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

résumé en français est inclus

SUMMARY

The **Desert Locust** (*Schistoseca gregaria* - **SGR**[1]) situation remained generally calm during August and only a few isolated adults were detected in a few places in western (WOR), central (COR) and eastern (EOR) outbreak regions.

Forecast: Small-scale breeding is likely in parts of the summer breeding areas in WOR, COR and EOR during the forecast period, but significant developments are not likely.

Red (Nomadic) Locust (*Nomadacris septemfasciata*) **(NSE):** NSE swarms and concentrations were controlled in Malawi during August. Swarms are expected to have formed in Tanzania and Mozambique.

Tree Locust, *Anacridium sp* outbreaks were reported in several countries in **Kenya** during August and Crop Protection Services and the Desert Locust Control Organization for Eastern Africa (DLCO-EA) carried out control operations.

Central American Locust, *Schistocerca piceifrons piceiferons* (CAL): Mixed populations of low density locusts were detected in Mexico and residual populations were observed in Nicaragua and El Salvador during August.

South American Locust, *Schistocerca cancellata* (SCA): Isolated adult locusts were sighted in Chaco Province in Argentina during joint surveys carried in August.

Italian (*CIT*), Moroccan (*DMA*), and the Asian Migratory Locusts (*LMI*): DMA is expected to have ended in the southern region and continued developing in Central Asia and the Caucasus and will gradually disappear while CIT and LMI will continue developing during the forecast period.

Fall Armyworm *(Spodoptera frugiperda)* ***(FAW)***: FAW continued being a problem to maize and other crops in eastern, central and western Africa during August. It was detected in **Yemen** in mid-July. The pest continued spreading in southern **India** where it was reported causing damage to maize crops. It will likely spread to other countries in southern, southeastern and eastern Asian countries (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 not reported in August.

Southern Armyworm (*Spodoptera eridania*) (SAW), native to the Americas and common from southern USA to Argentina has not yet been detected in Africa on an outbreak scale, but if and once established, this ravenous pest could become a heavy burden to small-holder farmers.

Quelea birds (**QQU**): QQU outbreaks were reported in **Kenya** and in several provinces of **Zimbabwe** in August and control operations were launched in both countries.

Active surveillance, monitoring, reporting, information sharing and timely 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 provides timely analytical bulletins and reports to stakeholders across the globe.* ***End summary***

RÉSUMÉ

La situation du Criquet pèlerin (*Schistoseca gregaria* - SGR) est restée généralement calme en août et seuls quelques adultes isolés ont été détectés dans quelques endroits dans les zones de flambée occidentale (WOR), centrale (COR) et orientale (EOR).

Prévision: Une reproduction à petite échelle est probable dans certaines parties des zones de reproduction estivale de WOR, COR et EOR au cours de la période de prévision, mais des développements significatifs sont peu probables.

Criquet nomade rouge (*Nomadacris septemfasciata*) (NSE): les essaims et les concentrations d'ESN ont été contrôlés au Malawi en août. Des essaims devraient s'être formés en Tanzanie et au Mozambique.

Criquet Amérique centrale, Schistocerca piceifrons piceiferons (CAL): Des populations mixtes de criquets pèlerins de faible densité ont été détectées au Mexique et des populations résiduelles ont été observées au Nicaragua et au Salvador en août.

Anacridium sp: ont été signalées dans plusieurs pays au Kenya en août et les services de protection des cultures et l'Organisation de lutte contre le criquet pèlerin en Afrique orientale (DLCO-EA) ont mené des opérations de lutte.

Criquet d'Amérique du Sud, Schistocerca cancellata (SCA): des criquets adultes isolés ont été observés dans la province de Chaco, en Argentine, lors des prospections menées conjointement en août.

Criquets italiens (CIT), marocains (DMA), Asian Migratory Locust (*LMI*): le DMA devrait s'achever dans le sud et continuer à se développer en Asie centrale et dans le Caucase et disparaîtra progressivement pendant que CIT et LMI continueront à se développer la période de prévision.

Chenille Légionnaire d'automne (*Spodoptera frugiperda*) (FAW): En août, le FAW a continué de poser problème au maïs et à d'autres cultures en Afrique orientale, centrale et occidentale. Il a été détecté au Yémen à la mi-juillet. Le ravageur a continué à s'étendre dans le sud de l'Inde, où il a été signalé qu'il avait causé des dégâts aux cultures de maïs. Il se répandra probablement dans d'autres pays d'Asie du Sud, du Sud-Est et de l'Est (pour plus d'informations, reportez-vous aux pages 10-13).

