Emergency Transboundary Outbreak Pests (ETOPs) Situation for September and October with a forecast through mid-December 2018

résumé en français est inclus

SUMMARY

The **Desert Locust** (*Schistoseca gregaria* - **SGR**[1]) situation remained generally calm during September only a few isolated adults and hoppers were detected in a few places in western (WOR) and adults and hoppers were reported in central (COR) region and the situation remained calm in the eastern (EOR) region.

Forecast: Small-scale breeding is likely in some places in winter breeding areas in WOR and COR. Significant activities are not expected in EOR during the forecast period.

Red (Nomadic) Locust (*Nomadacris septemfasciata*) **(NSE):** NSE swarms are expected to have formed in Tanzania, Mozambique and Zambia during September and October.

Tree Locust, *Anacridium sp* outbreaks persisted in September and October in Turkana, Wajir, Garissa and Madera counties in **Kenya** and control operations were being planned by MinAgri/Plant Protection Services.

Central American Locust, *Schistocerca piceifrons piceiferons* (CAL): No update was received on CAL during September and October at the time this bulletin was compiled.

South American Locust, *Schistocerca cancellata* (SCA): No update was received at the time this bulletin was compiled, however limited activities are expected to have occurred in the primary outbreak areas over the past months.

Italian (*CIT*), Moroccan (*DMA*), and the Asian Migratory Locusts (*LMI*): DMA is expected to have ended in most of the CAC regions in October and CIT and LMI continue developing in October, but will gradually come to an end soon.

Fall Armyworm *(Spodoptera frugiperda)* ***(FAW)***: FAW continued appearing a in rain fed and irrigated crops in Africa and India and elsewhere during September and October (for more info, refer to pages 10-13).

[1] *Definitions of all acronyms can be found at the end of the report.*

African Armyworm (AAW) (*Spodoptera exempta*): AAW outbreak was reported in Malawi in October.

Southern Armyworm (*Spodoptera eridania*) (SAW): SAW, a pest native to the Americas from southern USA to Argentina has not yet been reported in Africa on a scale. If and once established, this ravenous pest could become an extra heavy burden to small-holder farmers who are already struggling to fend off other indigenous and invasive pest species.

Quelea birds (**QQU**): QQU outbreaks were reported in several countries in **Kenya** in October.

Active surveillance, monitoring, reporting, information sharing and timely implemented preventive interventions remain critical at all times to abate the threats ETOPs pose to crops and pasture.

USAID/OFDA/PSPM *monitors ETOPs regularly in close collaboration with its network of national PPDs/DPVs, regional and international pest monitoring and/or control entities, including FAO, CLCPRO, CRC, DLCO-EA, and IRLCO-CSA, as well as Agency partners, and NGOs and issues timely analytical bulletins and reports to stakeholders across the globe.* ***End summary***

RÉSUMÉ

La situation du Criquet pèlerin (*Schistoseca gregaria* - SGR) est restée globalement calme en septembre. Seuls quelques adultes isolés et des larves ont été détectées dans quelques sites de l'ouest (WOR) et des adultes et des larves ont été signalés dans la région centrale (COR) en octobre. de criquets ont été détectés dans la région est de la flambée épidémique (EOR).

Prévision: Une reproduction à petite échelle est probable à certains endroits dans les zones de reproduction hivernale du WOR et du COR. Des activités importantes ne sont pas attendues dans la RAH pendant la période de prévision.

Criquet nomade rouge (*Nomadacris septemfasciata*) (NSE): Des essaims de NSE devraient s'être formés en Tanzanie et au Mozambique en septembre et octobre.

Criquet Amérique centrale, Schistocerca piceifrons piceiferons (CAL): Aucune mise à jour n'a été reçue concernant la CAL en septembre et en octobre au moment de la compilation du présent bulletin.

D'Anacridium sp: des foyers ont persisté en septembre et octobre dans les comtés de Turkana, Wajir, Garissa et Madera au **Kenya** et des opérations de lutte étaient en cours de planification par les services de protection des végétaux MinAgri.

Criquet d'Amérique du Sud, Schistocerca cancellata (SCA): Aucune mise à jour n'a été reçue à la date de rédaction du présent bulletin. Toutefois, certaines activités devraient se dérouler dans les zones de premier foyer au cours des derniers mois.

Criquets italiens (CIT), marocains (DMA), Asian Migratory Locust (*LMI*): le DMA devrait avoir pris fin dans la plupart des régions CAC en octobre et le CIT et le LMI continueront à se développer jusqu'en octobre, mais finiront bientôt par disparaître .

Chenille Légionnaire d'automne (*Spodoptera frugiperda*) (FAW): le FAW a continué à apparaître sous les cultures irriguées et sous pluie, en Afrique et en Inde et ailleurs, en septembre et octobre (pour plus d'informations, reportez-vous aux pages 10-13).

Chenille Légionnaire africaine (AAW) (*Spodoptera exempta*): le foyer d'AAW été signalé en Malawi en octobre.

La chenille légionnaire du Sud (***Spodoptera eridania*) (SAW**), Originaire des Amériques et commune du sud des États-Unis à l'Argentine, la SAW n'a pas encore été signalée en Afrique, mais si elle était établie, ce ravageur vorace pourrait devenir un fardeau supplémentaire pour les petites agriculteurs propriétaires qui luttent déjà pour se protéger d'autres espèces nuisibles indigènes et envahissantes.

Quelea birds (QQU): Des épidémies de QQU ont été signalées dans plusieurs pays du Kenya en octobre.

