a report titled *Focus on the Future: Strategic Planning Review of ICIPE* (July, 2002), which formed the basis of developing ICIPE's Vision and Strategy (2003–2012).

### 1. Issues Raised by the Strategic Review Team

While the Review Team recognised the outstanding achievements of the Capacity Building Programme, and specifically highlighted the unique contribution of the ARPPIS Programme towards human resource development and leadership training, they pointed out a number of operational weaknesses that needed attention.

The areas identified at the institution level were the need to:

- (i) Maintain a balance between science and capacity building, so that an expansion in training activities does not jeopardise staff motivation and hence the quality of science;
- (ii) Address the threats to the sustainability of capacity building activities that have occurred when donor grants diminish; and
- (iii) Develop a 'devolution plan' to move more research to universities.

The areas identified at the programme level, were the need to:

- (i) Develop ARPPIS further through assigning a greater role to universities, and taking greater advantage of the supervisory competence of other IARC's in complementing the areas of biosciences; and
- (ii) Develop an equitable geographic, linguistic and gender balance.

### 2. Approval by the Governing Council

As a result of these recommendations, the ICIPE Governing Council (GC) directed management to prepare a response, and specifically requested for a comprehensive capacity building strategy to address all the concerns raised. The Capacity Building and Institutional Development (CB&ID) Programme developed a strategic response titled 'Strategy for Enhancing Capacity Building Activities at ICIPE' that was discussed by the Executive Board of the GC in October 2002 and approved at the full GC meeting held in April 2003.

### 3. Policy and Operational Issues Raised by Donors Supporting the Training Programme

In an effort to mobilise funding to carry out the training programme, ICIPE approached the Royal Government of the Netherlands (who have supported ICIPE's training programmes since 1984) for a grant of US\$ 4.8 million for the period 2004–2009. The proposal review process was long-drawn, after which the donor raised the need for:

- (i) Addressing the sustainability of the capacity building programme;
- (ii) Incorporating an institutional strengthening component for the network universities;

- (iii) Spelling out the roles and responsibilities of the various parties in the network;
- (iv) Demonstrating the impact and expanding network linkages; and
- (v) Indicating possible avenues for mobilising further funding since the support would only be a partial contribution to the comprehensive training programme.

It is as a result of addressing these issues to the satisfaction of the donor that the Education and Development Division of the Ministry of Development Cooperation, Netherlands through its Programme for Cooperation with International Institutions (NetherlandsSII), approved in mid-November 2004, a contribution of 35% of the requested amount to support the comprehensive training programme for a five-year period.

## **B. Structure of ICIPE's Comprehensive Capacity Building Programme**

As a result of the aforementioned, and in the spirit of ICIPE's current Vision and Strategy, the Capacity Building and Institutional Development Programme (CB&ID) has developed a comprehensive training programme that is structured to meet the following targets within the five-year period:

### **Capacity Building Programme in Insect Biosciences (2005–2009)**

<b>Key Programme Activities and Outputs</b>
<b>1. Regional Training Fellowships</b> <i>Doctoral training at PhD level</i> <ul style="list-style-type: none"> <li>• Thirty (30) to be trained within the 5-year period at ICIPE</li> </ul> <i>Postgraduate training at MSc level</i> <ul style="list-style-type: none"> <li>• Forty-five (45) to be trained within the 5-year period undertaken at the three MSc sub-regional centres</li> </ul>
<b>2. Technology Dissemination</b> Technology dissemination to NARES through hosting of 1 International Group Training Course annually (total of 5)
<b>3. Development of Training Manuals</b> Sourcing, editing and designing electronic and print copies of essential training manuals
<b>4. Fostering Cooperation and Networking</b> Fostering S&T cooperation and networking across the continent, through support of research internships, scientific exchange visits, provision of postdoctoral support and support to ARPPIS Alumni symposia
<b>5. Institutional Strengthening for Partnering Universities</b> Institutional strengthening to 4 selected network-partnering universities, through equipment upgrade, support of staff time, travel and operational expenses.

## **C. Towards Sustainability of the Programme**

ICIPE's Vision and Strategy 2003–2012 makes a case for strengthening R&D through restructuring capacity building. It proposes that postgraduate training programmes be retooled to better meet the demand for highly trained indigenous researchers and to provide a cadre of well-trained IPVM specialists and trainers in technology introduction



and adaptation. It also proposes that selected African universities be strengthened, and student numbers increased. Practical skills training would be stressed for active and problem-based learning. New and rapidly evolving disciplines, such as in the molecular sciences, bioinformatics and ecology, would be taught for wider use as a bridge between scientific discoveries and field problems.

### **1. *Developing a Demand-Driven Institutional Strengthening Component***

In response to regional demand, and in an effort to strengthen university capacity to undertake research in insect biosciences, ICIPE is now developing an institutional strengthening component, based on maximising complementary partnerships to contribute to the long-term revitalisation of university capability to offer quality higher education. The project component will assist in modernising the teaching of insect biosciences by integrating the newer approaches and scientific discoveries into the curricula. Initially, focus will be on building research and training capability of four carefully identified universities by providing key institutional support to upgrade research and training facilities, staff development and communication capacity. It is expected that this intervention will significantly contribute to high-level trained brainpower, which will in turn undertake further training and hence sustain quality postgraduate training. The project is expected to serve as a model that can be replicated in the other collaborating universities in future programmes. This proposal fits in with the recommendations of various rectors, vice chancellors and presidents of universities meeting under the auspices of the Association of African Universities (AAU) and with those of the ARPPIS Academic Board (AAB).

Since this institutional strengthening intervention essentially builds on complementary partnerships, the determination and the willingness of the universities to cost-share in the long-term running of the programme is important. The universities selected to benefit from the upgrading and support investment project will need to indicate that they will be willing to continue supporting the ARPPIS network by:

- (i) Availing the use of acquired specialised research equipment and facilities to other network universities within the sub-region;
- (ii) Providing financial support for maintenance of staff and infrastructure either through regular financing or from extra-budgetary support; and
- (iii) Collaborating effectively within the network and continually exploring and refining cost-effective joint strategies and approaches for the long-term sustainability of the programme.

### **2. *Clarifying the Roles and Responsibilities within the Network***

To effectively share responsibilities between the universities and ICIPE, and provide for adequate exposure for students to benefit from interaction with ICIPE scientists and take advantage of the excellent infrastructure, it is proposed that existing institutional strengths be identified and built upon, with the roles and responsibilities of the network partners distributed as follows:

- **The Beneficiary Universities** will comprise those identified to benefit from the first phase of the institutional strengthening component and will:
  - (i) Determine university departments and staff to be involved in the project; and
  - (ii) Develop a realistic needs-assessment profile of the capability strengthening required, and how they fit within the partnership.
- **The ARPPIS Secretariat** based at ICIPE is expected to:
  - (i) Act as the implementing and coordinating agency of the project and hence participate in general guidance and advisory missions;
  - (ii) Undertake progress, technical and financial reporting on behalf of the partnership; and
  - (iii) Lead in the development of projects and evaluation of the results achieved.



- The ARPPIS Network Universities, while continuing with the ARPPIS postgraduate training programme, will work through the ARPPIS Academic Board to:
  - (i) Closely monitor progress and offer advisory support to the project; and
  - (ii) Develop plans and guidelines, including fundraising strategies on how to replicate the model.

### **3. Demonstrating the Impact**

There is need to demonstrate the impact of our training programmes beyond numbers admitted and graduated. It is known that, with few exceptions, ICIPE's graduates have remained in Africa and continue to work in the professional areas they were trained in. A number of graduates have risen to policy-influencing positions within their governments and have maintained linkages with ICIPE through an alumni association, the ARPPIS Scholars Association (ASA). However, there is need to undertake a performance measurement of the capacity building interventions ICIPE has been involved in, especially in relation to the ARPPIS training programmes at masters and doctoral levels. This is not a straightforward exercise, since the benefits are not easily quantifiable and hence the rate of return on investment in capacity building cannot be easily derived. Negotiations are ongoing with the Harare-based African Capacity Building Foundation (ACBF) to collaborate in a tracer impact study of the beneficiaries of the ARPPIS training programme.

### **4. New Networking Opportunities**

The CB&ID programme is reaching out to other network programmes who are active in Africa and who can bring synergy to the ARPPIS programme. These include FARA's initiative on Building African Scientific and Institutional Capacity (BASIC) as well as the African Network for Agriculture, Environment and Forestry Education (ANAFE). ICIPE has also been involved in a number of discussions with NEPAD and Biosciences Eastern and Central Africa (BECA). More efforts at linkages are being made with the AAU, as well as sub-regional groupings such as the Inter-University Council for East Africa and the evolving SADC Association of Universities.

### **5. Opportunities for Additional Funds Mobilisation**

The new emphasis by ICIPE to become a centre of excellence undertaking research and training in the area of tropical arthropod biosciences opens up new funding possibilities, especially from foundations who are becoming increasingly interested in funding higher education in Africa. These include, among others, the foundation-sponsored Partnership for Higher Education in Africa and ACBF. While ICIPE will continue to seek support for training programmes from the traditional donor community and philanthropic organisations, more emphasis, however, will be placed on the optimisation of co-sharing of responsibilities with universities, and through networking.

Strategic partnering will also continue to be explored, especially in the establishment of a visiting professors programme, who will be invited for teaching, research and preparation of training modules. A major strategy of the enhanced programme is to assist and benefit from participating universities through sabbaticals, secondment and twinning arrangements. The programme will also negotiate with industry and private enterprise to draw on their cooperation in areas of mutual interest. It is therefore envisaged that through sources such as these, as well as with the support offered by international specialised agencies with mandates to promote education, increased funding will be realised, not only for training but also for undertaking research.

## TRAINING PROGRAMMES IN INSECT BIOSCIENCES

The major objective of ICIPE's capacity and institutional building programmes is to build human resource capacity in insect science and related areas of the biosciences that is well trained, highly motivated and able to respond to the arthropod-related development needs of its pan-African constituency. Most importantly, ICIPE's approach has been to acclimatise researchers such that they can function and perform within the African context, yet remain competitive within the global research and development marketplace. ICIPE's capacity building effort has always been intricately in-built into its R&D programmes. These span the whole continuum, from basic strategic research to technology development and validation, and finally community-based adaptation. Hence, ICIPE's training objectives at all levels are achieved as the Centre undertakes its core research work in fulfillment of its mandate.

One of the key elements of ICIPE's training programmes is the emphasis on 'hands-on' experience and regular contact with the target communities, be it through training of farmers or training of trainers (ToT) and extension workers. ICIPE believes that this contact is pivotal in ensuring that the training remains relevant and that the trainees are aware of the pressing on-the-ground problems of technology implementation and adaptation in Africa.

ICIPE's current capacity building programme is complemented by collaborative arrangements with university and research institutions in developed countries. The programme is structured along the following major thrusts:

- Higher degree training for leadership in scientific research and policy formulation;
- Non-degree training mainly targeted to practitioners in the national agricultural and health research and extension systems;
- Professional development schemes, where postdoctoral fellows, research associates and visiting scientists come to ICIPE to develop and share expertise; and
- Interactive on-site training, as collaborative research work is carried out with ICIPE's national partners.

### **A. Higher Degree Training for Leadership in Scientific Research**

ICIPE works to build a critical mass of scientists in insect science in developing countries through the postgraduate degree programmes.

The objective of the graduate degree training programmes in insect biosciences is to:

- Prepare young scholars from the tropical developing world (especially Africa) for research careers in arthropod science at reasonable cost with the primary goal of enabling these countries to achieve the critical mass of scientists required for science-based development.

To achieve this, the Centre has established two postgraduate training programmes to annually enroll a substantial number of PhD and MSc scholars from the tropical developing world, viz. the African Regional Postgraduate Programme in Insect Science (ARPPIS) and the Dissertation Research Internship Programme (DRIP).

- The African Regional Postgraduate Programme in Insect Science (ARPPIS) offers three years of PhD degree training in collaboration with participating African universities. Training scholarships are secured through ICIPE's research and training grants. The ARPPIS Academic Board manages the ARPPIS Sub-Regional MSc Programme. This programme is organised at sub-regional level and is hosted by the following participating universities:
  - University of Zimbabwe for southern Africa;
  - University of Ghana for western Africa;
  - Addis Ababa University, Ethiopia, for eastern and northeastern Africa.

- The Dissertation Research Internship Programme (DRIP) is for PhD and MSc degree training of scholars registered at universities anywhere in the world. This is a self-financing scheme. Scholarships are from external sponsors and research funds are from either the sponsor or ICIPE's own research grants.

## 1. The African Regional Postgraduate Programme in Insect Science

### 1.1 Introduction

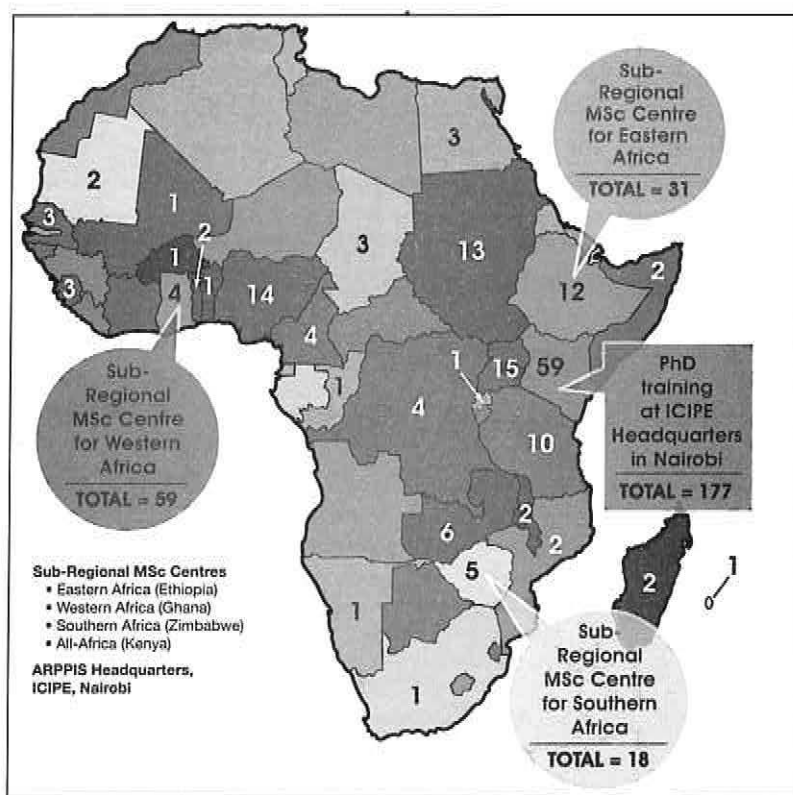
The African Regional Postgraduate Programme in Insect Science (ARPPIS) is a collaborative programme between ICIPE and 30 participating universities from Africa. It was established in 1983 to train arthropod scientists and pest management specialists within Africa.

### 1.2 Objectives

The objectives of the African Regional Postgraduate Programme in Insect Science (ARPPIS) are to provide:

- High-level research training at either MSc or PhD degree;
- Expertise for research career development as well as research leadership within Africa, in a cost-effective manner.

ICIPE aims to maintain a high standard of performance by scholars under this programme throughout the period of study. In any one year, the programme is expected to have a maximum of 30 trainees at different stages of their studies.



The African Regional Postgraduate Programme in Insect Science (ARPPIS) Network—2005

### **1.3 The ARPPIS Academic Board (AAB)**

The ARPPIS Academic Board (AAB) is the supreme policy body for ARPPIS programmes and is composed of the Vice Chancellors or Rectors of all partnering universities that have signed the ARPPIS Memorandum. Other members of the Board are ICIPE's Director General who is its Chair, the Director of Research and Partnerships, the Network Coordinator and the Chair of ICIPE's Board of Training and Postgraduate Studies. Nominated ARPPIS representatives can represent the University in the absence of their Vice Chancellors.

#### **1.3.1 Responsibilities**

The AAB is an advisory body. It meets once every two years. It advises ICIPE and the participating universities on academic matters relating to scholar enrolment and registration, research and theses quality and admission of universities to the programme.

In addition, the AAB ensures equitable participation of universities in the programme through sponsorship of scholars, soliciting donor support and ensuring that universities institute policies that foster meaningful collaboration in the programme as equal partners with ICIPE.

### **1.4 The PhD Academic Programme**

The ARPPIS PhD academic programme is composed mainly of thesis research, which the trainee must successfully complete within the specified programme duration.

Introductory courses may be offered in areas such as computer applications, biostatistics and project management.

Scholars can also enroll for specialised courses if such courses are deemed necessary as remedial course work. The remedial course is taken at the scholar's own cost, but the cost may also be met from the scholar's scholarship if funds are available.

### **1.5 Procedures for Scholar Admission**

#### **1.5.1 Qualifications for Scholar Admission**

The qualifications for scholar admission are:

- An undergraduate degree from an accredited university with a minimum pass level of second class upper division;
- A Masters degree from a reputable university, taken with both coursework and research, with evidence of successful completion of graduate-level courses in insect science disciplines.

Candidates must be nationals of African or other tropical developing countries. They must be, at most 35 years of age at their next birthday, when they are admitted.

#### **1.5.2 Applications**

Applicants must submit a written application, either in response to advertised scholarships tenable at ICIPE or as a general enquiry for graduate training opportunities.

The following documents must be submitted with the application:

- A full curriculum vitae which must show nationality, age, sex, educational background, work experience and scholarly work;
- Certified copies of degree certificates and course transcripts for Bachelor and Masters degrees;
- An abstract of the Masters thesis;
- Recommendations from two academic referees;
- Letter from a university showing willingness to register the applicant for PhD studies.

Eligible applicants are sent formal application forms, which must be completed and returned, along with all the required supporting documents and endorsements, certifying academic qualifications and all other subsidiary conditions for admission.

### *1.5.3 Award of Training Fellowships*

Each scholar admitted to the ARPPIS PhD programme must have a training sponsorship to support the full period of study.

Candidates may secure scholarships from donor agencies, their employers and governments. They can also apply for ICIPE's research and training project grants.

Each scholarship should pay for all direct scholar support costs (travel, university fees, maintenance allowance, medical insurance, supervision costs and reference materials) and programme management. Current schedules may be obtained from the Capacity Building and Institutional Development Programme.

The scholar's research project is an integral part of ICIPE's research programme and the project cost is normally covered from programme funds independently of the training scholarship, unless the donor has been requested to pay for it as part of the scholarship.

