Two PhD positions to work on <u>Fall armyworm (FAW)</u> under the <u>Plant Health Theme at the International Centre of Insect Physiology and Ecology (*icipe*), Kenya</u>

General Background
Fall armyworm (FAW) has recently invaded Africa, causing devastating losses to maize, the main staple and cash crop for millions of smallholder farmers in much of Africa, and the preferred host for the pest. The rapid spread and the potential to cause 100% loss in a wide range of crops especially cereals such as maize, rice, pasture, sorghum, millet pose a great and unprecedented threat to food security, incomes and livelihoods in the country. Extensive damage caused by FAW and lack of effective management strategies, has resulted in pesticide-based emergency responses in many affected countries at an astronomical cost, most of which has not only proved ineffective (Stokstad, 2017) but also with serious negative environmental impacts. The inefficacy of pesticides to manage FAW could be due to its ability to develop resistance to synthetic pesticides. Hence sustainable and environmentally friendly pests' management strategies need to be urgently developed to guide farmers on sustainable FAW management.

icipe is offering **two PhD positions**, one working on **plant-based biorationals for management of Fall armyworm** and the other working on f**actors influencing the ability of maize to compensate for damage by FAW.**

Project 3: Validation of indigenous-knowledge and plant-based biorationals for management of Fall armyworm

The Fall armyworm (FAW), *Spodoptera frugiperda*, is a key invasive pest in Africa (Goergen et al., 2016), affecting millions of hectares of maize, sorghum and pasture grasses (FAO, 2018). The pest can feed on over 80 plant species. In a situation of panic, broad-spectrum pesticides remain the primary control strategy (Prasanna et al., 2018). However, recent evidence on effectiveness of climate-adapted push-pull and intercropping in reducing Fall armyworm (Midega et al., 2018; Hailu et al., 2018) indicates the importance of plant-based volatiles for FAW management. Furthermore, FAW affected farmers in Sub-Saharan Africa report effectiveness of indigenous practice such as use of plant extracts, ash and soaps. These findings need to be validated and further elucidate and exploit the chemistry of bioactive plants against Lepidopteran insects to develop environmentally safer biorational pesticides for the effective control of Fall armyworm. Systematic assessment of indigenous practices for FAW management is critical to confidently upscale them for FAW management.

Applicant requirements specific for project 3: The successful applicant will hold an excellent master's degree with both coursework and research in crop protection, entomology or a related fields. Previous experience on conducting field experiments and lab bioassays, botanical pesticides and their characterisation might be helpful. A good knowledge about design of field experiments and lab bioassay, statistical analysis will be of help in the project.

Project 4: Understanding the key factors influencing the ability of maize to compensate for damage by fall armyworm at different crop phenological stages

The Fall armyworm (FAW), *Spodoptera frugiperda* is a key invasive pest in Africa that inflicts severe foliar damage to cereal crops such as maize and sorghum in the vegetative stage and less frequently damages the tassel and ears at reproductive stage. However, reduction in grain yields due to fall armyworm is influenced by several factors such as intensity of foliar damage, crop phenology when FAW infestation occurs, ability of cultivars/hybrids to compensate for foliar damage and good agricultural practices adopted by the farmers and other soil fertility related factors. It is critical to establish a relationship between these factors and the ultimate grain yield loss incurred to establish appropriate economic thresholds for FAW management in Africa. Further economic thresholds to guide implementation of economically viable pest management

interventions in Africa, depends on other variables such as value of maize produced, cost and effectiveness of the management interventions. This study will focus on understanding the diverse factor influencing the grain yield loss due to FAW, assess the ability of maize to compensate for damage due to FAW and establish economic thresholds for initiation of FAW management interventions in east Africa.

Applicant requirements specific for project 4: The successful applicant will hold an excellent master's degree with both coursework and research in crop protection, entomology or a related fields. Previous experience with conducting field experiments and lab bioassays, economic threshold assessment of pest and disease might be helpful. A good knowledge about design of field-, Screenhouse- and lab experiments, data modelling and multivariate analysis will be of help in the project.

Eligibility

- A Bachelor's degree with a minimum pass of second-class, upper division.
- The Master's degree must have been completed less than six years ago at the time of application.
- The applicant must be a national of Kenya, Rwanda, Ethiopia, Tanzania, Uganda.
- Qualified female candidates and candidates from less privileged regions or groups as well as candidates with disabilities are especially encouraged to apply.
- A good command of the English language (written & spoken).
- Completed application form and accompanying supporting documents submitted online.

Completed application form and accompanying supporting documents must be submitted latest by 15th January 2020.

Applications

For full instructions go to:

http://cbid.icipe.org/apps/fall-armyworm-2019_readvertisement/index.php

Timeline

Closing date for applications by 15th January 2020.
Successful candidates will be notified by 31st January 2020
3-year doctoral training by research: start: March 2020, end: Dec 2022
Please note: Successful candidates will develop a full proposal and register with a University after they commence their PhD programme at icipe.