La surveillance active, la surveillance, la notification, le partage d'informations et les interventions préventives en temps opportun restent critiques en tout temps pour réduire les menaces que posent les ETOP pour les cultures et les pâturages.

L'USAID / OFDA / PSPM surveille régulièrement les ETOP en étroite collaboration avec son réseau de PPV / DPV nationaux, d'organismes de contrôle et / ou de lutte antiparasitaire régionaux et internationaux, y compris la FAO, la CLCPRO, CRC, DLCO-EA et IRLCO-CSA, ainsi que des partenaires de l'Agence et des ONG. et fournit des bulletins analytiques et des rapports opportuns aux parties prenantes à travers le monde. **Résumé de fin**

OFDA's Contributions to ETOP Abatement Interventions

USAID/OFDA co-sponsored FAW disaster risk reduction project is being implemented by a group composed of the Center for Agriculture and Biosciences International (CABI), the Desert Locust Control Organization for Eastern Africa (DLCO-EA), International Center of Insect Physiology and Ecology (ICIPE) and National MinAgri and other partners with FAOSFE managing the project. To date the project has completed national level Training of Trainers (ToT) that trained several dozen officers/staff in Burundi, Ethiopia, Kenya, Rwanda, Tanzania and Uganda. It has also launched consultative district level meetings for stakeholders involving more than 300 villagers and village chiefs and others in 50 districts in six countries. Monitoring using pheromone traps and scouting are being actively implemented in all project villages. Mobile apparatus are being utilized for monitoring, documenting and reporting the situation in all countries. The OFDA-BFS co-funded FAW Field Guide for Integrated FAW Management https://feedthefuture.gov/sites/FallArmyworm_IPM_Guide_forAfrica.pdf and FAO's FAW IPM Manual for FFS were utilized for the training and scouting along with those of CABI, DLCO-EA, ICIPE and FAO.

The community/farmers' ToT field manual that CABI (Nairobi) has developed has been finalized and will soon be available for use. The Manual heavily references to the USAID FAW IPM field guide, FAO's FAW manual, and other relevant sources. It focuses on district officers, extension staff and rural communities. The manual is expected to be available for use soon

OFDA/PSPM is working with interested parties to explore means and ways to expand innovative technologies to AAW affected countries to contribute to food security and benefit farmers and rural communities.

OFDA/PSPM's interests in sustainable pesticide risk reduction in low income countries to strengthen their capacities and help avoid potentially threatening pesticide related contaminations and improve safety of vulnerable communities and their shared environment remain high on the agenda.

The online Pesticide Stock Management System (PSMS) that was developed by the UN/FAO with financial assistance from USAID/OFDA and other partners continues benefiting participating countries across the globe. Thanks to this tool, ETOP-prone countries and others have been able to avoid unnecessary procurements and stockpiling of pesticides. This practice has significantly contributed to host-countries' ability to effectively monitor, manage, minimize and avoid costly disposal operations and thereby improve safety and well-being of their citizens and their shared environment.

USAID/OFDA-sponsored DRR projects have been strengthened national and regional capacity for emergency locust control and prevention and helped tens of millions of farmers, pastoralists across Sahel West Africa, Northwest Africa, Eastern and Northeastern Africa, the Middle East and Caucasus and Central Asia (CAC). The projects created, facilitated and improved collaborations among neighboring countries for joint monitoring, surveillance, information sharing and technical support. The projects supported several dozen training on ETOP monitoring and control. Thanks to these and other similar efforts, potentially serious locust outbreaks and

invasions had been abated several times in many countries across the primary outbreak regions for more than a decade

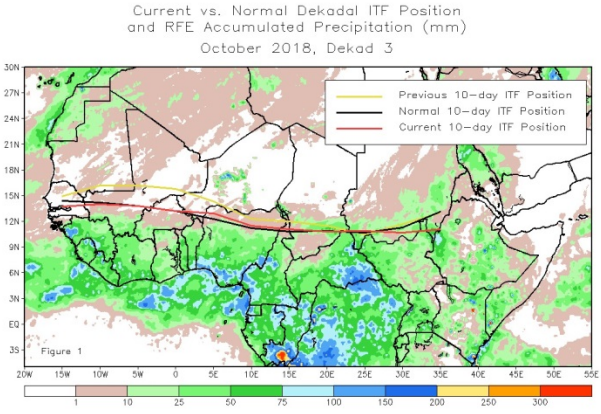
Technical and material supports that have been provided to participating frontline countries and DLCO-EA through the ***USAID/OFDA-FAO-DLCO-EA co-****sponsored Horn of Africa emergency desert locust management project has strengthened capacity to better monitor, report, prevent, and abate locusts in the sub-region.*

Note: *ETOP SITREPs can be accessed on USAID Pest and Pesticide Management website:* [USAID Pest and Pesticide Monitoring]

Weather and Ecological Conditions

From 21-31 October, the Inter-Tropical Front (ITF) continued its equatorial retreat, rapidly in the west but more slowly in the east. The ITF was close to the climatological position along most of its length. The mean western (10W-10E) portion of the ITF was approximated at 13.1N, a drop of 1.9 degrees. The displacement of the ITF to within a couple tenths of a degree of its average position put an end to late-season rain across the western Sahel.

Figure 1



The mean eastern (20E-35E) portion of the ITF was approximated at 10.9N, south of the previous dekad by 0.8 degrees. The eastern ITF position for late October fell below the normal position by 0.6 degrees and marked the 5th consecutive below-normal dekad to end the season. Figure 1 shows the current position (**red**) of the ITF compared to the climatological position (**black**) during the 3rd dekad October and its previous position (**yellow**) during the 2nd dekad of October (NOAA, 10/2018).