## *1.6 Constituency Considerations in Graduate Training*

Priority is given to trainees from the tropical developing world, with special consideration for nationals of African countries. Preference is also given to countries and institutions that have formalised arrangements for cooperation with ICIPE and have signed the ICIPE Charter.

Although training specialisation focuses on research areas in which ICIPE has active, leading expertise, scholars are encouraged to work on research problems relevant to their home situations.

Special consideration is given to disadvantaged groups, e.g. nationals of least developed countries, countries with no postgraduate training programmes, and women candidates.

## *1.7 Project Identification and Evaluation*

### *1.7.1 Project Identification*

The ICIPE Board of Training and Postgraduate Studies (IBTPS) is responsible for calling for priority proposals to be considered for award of fellowships in January of each year.

Topics of proposed research originate from ICIPE's research programmes and departments. Individual scientists are required to prepare a two-page concept statement specifying the following:

- Hypothesis of the study
- Overall and specific objectives of the project
- Project activities and time frame
- Key research methodologies to be applied
- Project location and collaborative arrangements
- Budget and funding status of the project
- Approval and/or comments by the Project Coordinator, Head of Department or Unit and Programme Leader.

### *1.7.2 Project Evaluation*

Applications for research theses projects are submitted in a standard format to the Head of the Capacity Building and Institutional Development Programme (CB&ID) for tabling at a meeting of ICIPE's Board of Training and Postgraduate Studies (IBTPS), after approval by the respective Heads of Programmes, Departments, Units or Projects.

For urgent projects and those coming up at unscheduled times when an IBTPS meeting is not possible, the Head of CB&ID seeks approval from the Director of Research and Partnerships (DRP).



## 1.8 Selection of Scholars

Interested candidates submit detailed applications based on advertisement to the office for CB&ID. The Project Coordinators/Programme Leaders/Heads of Department or Unit, who make the application, shortlist applicants based on merit and advise the IBTPS. The IBTPS considers the recommendations and approves admission of candidates best qualified to carry out the proposed research projects.

## 1.9 Research Supervision

### 1.9.1 Significance of Supervision

Supervision is an important academic exercise. Although the associated paperwork can be overwhelming for both the supervisor and the scholar, it is important that attention is paid to detail so that an appropriate academic record is maintained for the scholar.

ICIPE and the registering universities place a lot of emphasis on the quality of scholar research as exemplified in the thesis. Supervisory committees have considerable discretion in establishing requirements in scholar research proposals.

### 1.9.2 Appointment of Supervisors

- The head of department nominates and recommends a principal supervisor to ICIPE's Board of Training and Postgraduate Studies (IBTPS) for approval.
- Approval and appointment by the IBTPS is made within 3 months. The principal supervisor must be a regular ICIPE staff member.
- The principal supervisor recommends co-supervisors and counterpart supervisors to the HOD who are all approved by the IBTPS. Appointment of co-supervisors should be effected within 3 months of the scholar's study programme.
- The registering university appoints the university supervisor.

### 1.9.3 The Supervisory Committees

#### COMPOSITION

Each graduate scholar has a supervisory committee composed of at least two people: the principal supervisor (convenor), co-supervisor(s) and a counterpart supervisor (where applicable). When visiting ICIPE, the university supervisor joins the supervisory committee.

#### FREQUENCY OF MEETINGS

Each scholar should have a formal meeting with the supervisory committee *once every 3 months*. The first such meeting should take place as early as possible, during proposal preparation. A departmental seminar given by a scholar and attended by members of the supervisory committee may be considered a supervisory committee meeting.

#### FORMAT OF MEETINGS

Supervisory Committee meetings do not have any formal structure. The information to be presented and discussed is normally determined by the principal supervisor in consultation with the scholar and the other members of the committee. Scholars should take full advantage of such meetings to ensure that they receive the assistance and advice they need.

At the first meeting, the committee should attempt to establish any course or other requirements to be met by the scholar during the programme. During the second year of an MSc programme, or the third year of a PhD programme, the committee should discuss the projected date of thesis submission.

Where a single meeting between the entire committee and the scholar is logistically unfeasible in a given quarter (e.g., when a scholar is based away from ICIPE, or when a committee member is on leave), the principal supervisor should meet with the scholar and at least one other member of the committee. The principal supervisor in these circumstances should provide a written progress report to members of the committee unable to make it to the meeting and request feedback.



## **REPORTING**

Following each meeting, the supervisor provides a short written summary of the meeting to the head of department and the Office for Capacity Building in a prescribed format. This summary will be retained in the scholar's file.

## **APPOINTING ACTING SUPERVISORS**

When a supervisory committee member intends to be absent from campus for more than 2 months, the member should designate a formal acting supervisor in writing, to the head of department. During the period of absence, the acting supervisor will assume his or her full responsibilities.

### ***1.10 Denial of Right to Supervise Graduate Scholars***

The right to supervise scholars may be denied a member of the scientific staff for several reasons:

- (i) Inadequate research funding or other factors leading to disapproval of the proposed project;
- (ii) History of repeated, serious conflicts with graduate scholars where it is shown that most of the fault lies with the staff member;
- (iii) Gross and repeated negligence by the staff member in administering graduate scholars' programmes to the detriment of the graduate scholars;
- (iv) Gross negligence by the staff member in offering proper supervision;
- (v) Unethical practices by the staff member when dealing with graduate scholars.

### ***1.11 Conflict of Interest in Supervision***

Personal relationships (including intimate or business) that alter or affect academic relationships may constitute conflict of interest. In the rare circumstance where scientists involved in familial or intimate relationships are proposed for the same supervisory or examining committee, written justification must be made to ICIPE's Board of Training and Postgraduate Studies for approval.

Whenever a conflict of interest arises, particularly between a supervisor and the scholar, the supervisor should withdraw immediately and an appropriate supervisor found.

### ***1.12 Trainee Benefits, Privileges and Obligations***

#### ***1.12.1 University Fees***

The scholarship caters for the trainee's university fees. Fees vary depending on the university selected for registration and on the nationality of the scholar.

#### ***1.12.2 Research Costs***

Research costs, including field travel, labour, equipment and research supplies for an ARPPIS trainee will be met by the host research project or the department hosting the scholar's project.

#### ***1.12.3 Maintenance Allowances***

The scholarship provides funds to pay each scholar a monthly maintenance allowance to meet the costs of accommodation and meals, books, stationery and other domestic expenses.

#### ***1.12.4 Consultation Visits***

Each trainee's university supervisor is provided a single return economy class air ticket once during the entire training period, to visit ICIPE to evaluate scholar research, preferably in the *second year* of study. The visit will be for a maximum of 7 days for which per diem and accommodation allowances will be paid.

Trainees are issued with a single return economy class air ticket once during the entire training period to visit the registering university to give a seminar and interact with

Faculty. The visit will be for a maximum of 7 days for which per diem and accommodation allowances will be paid at the rate stipulated for the country visited.

Scholars registered in universities not in their home countries will be provided with a return economy/excursion air ticket (home-university-home) and per diem for up to 7 days.

Under special circumstances not mentioned above, advice should be sought from the Head of the CB&ID Programme.

#### *1.12.5 International Travel*

For all approved international travel, payable costs will include airfare, airport tax and subsistence allowance for accommodation, meals and incidental costs. The scholarship will provide funds for a one-way economy class air ticket (home-Nairobi) at the beginning of the training programme and a one-way economy class air ticket (Nairobi-home) at the end of the training programme. Unaccompanied baggage by airfreight to a maximum of 20 kg for scholars who have completed training and are returning to their home countries will be paid for.

#### *1.12.6 Field Travel*

Field travel to research sites within Kenya or where the scholar is studying should be spelt out in the research project plans.

The scholar will be entitled to ICIPE transport for the fieldwork, or reimbursement of transport costs on public transport (not taxi). Per diem will be paid at the local rate, but only for field visits not exceeding 14 days.

A special package will be arranged for visits exceeding 14 days but less than 3 months. For visits lasting 3 months and more, the scholar will be temporarily relocated to the research site at no extra allowance for the duration of the visit.

#### *1.12.7 Home Leave*

The scholarship provides for one home visit (30 days) at mid-term of the programme for scholars whose training programmes exceed 24 months.

#### *1.12.8 Leave of Absence*

ARPPIS scholars will be entitled to annual leave, compassionate leave and sick leave.

#### **ANNUAL LEAVE**

Scholars will be entitled to 14 calendar days of leave per year. Foreign scholars may accumulate their leave for the mid-term home visit.

#### **COMPASSIONATE LEAVE**

Compassionate leave will be approved in case of death of a close member of the family (parent, wife, child, parent-in-law, sibling) at the discretion of the programme coordinator and the ICIPE supervisor.

#### **SICK LEAVE**

Sick leave will be approved with full stipend up to a maximum of 2 months. Beyond 2 months, the scholar may remain on sick leave but without payment of stipend. After 6 months of sick leave, ICIPE's Board of Postgraduate Studies will review the scholar's scholarship.

### *1.13 Group Medical and Life Insurance*

The scholarship provides medical and life insurance cover to the trainee only, under ICIPE's group insurance schemes.

### *1.14 Preparation of Proposals, Reports and Theses*

The scholar is expected to type (or otherwise technologically produce) the research proposals, progress reports, thesis and illustrations and undertake data analysis with minimal assistance from the host programme. Secretarial service is not provided for

scholars. The cost of thesis binding is met from the scholarship, subject to the limit of the unit cost, and only if the thesis is finalised within one year after expiry of the formal training scholarship.

### ***1.15 Annual Progress Reports***

Trainees are required to submit to the Head of the CB&ID Programme annual reports on their progress in a prescribed format and enclosing a draft thesis, which must be endorsed by supervisors at ICIPE and at the registering university.

### ***1.16 Duration of the Training Programme***

The PhD degree programme lasts 3 years, and this *will not be extended*. Scholars who have not completed their training within the specified period will do so on their own time, without payment of any allowances.

### ***1.17 Termination of the Scholarship***

#### ***1.17.1 Termination by Notice***

Either party may terminate the scholarship contract by giving a one months' written notice. The stipend will not be payable during the notice period if termination is initiated by the scholar.

#### ***1.17.2 Termination on Academic Grounds***

If the trainee's annual progress report reveals unsatisfactory performance the scholarship will be terminated by giving one months' notice.

#### ***1.17.3 Disciplinary Termination***

The scholarship will be terminated without the benefit of notice when the trainee is involved in serious misconduct, such as unauthorised travel abroad, unauthorised leave, fraudulent manipulation of data and any other misdemeanor, and on the recommendation of the ARPPIS Academic Board.

#### ***1.17.4 Withdrawal of Scholarship***

The scholarship will also be terminated without notice if the sponsor withdraws the scholarship and no other funds are available to support the trainee's programme.

### ***1.18 Departure Formalities***

All trainees who are departing from ICIPE on completion or termination of their training programmes must obtain clearance from all departments of the Centre on the Departure Clearance Form before they are formally released.

All terminal provisions for departing trainees—including final stipend, air tickets, and assistance with hotel accommodation—are subject to satisfactory clearance from the Centre.

### ***1.19 Assistance with Accommodation on Arrival and Before Departure***

Trainees based away from their home countries are eligible for assistance with hotel accommodation for a period not exceeding 14 days on arrival at training base, and similarly just before they travel back to their countries on completion of their training programmes.

Where possible, scholars will be accommodated at ICIPE's Duduville International Guest Centre (DIGC). The cost of the room will be paid directly by the programme.

Where scholars have to be accommodated outside the Centre, an allowance not exceeding the approved rate for scholars will be paid. In both cases, the scholars will pay for their meals from their stipend allowances. There will be no provision for families.

### ***1.20 Certificates of Completion***

An ARPPIS Certificate of Completion will be issued only to scholars who will have completed their theses and submitted final drafts to the university for examination. A copy of the draft thesis must be deposited with the Capacity Building and Institutional Development Programme and with members of the supervisory committee before the certificate is released to the scholar. Issuing of the certificate is also subject to the scholar obtaining clearance from all ICIPE departments.

### ***1.21 General Capacity-Building Policies***

All general and specific policies regulating scholar supervision and responsibilities of departments, supervisors and scholars apply to this programme without exception.

## ***2. The Dissertation Research Internship Programme (DRIP)***

### ***2.1 Introduction***

Through ICIPE's Dissertation Research Internship Programme (DRIP), PhD and MSc research scholars in tropical insect science, from Africa and abroad, are able to access the Centre's state-of-the-art research facilities.

### ***2.2 Objectives***

The objectives of the Dissertation Research Internship Programme (DRIP) are to:

- Contribute towards human resource development for research in tropical insect science, by enabling university scholars to conduct thesis research at ICIPE as part of the requirements for the PhD or MSc degrees of their registering universities in Africa and abroad;
- Facilitate and enhance ICIPE's collaboration with universities and other centres of excellence in developed and developing countries, for interactive technology development and exchange;
- Enhance the capacity and productivity of African universities by availing to them advanced research facilities and resources for collaborative research and training.

### ***2.3 Eligibility for Participation***

The programme is open to scholars from universities in both developed and developing countries pursuing studies leading to postgraduate specialisation in applied tropical entomology.

### ***2.4 Conditions and Procedures for Admission***

#### ***2.4.1 Applications***

The institution seconding the scholar must send a formal written request for training attachment to ICIPE;

- The applicant must state the area of research interest and the name (if any) of the ICIPE scientist or department that may already have been contacted to host the scholar;
- The applicant must submit a concept paper in the prescribed format developed jointly with an ICIPE scientist. The proposal should be fully budgeted, and the scholar should attach a statement specifying the amount and source of funds available for personal maintenance.

#### *2.4.2 Relevance of Proposed Research*

The proposed research must aim to achieve ICIPE's research objectives and must be an integral part of an on-going project for which ICIPE has funding. ICIPE's Board of Training and Postgraduate Studies (IBTPS) will evaluate the proposal.

#### *2.4.3 Payment of Bench Fees*

Scholars attached to ICIPE's research projects are normally not required to pay fees. For externally sponsored scholars with own research projects, a bench fee of US\$ 3000 for PhD and US\$ 2000 for MSc is charged to cover research supervision, library use and administrative costs.

### *2.5 Training Scholarships*

ICIPE does not normally provide scholarships for DRIP scholars. However, as part of ICIPE's effort toward human resource development for national programmes, ICIPE may provide partial scholarships for scholars from developing countries, especially where a collaborative agreement exists between ICIPE and the institution seconding the scholar. An ICIPE scholarship for dissertation research attachment covers only the direct costs of research.

### *2.6 The Academic Programme*

During their research residence at ICIPE, the scholars on DRIP may be offered training in important project management areas such as:

- Project development and documentation;
- Research execution, monitoring and control;
- Research supervision and intellectual guidance;
- Data analysis, interpretation and presentation.

Scholars can join the programme at any time of the year. The duration depends on the project but is normally 2–3 years.

### *2.7 Trainee Benefits, Privileges and Obligations*

#### *2.7.1 University Fees*

The scholar makes personal arrangements with the seconding university for payment of fees.

#### *2.7.2 Research Costs*

For scholars under ICIPE's partial sponsorship, ICIPE provides all facilities and resources to support the scholar's research project, including field travel. In special circumstances, the university or the sponsor may be approached for additional assistance.

Scholars coming with their own projects sponsored from outside ICIPE must provide funds to support their research; the amount will vary with their project budgets.

#### *2.7.3 Maintenance Allowances*

The scholar must make personal arrangements with the sponsor or seconding university for stipend, medical care, life insurance and commutation, and meet all personal expenses for accommodation and maintenance from the stipend.

#### *2.7.4 International Travel*

The scholar must make personal arrangements with the sponsor or seconding university for travel to ICIPE, home travel, consultation visits by the scholar or university supervisor and professional visits to conferences and other laboratories.



### *2.7.5 Leave of Absence*

The scholar takes leave in accordance with the terms of the seconding university, subject to approval by the host department.

### *2.7.6 Progress Reports and Theses*

The scholar must submit an annual progress report through the head of department, endorsed by the supervisory committee and the university supervisor, to the Head of the CB&ID programme. A copy of the final thesis is deposited at ICIPE.

## *2.8 Termination of Scholarships*

The training attachment contract may be terminated on consultation with the sponsoring university on account of poor performance or breach of discipline.

## *2.9 Departure Formalities*

All scholars departing from ICIPE on conclusion of their training programmes will seek formal clearance from all departments of the Centre.

## *2.10 General Capacity-Building Policies*

All general policies regulating scholar supervision and responsibilities of departments, supervisors and scholars apply to this programme.

## **GENERAL INFORMATION**

### **Roles and Responsibilities**

#### **Scholars**

A graduate scholar has responsibility for:

- Familiarising himself or herself with university and ICIPE regulations relating to the degree programme;
- Designing, planning and executing their research project under guidance and supervision to adhere to scientific methods and standards;
- Preparing progress reports detailing the objectives, methodologies, work plan and schedule of projected activities on time;
- Preparing a research proposal showing a budget spread over the 3-year period of study, in accordance with the annual work plans;
- Meeting deadlines on payment of fees, registration, re-registration, consultation visits to universities, visits by university supervisors and submission of progress reports;
- Maintaining the progress of their research in accordance with stages agreed upon with the supervisor and supervisory committee;
- Producing the thesis according to requirements;
- Seeing himself or herself as a member of the respective unit, department and research programme as well as a team member within the host project;
- Availing his or her research results for official presentation as necessary by any appointed presenter as these results are part of ICIPE's output;
- Taking part and making presentations in reviews of host projects as well as taking part in both departmental and institutional seminars;
- Striving to publish his or her research results in international journals. Where it is deemed mandatory by the supervisory committee the requirement must be fulfilled before the thesis is signed for submission to the university.

#### **Supervisors**

The supervisor is the primary contact point of ICIPE and the student. Therefore a supervisor has responsibility for:

- Ensuring high quality supervision of all aspects of the scholar's programme;

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- Assisting the scholar, along with the Supervisory Committee, in planning a pragmatic and intellectually rewarding study programme;
- Ensuring that the scholar is well aware of all programme requirements, and of the degree, and general regulations of the department and ICIPE;
- Providing counsel on all aspects of the training programme and the scholar's research activities;
- Regularly evaluating the scholar's progress by maintaining regular contact.

#### **The Supervisory Committees**

The Supervisory Committee reviews and approves the detailed research project proposal submitted by a scholar and ensures quarterly and annual progress reports are submitted to the head of department, the Capacity Building Office and the university.

