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FIRST REPORT OF OUTBREAKS OF THE 'FALL ARMYWORM' ON THE AFRICAN CONTINENT

Following severe armyworm outbreaks in maize fields occurring simultaneously in several countries of West Africa, the fall armyworm *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera: Noctuidae) an alien invasive moth native to tropical and subtropical regions of the Americas has been detected for the first time on the African continent. First observations on armyworm attacks attributed to caterpillars of the genus *Spodoptera* were made on maize plants in the rainy forest of South-West Nigeria in late January 2016 and in IITA maize fields in Ibadan and Ikenne. Similar complaints were soon made in other countries of the sub-region where caterpillar populations had attained alarming levels later in the season in Benin, northern Nigeria and also in Sao Tomé thanks to samples provided for identification by the FAO sub-regional office for Central Africa. In Togo, concerns by maize farmers about severe armyworm outbreaks threatening food security in the Kara and Plateau regions were recently brought to the attention of a council of ministers. More recently the Federal Government of Nigeria has raised the alarm on the emergence of armyworm upsurges in maize fields in Edo and some South West states. These congruent reports about concurrent armyworms population build-up in several West African countries support evidence for the emergence of a regional problem.

At first glance caterpillars of the new species can be confused with *S. exigua* (Hübner), the beet armyworm, which is also regularly present together with *S. exempta* (Walker), the African armyworm, in outbreak areas. However, the examination of different larval and adult characters including the study of the moth's male and female genitalia unambiguously supported the presence of *Spodoptera frugiperda* as a new armyworm pest in West Africa. At the same time, to align morphological with molecular techniques, larval and adult samples were sent to IITA headquarters at Ibadan at the Virology and Molecular Diagnostics unit for DNA barcode analysis and results confirmed these findings.

Although the fall armyworm is highly polyphagous with a host range of more than 80 plant species it prefers to feed on gramineous plants in particular on economically important crops such as maize, millet, sorghum, rice, wheat, and sugar cane. Other crops of major agricultural importance attacked by the pest include cowpea, peanuts, potato, soybean and cotton. In climatic regions allowing constant generations such as in Brazil, the third largest maize producer in the world, *S. frugiperda* is considered as the most important pest on this crop causing a damage estimated at more than 400 million dollars annually. Caterpillars of *S. frugiperda* seem to be much more damaging to maize than most other African *Spodoptera* species having developed comparatively strong serrated cutting edges of mandibles as a way of overcoming high silica



Typical damage by fall armyworm on maize

contents in wild grasses. Unlike congeneric species, they are also actively feeding during daytime. Older larvae become cannibalistic tolerating only few congeners on the same host plant.

Pathways of the recent accidental introduction of the fall armyworm into West Africa are yet unknown but increase in international trade volume and easy air travel of people from one continent to another has amplified the phytosanitary risks of even multiple introductions. Similarly, the rates of quarantine interceptions of fall armyworm caterpillars at European entry points have significantly increased in recent years. As a result, the status of *S. frugiperda* was reassessed in 2015 and ranked as A1 quarantine pest on the list of the European and Mediterranean Plant Protection Organization (EPPO). The fall armyworm has a remarkable dispersal capacity and is observed to migrate every year from its endemic area in the warmer parts of the new world over more than 2000 km crossing the entire US up to Canada in the North and reaching the

northern parts of Argentina and Chile in the South. How far the fall armyworm

has already expanded into Africa is presently not known but with regard to its high spreading performance, large reproductive capacity and wide host plant range it is likely that the pest will soon be able to colonize most of tropical Africa.

Best bet practices for the management of the pest include the use of insecticides, host plant resistance and biological control. Despite its long history in the Americas control of the fall armyworm still largely relies on the use of synthetic pesticides which has led to the emergence of resistant pest populations. Interventions based on pest incidence thresholds are primarily meant to better protect young plants and reproductive stages of maize. Therefore monitoring activities together with alternated application of insecticides such as pyrethroids, carbamates and organophosphates are recommended as immediate measure. Early detection is primordial, as the application of chemical insecticides is only efficient on young larval stages. Transgenic Bt-maize (expressing Cry1F toxin) has been developed and is currently used in the US, but its deployment in tropical Africa might not be as straightforward owing to economic, logistic and socio-cultural considerations. Moreover resistance to Cry1F has already been widely reported. In its native range numerous parasitic wasps and flies have been recorded as natural enemies of the fall armyworm

and some species, in particular egg and larval parasitoids, are frequently introduced, resulting in noticeable levels of control. A large number of isolates of nucleopolyhedroviruses (NPV) have been obtained from the field and screening efforts only recently resulted in the detection of promising isolates. Similarly, the development of biopesticides including the use of endophytic entomopathogenic fungi is still in its infancy and needs increased attention for providing viable alternatives to conventional insecticides. Hence, there is an urgent need for developing ecologically sustainable, economically profitable and socially acceptable IPM programs to fight the fall armyworm in Africa.

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5TH INTERNATIONAL ENTOMOPHAGOUS INSECTS CONFERENCE

The organizing committee is pleased to announce that the fifth International Entomophagous Insects Conference (IEIC5) will be held in Kyoto, Japan, from October 16 to 20, 2017. This conference was born from the merging of two previous workshops, the International Entomophagous Insects Workshop and the European Parasitoid Workshop. The IEIC has since being held biennially, with the first meeting taking place in Minneapolis, USA, in 2009, the second in Antibes, France, in 2011, the third in Orford, Quebec, Canada, in 2013, the fourth in Torre del Mar, Spain, in 2015. IEIC5 is the first meeting to be held in Asia.

IEIC5 will cover both fundamental and applied topics related to arthropod natural enemies and range from genetics to landscape. Researchers with common scientific interest will be able to meet and exchange up-to-date information. The tentative topics of sessions during conference will be

- 1) Behavioral Ecology,
- 2) Chemical Ecology,
- 3) Systematics and Taxonomy,
- 4) Evolution, Genetics and Physiology,
- 5) Biological Control,
- 6) Population, Community and Landscape Ecology.

One or two theme sessions will be organized per day. Invited speakers will present an overview on each theme, but most of the scientific session will be devoted to submitted oral presentations and posters.

In Kyoto, the conference venue will be Miyakomesse, which is located in Okazaki Koen Park at Higashiyama area with a lot of cultural and historical points. You can visit Heian Jingu Shrine, City Zoo, and Museums within 5 minutes' walk. Detailed information on transportation, important dates, registration fees, and other available hotels nearby the conference venue, will be provided in future circulars and on the website (<http://ieic5.org/>) updates.

We are looking forward to your participation. Feel free to contact us (contact@IEIC5.org) if you have any questions.

Hoping to see you in October 2017,

Prof. Eizi Yano

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IAPPS Mission: to provide a global forum for the purpose of identifying, evaluating, integrating, and promoting plant protection concepts, technologies, and policies that are economically, environmentally, and socially acceptable.

It seeks to provide a global umbrella for the plant protection sciences to facilitate and promote the application of the Integrated Pest Management (IPM) approach to the world's crop and forest ecosystems.

Membership Information: IAPPS has four classes of membership (individual, affiliate, associate, and corporate) which are described in the IAPPS Web Site www.plantprotection.org.

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