Figure 2.

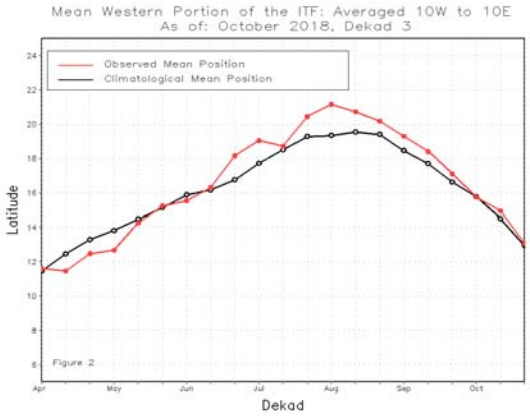
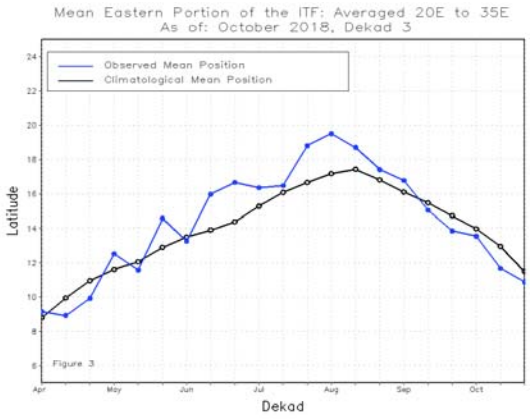


Figure 3.



Figures 2 and 3 are time series, illustrating the mean latitudinal values of the western and eastern portion of the ITF, respectively, and their seasonal evolutions since April, 2018 (NOAA, 9/2018).

During the month of October, rainfall was above-average over parts of southern

Senegal, southern Mali, parts of Guinea-Conakry, Sierra Leone, Cote d'Ivoire, Burkina Faso, parts of Ghana, Togo and Benin, western Niger, portions of Nigeria and Cameroon, local areas in Gabon, many parts of Congo-Brazzaville, portions of CAR, many parts of DRC, portions of Angola, local areas in Sudan and South Sudan, many parts of Ethiopia, local areas in Kenya and Tanzania. Rainfall was also above-average over local areas in Namibia, Mozambique, South Africa and Madagascar. In Morocco, warm weather and localized strong thunderstorms occurred in southeast of the Atlas, and southwest of the Saharan provinces was reported during October.

Below-average rainfall was reported over western Guinea-Conakry and Mali, coastal Liberia, local areas in Cote d'Ivoire and Ghana, parts of Togo and Benin, portions of Nigeria and Cameroon, Equatorial Guinea, portions of Gabon, local area in Congo Brazzaville and northern Central African Republic. Below-average rainfall was also observed over local areas in Sudan, many parts of South Sudan, local areas in Ethiopia and Uganda, portions Kenya, Southern Somalia, portions of Angola, western Zambia, northern Namibia, parts of Botswana, Zimbabwe, many parts of South Africa, local areas in Mozambique and portions of Madagascar (CNLAA/Morocco, NOAA 10/2018).

NSE Outbreak Regions: Seasonal rain commenced in the NSE region during October (IRLCO-CSA).

In CAC, no update was received at the time this bulletin was compiled, but warm and dry weather is expected to have gradually given way to cooler and drier weather with no significant rainfall expected during of September and October.

Note: *Changes in the weather pattern and increased temperature can contribute to ecological shift in ETOP habitats and increase the risk of pest outbreaks, resurgence and emergence of new pests. In Uzbekistan, Moroccan locust (DMA) which is normally a low to medium altitude pest has shown a considerable vertical habitat expansion by up to 1,000 feet or 300 meters from its ambient altitude due to warmer higher elevations.*

*The **Asian migratory locust**, an insect that normally breeds once a year, has begun exhibiting two generations per year. These anomalies which are largely attributed to the change in the weather patterns and associated ecological shift are serious concerns to farmers, rangeland managers, crop protection experts, development and humanitarian partners, etc. Regular monitoring, documenting and reporting anomalous manifestations in pest behavior and on habitat shifts remain critical to help avoid/minimize potential damage to crops, pasture and livestock and reduce subsequent negative impacts on food security and livelihoods of vulnerable populations and communities.*
http://www.cpc.ncep.noaa.gov/products/international/casia/casia_hazard.pdf
End note.

Detailed Accounts of ETOP Situation and a Forecast for the Next Six Weeks are provided below

SGR – WOR: WOR remained largely calm during September, but some activities occurred in October. In **Algeria** 5 survey and control teams were deployed to Adrar, In Guezzam, Bordj Badji Mokhtar, Illizi and El Bayadh during October and locusts begin breeding in the perimeters of agricultural areas near Hoggar, in the extreme south. Adult locusts were

controlled on 180 ha in the agricultural areas in El Bayadh (north-west) and 2nd generation breeding was reported in **Chad,** northern **Niger** and southern **Algeria** in October. Solitary adults were detected at Oued Sakia El Hamra and in the Draa and Ziz-Ghris valleys in **Morocco** during the last two dekads of October.