In this regard, the Supervisory Committee has responsibility for:

- Providing judicious advice to the scholar about courses, and reading or discussion groups that strengthen the scholar's background;
- Designing and executing the thesis research;
- Developing a scholar's essential communication skills (like speaking and writing);
- Ensuring ethical conduct and presentation of scientific research.

#### **Hosting Departments**

An ICIPE department hosts the scholar, and is the primary operational base. Therefore the hosting department has responsibility for:

- Overseeing the supervision of all graduate scholars enrolled in its projects;
- Serving as the main liaison with the ICIPE's office for CB&ID as well as the registering universities.

#### **Departmental Heads**

The departmental head is the official advocate of the graduate scholar in ICIPE. Therefore the departmental head has responsibility for:

- Attending to any grievances that the scholar presents as well as forwarding them to IBTPS.

#### **The ICIPE's Board of Training and Postgraduate Studies (IBTPS)**

The ICIPE's Board of Training and Postgraduate Studies has responsibility for:

- Establishing the policy framework for graduate programmes within which departmental training policies can be developed;
- Approving scholar projects, selection of scholars, supervisory committees, course curricula and scholars' study programmes.

#### **Capacity Building and Institutional Development (CB&ID) Programme**

The general administration of graduate programmes falls under the CB&ID programme. In this regard, the Capacity Building and Institutional Development (CB&ID) Programme has responsibility for:

- Enforcing training policies;
- Administering training fellowships;
- Providing administrative liaison with research departments and universities;
- Implementing decisions of ICIPE's Board of Training and Postgraduate Studies.

#### **Specific Responsibilities of Supervisors and Co-Supervisors**

##### **Principal Supervisors**

The principal supervisor has responsibility for:

- Day-to-day intellectual guidance of the scholar;
- Coordinating the communication between members of the supervisory committee, the university supervisor and the scholar;
- Regular close contact with the co-supervisors, scholar and the scholar's programme;
- Playing a key and proactive role in providing leadership to the supervisory committee;
- Providing the scholar with laboratory and field research facilities;
- Attending the scholar's *viva voce* examination where required by the university.

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### **Co-Supervisors**

A co-supervisor has responsibility for:

- Involvement in developing the scholar's research programme;
- Availing himself or herself for consultation by the scholar;
- Maintaining close and frequent communication with the scholar and the principal supervisor;
- Attending the scholar's *viva voce* examination where required by the university.

### **Intellectual Property Rights**

All scholars conducting research at ICIPE, with material and intellectual support from the Centre, are required to sign the ICIPE Intellectual Property Agreement that spells out the mode of ownership of the research products (See Appendix 4). Where an intellectual property agreement has also been signed with a sponsoring agency, express permission of that agency must also be obtained.

### **Authorship**

All postgraduate scholars are entitled to publish their research results in international journals only after obtaining permission from their ICIPE and university supervisors. In addition, a completed 'Permission to Submit' form must be lodged with the ICIPE's Information and Publications Unit.

All publications resulting from scholars' research are subject to ICIPE regulations respecting ethics of authorship and copyright. Scholars must read and understand these regulations.

### **Graduate-Level Basic Courses in Insect Science**

Intensive graduate courses are intended for students in graduate degree training programmes in applied tropical entomology (and for postdoctoral fellows and young scientists) who wish to have an in-depth understanding of insect science. Each course includes lectures, student seminars and laboratory or field exercises.

Courses are offered in six major disciplines: insect functional morphology, insect taxonomy, insect physiology and biochemistry, biostatistics and computer science, insect ecology, and biological control of arthropod pests. The six disciplines are covered in three years as two disciplines are offered each year.

## **B. Non-Degree Training in Insect Biosciences**

Non-degree training aims to bridge the gap between technology generation and its practical application in the field.

The objectives of the non-degree training programmes are to:

- Enlighten policy makers to embrace the results and use the technology intended for dissemination;
- Train extension service providers on the functions of the intended technology so that they can play the role of trainers;
- Sensitise end-users to prepare them to internalise the intended technology.

The training season for short courses runs from mid-January to mid-December of each calendar year. An annual training calendar shows the titles and tentative dates of planned courses for the coming season; it is prepared and released before November of each year.

The annual training calendar and brochures are widely circulated to institutions in national programmes (universities, research institutes and relevant government ministries) of tropical countries as well as regional and international research institutions targeted for the courses.

A brochure announcing the offer of each course is prepared and released at least three months before the beginning of the course. The brochure describes the theme and

importance of the course as well as course objectives, content, methods, presenters, expected participants, fees and/or sponsorship, venue and how to apply for admission.

Applications or nominations are made on specified application forms that are circulated with the brochures, depending on the sponsorship of the course.

The course organising committee makes selection for admission on behalf of Capacity Building and Institutional Development Programme and the ICIPE's Board of Training and Postgraduate Studies (IBTPS).

All participants and resource persons register during the official opening of each course.

The courses are offered to individuals or selected groups of national programme researchers, pest management field officers, farmers, the general public and policy makers from tropical developing countries, particularly in Africa.

The following courses may last a few weeks to 1 year each and accommodate up to 25 participants.

- Individual In-service Training Scheme for national programme officers who need to improve their knowledge on specific technologies or research methodologies.
- The Industrial Training Attachment Programme provides practical laboratory and field training to science and technical students as part of the requirements for their certificate courses.

## ***1. Individual In-Service Training Scheme for Practitioners***

### ***1.1 Introduction***

This programme provides training in arthropod science and its application to personnel from national programmes. Courses are individually tailored with short, formal practitioner courses and trainees are attached to research projects.

### ***1.2 Conditions and Procedure for Admission***

The programme admits experienced technologists and field officers from government departments or NGOs wishing to up-grade their knowledge of current practices in the management of specific insects or insect groups for pest control or commercial production.

Candidates must have sponsors to meet their training costs. UN agencies, international NGOs or governments sponsor most candidates.

The candidate or the sponsor submits a request specifying the type of training required and attaches all necessary information on the candidate's previous training and experience. ICIPE develops and proposes an appropriate curriculum, training programme and budget that cover all aspects of the training.

### ***1.3 Duration of Attachment***

The period of attachment ranges from a few weeks to one year but will vary with the nature of training requested and the available personnel.

### ***1.4 Training Costs***

The training costs depend on the duration of the training programme. Cost components include personal costs, accommodation, health and life insurance cover and training fees.

Training fees include tuition, local travel and institutional costs.

#### ***1.4.1 Personal Costs***

Cost of travel to ICIPE's training station (if needed) will depend on the trainee's institution.

#### *1.4.2 Accommodation*

Living expenses include room and board and out-of-pocket allowance. Full board accommodation at ICIPE's Duduville International Guest Centre costs about US\$ 50 per day (this may change with time). The rate for out-of-pocket allowance is US\$ 5-10 per day depending on the sponsor's terms. Long-term trainees should be paid a monthly stipend (US\$ 650 is recommended) to cover accommodation of their choice.

#### *1.4.3 Health and Life Insurance Cover*

Trainees must arrange with their sponsors for health insurance cover from brokers or make claims on actual cost of treatment.

The sponsor or employer is responsible for life insurance.

#### *1.4.4 Training Fees*

##### **TUITION FEES**

ICIPE charges tuition fees at US\$ 220 per week of attachment. This is substituted as appropriate with the actual cost of scheduled group training courses, which the trainee may opt to attend while on attachment at ICIPE.

##### **LOCAL TRAVEL COSTS**

These are inclusive of airport transfer. Local travel costs are calculated from the training schedule and vary with the nature of training.

##### **INSTITUTIONAL CHARGES**

The standard institutional charge of 25% of total project cost is levied on each training attachment.

### *1.5 Funding*

The trainee's sponsor is responsible for meeting all training costs.

Prospective trainees may seek assistance from donor agencies through bilateral or multilateral arrangements, employers or ICIPE's research or capacity-building projects, especially if the employing organisation has a training agreement with ICIPE.

## **2. Industrial Attachment Scheme**

Since classroom learning alone is not enough, ICIPE has developed an apprentice scheme aimed at providing trainees from tertiary and technology colleges with the opportunity to put theory into practice, especially in fields of insect biosciences and related applications.

The objectives of the industrial attachment or apprenticeship scheme are to:

- Provide opportunity to undergraduate students to have hands-on experience in arthropod science as a way of encouraging them to take up careers in this field;
- Provide opportunity for trainee technologists and students of craft colleges and polytechnics to gain practical experience and practice in their areas of specialisation in partial fulfillment of course requirements;
- Supplement ICIPE's requirement for technical assistants in a manner that is mutually beneficial to both the trainee and ICIPE;
- Enable ICIPE to collaborate with middle-level national training institutions in human resource development.

### *2.1 Types of Trainees*

The scheme provides hands-on-training to the following categories of trainees.

- Polytechnic students taking courses in science and medical laboratory technology, agricultural practices, computer applications and data management, and any other training fields that support the implementation of science, and in which ICIPE has expertise;
- University undergraduates in science, agricultural and medical disciplines that need experience in laboratory practice, or those who need to undertake study

- projects as part of their degree requirement;
- Technical personnel of research institutions requiring training in specialised analytical techniques or general upgrading of laboratory skills.

## **2.2 Admission**

Admission is on request or with the support of collaborating training institutions or employers.

Private applicants may also be admitted only on their ability to benefit from the training attachment.

Candidates are admitted on a competitive basis; only good candidates with excellent academic records will be admitted. Admission is offered at any time of the year. However, the number admitted depends on availability of training space in ICIPE's science departments.

## **2.3 Eligibility for Participation**

The programme is open to students from recognised government and private training institutions. Limited consideration is given to freelance trainees.

## **2.4 Conditions and Procedure for Admission**

### **2.4.1 Basis of Selection**

Since most of the students will be exposed, for the first time, to areas of high-level scientific research or R&D management, where they will be expected to contribute to ongoing programmes and projects, ICIPE designed the attachment programme in ways to make it meaningfully beneficial and intellectually rewarding to the students. As a result ICIPE participates in the selection, on the basis of merit, and award such opportunities to most promising students.

### **2.4.2 What is Required of the Nominating Institution**

Applicants must be officially nominated by their training institutions, who are required to send to ICIPE's Capacity Building and Institutional Development Programme a formal request six months prior to the expected date of attachment for students:

- Listing the students who wish to apply for attachment;
- Attaching transcripts duly endorsed by the head of the institute;
- Indicating areas of research or management the students would like to be exposed to; and
- Specifying the exact dates of the proposed attachments.

### **2.4.3 Minimum Duration of Attachment**

The minimum period of attachment is 3 months. Attachment for a period of less than 3 months is considered of no training value and will not be accepted.

Repeated attachment over the full duration of the trainee's course is preferred.

### **2.4.4 Letter of Training Attachment**

Trainees whose attachment is approved must have a letter of attachment from ICIPE's training unit on the day of reporting. The letter must spell out all the terms of the training attachment, and a copy must be signed by the student and returned to ICIPE.

## **2.5 Trainee Obligations**

### **2.5.1 Payment of Fees**

ICIPE provides industrial attachment to students free of charge and no fees are required.



### **2.5.2 Training Assignments**

The trainee is provided with training assignments together with facilities and materials necessary for the work. Depending on the area of competence required, a supervisor is nominated to develop the training programme, coach the trainee, give intellectual guidance and assist in evaluating performance. Facilities are provided for the preparation of the post-training report.

### **2.5.3 Provision of Personal Support**

All trainees must undertake to provide their own resources for personal maintenance, commutation, health and life insurance and protective clothing or uniform.

### **2.5.4 General Staff Policies**

All trainees must observe ICIPE's staff and trainee regulations and rules.

## **GENERAL INFORMATION**

### **Roles and Responsibilities**

#### **Trainees**

The trainee has responsibility for:

- Familiarising himself or herself with the course programme and the requirements of the home institute or sponsor;
- Ensuring that he or she meets the training programme deadlines;
- Taking the initiative to identify problems or difficulties and share responsibility for seeking solutions;
- Seeing himself or herself as a member of the respective unit, department and research programme. Trainees are legitimate members of the research teams within their host projects and should take part in departmental activities and provide services as instructed by their supervisors.
- Availing the results at the end of their training in a report form to the Capacity Building and Institutional Development Programme as they are part of ICIPE's research output.

#### **Supervisors**

Each trainee on attachment must have a principal supervisor who is a senior member of the department conversant with the trainee's work interest. The head of department assigns a principal supervisor. A co-supervisor, such as a research assistant or technician, may be delegated the responsibility of working directly with the trainee.

The sponsoring institution provides an examining supervisor whose responsibility is to examine the trainee in collaboration with the principal supervisor from ICIPE.

- Supervisors and co-supervisors have responsibility for providing guidance to the student during the course of learning at ICIPE.

#### **Heads of Department/Programmes/Units/Projects**

Heads of Department/Programme/Unit/Project have responsibility for:

- Overseeing the supervision of all trainees enrolled under them;
- Attending to any grievances and serving as the main liaison with the Capacity Building and Institutional Development Programme;
- Nominating supervisors to work with individual students on attachment.

### **Specific Responsibilities of Supervisors and Co-Supervisors**

#### **Principal Supervisors**

The principal supervisor has responsibility for:

- Developing the trainee's work programme and submitting a copy to the Head of CB&ID programme within the first 10 days of the training attachment;

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- Providing day-to-day guidance and is in regular contact with the trainee;
- Completing a performance report on the student in liaison with the evaluating supervisor from the seconding institution.

#### **Co-Supervisors**

The co-supervisor(s) has responsibility for:

- Involvement in developing the student's training programme;
- Availing himself or herself for consultation by the student;
- Maintaining close and frequent communication with the student and the principal supervisor.

## **C. Professional Development Programmes in Insect Biosciences**

The Professional Development Programmes at ICIPE allow doctoral and postdoctoral scientists to advance their careers in diverse fields in arthropod science in an international research environment.

The objectives of the professional development programmes are to:

- Attract young doctoral graduates from centres of excellence all over the world to spend time at ICIPE, bringing with them new impetus to the Centre's research and development, and at the same time advancing their careers through work experience in an international research environment;
- Optimise exposure of the ICIPE scientific community to the wider scientific world in the field of arthropod science and its application;
- Facilitate exchanges and interactions among ICIPE scientists and scientists from other institutions and organisations (including government departments) throughout the world;
- Provide a means of seeking and obtaining specialised scientific advice through consultancy, should this become necessary.

Two programmes have been established for advanced professional development in research in arthropod science and its application:

- The Postdoctoral Fellowship Programme
- The Visiting Scientists Programme

### **1. The Postdoctoral Fellowship Programme**

#### **1.1 Introduction**

The Postdoctoral Fellowship Programme allows young doctoral graduates from universities and research laboratories all over the world to work at ICIPE on regular employment on a medium-term basis.

The Programme is meant to enable young scientists to introduce new research ideas and initiate new research techniques at the Centre while at the same time receiving exposure to international research. In ICIPE, the majority of scientific staff belongs to this cadre and is supervised by a smaller core of senior scientists.

Postdoctoral positions are funded either through restricted projects or by ICIPE core budget. Regardless of the source of funding, appointees are hired for specific research projects and are assigned to work as part of the projects' research teams; they are normally released on expiry of the project.

#### **1.2 Appointment Procedure**

Postdoctoral positions are advertised internationally. They are filled on a competitive basis from applications received through general enquiries as well as those received in response to the advertisement. A vacancy is declared by the project leader through the

Head of Department and approved by the Head of the CB&ID programme. Filling a vacancy follows the normal ICIPE human resources recruitment procedures.

### **1.3 Benefits, Privileges and Obligations**

Postdoctoral fellows are regular ICIPE professional staff. The benefits, privileges and obligations associated with their appointments are determined by job grades as elaborated in the HR and financial policies.

Those seeking postdoctoral appointment on their own sponsorship are required to submit a research proposal with the full budget of the project at least four months before the intended date.

In their budgets, applicants should include ICIPE overhead costs, at 25 per cent of the direct project cost. A grant agreement document signed by the sponsor is also required. If appointment is approved, the candidate will be issued with a letter of appointment on the terms approved by the sponsor, and a work permit and visa will be obtained for the candidate. It could take up to 3 months to secure a work permit and up to 6 months to obtain a research permit.

## **2. The Visiting Scientists Programme**

The Programme has been established to enable senior professionals from other institutions, who are still on their payroll, to undertake research at ICIPE.

Two types of programmes are offered under the Visiting Scientists Programme:

- The Collaborative Research Scientist Programme
- The Research Associate Programme

Scientists under these various programmes take up residence at ICIPE for short periods to work on priority areas of ICIPE's research projects as members of ICIPE research teams. The scientists may also take part in offering specialised training or undertake advisory roles.

### **2.1 The Collaborative Research Scientist Programme**

#### **2.1.1 Programme Description**

The Collaborative Research Scientist programme is a programme through which senior scientists take short study or working visits at the Centre or other ICIPE research site for one week to one year. In this programme, the scientist works as a member of a team in a well-defined research project jointly agreed upon prior to the appointee joining ICIPE. The scientist also delivers lectures and seminars to the ICIPE scientific community.

The programme is open to scientists from any part of the world with research interest in tropical arthropod science. ICIPE uses this programme to appoint scientists for short-term specialised research and teaching assignments, while visiting scientists use it to further their research interests using facilities available at the ICIPE.

#### **2.1.2 Appointment Procedure**

Appointment is made either on the instigation of ICIPE's departments or on receipt of a request from an applicant.

Vacancies arising from ICIPE's own needs are advertised, or the appointee is nominated based on ICIPE's prior knowledge of and need for such expertise.

Visiting scientists seeking to join the programme, either with research projects of their own or to be accommodated in on-going ICIPE projects, should send enquiries to the Director General. It may be an advantage if the applicant has already identified an ICIPE collaborator.

Appointments to Collaborative Research Scientist positions are coordinated and processed by the Capacity Building and Institutional Development Programme.

### *2.1.3 Benefits, Privileges and Obligations*

#### **MAINTENANCE ALLOWANCE**

Collaborative Research Scientists will normally be expected to earn a salary from their home institutions during the period of their appointments at ICIPE. In addition, their institutions or sponsors may provide them with maintenance allowance.

A Collaborative Research Scientist who is appointed and assisted by ICIPE shall be paid a maintenance allowance commensurate with seniority and which is agreed upon prior to the appointment.

#### **TRAVEL ASSISTANCE**

The institution of origin or the sponsor provides travel allowances for air ticket, baggage and incidental expenses under their terms for Collaborative Research Scientists.

Those assisted by ICIPE for visits of three months or less will receive one round trip economy class airfare for self and unaccompanied baggage allowance by airfreight of up to 40 kg. For longer-term appointments, ICIPE will consider providing similar travel allowances for the immediate family of the Collaborative Research Scientist constituting of a named spouse and up to four dependent children less than 18 years.

#### **INSURANCE BENEFITS**

During their stay at ICIPE, Collaborative Research Scientists will be entitled to group medical, life and personal accident insurance benefits currently enjoyed by ICIPE employees. Where the member is not directly under ICIPE's support, the sponsoring institution will reimburse ICIPE with the actual cost of such covers incurred in respect of the member.

#### **IMMIGRATION PRIVILEGES**

Collaborative Research Scientists will enjoy immigration privileges applicable to ICIPE's international professional staff in accordance with existing agreements between ICIPE and the host country.

#### **LEAVE**

Collaborative Research Scientists will earn leave in accordance with the regulations of their institutions of origin.

#### **OTHER TERMS OF APPOINTMENT**

All Collaborative Research Scientists will be governed by the ICIPE's personnel and financial regulations and formalities in force during their stay at the Centre.

#### **DURATION OF APPOINTMENT**

Collaborative Research Scientists will normally be expected to stay at ICIPE for a period ranging from seven days to one year. Flexibility will be applied to those coming with their own project for their stay to last the duration of the project.

#### **FINAL REPORT**

At the end of the appointment at ICIPE, a Collaborative Research Scientist will be required to submit a detailed end-of-appointment report to the Director of Research and Partnerships of ICIPE and a general research report for submission to the Government of Kenya (or other host).

## **2.2 The Research Associate Programme**

This programme is for scientists from universities or research institutes in the developing world wishing to enhance scientific training in arthropod science.

### **2.2.1 Programme Description**

The Research Associate Programme is for middle-level or senior scientists from universities or research institutes in developing countries who are seeking an invigorating and special environment for research on major arthropod pests, disease vectors and commercial insects of the tropics, and who wish to enhance the scientific leadership of the tropical developing world in arthropod science.

The programme is undertaken in collaboration with international societies and academies of science such as the Third World Academy of Sciences and the Third World Organisation for Women in Science (TWOWS), for cost-sharing purposes.

An appointee will participate directly as a member of a research group working on a well-defined project for 2–4 years spending 1–4 months each year at ICIPE but returning to the home institution in the intervening months. The Programme is part of ICIPE's answer to the brain drain in the developing world.

#### *2.2.2 Appointment Procedure*

Applicants should apply either directly to ICIPE in response to an advertisement (general enquiries will also be considered) or to a collaborating organisation that cooperates with ICIPE on the Programme with an explicit declaration requesting to be hosted at ICIPE.

As a major collaborator on this Programme, the Third World Academy of Sciences receives and sorts out applications and forwards those from applicants who wish to come to ICIPE.

Appointments to Research Associate positions are coordinated and processed by the Head of Capacity Building and Institutional Development Programme.

#### *2.2.3 Benefits, Privileges and Obligations*

##### **MAINTENANCE ALLOWANCE**

Research Associates will normally be expected to earn a salary from their home institutions during the period of their appointment at ICIPE. In addition, their institutions may provide them with maintenance allowance. However, ICIPE may consider assistance for Research Associates in cases considered essential to the ICIPE mandate, and those who are appointed through collaborative agreements that oblige ICIPE to pay local costs.

##### **TRAVEL ASSISTANCE**

Research Associates will normally be provided with travel allowances for the air ticket, baggage and incidental expenses under their sponsors' terms. However, ICIPE will consider providing unaccompanied baggage allowance to a Research Associate under the following conditions: (i) where the sponsor or institution of origin does not provide unaccompanied baggage allowance (up to 40 kg when coming to ICIPE and when returning to the country of origin); and (ii) where ICIPE is providing air passage for the family of a Research Associate (unaccompanied allowance by airfreight of up to 40 kg per trip).

The home institutions or the sponsors will normally meet the cost of air passage of the families of Research Associates. However, a Research Associate who is assisted by ICIPE will be provided with economy air passages to enable the family to reside in Kenya, involving one named spouse and up to four dependent children under the age of 18 years.

Air passages for families of Research Associates may be granted by ICIPE once during the entire appointment period of 3–4 years as the case may be and only if the visit in any given year is for approximately six continuous months. Request for such travel assistance must be made to the Director General of ICIPE, well in advance, for approval. No additional maintenance allowance will be provided by ICIPE to a Research Associate who has been joined by the family.

##### **MEDICAL AND INSURANCE BENEFITS**

During their stay at ICIPE, Research Associates will be entitled to group medical, life and personal accident insurance benefits currently enjoyed by ICIPE employees.

Where the member is not directly under ICIPE's support, the sponsoring institution will reimburse ICIPE with the actual cost of such covers incurred in respect of the member.

##### **IMMIGRATION PRIVILEGES**

Research Associates will enjoy immigration privileges applicable to ICIPE's international professional staff in accordance with existing agreements between ICIPE and the host country.

#### **WORK PLAN**

Immediately on appointment, a Research Associate will be required to submit to the Head of Capacity Building and Institutional Development Programme, a detailed work plan for the period of appointment.

#### **LEAVE**

Research Associates will earn leave in accordance with the regulations of their institutions of origin.

#### **OTHER TERMS OF APPOINTMENT**

All Research Associates will be governed by ICIPE's personnel and financial regulations and formalities in force during their stay at the Centre.

#### **DURATION OF APPOINTMENT**

Research Associates will be attached to ICIPE for 1–4 months (or more by special consideration) every year over a period of 2–4 years, normally adding to a total of 12 months during the entire period of appointment.

The appointees are expected to return to their home institution after final completion of the programme.

#### **TERMINATION OF APPOINTMENT**

A Research Associate may have the appointment terminated with one months' notice on account of one or more of the following reasons:

- Failure to submit to the Head of Capacity Building and Institutional Development Programme a satisfactory work plan or progress report in the area of research during the period of appointment;
- Remaining attached to an ICIPE research project beyond the prescribed maximum period of 12 months;
- Conduct that may place the Centre in disrepute.

#### **FINAL REPORT**

At the end of the appointment at ICIPE, a Research Associate will be required to submit a detailed end-of-appointment report to the Head of Capacity Building and Institutional Development Programme and a general research report for submission to the Government of Kenya (or other host).

### **GENERAL INFORMATION**

#### **Provisions for All Visiting Scientists**

##### **Research Facilities**

ICIPE will meet the research expenses, including provision of logistical facilities to visiting scientists during their sojourn at ICIPE. Except where specifically stated, the Centre shall normally not be responsible for providing the visiting scientist with transport for private or domestic use.

##### **Patents**

Any rights on a patentable product, method or process developed by a visiting scientist during the period of appointment for research work at ICIPE will be assigned to ICIPE. The inventor is normally granted a token award for the invention in recognition of talent, but the ultimate rights on the invention rest with ICIPE. An agreement to this effect will be specified to a visiting scientist in the letter of appointment.



## **D. Interactive On-Site Training with ICIPE's National Partners**

Unless information is shared, technologies cannot be adapted. This programme, targeting policy makers and research and training personnel, will allow them to be trainers of trainers in integrated pest and vector management (IPVM) methods.

The general objectives are to:

- Appraise national policy-making personnel on IPVM methods and arthropod diversity issues to facilitate decision-making for development planning;
- Enable national research and training personnel to upgrade their knowledge of IPVM research and practice so that technology transfer and internalisation should gain from the multiplier effect of training of trainers.

The specific objectives are to:

- Disseminate IPVM technologies to target beneficiaries by enlightening extension personnel and end-users.
- Demonstrate to national extension staff and farmers improved methods of managing biodiversity, using insects for commercial purposes, and using insect products for a productive environment.

Interactive On-site training, through resident scientific teams at ICIPE or posted to off-campus stations in individual countries, has been established:

### **1. Group Training Programme for IPVM Technologists and Practitioners**

#### **1.1 Short Courses**

Field scientists, extension workers and government policy makers are offered short courses in four major areas.

##### **1.1.1 Group Training Courses on the Management of Crop Pests**

These training and management courses aim at preparing practitioners by upgrading their knowledge of integrated pest management (IPM), especially in the tropics. The courses examine components of IPM and emphasise ecologically sound and economically feasible approaches that sustain biodiversity.

##### **1.1.2 Group Training Courses on the Management of Arthropod Disease Vectors**

These courses emphasise recent advances in the management of arthropod vectors of human and livestock diseases of major economic importance to tropical countries, particularly in Africa. These include tsetse, livestock ticks, mosquitoes and sandflies.

The courses are designed to cover individual vector groups or to combine several vectors in an integrated approach, with considerations for land-use systems and wildlife.

##### **1.1.3 Group Training Courses on Arthropod Diversity, Conservation and Use**

These courses discuss the role of arthropods in sustaining the environment, their use as indicators of environmental health, and the economic value derivable from arthropods through cottage industries.

##### **1.1.4 Specialised Courses on Research Methods and Techniques**

These are short two-week courses aimed at improving the skills of young scientists actively engaged in research or teaching. They complement the more applied courses on pest and vector management and include substantial practical sessions for learning or testing new methods.

Topics covered include insect growth, development and behaviour; plant resistance to insect pests; crop loss assessment techniques; techniques in insect mass rearing

for development of IPM strategies; and data collection and interpretation for pest management.

## **1.2 Course Implementation**

- Practitioner training is undertaken through national, sub-regional and international group training courses lasting 2–6 weeks and concentrating on demonstration and application of integrated pest and vector management (IPVM) technology, research methods, commercial use of insects and the role of pest management in biodiversity.
- At least three practitioner courses are planned each year, with each course accommodating up to 25 participants. Instructors are selected internationally.
- Courses are mainly application-oriented, with heavy laboratory and practical field components as well as hands-on demonstrations.

## **1.3 Venues**

- Courses are held either at ICIPE or in any country in Africa in collaboration with a locally based national or international institution.

## **1.4 Financing**

- ICIPE's research and training grants finance most courses; as a rule, all of ICIPE's research grants will incorporate practitioner training to disseminate research findings.
- Countries, donors or collaborating institutions, requesting such specified groups of beneficiaries, finance tailored courses.

## **1.5 Nominations**

National authorities undertake nomination of course participants. Final selection is made by ICIPE on a competitive basis and with special consideration for disadvantaged groups.

## **1.6 Benefits and Privileges of Resource Persons and Trainees**

### **1.6.1 Resource Persons**

#### **INTERNATIONAL TRAVEL**

Resource persons will be reimbursed transport expense by air (for international resource persons) and all associated costs. The costs of hotel accommodation and meals will be paid at ICIPE rates applicable to the course venue.

#### **HONORARIA**

- Resource persons who are not ICIPE staff will be paid a token honorarium based on hours of instruction;
- The rate of payment will be set in accordance with the fee agreed upon at the time of offer of the teaching assignment;
- ICIPE staff will be treated in accordance with the personnel policy currently in force.

### **1.6.2 Trainees**

#### **MAINTENANCE ALLOWANCE**

The sponsor will provide maintenance allowance for the trainees during the training period as part of course fees.

### **TUITION FEES**

Tuition fee is part of the course fees payable by the sponsor to meet the cost of lectures and practical training, logistic facilities for fieldwork and other essential movements during training.

### **TRAVEL**

The sponsoring institution will meet the round trip transport cost for appropriate means of travel (air, rail or road) for the trainee.

### **MEDICAL CARE**

The sponsor will meet the cost of providing group medical benefits for the trainee during the training period. The CB&ID Programme is needed to approve a request for medical treatment.

## **GENERAL INFORMATION**

### **Roles and Responsibilities**

#### **Trainees**

The trainee has responsibility for:

- Familiarising himself or herself with the course programme and the requirements of the home institute or sponsor;
- Ensuring that he or she meets the training programme deadlines;
- Taking the initiative to identify problems or difficulties and share responsibility for seeking solutions;
- Producing a post-training report;
- Seeing himself or herself as a member of the respective unit, department and research programme. Trainees are legitimate members of the research teams within their host projects and should take part in departmental activities and provide services as instructed by their supervisors.
- Availing the results, as they are part of ICIPE's output (for trainees involved with data collection).

#### **The Scientific Coordinator**

The Scientific Coordinator has responsibility for:

- Designing the technical content of the course and suggesting resource persons for discussion by the Course Coordination Committee.
- Implementing the technical course programme with administrative support from the Capacity Building and Institutional Development Programme;
- Supervising trainees on a group-training course.

#### **The Course Coordination Committee**

A course coordination committee is constituted for each course and consists of the scientific coordinator, administrative coordinator, key resource persons and logistical support staff.

The Course Coordination Committee has responsibility for:

- Working out all the logistics for implementing the course.

#### **Scientific Departments and Programmes**

Scientific departments and mega-projects have responsibility for:

- Providing course coordinators for courses falling under their disciplines;
- Providing facilities for executing the course.

#### **Departmental Heads**

A departmental head has responsibility for:

- Including fellowships for practitioner courses in the research project proposals developed.

#### **Programme Leaders**

A Programme Leader has responsibility for:

- Appointing the course coordinator for practitioner courses that cut across several disciplines or departments.

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#### **Heads of Department/Programmes/Units/Projects**

Heads of Department/Programme/Unit/Project have responsibility for:

- Overseeing the supervision of all trainees enrolled under them;
- Attending to any grievances and serving as the main liaison with the Capacity Building and Institutional Development Programme;
- Nominating supervisors to work with individual students on attachment.

#### **Capacity Building and Institutional Development Programme**

The Capacity Building and Institutional Development Programme has responsibility for:

- Administering all training programmes and courses;
- Appointing the administrative course coordinator responsible for coordinating the preparation of individual training course programmes;
- Preparing training budgets;
- Overseeing training logistics;
- Enforcing policies;
- Administering training fellowships;
- Providing administrative liaison with science departments and sponsoring institutions.

#### **Specific Responsibilities of Resource Persons**

##### **Submission of Training Notes and Lecture Outlines**

All resource persons should submit well-written notes, handouts and instruction schemes for use during the course at least two weeks before the course begins. The notes and handouts are compiled by the CB&ID Programme and supplied to the trainees along with their training packages.

#### **Specific Responsibilities of Trainees**

##### **Duration of Training**

The training period will be in accordance with course requirements as specified in the course announcement. Once accepted into a course, the trainee is under obligation to attend the course to its conclusion except where circumstances are unavoidable.

##### **Performance Evaluation**

The supervisor will provide an evaluation of the trainee's performance.

##### **Course Evaluation**

Participants will evaluate the adequacy of subject coverage and quality of presentation at the end of each course by completing an evaluation form.

## RESEARCH TRAINING PROGRAMMES (2005–2007)

### A. Areas of Training to be Undertaken by PhD and MSc Students as a Direct Contribution to Research Activities of ICIPE

#### 1. Human Health

##### 1.1 Management of African Malaria Vectors and Malaria

Project Number	Thesis Research Projects
CBHH/01	Studies on the effects of rice cultivation cycles and livestock distribution on spatio-temporal dynamics of larval and adult stages of <i>Anopheles arabiensis</i> and identification of potential interventions.
CBHH/02	Population dynamics studies of malaria vectors in epidemic-prone semi-arid ecosystems in Eritrea and examination of the effects of larviciding and environmental management.
CBHH/03	Optimisation of zooprophyllaxis for diverting opportunistic feeding mosquitoes to cattle through a detailed study of the spatial relations between human dwellings and cattle sheds; and enhancement of the process through a spatial 'push-pull' mode using mosquito repellent plants or thermal fumigants from such plants in human dwellings.
CBHH/04	Host (cattle, human) location behaviour of <i>Anopheles arabiensis</i> and identification of the attractive blends that mediate the process.
CBHH/05	Studies to develop and undertake field intervention experiments involving larval habitat management with crude botanicals and introduction of plants with foliage secondary metabolites and/or root exudates that disrupt the growth and development of mosquito larvae.
CBHH/06	Studies to develop and field-test traps baited with newly identified attractant blends for monitoring (and possibly for control) of blood-seeking and ovipositing <i>Anopheles gambiae</i> , as part of a programme to develop an effective integrated vector and disease management system.
CBHH/07	Bioprospecting for natural mosquito repellents and larvicides in forest-fringe areas and detailed chemical and biological investigation of promising candidates.
CBHH/08	Comparative expression studies of genes implicated in vector competence in field-collected <i>Anopheles gambiae</i> in Kenya.
CBHH/09	Identification and characterisation of candidate odorant receptors in <i>Anopheles gambiae</i> using molecular biology and bioinformatics tools and ligand-receptor studies with analogues derived from combinatorial techniques.



## 2. Plant Health

### 2.1 Management of Cereal Pests

Project Number	Thesis Research Projects
CBPH/01	Genetic and molecular basis of differential susceptibility to <i>Cotesia flavipes</i> of different populations of <i>Busseola fusca</i> .
CBPH/02	Modelling cereal yield losses due to stemborers.
CBPH/03	Characterisation of polydnarivuses of the stemborer parasitoid <i>Cotesia flavipes</i> and their relation for host suitability.
CBPH/04	Effects of stem- and cob-borers on the infestation of maize by storage pests and subsequent fungal infection and mycotoxin contamination.
CBPH/05	Assessing the risk of resistance development in <i>Helicoverpa armigera</i> to <i>Bacillus thuringiensis</i> toxins through GM crops.
CBPH/06	Impact of habitat management on abundance and activity of maize stemborer natural enemies and biodiversity of arthropods and soil fauna in Africa.
CBPH/07	Economics of 'push-pull' strategies for controlling stemborers and striga weed in Kenya.
CBPH/08	Impact of 'push-pull' strategies on farming communities of Suba and Trans Nzoia Districts of Kenya.
CBPH/09	The prospect of protecting transgenic maize from stemborer resistance by means of the 'push-pull' strategy in South Africa.
CBPH/10	Modelling of striga suppression by <i>Desmodium uncinatum</i> and <i>Desmodium intortum</i> in various agroecologies in Kenya.
CBPH/11	Applications of molecular tools to assess microbial biodiversity in the 'push-pull' system for stemborers and Striga weed control in maize.