Surveys were not conducted in **Mali** in October, but watch brigades reported the presence of immature and mature adult locusts in the western slopes of the Adrar des Iforas and Timetrine in Tarlit, Achou,Toulout, Inchekar, And Tahotène. A mission composed of rapid intervention teams at the Gao Base has been deployed to the sub-base with support from community leaders to verify the presence of locusts. During September, three survey and control teams were deployed to Adrar, Tamanrasset and Illizi wilayas in Algeria where rainfall continued and vegetation remained green in the main wadis and irrigated areas during September. The teams detected groups of hoppers and isolated solitary adults in wadis and in the surrounding of irrigated areas in Adrar and controlled on 406 ha September. In **Mali, Mauritania, Niger**, and **Chad** limited breeding may have occurred in a few places where ecological conditions were favorable during September and October locusts from the summer breeding areas in the south are expected to have migrated north **Mauritania**. No locusts were reported in Tunisia, Senegal, Burkina Faso or Libyaduring September or October. (CNLA/Mauritania, CNLAP/Mali, CNLAA/Morocco, CNLA/Tunisia, FAO-DLIS, INPV/Algeria).

Forecast: In **WOR** locusts that are expected to have begun moving from the summer breeding areas to the north will move further north into northern Mauritania, Morocco, and Algeria and form small groups and start breeding in some localities. In **Mali** small-scale breeding that is expected to have occurred in Adrar des Iforas and Tamesna and perhaps elsewhere in the region will likely concentrate in patches of green vegetation and law laying wadis. CNCLP expects to closely monitor the situation during the coming months to predict migration routes to North Africa. Overall the WOR region will likely remain calm as ecological conditions will continue becoming unfavorable during the forecast period (INPV/Algeria, CNLCP/Mali, CNLA/Mauritania, CNLAA/Morocco, CNLA/Tunisia, FAO/DLIS, PSPM/PMI).

SGR (Desert Locust) - In **Sudan**, mature adults and hoppers were detected in North Kordofan and Northern States and in summer breeding areas in the Red Sea coast during October. Solitary, immature and mature adults were also detected in North Khartoum State along the River Nile during the first dekad of September.

Surveys were conducted in summer breeding areas along the northwest coastal and sub–coastal areas in **northern Somalia** during the first week of September and detected 5th instar hoppers west of Hadayta village and some 2nd instar hoppers 15-20 Km away from Hadayta. Small-scale breeding resulted in medium density gregarious hoppers. Solitary hoppers and isolated low density immature adults were also detected in Duqle village where light to moderate rainfall was reported in some of the areas that were surveyed. Vegetation was green in Hadayta and west of Cabdi Geedi and Duqle (west of Lughaye) where mature locusts were reported in cropping areas. During October, local breeding was

in progress and hoppers and adults were controlled on 70 ha on the northwest coast of **Somalia** with biopesticides (FAO-DLIS, PPD/Somalia).

In **Oman**, no locusts were detected in the North and South Al Batinah, Musandam, Al Bureimi, Al Wusta and Dhofar regions during September, but small-scale breeding occurred in October in areas where cyclone Luba brought heavy rain. No locusts were reported in Djibouti and no updates were received from other countries in COR during September or October. Surveys were not possible in Yemen and the situation in summer breeding areas in the interior of the country remained unclear (FAO-DLIS, LCC/Oman, PPD/Djibouti).

Forecast: As ecological conditions gradually become unfavorable in summer breeding areas, locusts will likely concentrate in patches of green vegetation and migrate to winter breeding areas along both sides of the Red Sea coasts, but significant developments are not likely during the forecast period (FAO-DLIS, LCC/Oman, PPD/Sudan).

SGR - EOR: In South-West Asia, low numbers of locusts were reported in in summer breeding areas along the Indo-Pakistan border during September and the situation remained calm during October (FAO-DLIS).

Active monitoring, timely reporting and preventive interventions remain critical to abate any major developments that could pose serious threats to crops and pasture in areas where locust activities are present.

*The **USAID/OFDA-FAO-DLCO-EA** sponsored Horn of Africa emergency desert locust management project contributed to strengthening national and regional capacity for SGR surveillance, monitoring and control. Technical and material supports that have been provided through the project enabled front-line countries and DLCO-EA to better monitor, report, and build capacity to prevent, and abate locusts in the sub-region.*

Red (Nomadic) Locust (NSE): NSE swarms and concentrations are expected to have persisted in Malagarasi Basin, Ikuu-Katavi plains, Rukwa Valley in Tanzania; Lake Chilwa/Lake Chiuta plains, Mpatasanjoka Dambo in Malawi; Buzi Gorongosa plains, Dimba plains in Mozambique and in the Kafue Flats in Zambia during September and October (IRLCO-CSA).

Forecast: NSE will likely start breeding with the onset of the rains in November/ December 2018 and hopper bands will form in January/February 2019 (IRLCO-CSA, OFDA/AELGA).

Central American Locust - Schistocerca piceifrons peceifrons (CAL): No update was received at the time this report was compiled, however mixed *populations of 1st generation of hoppers and mating and egg laying adults, which normally develop from May-September, and that were reported in* Yucatán Peninsula in **Mexico** during August are expected to have further developed during September into October

in the region.

Adult CAL/SPI in Yucatan, Mexico (photo courtesy: CESVY, 2018)

Forecast: 2nd generation CAL populations will likely further develop in the Yucatan Peninsula in **Mexico** and **Nicaragu**a during the forecast period.

Note: *CAL (SPI), native to Central and South America, belongs to the same genus as the Desert Locust, Schistocerca. It is an important pest in the tropical regions of the America particularly in Belize, México, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panamá. The pest has two generations per year. In the Yucatán Peninsula outbreak often occurs every 4 years, probably this year it may appear in higher density due to favorable ecological conditions. National entities routinely monitor the pest and the Federal and State Governments coordinate with farmers to prevent population build ups. In addition, training and other supports are provided through OIRSA – the Regional office of the International Organization for Animal and Plant Health (Mario Poot).*

South American Locust, Schistocerca cancellata (SAL): No update was received during September or October and significant populations are not expected to have occurred in Argentina, Bolivia or Paraguay.

Forecast: *SCA outbreaks are usually reported in Argentina, Bolivia and Paraguay during summer/warmer season which is often accompanied by the seasonal rains. The SCA situation is relatively calm, but warmer weather and regeneration of vegetation – shrubs, trees and grasses during spring into summer rainy seasons will allow locust populations to begin appearing and further develop in some places.* Timely cross-border surveillance and monitoring remain essential to detect and control the locusts (Senasa/Argentina).

***Tropidacris collaris* (Tucura quebrachera – TCO** - grasshopper-): No update was received during September or October and escapee locusts from the high density populations that were detected and controlled in Argentina are expected to have further subsided during this period.

Italian (CIT), Moroccan (DMA) and Migratory (LMI) Locusts in Central Asia and the Caucasus (CAC): No update was received for September or October from CAC, however, DMA is expected to have diminished in its southern range in Azerbaijan, Georgia and Armenia and northern Afghanistan, but may have persisted in its northern range in September and further diminished in October. CIT hoppers are expected to have continued developing in Kazakhstan, Tajikistan and Uzbekistan during

September, but gradually began decreasing in October. LMI is expected to have continued laying eggs in Kazakhstan, Uzbekistan, and Russian Federation through October.

Forecast: Locust situation in CAC is expected to end during the forecast period and the situation will remain calm till next spring.

Tree locust: *Anacridium spp*. outbreaks continued in Turkana, Wajir , Garissa and Madera Counties in **Kenya** during September and October. The locusts were reported feeding on *Acacia* sp vegetation, the main source of food for grazing animals. Control operations were being considered by the Crop Protection Services (IRLCO-CSA).

Fall armyworm (FAW) (S. frugiperda)

FAW continued its presence in Africa where it has been causing damage to rain-fed and irrigated crops. In eastern Africa and the Horn, the pest was detected on rain-fed/irrigated fields. In **Rwanda** and **Kenya**, the pest was observed in several farms in villages where OFDA PMI technical advisor visited during the 1st and 2nd dekads of October 2018. In **Kenya**, most of the areas where the technical advisor visited were either harvested or mature and the FAW infestations were not detected or were at low level. In **Rwanda** maize crops were at different stages during the October field visit. FAW was detected in many fields with different levels of infestations.

Beneficiaries who participate in OFDA funded project in both countries routinely monitor and scout their fields and take actions to protect their crops from FAW attack. In all locations, farmers and village chiefs clearly described the methodologies they employ to control the pest. The pest was also reported in Ethiopia, Uganda, and South Sudan during September and October. FAO and its partners developed an interactive FAW Risk-Index heat map to help monitor the potential level of risk of FAW situation in affected countries across Africa, Yemen, etc. As of now, the pest has been reported in all of sub-Saharan African, including Seychelles. Only Eritrea and Lesotho have not yet reported. http://www.fao.org/emergencies/resources/maps/detail/en/c/1110178/

FAW larva feeding on fresh corn ear in Moshi district in Kilimanjaro Region of Tanzania (photo courtesy: Juma and Didas, 13 June, 2018)

In **Malawi** and **Tanzania**, the pest was reported causing damage to irrigated maize. In **Tanzania**, FAW was reported in Baliadi and Miyatu districts in Simiyu region the northern part of the country on maize crops and control is effected by the affected farmers with technical and material assistance from the MinAgri. Awareness raising and training by PHS staff who received training through USAID/OFDA and other means cotninued. The pictures showing infested corn ears were taken during USAID/OFDA-sponsored training of community focal persons (CFP) in Usagara village in Iringa District, Iringa Region in southern Tanzania. The **CFP training is part of the OFDA/PSPM-funded community empowerment project on fall**

armyworm monitoring, early warning and management.

FAW larva feeding on fresh corn ear (kernels are at R2 growth stage) in Hanang district in Manyara Region of Tanzania (photo courtesy: Juma and Didas, 20 June, 2018)

A fall armyworm (FAW) larva (caterpillar) comfortably resting between rows of corn kernels (Photo courtesy: Didas Moshi, DLCO-EA-Tanzania 28 June, 2018).

In addition to acquiring knowledge and skills in FAW biology, behavior, monitoring, scouting, and management, participants are also sensitized on human and animal health risks associated with consuming fungal-infected grains. Awareness raising is also conducted on trade impacts of fungal-infested grains as such grans are unfit to export market in Tanzania and elsewhere.

Affected farmers pour a mixture of soil and ash to whorl during vegetative growth stage to suffocate and expel or kill the larvae. Natural enemies such as fungal pathogens, predators and parasitoids are being detected in several countries, including Kenya, Ethiopia, Madagascar and elsewhere. Handpicking and plant-based mixtures of extracts of leaves of common weeds, such as Babachico (*Chromolaena odorata – common name Siam weed, devil weed, triffid* - larvicidal chemical that can affect major mosquito vectors as well as funcigicidal, nematicidal and other useful properties[I] https://en.wikipedia.org/wiki/Chromolaena_odorata) is utilized in many countries (FAOSFE, IRLCO-CSA, PPD/Ethiopia, PPD/Somalia).

In was also reported in northern **Nigeria**, southern **Mali** and southern Senegal during August which may have persisted through September, but additional information was not available at the time this bulleting was compiled (FAONG, DPV/Mali, DPCV/Senegal). FAW was also reported in Yemen in July, but additional information was not available at the time this bulletin was compiled.