### 2.2 Management of Horticultural Pests

Project Number	Thesis Research Projects
CBPH/12	Mechanisms for host-plant resistance in tomato against <i>Tetranychus evansi</i> Pritchard & Baker.
CBPH/13	Genetic variability of <i>Cotesia plutellae</i> and its relation to parasitisation rates and susceptibility to microsporidian infections.
CBPH/14	Biological and economic impact assessment of biological control of the diamondback moth in eastern Africa.
CBPH/15	Assessment of new parasitoid species for diamondback moth biocontrol in the semi-arid tropics.
CBPH/16	Economic modelling for the allocation of research funds in the development of MRL-compliant horticultural export production.
CBPH/17	Nematode management for smallholder export-vegetable production in semi-arid irrigated production systems.
CBPH/18	Predator-prey relationships between <i>Tetranychus evansi</i> and generalist and specialist phytoseiid predators.
CBPH/19	Host-mediated behaviour of African fruit fly species of economic importance.
CBPH/20	Ecological adaptation of introduced <i>Liriomyza</i> spp. (leafminers) in Kenya and implications for biological control.
CBPH/21	Biological control of western flower thrips ( <i>Frankliniella occidentalis</i> ) in Kenya: Myth or reality?

## 2.3 Management of Migratory Pests

Project Number	Thesis Research Projects
CBPH/22	Chemical communication systems that mediate the behaviour and physiology of important locust and aggregating grasshopper species (red locust, brown locust, African migratory locust, variegated grasshopper) and characterisation of the pheromones involved, and their potential in control.
CBPH/23	Population dynamics studies of solitary locusts in recession areas and elucidation of the environmental and semiochemical mechanisms associated with the process of gregarisation.

## 3. Animal Health

### 3.1 Management of Tsetse and Sleeping Sickness

Project Number	Thesis Research Projects
CBAH/01	Host selection by <i>Glossina fuscipes fuscipes</i> (and other riverine species), an important vector of human trypanosomosis in southern Sudan, Uganda, Ethiopia and the Lake Victoria basin, and identification of attractants and specific repellents (host/non-host odour analyses, combinatorial and genomics techniques), and development of bait and repellent technologies.
CBAH/02	Studies to address knowledge gaps (host profile, attractant systems, spatial and temporal dynamics) in multi-species tsetse situations involving <i>Glossina morsitans morsitans</i> and/or <i>G. pallidipes</i> with <i>G. m. centralis</i> and <i>G. m. submorsitans</i> (in Kagera basin, Ethiopia, Tanzania, Uganda, etc.) toward the development of multi-species management systems.
CBAH/03	Behavioural ecology of biting flies that are vectors of camel trypanosomosis and elucidation of the factors associated with host location and disease transmission.
CBAH/04	Analysis of the population genetic structures of <i>Glossina pallidipes</i> and <i>Glossina fuscipes fuscipes</i> to determine the extent of gene flow within species and to assess how the diversity might influence the spread of important genotypes (such as vector competence and resistance to pesticides).
CBAH/05	Molecular characterisation of factors involved in tsetse-trypanosome interactions and studies of their interactions with trypanosome genes using the yeast two-hybrid system.
CBAH/06	Identification and characterisation of candidate odorant receptors in riverine tsetse species using molecular biology and bioinformatics tools, and the use of various repellent analogs in ligand-receptor binding studies to ascertain specificity of binding.

### 3.2 Management of Ticks

Project Number	Thesis Research Projects
CBAH/07	Development of semiochemicals-based monitoring tools for tick disease vectors and the initiation of spatial and temporal population dynamics studies in selected areas.
CBAH/08	Development of control tactics for key livestock ticks disease vectors ( <i>Amblyomma</i> spp. and <i>Rhipicephalus appendiculatus</i> ) based on behaviour-controlling agents (pheromones/semiochemicals identified from hosts, and plant-derived repellents) with botanicals or biopesticides.

### 3.3 Management of Trans-boundary Livestock Diseases

Project Number	Thesis Research Projects
CBAH/09	Dynamics of Rift Valley fever in endemic foci with emphasis on host–vector relationships and identification of future lines of R&D for the management of the disease.
CBAH/10	Dynamics of bluetongue disease in endemic foci, host–vector relationships and identification of follow up lines of R&D for integrated vector management.

## 4. Environmental Health

### 4.1 Biosystematics, Inventories and Monitoring

Project Number	Thesis Research Projects
CBEH/01	Taxonomic research on specific insect taxa, particularly those of economic importance (pollinators, pests and their natural enemies, invasive species) using classical, molecular and genomic techniques.
CBEH/02	Development of sampling protocols for inventories in important biodiversity habitats, identifying and testing indicator taxa to monitor environmental health, and developing monitoring protocols using these indicator taxa.
CBEH/03	Biodiversity informatics including the development of taxonomic and biogeographical databases identifying patterns of endemism in African arthropods, and interactive electronic keys.
CBEH/04	Assessment of the biodiversity of African tetranychid mites using conventional and molecular taxonomic methods.

### 4.2 Bioprospecting and Biodiversity Conservation

Project Number	Thesis Research Projects
CBEH/05	Identification of useful natural products from plants and animals, including screening for active compounds, and testing for efficacy and toxicity.
CBEH/06	Identification and development of nature-based income-generating activities (IGAs) for local communities living next to or within biodiversity areas and monitoring the effects on livelihoods and attitudes to biodiversity conservation.

### 4.3 Ecosystem Services

Project Number	Thesis Research Projects
CBEH/07	Effects of forest fragmentation on ecosystem services performed by forest arthropods (pollination, decomposition, seed dispersal, food chain).
CBEH/08	Impacts of pest control practices on the arthropod biodiversity that maintains soil fertility in agroecosystems.
CBEH/09	Role of pollinators in determining the productivity of crops grown under tree cover (e.g. shade coffee, shade cocoa).
CBEH/10	Impacts of insecticides and habitat destruction on wild pollinators.
CBEH/11	Impacts of pesticides and GMOs on non-target organisms in export horticultural crops.

#### 4.4 Pest Problems

Project Number	Thesis Research Projects
CBEH/12	Ecology and biocontrol of invasive species (e.g. <i>Prosopis</i> spp., <i>Parthenium hysterophorus</i> , <i>Argemone mexicana</i> ) in Africa.
CBEH/13	Management of agrobiodiversity through mixed cropping and cultural practices to ameliorate pest problems in vegetable cropping systems.
CBEH/14	Potential use of maternally inherited male-killer systems in pest control.

#### 4.5 Commercial Insects

Project Number	Thesis Research Projects
CBEH/15	Cross-border mitochondrial variability in the honeybee races in Africa.
CBEH/16	Breeding of potential strains of honeybees ( <i>Apis mellifera scutellata</i> , <i>A. m. monticola</i> ) for beehive products and pollination services.
CBEH/17	Developing <i>Bombyx mori</i> silkworm hybrids for semi-arid zones and wetlands in Africa for income generation and for conserving threatened forests.
CBEH/18	Wild silk moth (e.g. <i>Gonomieta</i> spp.) population dynamics and production systems.
CBEH/19	Comparative studies of marketplace development and marketing linkages for apiculture and sericulture products in Africa.

### 5. Capacity Building and Institutional Development

Project Number	Thesis Research Projects
CBID/01	Promoting the participation of women in postgraduate research training in the biosciences: A gender analysis of the African Regional Postgraduate Programme in Insect Science (ARPPIS)
CBID/02	Impact audit of capacity building programmes in biosciences: The case of the African Regional Postgraduate Programme in Insect Science (ARPPIS)





## **RESEARCH FELLOWSHIPS**

### **A. ARPPIS Postgraduate Research Fellows (2000–2004)**

Year of Registration/ Sponsor	Registering University	Research Fellow and Country of Origin	Area of Research	Faculty	
				ICIPE	University
2000, DAAD	Kenyatta University, Kenya	Gashawbeza Ayalew (Ethiopia)	Population ecology of the diamondback moth (DBM) and its parasitoids in Ethiopia	Dr Bernhard Löhr	Dr Callistus K. Ogot
2000, Netherlands-SII	University of Mauritius, Mauritius	Aruna Manrakhan (Mauritius)	Feeding behaviour of three African fruit fly species: <i>Ceratitis cosyra</i> , <i>C. fasciventris</i> and <i>C. capitata</i> (Diptera: Tephritidae)	Dr Slawomir Lux	Prof. I. Fagoonee
2000, Netherlands-SII	University of Zimbabwe, Zimbabwe	Rudo Sithole (Zimbabwe)	Studies on comparative fitness of African parasitoids of the diamondback moth (DBM)	Dr Bernhard Löhr	Dr Audrey Mabveni
2000, DAAD	Egerton University, Kenya	Leunita Sumba (Kenya)	Pre-oviposition behaviour of the African malaria mosquito, <i>Anopheles gambiae</i>	Prof. Ahmed Hassanali, Dr John Githure	Dr Arop Leek Deng
2000, Netherlands-SII	Moi University, Kenya	Mathew Bett (Kenya)	Integrated use of synthetic and natural repellents for tsetse management	Dr Rajinder Saini	Prof. B. M. Khaemba
2000, Netherlands-SII	Kenyatta University, Kenya	Alioune Toure (Senegal)	Integrated use of synthetic and natural repellents for tsetse management	Dr Ellie Osir, Prof. Ahmed Hassanali	Dr Sammy Kubasu
2000, Netherlands-SII	Kenyatta University, Kenya	Aklilu Seyoum (Ethiopia)	Evaluation of mosquito repellent and insecticidal plants and plant products for control of mosquitoes	Prof. Ahmed Hassanali	Dr Ephantus Kabiru
2000, Netherlands-SII	Kenyatta University, Kenya	Yonas Feleke (Ethiopia)	Cowpea ( <i>Vigna unguiculata</i> ) cpDNA polymorphism as a tool to assess gene flow directions between cultivated and wild	Dr Rémy Pasquet	Dr Geoffrey Munuvi
2000, DAAD	University of Nairobi, Kenya	Frederick Baliraine (Uganda)	Analysis of genetic diversity of fruit fly populations in Africa for improved management	Dr Ellie Osir, Dr Slawomir Lux	Dr Francis Mulaa
2001, DAAD	Kenyatta University, Kenya	Charles Midega (Kenya)	Impact of habitat management on abundance and activity of maize stem borer/natural enemies and	Dr Zeyaur R. Khan	Dr Callistus K. Ogot

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Year of Registration/ Sponsor	Registering University	Research Fellow and Country of Origin	Area of Research	Faculty	
				ICIPE	University
			biodiversity of arthropods and soil fauna in Africa		
2001, DAAD	University of Ghana, Ghana	Janet T. Midega (Kenya)	Distribution patterns, gene flow and dispersal capabilities of anopheline mosquito species at three ecological zones along the Kenyan coast	Dr John Githure, Dr Charles Mbogo	Prof. David Wilson
2002, Dutch Embassy	Kenyatta University, Kenya	Melaku Wale (Ethiopia)	Ecology and biologically based management of cereal stemborers on maize and sorghum in the Amhara state of Ethiopia	Dr Charles Omwega, Dr Fritz Schulthess	Dr Eunice Kairu
2002, Dutch Embassy	Kenyatta University, Kenya	Catherine Gitau (Kenya)	Geographical variation in the developmental success of <i>Cotesia sesamiae</i> Cameron (Hymenoptera: Braconidae) on <i>Busseola fusca</i> Fuller (Lepidoptera: Noctuidae)	Dr Fritz Schulthess, Dr Adèle Ngi-Song	Dr Jenard Mbugi
2002, Dutch Embassy	Kenyatta University, Kenya	Teddy Kauma (Uganda)	Role of wild host plants in population dynamics of cereal stemborers and associated natural enemies in Uganda	Dr Fritz Schulthess, Dr Charles Omwega	Prof. Jones Mueke
2002, Dutch Embassy	Kenyatta University, Kenya	Domingos Cugala (Mozambique)	Impact assessment of natural enemies on stemborer populations and maize yield in Mozambique	Dr Fritz Schulthess, Dr Charles Omwega	Dr Callistus K. Ogot
2002, Singerberg Foundation	University of Dar es Salaam, Tanzania	Innocent Ester (Tanzania)	Bioprospecting for botanical larvicides and repellents for the control of malaria	Prof. Ahmed Hassanali	Prof. M. H. H. Nkunya
2002, Singerberg Foundation	Kenyatta University, Kenya	Hortance Manda (Cameroon)	Plant-feeding behaviour and effect of plant diets on the African malaria vector <i>Anopheles gambiae</i> fitness	Dr John Githure	Dr Ephantus Kabiru
2002, DAAD	Kenyatta University, Kenya	Daniel Amin (Cameroon)	Functional analysis of the midgut lectin gene of <i>Glossina austeni</i>	Dr Ellie Osir	Dr Geoffrey Munuvi

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Year of Registration/ Sponsor	Registering University	Research Fellow and Country of Origin	Area of Research	Faculty	
				ICIPE	University
2002, DAAD	Kenyatta University, Kenya	Fiaboe K. Mokpokpo (Togo)	Studies of potential predators of tomato red spider mite <i>Tetranychus evansi</i> (Baker & Pritchard) for possible introduction as biocontrol agents in Africa	Dr Markus Knapp	Dr Callistus K. Ogol
2003, DAAD	University of Dar es Salaam, Tanzania	Charles Kihampa (Tanzania)	Characterisation and assessment of anti-mosquito natural products from Tanzanian botanicals	Prof. Ahmed Hassanali	Prof. M. H. H. Nkunya
2003, DAAD	Moi University, Kenya	Anderson Kipkoech (Kenya)	The socioeconomic impact assessment of biological control of cereal stemborers in maize growing belts of eastern and southern Africa	Dr Fritz Schulthess	Prof. H. Maritim Dr W. Yabban
2003, DAAD	University of Nairobi, Kenya	Salome Guchu (Kenya)	Allelochemicals mechanism of Striga suppression by <i>Desmodium</i>	Prof. Ahmed Hassanali	Dr Abiy Yenesew
2003, DAAD	Kenyatta University, Kenya	Spala Ohaga Oduor (Kenya)	Host location behaviour of <i>Glossina swynnertoni</i> and development of baits	Dr Rajinder Saini	Prof. E. D. Kokwaro
2003, DAAD	Kenyatta University, Kenya	Bruce Yaovi Anani (Togo)	The importance of indigenous egg parasitoids in the population dynamics of cereal stemborers in East Africa and implications for the release of the western egg parasitoid species <i>Telenomus isis</i> Polaszek (Hymenoptera: Scelionidae)	Dr Fritz Schulthess	Prof. Jones Mueke
2003, DAAD	University of Nairobi, Kenya	Esther Mwihaki Njuguna (Kenya)	Economics of habitat management strategies in maize and livestock production by controlling stemborers and striga weed in mixed farming systems	Dr Zeyaur R. Khan	Prof. Steven Mbogo, Dr Rose Nyikal

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Contd.

Year of Registration/ Sponsor	Registering University	Research Fellow and Country of Origin	Area of Research	Faculty	
				ICIPE	University
2004, DAAD	Kenyatta University, Kenya	Eric Kouam (Cameroon)	Cowpea ( <i>Vigna unguiculata</i> ) gene pool organisation and wild-crop complex dynamics	Dr Rémy Pasquet	Dr Geoffrey Munuvi
2004, DAAD	Kenyatta University, Kenya	Norber Mbahin (Cameroon)	Population dynamics, dispersal, parasitism and predation aspects of <i>Anopheles gambiae</i> (Boisduval) in Kakamega forest, Kenya	Dr Esther Kioko	Prof. Jones Mueke
2004, DAAD	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Steven Ger Nyanjom (Kenya)	Characterisation of tsetse olfactory receptor proteins associated with repellency; the use of functional genomics and ligand-protein binding studies	Dr Ellie Osir	Dr Peter Lomo
2004, DAAD	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	David Bugeme (Democratic Republic of Congo)	The potential of pathogenic fungi in the control of economically important spider mite species	Prof. Ahmed Hassanali, Dr Nguya Maniania	Dr Hamadi Boga
2004, DAAD	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	David Mwangi (Kenya)	Mechanism of fungus-avoidance behaviour of termites and identification of the mediating signals	Prof. Ahmed Hassanali, Dr Nguya Maniania	Dr Hamadi Boga

DAAD—German Academic Exchange Service

Netherlands-SII—The Dutch Programme for Cooperation with International Institutions





## **B. DRIP Postgraduate Research Fellows (2000–2004)**

Contd.

Year of Registration/ Sponsor	Registering University	Research Fellow	Area of Research	ICIPE Supervisor
<b>MSc degree</b>				
2000, Netherlands-SII	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Zipporah B. Osiemo	Naturally occurring <i>Trichogramma</i> egg parasitoids	Dr Srinivasan Sithanatham
2000, IFAD	Kenyatta University, Kenya	Boniface Ngoka	Research on technologies for wild silk mass production in Kenya	Dr Suresh Raina
2000, Netherlands/DPO	Kenyatta University, Kenya	Catherine Gitau	Suitability of African stemborers for development of <i>Xanthopimpla</i> <i>stemmator</i> (Thunberg), a candidate for classical biological control	Dr William Overholt Dr Adèle Ngi-Song
2000, Self	Kenyatta University, Kenya	David Thumbi	Evaluation of a local strain of <i>B.t.</i> and <i>Metarhizium</i>	Dr S. Sithanatham Dr Ellie Osir
2001, BioNet	Kenyatta University, Kenya	Musa Ng'ayo	Molecular characterisation of trypanosomes in small ruminants and pigs in western Kenya	Dr Ellie Osir Dr Daniel Masiga
2001, USAID	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Lorna Migiro	<i>Trichogramma</i> species in East Africa	Dr S. Sithanatham
2001, WHO/MIM	Kenyatta University, Kenya	Barasa Maniafu	1,4 naphthoquinones and related compounds from <i>Plumbago</i> spp.. Assessment of the activity on <i>Anopheles gambiae</i>	Dr Wilber Lwande Prof. Ahmed Hassanali
2001, WHO/MIM	Kenyatta University, Kenya	Fidelis Samita	Bioprospecting for phytochemicals for <i>Anopheles gambiae</i> control	Dr Wilber Lwande Prof. Ahmed Hassanali
2001, WHO/MIM	Kenyatta University, Kenya	Geoffrey Mahanga	Synthesis and structure activity tests of 2-hydroxy-4-methoxybenzaldehyde and derivatives as mosquito larvicides	Dr Wilber Lwande Prof. Ahmed Hassanali
2001, WHO/MIM	Kenyatta University, Kenya	Josiah Odalo	Bio-examination for phytochemicals active against <i>Anopheles gambiae</i> from eastern and coastal Kenya flora	Dr Wilber Lwande Prof. Ahmed Hassanali

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Contd.