In southern **India**, FAW that was detected in July 2018 in maize crops during the kharif cropping season (July-October) at the foothills of the south-west monsoon in Karnataka State had reached neighboring Tamil Nadu State, West Bengal and Gujarat by September 2018. The pest is expected to have continued its presence and causing damage to crops during October and perhaps spread to neighboring areas and may have also reached countries neighboring India, but this needs to be confirmed.

Several species of natural enemies that can attack FAW were detected along with the pest during surveys that were conducted in all five districts in Karnataka State in the southwestern part of India. The natural enemies include egg parasitoids, e.g., *Telenomus sp*. and *Trichogramma sp*. (Hymenoptera),

gregarious larval parasitoid - *Glyptapanteles creatonoti (*Hymenoptera), a solitary larval parasitoid - *Campoletis chlorideae Uchida* (Hymenoptera), a solitary indeterminate Hymenoptera larval-pupal parasitoid - *G. creatonoti* - a well-established parasitoid that attacks various *noctuid spp.* in India and Malaysia. Other predatory natural enemies such earwigs and a pathogenic fungus, *Nomuraea rileyi* were also collected in large numbers in areas where the pest was detected. Studies are underway to develop means and ways to effectively manage the pest (Shylesha et al., 2018): http://www.informaticsjournals.com/index.php/jbc/article/viewFile/21707/17850: https://www.thehindu.com/news/national/karnataka/ravaged-by-a-caterpillar/article25010469.ece http://www.nbair.res.in/recent_events/Pest%20Alert%2030th%20July%202018-new1.pdf,

Forecast: FAW will continue being a threat to irrigated and rain-fed maize and other crops across several regions in Africa and Asia during the forecast period and will likely continue expanding its invasion territories.

http://www.exeter.ac.uk/news/featurednews/title_676373_en.html,

http://www.fao.org/news/story/en/item/1148819/icode)/,

https://www.cimmyt.org/fall-armyworm-reported-in-india-battle-against-the-pest-extends-now-to-asia/

USAID/BFS and OFDA co-funded IPM based FAW management guidance document is now available in English and French: Fall Armyworm in Africa: A Guide for Integrated Pest Management and will soon be ready in Portuguese language. USAID/BFS has developed an easy-to-use one-page pest management decision guide (PMDG) in collaboration with CABI for dozens of countries across Africa and continues working on affordable tools. The PMDG is being translated into local languages to benefit rural communities. BFS and SAWBO (Scientific Animation Without Borders) jointly developed a short, animation video clip on FAW biology, detection, scouting, monitoring, control and awareness raising for small-holder farmers *https://sawbo-animations.org/video.php?video=//www.youtube.com/embed/5rxlpXEK5g8*

https://ecd.usaid.gov/repository/pdf/50065.pdf

Active surveillance and timely reporting and preventive interventions remain crucial to address FAW problems

The need to develop safer and affordable, ecologically sustainable, economically sound and socially acceptable IPM based management interventions and assessment tools need to be available and widely disseminated to manage the threat/damage poses to small-holder farmers.

Additional info sources on FAW

Armyworm Network: A web resource for armyworm in Africa and their biological control: http://www.armyworm.org/

https://www.plantwise.org/pesticide-restrictions

Bt maize and the fall armyworm in Africa (Africa Center for Biodiversity, June 2018): https://acbio.org.za/sites/default/files/documents/BT%20Maize%20Fall%20Army%20Worm%20report.pdf

Invasive Species Compendium Datasheets, maps, images, abstracts and full text on invasive species of the world: http://www.cabi.org/isc/datasheet/29810

Drought and armyworm threaten Africa's food security:
http://www.theeastafrican.co.ke/news/Drought-and-armyworm-threaten-Africa-food-security/2558-3996692-ggws8g/index.html

http://www.fao.org/food-chain-crisis/how-we-work/plant-protection/fallarmyworm/en/

http://www.fao.org/fileadmin/templates/fcc/map/map_of_affected_areas/Fall_Armyworm_brief_-__15Dec2017_.pdf

FAO Food Chain Crisis Early Warning Bulletin for January, 2018:
http://www.fao.org/3/I8520EN/i8520en.PDF

FAO FAWRisk-Map has been developed to provide information on the risk of household food insecurity due to FAW across Africa (see below)
http://www.fao.org/emergencies/resources/maps/detail/en/c/1110178/

NURU, a mobile phone application that detected FAW eggs, larvae, pupae and damage on maize crops. The app is developed by Penn State University and UNFAO:
http://www.fao.org/news/story/en/item/1141889/icode/

https://play.google.com/store/apps/details?id=org.fao.faw

http://www.armyworm.org/

African Armyworm (AAW): AAW caterpillars were reported affecting grass pasture in Rumphi district of Muzuzu Agricultural Development Division in Malawi during October (IRLCO-CSA).

Forecast: AAW outbreaks will likely occur in more IRLCO-CSA Member Countries southern Africa following the onset of rains in November/December.

Forecasters are advised to ensure that pheromone traps are operational at the start of the rains which triggers the appearance of the pest which is followed by crop damage. Regular crop scouting is encouraged to accompany trap monitoring to ensure early detection and reporting on the presence of eggs, larvae and damage marks on plants and help facilitate rapid interventions. Vigilance and timely appropriate preventive interventions remain critical to avoid major crop damage (OFDA/AELGA).

Note: USAID/OFDA has developed printable and web-based maps for AAW trap monitoring locations, for participating outbreak and invasion countries in the central region: http://usaid.maps.arcgis.com/apps/Viewer/index.html?appid=8ff7a2eefbee4783bfb36c3e784e29cb. A similar map is also being developed for the southern region: http://usaid.maps.arcgis.com/apps/Viewer/index.html?appid=9d2ab2f918284595819836d1f16a526f (click the links for the maps). OFDA/PSPM intends to develop a similar map for FAW DDR project).