Year of Registration/ Sponsor	Registering University	Research Fellow	Area of Research	ICIPE Supervisor
2001, USAID	Kenyatta University, Kenya	Jackline Makatiani	Role of companion crops in managing DBM on cabbage/kale	Dr S. Sithanantham
2001, IITA	University of Nairobi, Kenya	Rose Irungu	Identification of sustainable sites for the release of <i>Neozygites tanajoae</i> (Floridana) (Entomophthorales: Neozygitaceae) for the control of the cassava green mite <i>Mononychellus</i> <i>tanajoa</i> (Acari: Tetranychidae)	Dr Nguya K. Maniania
2001, WHO/MIM	Kenyatta University, Kenya	Ohaga S. Oduor	Field evaluation of mosquito larvicidal plants	Dr Wilber Lwande
2001, IDRC/IWMI	Kenyatta University, Kenya	John N. Kuria	An economic assessment of rice production systems in Mwea Irrigation Scheme	Dr C. M. Mutero
2001, IDRC/IWMI	Kenyatta University, Kenya	Elijah K. Gituanjah	Assessment of crops/livestock interactions and nutrient cycling in a rice based Mwea irrigation scheme	Dr C. M. Mutero
2001, IDRC/IWMI	Kenyatta University, Kenya	Lucy Musyoka	Treatment seeking behaviour for malaria in a rice irrigation scheme	Dr C. M. Mutero
2001, University of Nairobi	University of Nairobi, Kenya	Fredrick Musieba	Evaluation of the adult gregarisation pheromone in combination with <i>Metarhizium anisopliae</i> var <i>acridium</i> on gregarious nymphs of <i>Schistocerca</i> <i>gregaria</i> Forskal (Orthoptera: Acrididae)	Prof. Ahmed Hassanali Dr Peter Arama
2001, WHO/TDR	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Benson Charles Ochieng Nyambega	Mechanisms of trypanolysin mediated lysis of <i>Trypanosoma brucei</i> <i>brucei</i> (Kinetoplastida: Trypanomastidae)	Dr Ellie Osir
2001, Limburgs Universitair Centrum, Belgium	Limburgs Universitair Centrum, Belgium [now Universiteit Hasselt]	Anthony Wanjoya	Biostatistics	Dr Adedapo Odulaja
2001, Dupont	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	John B. Ocholla	Bioprospecting for insecticidal scorpion venom and identification of active toxins for potential development of pest control products	Dr Wilber Lwande

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Year of Registration/ Sponsor	Registering University	Research Fellow	Area of Research	ICIPE Supervisor
2002, Self	Egerton University, Kenya	Sammy R. Kiambi	Comparison of biological effects and chemistry of soybean and desmodium root exudates on <i>Striga hermonthica</i>	Prof. Ahmed Hassanali
2002, Rockefeller Foundation	Kenyatta University, Kenya	Ismael Rabbi	Population genetic studies of a wild cowpea population from Kenya	Dr Rémy Pasquet
2002, Rockefeller Foundation	Kenyatta University, Kenya	Consolata Ager	Volatile composition of some selected cowpea varieties: Assessment of chances of cross-pollination and gene flow	Dr Rémy Pasquet Prof. Ahmed Hassanali
2002, BioNet	Kenyatta University, Kenya	Marion Wagiria	Molecular characterisation of <i>Anopheles gambiae</i> and <i>Culex</i> and habitat selection of <i>Anopheles gambiae</i>	Dr Ellie Osir
2002, Biota	University of Nairobi, Kenya	Vincent Mahiva	Study on dung beetles in the Kakamega forest region	Dr Ian Gordon
2002, NIH	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	James Mutunga	Molecular analysis of the knockdown resistance (kdr) gene in the <i>Anopheles gambiae</i> s.l. and <i>Anopheles funestus</i> populations in Kenya	Dr John Githure
2002, GTZ/ Netherlands-SII	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Caleb M. Momanyi	Biological impact assessment of an exotic parasitoid, <i>Diadegma semiclausum</i> , on DBM and its local natural enemies	Dr B. Löhrr
2002, USAID	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	James Kanya	Quantification and qualification of vegetation in the proximity of maize fields in Trans Nzoia District	Dr Adèle J. Ngi-Song
2002, USAID	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	George Keere	Aspects relating to the use of egg parasitoids for biological control of the African bollworm	Dr S. Sithanantham
2002, Netherlands-DPO	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	John Muturi	Assessment of potential effects of <i>Xanthopimpla stemmator</i> (Hymenoptera: Ichneumonidae) on target and non-target Lepidoptera and pupal parasitoids in grasses	Dr Adèle Ngi-Song

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Contd.

Year of Registration/ Sponsor	Registering University	Research Fellow	Area of Research	ICRPE Supervisor
2002, Diversa Corporation	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Lucy Mackenzie	Bacterial diversity in the intestinal tracts of fungus-cultivating termites, <i>Macrotermes michaelsoni</i> and <i>Odontotermes somaliensis</i>	Dr Wilber Lwande Dr Ellie Osir
2002, GTZ	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Ibrahim Macharia	Economic impact of biological control of the diamondback moth by use of the exotic parasitoid, <i>Diadegma semiclausum</i>	Dr B. Löhr
2002, USAID	University of Nairobi, Kenya	Dennis Wanyama Ochiero	Effect of <i>Bt</i> -maize tissues and pollen on stemborer parasitoids and selected non-target Lepidoptera in Kenya	Dr Adele Ngi-Song Dr Ellie Osir
2002, GTZ	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Vitalis W. Wekesa	Evaluation of <i>Beauveria bassiana</i> and <i>Metarhizium anisopliae</i> for the control of spotted spider mite, <i>Tetranychus urticae</i>	Dr Markus Knapp
2002, BioNet	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Fathiya Mbarak	Studies on biochemical changes associated with pheromone induced maternal transfer of gregarious phase of offspring in the desert locust, <i>Schistocerca gregaria</i>	Dr Ellie Osir
2002, WHO	Kenyatta University, Kenya	Joseph K. Thaimuta	Bioprospecting for natural botanicals with insecticidal action for adult mosquitoes	Prof. Ahmed Hassanali
2002, BMZ	University of Nairobi,	Gladys G. Kithusi	Evaluation of biopesticides in the control of red spider mites ( <i>Tetranychus evansi</i> ) on tomatoes ( <i>Lycopersicon esculentum</i> )	Dr Markus Knapp
2002, University of Nairobi	University of Nairobi, Kenya	Justin Mabeya	Evaluation of a new acaricide (Oberon) in the control of red spider mites ( <i>Tetranychus evansi</i> ) on tomatoes ( <i>Lycopersicon esculentum</i> ) and its effect on the predator <i>Phytoseiulus persimilis</i>	Dr Markus Knapp
2002, Dutch Embassy	Kenyatta University, Kenya	Evans Okoth	Performance of <i>Cotesia flavipes</i> (Hymenoptera: Braconidae) on stemborer species found on cereal crops and wild grasses	Dr Charles Omwega Dr Fritz Schulthess

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Year of Registration/ Sponsor	Registering University	Research Fellow	Area of Research	ICP Supervisor
2003, Tropical Biology Association	Kenyatta University, Kenya	Mark Otieno	Spatial and temporal distribution and dynamics of male-killers (spiroplasm) in the butterfly <i>Danaus chrysippus</i>	Dr Ian Gordon Dr Ellie Osir
2003, WHO	Egerton University, Kenya	Vincent Owino	Chemical cues from the host plant influencing the oviposition behaviour of the stemborer <i>Busseola fusca</i> Fuller (Lepidoptera: Noctuidae)	Dr Daniel Masiga
2003, IRD	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Gerald Juma	Chemical cues from the host plant influencing the oviposition behaviour of the stemborer <i>Busseola fusca</i> Fuller (Lepidoptera: Noctuidae)	Dr Paul-Andre Calatayud
2003, IFAD	University of Nairobi, Kenya	Peninah M. Munyua	Toxicological assessment of a tsetse repellent developed for smallholder indigenous communities of sub-Saharan Africa, on the health of exposed animals	Dr Rajinder K. Saini
2003, WHO	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Joseph O. Odera	Isolation and characterisation of anti- mosquito compounds from <i>Turraea</i> <i>abyssinica</i>	Prof. A. Hassanali
2003, Netherlands-DPO	Kenyatta University, Kenya	Abdalla Ibrahim Ali	Effect of nitrogenous fertiliser and pesticide on <i>Cotesia flavipes</i> (Hymenoptera: Braconidae) in the biocontrol of maize stemborers in Zanzibar	Dr Charles Omwega Dr Fritz Schulthess
2003, WHO	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Timothy Rimu	Isolation and characterisation of anti- mosquito compounds from <i>Turraea</i> <i>mombasana</i>	Prof. A. Hassanali
2003, BMZ	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Lucy K. Murungi	Chemical composition and activity of leaf-emitted volatile compounds and essential oils in tomato accessions against the tobacco spider mite, <i>Tetranychus evansi</i> Baker & Pritchard	Dr Markus Knapp Prof. Ahmed Hassanali

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Contd.

Year of Registration/ Sponsor	Registering University	Research Fellow	Area of Research	ICRPE Supervisor
2003, IRD	Kenyatta University, Kenya	Edwin Akhusama	Yield and damage losses caused by maize stemborers	Dr Bruno Le Rü
2003, IRD	Kenyatta University, Kenya	George Ong'amo	Distribution, pest status and agro- climatic preferences of lepidopteran stemborers of maize and sorghum in Kenya	Dr Bruno Le Rü
2003, BMZ	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Gladys K. Onyambu	The role of trichomes and non-volatile phytochemicals on the resistance of <i>Lycopersicon</i> species to tobacco spider mite ( <i>Tetranychus evansi</i> Baker and Pritchard)	Dr Markus Knapp
2004, USAID	University of Nairobi, Kenya	Cecilia Nzau	Application of modern biotechnology in agriculture: A risk assessment study on the effects of <i>Bacillus thuringiensis</i> (Bt) toxins on nodulation of the common bean, <i>Phaseolus vulgaris</i>	Dr Ellie Osir
51 2004, University of Geneva, Switzerland	University of Geneva, Switzerland	Fabrice Gern	Investigating the extent to which bee- keeping activities under the GEF ICRPE project benefit from the presence of the forest, using floral calendars, pollen analysis of honey quality and quantity in honey from hives at different distances from the forest	Dr Ian Gordon
2004, Netherlands-DPO	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Meshack Obonyo	Performance of <i>Cotesia flavipes</i> (Hymenoptera: Braconidae) on stemborer species found on cereal crops and wild grasses	Dr Fritz Schulthess Dr Paul Andre-Calatayud
2004, WHO	Egerton University, Kenya	Samuel Karenga	Phytochemical investigation of the anti- larval compounds and blend(s) from <i>Melia volkensii</i> (Gürke) against <i>Anopheles gambiae</i> s.s.	Prof. Ahmed Hassanali
2004, WHO	Kenyatta University, Kenya	Gladys N. Mokua	Phytochemical investigation of anti- larval activity of genus <i>Vitex</i> ( <i>V. payson</i> and <i>V. schliebenii</i> ) against <i>Anopheles</i> <i>gambiae</i>	Prof. Ahmed Hassanali

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Contd.

Year of Registration/ Sponsor	Registering University	Research Fellow	Area of Research	ICRPE Supervisor
2004, Rockefeller Foundation	University of Nairobi, Kenya	Sopher Ondiako	The efficacy of entomopathogenic fungus <i>Beauveria bassiana</i> in the management of sweet potato weevil <i>Cylas puncticollis</i> , a pest infesting sweet potato ( <i>Ipomoea batata</i> ) tubers	Dr Nguya K. Maniania
2004, Rockefeller	Kenyatta University, Kenya	Jane W. Mwathi	Isolation and evaluation of local isolates of <i>Bacillus thuringiensis</i> against the larger grain borer ( <i>Prostephanus truncatus</i> ), a post harvest storage pest	Dr Nguya K. Maniania
2004, Self	University of Nairobi, Kenya	Marion Gathumbi	Comparative performance of three mulberry varieties ( <i>Morus</i> sp.) on silk cocoon and fibre quality in Central province of Kenya	Dr S. Raina Dr Vijay Adolkar
2004, SIMA	University of Nairobi, Kenya	Onesmus Mutinda	An evaluation of the economic potential of rice-soya bean rotation	Dr J. Githure Dr Josephat Shililu
2004, SIMA	University of Nairobi, Kenya	Peter Ng'ang'a	A study of factors affecting the implementation of malaria vector control measures in Mwea Division, Kirinyaga District	Dr John Githure Dr Josephat Shililu
2004, IRD	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Nicholas A. Otieno	Vegetation mosaic, diversity and abundance of wild host plants (Poaceae, Cyperaceae, Typhaceae) of lepidopteran stemborers in Kakamega forest and its environs (Kenya)	Dr Bruno Le Ru
<b>PhD degree</b>				
2000, IFAD	Kenyatta University, Kenya	Eliud Maundu	Breeding of the honeybee <i>Apis mellifera</i> L. races and their potential for royal jelly production in Kenya	Dr Suresh Raina
2000, BioVision	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Grace Njoroge	Anthecological and systematic studies of four Cucurbitaceae species at Yatta (Kenya)	Dr Suresh Raina
2000, TWOWS	University of Gezira, Sudan	Intisar E. Elteraili	Ecological viability in neem growth, oil and limonoids in Sudan	Prof. Ahmed Hassanali

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Year of Registration/ Sponsor	Registering University	Research Fellow	Area of Research	ICR Supervisor
2000, NIH	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Steven Barasa	Chemical ecology of oviposition site selection of the major vector, <i>Anopheles gambiae</i>	Prof. Ahmed Hassanali
2001, IFAD	Kenyatta University, Kenya	Everlyne Nguku	A study on the quality of silk fabric using bivoltine silkworm races, <i>Bombyx mori</i> L.	Dr Suresh Raina
2001, NIH/ABC	Kenyatta University, Kenya	Joseph Odhiambo	Immune disruption of protein digestion in <i>Anopheles gambiae</i> midgut based on digestive enzyme cDNA immunisation	Dr John Githure
2001, NIH/ABC	Kenyatta University, Kenya	Paul O. Mireji	Response of mosquitoes to urban environmental contaminants	Dr John Githure
2001, Netherlands SII/BMZ, Federal Republic of Germany	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	Joseph Baya	Characterisation of inter- and -intra species diversity and habitat association of native trichogrammatids	Dr S. Sithanatham
2001, NIH/ABC	Kenyatta University, Kenya	Wilfred Injera	Characterisation of anti-mosquito immune responses in mice immunised with plasmid containing <i>Anopheles gambiae</i> (AgMuc1)	Dr John Githure
2002, JIRCAS	University of Jagiellon, Poland	Radoslaw Brzezowski	Study of ecology and behaviour of parasitoid flies that are potential biological control agents on major crop pests in E. Africa	Dr T. Yoshida
2002, JIRCAS	Japan International Research Centre for Agricultural Sciences (JIRCAS)	Ishida Takahide	The ecology and physiology of lepidopteran species with specific interest on <i>Busseola fusca</i>	Dr Takao Yoshida
2002, WHO	Kenyatta University, Kenya	Maurice Omolo	The isolation, identification and synthesis of behaviourally active semio- chemicals from the human foot odour as attractants for African malaria vectors	Prof. Ahmed Hassanali

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Year of Registration/ Sponsor	Registering University	Research Fellow	Area of Research	ICIPE Supervisor
2002, Fulbright	Yale University, USA	Brandon Ogbuganofor	Characterisation of novel antiviral therapeutic agents	Prof. Ahmed Hassanali
2002, NIH/ICIDR	Tulane University, USA	Benjamin Jacob	<i>Anopheles</i> larval habitats	Dr John Githure
2002, NIH/ICIDR	Tulane University, USA	John Carlson	Predators of mosquito larvae	Dr John Githure
2002, TWOWS	International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria	Olubokola O. Babalola	<i>Striga hermonthica</i> strains in Kenya	Dr Ellie Osir
2002, NIH	Tulane University, USA	Tereza Magalhaes	DNA vaccination against the malaria vector <i>Anopheles gambiae</i>	Dr John Githure
2003, NIH	Kenyatta University, Kenya	Joseph Mwangagi	Environmental, agricultural and ecological factors that regulate vector productivity and diversity in the Mwea Rice irrigation scheme in Kenya	Dr Charles Mbogo Dr John Githure
2004, TWOWS	Michael Okpara University of Agriculture, Umudike, Nigeria	Elechi F. Asawalam	Evaluation of plant products for the control of ( <i>Sitophilus zeamais</i> "Motsch" Coleoptera: Curculionidae) maize weevil	Prof. Ahmed Hassanali
2004, SIMA	University of Nairobi, Kenya	Jane Gatune	An assessment of gender differences in prevention, treatment and impact of malaria in Mwea, Kirinyaga District	Dr John Githure Prof. Ahmed Hassanali
2004, SIMA	University of Nairobi, Kenya	Raphael Wanjogu	Alternating cultivation of rice and soybean as agroecosystem strategy for enhancing household incomes and reducing malaria-vector breeding habitats	Dr J. Githure Dr Josephat Shililu

## A SELECTION OF TEN SUCCESSFUL GRADUATES



### Alioune Toure (Senegal)

**PhD thesis title:** "An Assessment of the Use of Botanical Extracts and Pheromones for the Off-Host and On-Host Control of *Amblyomma variegatum* Tick".

**Registering university:** Kenyatta University, Nairobi, Kenya

**Supervisors:** Dr Ellie O. Osir, ICIPE, Nairobi, Kenya; Prof. Ahmed Hassanali, ICIPE, Nairobi, Kenya; Dr Sammy S. Kubasu, Kenyatta University, Kenya; Dr Rosebella Maranga, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya

**Duration:** 2001–2005

**Sponsorship:** DSO

**Major findings:** The possibility of enhancing attraction of ticks to the attraction-aggregation-attachment-pheromone (AAP) with 1-octen-3-ol and 2,6-dichlorophenol was investigated in a T-tube olfactometer in the laboratory. While males were attracted to increasing proportions of 1-octen-3-ol, females were repelled. A combination of 8 ng of 1-octen-3-ol with 1.1 mg of AAP was adopted for the attraction of both sexes, enhancing the attraction of ticks by 20%. Unlike 1-octen-3-ol, 2,6-dichlorophenol did not improve the attraction of *Amblyomma variegatum* in the laboratory. In the field, the attraction of *A. variegatum* to different doses of AAP + 1-octen-3-ol from various distances was investigated. The longest distance from which ticks were attracted was 7 m. The effects of continuous and intermittent releases of carbon dioxide (CO<sub>2</sub>) on the performance of AAP and 1-octen-3-ol in attracting ticks in the field were also investigated and the results showed that attraction was increased to 8 m in the presence of CO<sub>2</sub>. The continuous and intermittent releases of CO<sub>2</sub> were not significantly different. The efficacy of traps treated with neem cake extract (NCE) baited with the attraction-aggregation-attachment-pheromone (AAP), 1-octen-3-ol and CO<sub>2</sub> was evaluated. The attraction to the traps as well as the mortality of *A. variegatum* were significant compared to the controls. The mortality of attracted ticks was dependent on the concentration of NCE and the time of exposure. Mortality (98%) was recorded at a concentration of 30% of the neem cake extract. *Ocimum kilimandscharicum* was also found to repel adult *A. variegatum* by 33%.

**Current position:** Officer, Ministry of Livestock, Senegal.

**Future plans:** To conduct research on tick-borne diseases and tsetse flies, and teaching.



### Aruna Manrakhan (Mauritius)

**PhD thesis title:** "Feeding Behaviour of Three African Fruit Flies: *Ceratitis cosyra*, *C. fasciventris* and *C. capitata* (Diptera: Tephritidae)".

**Registering university:** University of Mauritius, Reduit, Mauritius

**Supervisors:** Dr Slawomir Lux, ICIPE, Nairobi, Kenya; Prof. I. Fagoonee, University of Mauritius, Reduit, Mauritius

**Duration:** 2000–2004

**Sponsorship:** DSO

**Major findings:** The feeding activities of *Ceratitis cosyra*, *C. fasciventris* and *C. capitata* were found to be confined mostly to host trees. The fruit flies exhibited diel patterns of feeding that varied according to species and sex. Carbohydrates obtained from natural food sources such as fruit juices and honeydew sustained the flies for more than four weeks after adult emergence. Total sugar intake was found to be similar for males and females of the three fruit fly species. Nutrition significantly influenced the reproductive behaviour of the flies. Fecundity of the flies was higher when fed on a source of carbohydrates than when fed on a sugar only. *Ceratitis cosyra* males and females consumed fewer carbohydrates than males and females of *C. fasciventris* and *C. capitata*.



The nutritional state of a fly was the most influential factor in guiding it to food odours. The effects of the nutritional state and age were additive. The mating status was the least important factor in influencing fly responses to food sources. Odours from natural food sources were found to be more attractive than odours from artificial food sources for all three fruit fly species. These findings have practical implications on (1) the establishment of a protocol for evaluation of food baits, and (2) the implementation of food baits in fruit fly-infested areas.

**Current position:** Research Scientist, Entomology Division of the Agricultural Research and Extension Unit, Mauritius.

**Future plans:** Management of the litchi moth, *Cryptophlebia peltastica* (Meyrick) (Lepidoptera: Tortricidae) in orchards in Mauritius.



### **Adèle Josée Ngi-Song (Cameroon)**

**PhD thesis title:** "Parasitisation of Selected African Stemborers by *Cotesia flavipes* Cameron and *Cotesia sesamiae* (Cameron) (Hymenoptera: Braconidae) with Emphasis on Host Selection and Host Suitability"

**Registering university:** University of Ghana, Legon, Accra, Ghana

**Supervisors:** Dr Wilber Lwande, ICIPE, Nairobi, Kenya; Dr P. G. N. Njagi, ICIPE, Nairobi, Kenya; Dr W. A. Overholt, ICIPE, Nairobi, Kenya; Prof. J. N. Ayertey, University of Ghana

**Duration:** 1991–1995

**Sponsorship:** DSO and DAAD

**Major findings:** The host and host habitat location, the acceptability and suitability of *Chilo partellus* (Swinhoe) and indigenous stemborer hosts for the development of an exotic parasitoid *Cotesia flavipes* Cameron and a local natural enemy *Co. sesamiae* (Cameron) (Hymenoptera: Braconidae), as well as the semiochemicals involved in host finding were investigated. There were no differences in the acceptability of the four hosts exposed to *Co. flavipes*. In contrast, *Co. sesamiae* preferred *Sesamia calamistis* Hampson larvae followed by the two *Chilo* species. Both parasitoid species did not develop in *Busseola fusca* (Fuller) and egg encapsulation was observed. *Chilo partellus*, *Ch. orichalcociliellus* Strand and *S. calamistis* were suitable hosts for the development of *Co. flavipes*. It was observed that female parasitoids were attracted to odours from uninfested maize, sorghum and Napier grass in a Y-tube olfactometer. In a dual choice test, the three plant species infested with *Ch. partellus*, *Ch. orichalcociliellus*, *Busseola fusca* or *S. calamistis* larvae were more attractive than uninfested plants. *Cotesia flavipes* and *Co. sesamiae* did not show preference for any of the stemborer species under study in dual choice tests. Odours from frass, produced by the four stemborer species fed on maize, sorghum and Napier grass were attractive to both parasitoid species. The main attractive volatiles from infested plants were (E)- $\beta$ -farnesene and (Z)-3-hexenyl acetate. Other chemicals identified from maize infested with *Chilo partellus* included myrcene, 2-heptanone, 4,8-dimethyl-1,3,7-nonatriene, (Z)-2-hexenal, (Z)-3-hexen-1-ol, cyclosativen, cedrene and  $\alpha$ -copaene. GC comparison of infested and uninfested maize seedlings showed a quantitative and qualitative difference in the volatile composition.

**Current position:** Postgraduate training in management, Université de Sherbrooke, Québec, Canada.

**Future plans:** Science administration.

### **Laila Uweso Abubakar (Kenya)**

**PhD thesis title:** "Molecular Characterisation of Lectin-Trypsin Complex from the Midgut of Tsetse Fly, *Glossina fuscipes fuscipes*, and Its Role in Determining Susceptibility to Trypanosome Infection".

**Registering university:** University of Nairobi, Kenya

**Supervisors:** Dr Ellie Osir, ICIPE, Nairobi, Kenya; Dr Francis Mulaa, University of Nairobi, Kenya



**Duration:** 1998–2002

**Sponsorship:** DAAD and WHO/TDR (Grant No.970648)

**Major findings:** Screening a *Glossina fuscipes fuscipes* midgut cDNA expression library with polyclonal antibodies raised against the lectin-trypsin complex identified a lectin-trypsin gene. The gene designated *Glossina proteolytic lectin (Gpl)* comprised of 933 bp cDNA that encoded a 274 amino acids polypeptide. It contained the catalytic domain of serine protease with aspartate in the specificity pocket, suggesting that the clone was a typical trypsin. Expression of the gene in a bacterial system yielded a protein with  $M_r \sim 32,500 \pm 2828$  Da that exhibited D-glucosamine binding and agglutination activity against bloodstream trypanosomes. In addition, *Gpl* exhibited trypsin

activity of  $6.025 \text{ units} \times 10^{-4}$ . Using immunofluorescence assays, the recombinant protein was found to be capable of inducing differentiation of bloodstream-form trypanosomes into procyclic forms *in vitro*. These results provide evidence for the possible involvement of the midgut lectin-trypsin molecule in both clearance and development of parasites in tsetse.

**Current position:** Lecturer, Department of Biochemistry, University of Nairobi.

**Future plans:** Working on vector-parasite interactions with particular emphasis on genetic manipulations for vector control.



## Maxwell Kelvin Billah (Ghana)

**PhD thesis title:** "Biosystematic Studies of *Psytallia* Species (Hymenoptera: Braconidae) Parasitoids Attacking Fruit-Infesting Flies (Diptera: Tephritidae) in Africa".

**Registering university:** University of Ghana, Legon, Accra, Ghana

**Supervisors:** Dr Susan Kimani-Njogu, ICIPE, Nairobi, Kenya; Dr William Overholt, ICIPE, Nairobi, Kenya; Dr R. A. Wharton, Texas A&M University, USA; Dr D. D. Wilson, University of Ghana, Legon, Accra, Ghana; Ms M. A. Cobblah, University of Ghana, Legon, Accra, Ghana

**Duration:** 1999–2004

**Sponsorship:** DSO and in part by IFS, Sweden (Grant No. C/3190-1 of 2001)

**Major findings:** Morphological comparison of the ovipositor, ovipositor sheath and hind tibia showed ovipositor–tibia and ovipositor sheath–tibia ratios could differentiate *Psytallia cosyrae* and *P. phaeostigma* from other species. Parasitoids reared on larvae other than their natural hosts showed significant changes in linear measurements and body colour. Morphometric studies assigned populations of unknown identity to groups based on variances. In a comparison of individual populations veins enclosing the submarginal cell accounted for the main differences. Cross-mating studies showed that once mating was successful, viable female offspring were produced in all crosses up to  $F_2$ , indicating the absence of post-copulatory isolating mechanisms, and suggesting the inadequacy of the biological species concept alone in separating species in the genus. Total genome comparison by AFLP separated the populations into groups that matched the clustering defined by morphometry, lending genomic support to the clusters. In the morphology and DNA studies, a population from Shimba Hills was shown to be similar to *P. perproximus* from Cameroon and *P. perproximus* from Tafo in Ghana. The Shimba Hills population is suggested as belonging to *P. perproximus* and is a new record from Kenya and East Africa. The study also characterised the populations based on outcome of the different taxonomic tools used.

**Current position:** Consultant, the African Fruit Fly Initiative (AFFI), ICIPE, Nairobi, Kenya.

**Future plans:** Hoping to join the Biosystematics Unit, ICIPE.



## Samira Abuelgasim Mohamed (Sudan)

**PhD thesis title:** "Biology, Host and Host Plant Relationships of Two *Psytalia* Species (Hymenoptera: Braconidae): Parasitoids of Fruit Flies (Diptera: Tephritidae) In Kenya"

**Registering university:** University of Gezira, Wad Medani, Sudan

**Supervisors:** Dr W. A. Overholt, ICIPE, Nairobi, Kenya; Dr S. A. Lux, ICIPE, Nairobi, Kenya; Dr E. A. Eltoum, University of Gezira, Wad Medani, Sudan; Dr R. M. Khafagi, University of Gezira, Wad Medani, Sudan

**Duration:** 1998–2002

**Sponsorship:** DAAD and USDA

**Major findings:** Host-habitat relationships of two parasitoid species (*Psytalia* cf *concolor* and *P. cosyrae*) of tephritid fruit flies were observed in a Y-tube olfactometer. Except for coffee, which was not attractive to *P. cosyrae*, all two parasitoid species were attracted to volatiles of the uninfested fruits tested compared to clean air. But infested fruit increased the attraction. *Psytalia* cf *concolor* preferred coffee infested with *Ceratitis capitata* to all other fruits. Host acceptability for oviposition of six fruit fly species (*C. capitata*, *C. cosyra*, *C. rosa*, *C. fasciventris*, *C. anonae* and *Bactrocera cucurbitae*) by the two *Psytalia* parasitoid species, revealed that all hosts were accepted; although, acceptance varied among the different hosts. However, when testing for suitability for parasitoid development, only *C. capitata* and *C. cosyra* were suitable for the two parasitoid species. Eggs of the two *Psytalia* species oviposited in any other host were encapsulated, or encapsulated and partially or completely melanised. In light of the results obtained during this study, it can be concluded that both parasitoid species are fairly specific in their host selection, a desirable character when selecting natural enemies for biological control. These results also indicate that *P. cosyrae* is (i) more specific in locating its host habitat and (ii) has a relatively wider thermal tolerance than *P. cf concolor*.

**Current position:** Visiting Scientist, African Fruit Fly Initiative (AFFI) project, ICIPE, Nairobi, Kenya.

**Future plans:** Working on fruit fly management in Sudan with particular emphasis on biological control.



## Sidi Ould Ely (Mauritania)

**PhD thesis title:** "Relative Oviposition Preferences of Solitary Desert Locusts on Different *Heliotropium* spp. and their Semiochemicals Basis"

**Registering university:** University of Khartoum, Sudan

**Supervisors:** Prof. Ahmed Hassanali, ICIPE, Nairobi, Kenya; Dr Peter Njagi, ICIPE, Nairobi, Kenya; Prof. M. Bashir, University of Khartoum, Sudan

**Duration:** 1999–2003

**Sponsorship:** DSO

**Major findings:** Mate attraction in the desert locust by monitoring the sexual behaviour of solitary-reared, gregarising and gregarious locusts was studied in ICIPE, Nairobi as well as in the Field Station in the Red Sea coast of Port Sudan. The study showed evidence of a sex pheromone in female solitary insects that attracts gregarising locusts (shifting them from the solitary to the gregarious phase). This behaviour facilitates the recruitment of solitary locusts in the field during locust invasions. A study on the diel behavioural activity patterns of adult solitary desert locusts, *Schistocerca gregaria* (Forskål), by monitoring their activities in a wind tunnel was also carried out. The results of this study confirm previous field observations that solitary desert locusts are more behaviourally active after onset of dark than during the day. This is manifested as short distance and migratory flights in the field after sunset. While the diel behavioural patterns are preserved in the laboratory-reared solitary locusts, it was evident that there is a significant decline in the levels of these behavioural activities after several generations. Investigations also extended to host-plant odour preferences by the solitary desert locust *Schistocerca gregaria* Forsk.

This study showed that field-collected locusts showed attraction to a broad range of desert plant volatiles compared to locusts reared on one plant for many generations. Feeding choice assays showed that the locusts preferred annuals for feeding rather than the perennial plants, balancing their food intake between the plants. Some aspects of the reproductive strategy of female desert locusts in the solitary phase were also studied in the field. It was noticed that all incoming females at the beginning of the rainy season are mated and fertile. This suggests that, since mate finding is not easy between scattered individuals, solitary females may compensate for this by their high fertility during the breeding season, which ensures the spreading of their eggs through the rainy season.

**Current position:** Visiting Scientist, Locusts and Migratory Pests Sub-Division, Plant Health Division, International Centre of Insect Physiology and Ecology (ICIPE).

**Future plans:** Finding a way to control the desert locust (which is a serious problem in Mauritania) by developing an early warning system through investigation into the gregarisation process.



### **Vincent Oduol Ochieng (Kenya)**

**PhD thesis title:** "Genetic Variation in Banana Weevil *Cosmopolites sordidus* (Coleoptera: Curculionidae)".

**Registering university:** University of Nairobi, Department of Biochemistry, Nairobi, Kenya

**Supervisors:** Dr E. O. Osir, ICIPE, Nairobi, Kenya; Dr C. Gold, International Institute of Tropical Agriculture (IITA), Uganda; Dr F. J. Mulaa, University of Nairobi (UON), Department of Biochemistry, Nairobi, Kenya

**Duration:** 1998–2001

**Sponsorship:** Rockefeller Foundation and German Academic Exchange Service (DAAD)

**Major findings:** Genetic variability in banana weevil populations was analysed in samples obtained from different banana growing regions using random amplified polymorphism (RAPD). The results of the study clearly demonstrated genetic variability in the different banana weevil populations. According to the study, the populations fell into distinctive clusters depending on their degree of genetic similarities. In addition, specific molecular markers for the different clusters were identified. This proved the genetic distinctiveness of the clusters. Indonesian samples were different from the rest of the populations as shown by RAPD and PCR-RFLP of CO1 mt DNA. This confirmed the hypothesis that the banana weevil could have originated from Asia. The results show that different tactics would have to be devised for managing the banana weevil in different regions.

**Current position:** Lecturer, University of Nairobi, Kenya.

**Future plans:** Working on multilocation testing of banana weevil with respect to resistant germplasm and different strains of fungal pathogens as a way of control.



### **Frederick Ndhoga Baliraine (Uganda)**

**PhD thesis title:** "Development of Molecular Markers for Species Diagnosis and Analysis of Genetic Diversity in African Fruit Fly Populations"

**Registering university:** University of Nairobi, Kenya

**Supervisors:** Dr E. O. Osir, ICIPE, Nairobi, Kenya; Dr S. A. Lux, ICIPE, Nairobi, Kenya; Dr F. J. Mulaa, University of Nairobi, Kenya; Prof. A. R. Malacrida, University of Pavia, Italy

**Duration:** 1999–2003

**Sponsorship:** German Academic Exchange Service (DAAD), International Fund for Agricultural Development (IFAD)–AFFI, CICOPS–University of Pavia, ICSC–World Laboratory, Switzerland (Projects FIP-10 & T-1), International Atomic Energy Agency (IAEA), Vienna, Austria



**Major findings:** Twenty-four *Ceratitis capitata* (medfly) simple sequence repeats (SSRs or microsatellites), based on published sequences obtained from the GenBank database, were screened for amplification on the genomic DNA of congeneric pest fruit flies *C. rosa*, *C. fasciventris* and *C. cosyra*. Amplification success ranged from 79.2% (*C. cosyra*) to 91.3% (in both *C. rosa* and *C. fasciventris*). Some loci differentially amplified in the four species examined, with one locus amplifying only in *C. capitata*. The majority of the amplicons were similar, if not identical in size to those expected in the medfly. Sequence analysis revealed the same repeat type as the homologous medfly SSRs in the majority of the isolated SSR loci. The most common repeat units were (CA)<sub>n</sub> / (TG)<sub>n</sub>. Some species-specific nucleotide differences were observed among the four species. Ten of the cross-species SSRs markers were used to survey the levels of genetic variability and analyse the genetic aspects of the population dynamics of *C. rosa*, *C. fasciventris* in Africa, in comparison with variability data from *C. capitata*. The degree of microsatellite polymorphism in *C. rosa*, *C. fasciventris* was extensive and comparable to that of *C. capitata*. In *C. rosa*, the evolution of SSR polymorphism in its distribution area reflected the colonisation history of this species. The SSR data of *C. fasciventris* over the Uganda/Kenya spatial scale suggested a recent expansion and possibly continuing gene flow within this area. Low levels of genetic differentiation were observed among the different geographic populations of *C. rosa*, *C. fasciventris* and *C. capitata* in Africa; implying that the same control tools/strategies may work across Africa. The SSR variability data from this study suggest Kenya as the source area of *C. rosa*, *C. fasciventris* and confirm the ancestral status of the Kenyan *C. capitata* population. From a taxonomic point of view, *C. fasciventris* had previously been considered to be a variety of *C. rosa*. However, in this study, differences were observed in allelic lengths and levels of polymorphism of the homologous SSR loci between these two entities, together with distinct differences at sequence level; all of which support a different species status for each of these two pests. In addition, data from this study gives molecular support to the hypothesis of an East African origin of the *Ceratitis* spp.