Southern Armyworm (*Spodoptera eridania*) (SAW/SER). SAW- a *pest native to the Americas widely present from the southern parts of the US down to Argentina is probably the most polyphagous (can feed on multiple host plants) of all armyworm species that belong to the Genus Spodoptera. This pest is known to feed on more than 200 species of plants in 58 families, mostly broadleaf, including, but not limited to cabbage, carrot, cassava, collard, cotton, cowpea, eggplant, okra, pepper, potato, soybean, sweet potato, tomato, avocado, citrus, peanuts, sunflower, tobacco and varies flowers and watermelon* http://entnemdept.ufl.edu/creatures/veg/leaf/southern_armyworm.htm. *(comparison: FAW has a host range of 80-100 plant species*


A mature SAW larva (caterpillar) (file photo UF)

SAW can produce multiple generations per year and completes its life cycle in 30-40 days. It is prolific and the female can lay 1,500-3,000 eggs under favorable temperature and host plant over her lifetime.

So far, SAW has not been detected in Africa on an outbreak-scale. However, its presence is not discounted. With more than 200 plant species on its menu, the presence of SAW on the African continent is certainly an additional and a serious threat to small-holder farmers who are already struggling to fend of other pests of major economic importance.

Control operations for SAW include natural enemies - parasitoids, predators, and pathogens; synthetic and biological pesticides, as well as botanical agents and other technologies. Given that the larvae of this pest are mostly external feeders, although they bore into fruits such as tomatoes, direct application of safer, effective and affordable pesticide use can be more effective on this pest than others that feed from inside plant parts.

***Quelea* (QQU):** QQU bird outbreaks were reported in Kirinyaga, Kisumu and Tana River counties in Kenya. The birds were reported attacking irrigated rice (Kirinyaga, Kisumu counties) and sorghum in Tana River County. The Crop Protection Services Division in collaboration with county extension staff were carrying out surveys for roost sites with intention of carrying out control (IRLCO-CSA).

Forecast: QQU outbreaks will likely continue being a problem to irrigated rice growers in Busia, Siaya, Kisumu and, Kirinyaga counties of Kenya and to sorghum growers in Busia and Tana River counties. Breeding will likely commence in Kenya, Mozambique, Tanzania and Zimbabwe several weeks following the onset of the rains. Fledglings and parental populations likely cause damage to small grain cereals by mid-January 2019 (IRLCO-CSA, OFDA/AELGA).

Facts: *QQU birds can travel ~100 km/day in search of food. An adult QQU bird can consume 3-5 grams of grain and destroy the same amount each day. A medium density QQU colony can contain up to a million or more birds and is capable of consuming and destroying 6,000 to 10,000 kg of seeds/day, enough to feed 12,000-20,000 people/day* (OFDA/AELGA).

Rodents: No update was received on rodents during September or October, but the pest is a constant threat to field and storage crops.

FACTS*: On average, an adult rat can consume 3-5 gm of food (grain, etc.) per day; a population of 200 rats/ha (an extremely low density/unit area) can consume a quantity enough to feed an adult sheep/day, not to mention the amount of food the rats can damage, destroy, contaminate making it unfit for human consumption, not to mention the zoonotic disease this pest carries and can transmit.*

All ETOP front-line countries *must maintain regular monitoring and surveillance. During crop in-seasons, scouting must be implemented on a regular basis. Invasion countries should remain on alert. DLCO-EA, IRLCO-CSA, DLCCs, DLMCC, CNLAs, national DPVs and PPDs, ELOs are encouraged to continue sharing ETOP information with stakeholders as often as possible and on a timely basis. Lead farmers and community forecasters must remain vigilant and report ETOP detections to relevant authorities immediately.*

Note: *A sustainable Pesticide Stewardship (SPS) can contribute to strengthening a pesticide delivery system (PDS) at the national and regional levels. A strong and viable PDS can effectively reduce pesticide related human health risks, minimize environmental pollution, reduce pest control cost, improve food security and contribute to the national economy. A viable SPS can be effectively established by linking key stakeholders across political borders and geographic regions.* ***End note.***

OFDA/PSPM encourages the use of alternatives to hard core pesticides and at all times promotes IPM to minimize risks associated with pesticide stockpiling. A judiciously executed triangulation of surplus stocks from countries with large inventories and disproportionate need to countries in need and that can effectively and safely utilize can create a win-win situation worth considering.

Inventories of Pesticide Stocks for SGR Prevention and Control

Inventory of national strategic stocks of SGR pesticides slightly changed during September with 406 ha treated and in October with 180 ha treated in Algeria.