**Current position:** Scientific Officer, Measles Regional Reference Laboratory, Uganda Virus Research Institute, Entebbe.

**Future plans:** Career as a distinguished Scientist/ Researcher.



## **Intisar Elnour Elteraifi (Sudan)**

**PhD thesis title:** "Variability in Growth, Oil and Limonoids in Neem (*Azadirachta indica* A. Juss) from Different Ecozones in Sudan"

**Registering university:** University of Gezira, Faculty of Agricultural Sciences, University of Gezira, Wad Medani, Sudan

**Supervisors:** Prof. A. Hassanali, ICIPE, Nairobi, Kenya; Prof. H. A. Mohamed, University of Gezira, Wad Medani, Sudan; Prof. N. H. H. Bashir, University of Gezira, Wad Medani, Sudan; Dr H. F. Mustafa, University of Gezira, Wad Medani, Sudan

**Duration:** 2000–2003

**Sponsorship:** Third World Organisation for Women in Science (TWOWS), Trieste, Italy

**Major findings:** The main objective of this study was to generate information, which would provide the basis of exploiting the neem tree (*Azadirachta indica* A. Juss) in Sudan as a source of safe, 'soft' pesticides, as well as other raw materials (e.g. fertilisers, medicines and cosmetics). The study, therefore, included investigations on seed characteristics, seedling growth, and variability in neem oil and limonoids in seed kernels. The effects of climate (rainfall, temperature and relative humidity) were analysed in relation to the concentration of the limonoids in the seed kernels. Neem ecotypes showed significant variations in seed weight, size, number of seeds per kilogramme and kernel weight. No variations between ecotypes were detected in most of the growth traits measured in the tree nursery. No significant variations were found in response of various ecotypes to the two irrigation regimes in almost all growth traits measured. The oil content in the neem seed kernel was found to constitute about 44.6%, with no significant variation between ecotypes. The azadirachtin content in the samples from the various zones ranged from 1.08 to 2.3 and 0.48 to 3.09 mg/g in 2001 and 2002 seasons, respectively. The major climate factor that had a significant relation to the level of the azadirachtin in the seed kernel was rainfall. Azadirachtin levels increased with the increase in rainfall, with 717 mm being the optimum. Temperature and relative humidity had no direct effect

on the azadirachtin content. Significant variations were observed between the 10 zones in the level of salannin and nimbin in both seasons. Salannin ranged from 1.59 to 3.02 and 1.05 to 2.82 mg/g and nimbin from 1.39 to 2.11 and 1.05 to 2.61 mg/g, in the first and second seasons respectively. Salannin was affected by rainfall, while nimbin was not affected by any of the climate factors examined. Relative humidity and temperature had no effect on both salannin and nimbin. This study showed variations between ecotypes in the contents of azadirachtin, salannin and nimbin in neem seed kernels in relation to climatic factors. The practical implication of this is that the best sources of limonoids in Sudan for biopesticides production would be from neem trees growing in humid and sub-humid zones.

**Current position:** Head, Environmental Sciences and Natural Resources Department (ESNRD)

**Future plans:** Continue studies on drought tolerance characteristics of the neem tree in different ecozones in the Sudan and to determine the yields of associated products in relation to the ecotypes and/or habitat attributes.





## **ICIPE'S BOARD OF TRAINING AND POSTGRADUATE STUDIES (IBTPS)**

### **A. Functions of the Board**

ICIPE's Board of Training and Postgraduate Studies (IBTPS) is a subsidiary committee reporting to the Director of Research and Partnerships through the Research and Capacity Building (R&CB) Committee. The Board serves as an institutional clearinghouse on all matters concerning capacity building, including short-term group training, staff development, as well as degree training. This includes postgraduate training activities of specialised networks such as the African Regional Postgraduate Programme in Insect Science (ARPPIS), to which it reports to the ARPPIS Academic Board (AAB). The Board is also mandated to advise on institutional strengthening activities of ICIPE.

Below is the detailed Terms of Reference of the Board.

- Oversee the implementation of the key institutional objective of capacity building and institutional strengthening, in accordance with the Centre's vision and strategy;
- Develop, review and evaluate training policies and operational guidelines of all training and capacity building activities at ICIPE;
- Through a competitive process based on merit, select and recommend admission of qualified candidates to the various programmes;
- Review the content of all academic training programmes, especially their quality and relevance. This includes content of taught courses as well as theses projects;
- Recommend the appointment of staff involved in academic training for programmes undertaken within ICIPE, including the appointment of supervisory committees;
- Oversee the professional development of trainees and advise on issues that impact on their welfare during training;
- Undertake any other functions on behalf of ICIPE's management related to capacity building within ICIPE's evolving Strategy and Vision.
- Meet regularly, and not less than four times a year, in order to meet the demands of the CB&ID Programme.

### **B. Composition**

The Board is composed of experienced scientists and professional staff who are capable of representing the broad needs of training and capacity building. The Director of Research and Partnerships, who also serves as the Chair of the ARPPIS Academic Board, is the appointing authority of the Board members, including its Chair.

## ARPPIS PARTICIPATING UNIVERSITIES, 2005

Country/ University	Name of Chief Executive	Representatives to the ARPPIS Academic Board
<b>CAMEROON</b> University of Dschang P. O. Box 96 DSCHANG, Cameroon	Prof. Dongmo Rector	Prof. R. I. Purh Fax: +237-4451381
<b>EGYPT</b> Assiut University P. O. Box 71516 ASSIUT, Egypt	Prof. Dr M. R. Mohmoud President	Dr S. H. Ismail Email: assuit@frcu.eun.eg
<b>ETHIOPIA</b> Addis Ababa University P. O. Box 1176 ADDIS ABABA, Ethiopia	Dr Mogessie Ashenafi Vice Chancellor	Dr Dawit Abate Coordinator, Masters Centre for Eastern Africa Email: biology.aau@telecom.net.et
Alemaya University of Agriculture P. O. Box 138 DIRE DAWA, Ethiopia	Dr Desta Hamito President	Dr Tadele Tefere Fax: +251-5-610713 Email: tadeletefera@yahoo.com
<b>GHANA</b> University of Cape Coast University Post Office CAPE COAST, Ghana	Rev. Prof. E. A. Obeng Vice Chancellor	Dr M. Botchey Fax: +233-42-32095 Email: csucc@ghana.com
University of Ghana, Legon P. O. Box 44, Legon ACCRA, Ghana	Prof. K. Asenso-Okyere Vice Chancellor	Prof. K. Afreh-Nuamah Coordinator, Masters Centre for Western Africa Tel: +233-21-500180 Fax: +233-21-502701
<b>KENYA</b> Egerton University P. O. Box 536 NJORO, Kenya	Prof. H. Maritim Vice Chancellor	Prof. M. K. Limo Email: mklimoh@yahoo.com or eugradschool2004@yahoo.com
Jomo Kenyatta University of Agriculture and Technology P. O. Box 62000 NAIROBI, Kenya	Prof. N. G. Wanjohi Vice Chancellor	Dr R. O. Maranga Email: bellamaranga@yahoo.com Tel: +254-67-52711
Kenyatta University P. O. Box 43844 NAIROBI, Kenya	Prof. E. Standa Vice Chancellor	Prof. J. M. Mueke Tel: +254-20-801901
Maseno University P. O. Box Private Bag MASENO, Kenya	Prof. F. Onyango Vice Chancellor	Prof. P. J. Aduma Email: dvcaa@maseno.ac.ke Fax: +254-57-351153
Moi University P. O. Box 3900 ELDORET, Kenya	Prof. D. Some Vice Chancellor	Prof. F. M. E. Wanjala Fax: +254-53-63257
University of Nairobi P. O. Box 30197 NAIROBI, Kenya	Prof. G. A. O. Magoha Vice Chancellor	Dr R. Mukabana Email: rmukabana@yahoo.com
<b>MALAWI</b> University of Malawi P. O. Box 280 ZOMBA, Malawi	Prof. D. Rubadiri Vice Chancellor	Mrs M. P. Kalindekafe Email: biology@chanco.unima.mw or jkalindekafe@chanco.unima.mw Fax: +265-1-524046
<b>MOZAMBIQUE</b> Eduardo Mondlane University P. O. Box 257 MAPUTO, Mozambique	Prof. B. Mazula Vice Chancellor	Prof. B. Mazula Tel: +258-1-437-851 Fax: +258-1-426-426
<b>NIGERIA</b> Ahmadu Bello University PMB 1044 ZARIA, Nigeria	Prof. S. U. Abdullahi Vice Chancellor	Prof. R. I. S. Agbede Email: roagbede@abu.edu.ng

Enugu State University Independence Layout PMG 01660 ENUGU, Nigeria	Prof. J. O. Onah Vice Chancellor	Dr E. D. M. Umeh Email: C/o vc@esunet.edu.ng
University of Agriculture, Makurdi Private Mailbag 2373 MAKURDI, Nigeria	Prof. J. Ayatse Vice Chancellor	Prof. E. O. Ogunwolu Email: Orbit@gacom.net
University of Ibadan P. O. Box 8761 Ibadan, Nigeria	Prof. A. Falase Vice Chancellor	Prof. A. Odebiyi Email: C/o dvc@ui.edu.ng
Nnamdi Azikiwe University PMB 5025, AWKA Anambra State, Nigeria	Prof. F. A. Nwako Vice Chancellor	Prof. R. I. Egwatu Email: C/o vc@nauni.edu.ng
Ogun State University PMB 200 Ago-Iwoye Ogun State, Nigeria	Prof. O. Y. Oyeneye Vice Chancellor	Dr V. A. Awoderu Email awoderu@ibadan.skannet.com.ng
Rivers State University of Science and Technology PMB 5080 Port Harcourt, Nigeria	Prof. S. C. Achinewhu Vice Chancellor	Dr B. A. Okwakpam Email: achinewhu@yahoo.com or achinewhu@hotmail.com
<b>RWANDA</b> The National University of Rwanda P. O. Box 56 BUTARE, Rwanda	Prof. C. Karangwa Rector	Prof. D. T. M. N. Rukazambuga Email: danruka@hotmail.com Fax: +250-530228
<b>REPUBLIC OF SOUTH AFRICA</b> University of Pretoria PRETORIA 0002 Republic of South Africa	Prof. C. W. I. Pistorius Vice Chancellor and Principal	Dr. Kerstin Kruger Email: kkruger@zoology.up.ac.za Fax: +27-12-362-5242
<b>SUDAN</b> University of Gezira P. O. Box 20 WAD MEDANI, Sudan	Prof. I. H. Hussein Vice Chancellor	Dr A. E. Hussein Fax: +249-51-40279
University of Khartoum P. O. Box 321 KHARTOUM, Sudan	Prof. H. M. El Hadi Vice Chancellor	Prof. I. Khidir Fax: +249-11-80295
<b>TANZANIA</b> Sokoine University of Agriculture P. O. Box 3000 MOROGORO, Tanzania	Prof. A. B. Lwoga Vice Chancellor	Prof. B. S. Kilonzo Email: sua@sua.ac.tz or fum@sua.ac.tz
<b>UGANDA</b> Gulu University P. O. Box 166 GULU, Uganda	Dr J. H. Nyeko Pen-Mogi Vice Chancellor	Dr J. H. Nyeko Pen-Mogi Email: pnyeko@parliament.go.ug Fax: +255-41-531776
Makerere University P. O. Box 7002 KAMPALA, Uganda	Prof. P. J. M. Ssebuwufu Vice Chancellor	Prof. J. Kaddu Email: zoology@imul.com
<b>ZAMBIA</b> University of Zambia P. O. Box 32379 LUSAKA, Zambia	Prof. A. A. Siwela Vice Chancellor	Prof. A. A. Siwela Email: Asiwela@admin.unza.zm
<b>ZIMBABWE</b> University of Zimbabwe P. O. Box MP 167 Mount Pleasant, Zimbabwe	Prof. L. Nyagura Vice Chancellor	Mr M. Barson Ag. Coordinator, Masters Centre for Southern Africa Email: barson@science.uz.ac.zw or barson001@yahoo.co.uk

## PROGRESS EVALUATION OF PHD DRAFT THESIS

(To be completed and submitted by the 1st day of September of each year in residence.)

### I. General Information

1. Scholar's name: \_\_\_\_\_
2. Admission date: \_\_\_\_\_
3. University of registration: \_\_\_\_\_
4. ICIPE department hosting scholar: \_\_\_\_\_
5. Title of thesis: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
6. Date of submission of this draft thesis: \_\_\_\_\_

### II. Self-evaluation by Scholar

(a) % Assessment of completion of the chapters	
Title of Chapter	% Completion
Chapter 1:	
Chapter 2:	
Chapter 3:	
Chapter 4:	
Chapter 5:	
Chapter 6:	
Chapter 7:	
Chapter 8:	
(b) Papers published or under preparation:	
1.	
2.	
3.	
(c) Limitations faced in completing work:	
(d) Assessment of work still to be undertaken for thesis to be completed:	

### III. Evaluation by Supervisor(s):

(a) General evaluation on work progress: \_\_\_\_\_

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(b) Supervisor's evaluation of scholar's draft presentation, technical writing skills, analysis, illustrations etc.) \_\_\_\_\_

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(c) Recommendation by ICIPE Supervisor(s) \_\_\_\_\_

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Signed: \_\_\_\_\_ Date: \_\_\_\_\_

(d) Comments by University Supervisor(s): \_\_\_\_\_

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Signed: \_\_\_\_\_ Date: \_\_\_\_\_

(e) Remarks by ICIPE's Capacity Building Office: \_\_\_\_\_

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Signed: \_\_\_\_\_ Date: \_\_\_\_\_



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I, .....  
(Full Name)

do accept the offer of training fellowship under the terms and conditions stated.

SIGNED by me: .....  
(Signature)

Date: .....

In the  
Presence of:

Name of Witness: .....

Signature of Witness: .....  
(Signature)

Date: .....

## **ACRONYMS AND ABBREVIATIONS**

AAAP	attraction-aggregation-attachment pheromone
AAB	ARPPIS Academic Board
AAU	Association of African Universities
ABC	Actions for Capacity Building of NIH
ACBF	African Capacity Building Foundation, Harare, Zimbabwe
AFFI	African Fruit Fly Initiative
ANAFE	African Network for Agriculture, Environment and Forestry Education
ARPPIS	African Regional Postgraduate Programme in Insect Science
ASA	ARPPIS Scholars Association
BASIC	Building African Scientific and Institutional Capacity (FARA initiative)
BECA	Biosciences Eastern and Central Africa, ILRI
BMZ	Bundesministerium für Wirtschaftliche und Entwicklung Zusammenarbeit, Bonn, Federal Republic of Germany
CB&ID	Capacity Building and Institutional Development Programme, ICIPE
DAAD	German Academic Exchange Service
DBM	diamondback moth
DIGC	Duduville International Guest Centre, ICIPE
DPO	Directorate for NGO, International Education and Research Programme, Netherlands Government
DRIP	Dissertation Research Internship Programme
FARA	Forum for Agricultural Research in Africa
GC	ICIPE Governing Council
GTZ	Gesellschaft für Technische Zusammenarbeit, Eschborn, Federal Republic of Germany
HOD	Head of Department
HR	Human Resources
IARC	international agricultural research centre
IBTPS	The ICIPE Board of Training and Postgraduate Studies
ICIDR	NIH's International Collaborations in Infectious Diseases Research
IDRC	International Development Research Centre, Canada
IFAD	International Fund for Agricultural Development, Rome, Italy
IFS	International Foundation for Science
IGA	income-generating activity
IITA	International Institute of Tropical Agriculture
IPM	integrated pest management
IPVM	integrated pest and vector management
IRD	Institut de Recherche pour le Développement, Montpellier, France
IWMI	International Water Management Institute, Colombo
JIRCAS	Japan International Research Centre for Agricultural Sciences
MIM	Multilateral Initiative on Malaria Research in Africa
NCE	neem cake extract
NEPAD	New Partnership for Africa's Development
NGO	non-governmental organisation
NIH	National Institutes of Health, USA
R&CB	Research and Capacity Building Committee
R&D	research and development
S&T	science and technology
SADC	Southern Africa Development Community
SGI	Sponsoring Group of ICIPE
SIMA	Systemwide Initiative on Malaria and Agriculture of the CGIAR
TDR	Tropical Diseases Research
TWOWS	Third World Organisation for Women in Science
USAID	United States of America Agency for International Development
USDA	United States Department of Agriculture
WHO	World Health Organisation

## CONTACTS

***For further information please contact:***

**The Director General**  
International Centre of Insect  
Physiology and Ecology (ICIPE)  
P.O. Box 30772-00100 Nairobi, Kenya  
Tel: +254 (20) 8632000  
Fax: +254-20-8632001/2  
Email: [icipe@icipe.org](mailto:icipe@icipe.org)

Or

**The Network Coordinator**  
ARPPIS Secretariat  
C/o International Centre of Insect  
Physiology and Ecology (ICIPE)  
P.O. Box 30772-00100 Nairobi, Kenya  
Tel: +254 (20) 8632000  
Fax: +254-20-8632001/2  
Email: [cb&id@icipe.org](mailto:cb&id@icipe.org)



The African Regional Postgraduate Programme in Insect Science (ARPPIS) of the International Centre of Insect Physiology and Ecology (ICIPE) was started in 1982 after extensive consultations with African universities and related higher education coordinating institutions such as the Association of African Universities (AAU).

A comprehensive revised training programme has been recently developed that is structured to better meet the demand for highly trained indigenous researchers and to provide a cadre of well-trained integrated pest and vector management (IPVM) specialists and trainers in technology introduction and adaptation.

This Calendar presents the training activities on which ICIPE and its 30 African university partners will be focusing over the next three years from 2005–2007



**ARPPIS**



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**ICIPE's mission is to improve  
the well being of peoples of  
the tropics through research  
and capacity building in  
insect science and its application**

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