Table 1. Inventory of Strategic SGR Pesticide Stocks in Frontline Countries

Country	Quantity (l/kg)*
Algeria	1,186,971~
Chad	34,100
Egypt	68,070~ (18,300 ULV, 49,770 l
Eritrea	17,122~ + 20,000[D]
Ethiopia	9,681~
Libya	25,000~
Madagascar	206,000~ + 100,000[D]
Mali	3,600
Mauritania	40,000
Morocco	3,490,732[D]
Niger	75,750~
Oman	10,000~
S. Arabia	89,357~
Senegal	156,000~
Sudan	169,710~
Tunisia	62,200 obsolete
Yemen	40,090[D] + 180 kg GM~

*Includes different kinds of pesticide and formulations - ULV, EC and dust;

~ data may not be current;

[D] = Morocco donated 100,000 l of pesticides to Madagascar and 10,000 l to Mauritania in 2015

[D] = In 2013 Morocco donated 200,000 l to Madagascar

[D] = Saudi donated 10,000 to Yemen and pledged 20,000 l to Eritrea

[DM] = Morocco donated 30,000 l of pesticides to Mauritania

GM = *GreenMuscle*™ (fungal-based biological pesticide)

LIST OF ACRONYMS

AAW African armyworm (Spodoptera expempta)
AELGA Assistance for Emergency Locust Grasshopper Abatement
AFCS Armyworm Forecasting and Control Services, Tanzania
AfDB African Development Bank
AGRA Agricultural Green Revolution in Africa
AME Anacridium melanorhodon (Tree Locust)
APLC Australian Plague Locust Commission
APLC Australian Plague Locust Commission
Bands groups of hoppers marching pretty much in the same direction
ASARECA Association for Strengthening Agricultural Research in Eastern and Central Africa
CABI Center for Agriculture and Biosciences International
CAC Central Asia and the Caucasus
CBAMFEW Community-based armyworm monitoring, forecasting and early warning
CERF Central Emergency Response Fund
CIT Calliptamus italicus (Italian Locust)
CLCPRO Commission de Lutte Contre le Criquett Pélerin dans la Région Occidentale (Commission for the Desert Locust Control in the Western Region)
CNLA(A) Centre National de Lutte Antiacridienne (National Locust Control Center)
COR Central SGR Outbreak Region
CPD Crop Protection Division
CRC Commission for Controlling Desert Locust in the Central Region
CTE Chortoicetes terminifera (Australian plague locust)
DDLC Department of Desert Locust Control
DLCO-EA Desert Locust Control Organization for Eastern Africa
DLMCC Desert Locust Monitoring and Control Center, Yemen
DMA Dociostaurus maroccanus (Moroccan Locust)
DPPQS Department of Plant Protection and Quarantine Services, India
DPV Département Protection des Végétaux (Department of Plant Protection)
ELO EMPRES Liaison Officers –

EMPRES Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases
EOR Eastern SGR Outbreak Region
ETOP Emergency Transboundary Outbreak Pest
Fledgling immature adult locust /grasshopper that has pretty much the same phenology as mature adults, but lacks fully developed reproductive organs to breed
GM GreenMuscle® (a fungal-based biopesticide)
ha hectare (= 10,000 sq. meters, about 2.471 acres)
ICAPC IGAD's Climate Prediction and Application Center
IGAD Intergovernmental Authority on Development (Horn of Africa)
IRIN Integrated Regional Information Networks
IRLCO-CSA International Red Locust Control Organization for Central and Southern Africa
ITCZ Inter-Tropical Convergence Zone
ITF Inter-Tropical Convergence Front = ITCZ)
FAO-DLIS Food and Agriculture Organizations' Desert Locust Information Service
Hoppers young, wingless locusts/grasshoppers (Latin synonym = nymphs or larvae)

JTWC Joint Typhoon Warning Center
Kg Kilogram (~2.2 pound)
L Liter (1.057 Quarts or 0.264 gallon or 33.814 US fluid ounces)
LCC Locust Control Center, Oman
LMC Locusta migratoriacapito (Malagasy locust)
LMM Locusta migratoria migratorioides (African Migratory Locust)
LPA Locustana pardalina
MoAFSC Ministry of Agriculture, Food Security and Cooperatives
MoAI Ministry of Agriculture and Irrigation
MoARD Ministry of Agriculture and Rural Development
NALC National Agency for Locust Control
NCDLC National Center for the Desert Locust Control, Libya
NOAA (US) National Oceanic and Aeronautic Administration
NPS National Park Services
NSD Republic of North Sudan
NSE Nomadacris septemfasciata (Red Locust)
OFDA Office of U.S. Foreign Disaster Assistance
PBB Pine Bark Beetle (Dendroctonus sp. – true weevils
PHD Plant Health Directorate
PHS Plant Health Services, MoA Tanzania
PPD Plant Protection Department
PPM Pest and Pesticide Management
PPSD Plant Protection Services Division/Department
PRRSN Pesticide Risk Reduction through Stewardship Network
QQU Quelea Qulelea (Red Billed Quelea bird)
SARCOF Southern Africa Region Climate Outlook Forum
SCA Schistocerca cancellata (South American Locust)
SFR Spodoptera frugiperda (SFR) (Fall armyworm (FAW)
SGR Schistoseca gregaria (the Desert Locust)
SPI Schistocerca piceifrons piceiferons (Central American Locust)
SSD Republic of South Sudan
SPB Southern Pine Beetle (Dendroctonus frontalis) – true weevils
SWAC South West Asia DL Commission
PBB Pine Bark Beetle
PSPM Preparedness, Strategic Planning and Mitigation (formerly known as Technical Assistance Group - TAG)
Triangulation The process whereby pesticides are donated by a country, with large inventories, but often no immediate need, to a country with immediate need with the help of a third party in the negotiation and shipments, etc. Usually FAO plays the third party role in the case of locust and other emergency pests.
UF University of Florida
USAID the Unites States Agency for International Development
UN the United Nations
WOR Western SGR Outbreak Region
ZEL Zonocerus elegans, the elegant grasshopper
ZVA Zonocerus variegatus, the variegated grasshopper, is emerging as a fairly new dry season pest, largely due to the destruction of its natural habitat through deforestation, land clearing, etc. for agricultural and other development efforts and due to climate anomalies

Point of Contact:

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http://www.cpc.ncep.noaa.gov/products/international/itf/itcz.shtml