Chenille Légionnaire africaine (AAW) (*Spodoptera exempta*): aucune épidémie d'AAW n'a été signalée en août.

La chenille légionnaire du Sud (***Spodoptera eridania*) (SAW**), originaire des Amériques et commune du sud des États-Unis à l'Argentine, n'a pas encore été détectée en Afrique à une échelle épidémique, mais une fois établie, ce ravageur pourrait devenir un lourd fardeau pour les petits exploitants agricoles.

Quelea birds (QQU): des épidémies de QQU ont été signalées au Kenya et dans plusieurs provinces du Zimbabwe en août et des opérations de lutte ont été lancées dans les deux pays.

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 consortium composed of the Center for Agriculture and Biosciences International (CABI), the Desert Locust Control Organization for Eastern Africa (DLCO-EA), International Center for Insect Physiology and Ecology (ICIPE) and National MinAgri and other partners and led by FAOSFE. The project has conducted national level ToTs and trained several dozen officers/staff in Tanzania, Ethiopia, Kenya and Rwanda, Uganda and Burundi and launched district level meetings for stakeholders involving more than 600 villagers in 300 villages in 30 districts. The OFDA-BFS co-funded FAW Field manual: https://feedthefuture.gov/sites/FallArmyworm_IPM_Guide_forAfrica.pdf and FAO's FAW IPM Manual for FFS were utilized for the training and scouting.

Pheromone traps have been issued to all participating countries and mobile phones have been distributed to some countries and will be distributed to others in due course. The mobile apparatus will utilize the monitoring and forecasting application that has been developed by FAO.

The CABI (Nairobi) drafted community training of trainers field manual is in its final stage. The Manual references to the USAID field FAW field guide, FAO's FAW manual, and other relevant sources. It focuses on district officers, extension staff and rural communities. The document which is under review for design layout format and audience-specific content validation is expected to be distributed soon for technical review.

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 populations 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 minimize and avoid costly disposal operations and thereby improved safety and well-being of their citizens and their shared environment.

USAID/OFDA-sponsored DRR projects have been strengthening 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, enhanced, and facilitated 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

*The **USAID/OFDA-FAO-DLCO-EA co-**sponsored Horn of Africa emergency desert locust management project is progressing well. Technical and material supports that have been provided to participating frontline countries and DLCO-EA continue strengthening their 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*

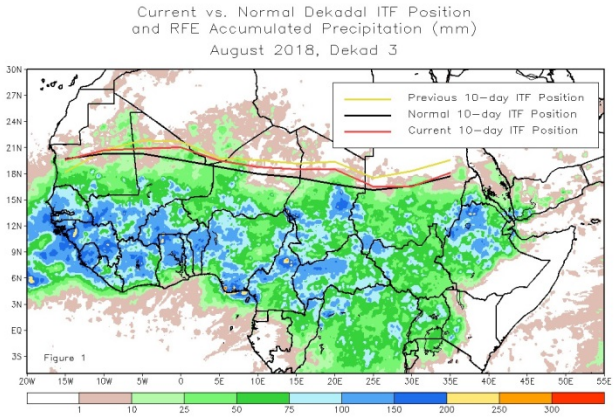
Weather and Ecological Conditions

In **Mali** and other countries in Sahel West Africa, the ITCZ remained over the northern portion of the summer breeding areas causing good rains that continued maintaining favorable ecological conditions for SGR and other pests such as FAW during August. In **Morocco**, hot weather at times with localized strong thunderstorms prevailed in the south, southeast Atlas, Sakia Al Hamra and northeast of the Saharan provinces, but ecological conditions remained unfavorable for locusts to develop (CNLCP/Mali, AELGA/OFDA, CNLCP/Mali, CNLA/Mauritania, CNLAA/Morocco,, CNLA/Tunisia).

In **Yemen**, light to moderate rainfall was reported along the Red Sea coasts between Midi to Bait Alfaqyh and in the southern coastal plains of Aden in Lahijj governorate during the 1st and 2nd dekads of August. Light rain was also reported in summer breeding areas in the interior of the country between Ramlat Sabaten and W. Hadhramout during this time (DLMCC/Yemen)

During the final dekad of August, the Inter-Tropical Front (ITF) continued its southward retreat, while still positioning itself to the north of the average position during this time of the year. The mean western (10W - 10E) portion of the ITF was located at 20.2N, anomalously north of the mean position by 0.8 degree. Consequently, above-average rainfall was observed over the Sahel during this period. The mean eastern (20E - 35E) portion of the ITF was approximated at 17.4N, which also was located to the north of the climatological position by 0.6 degree. This resulted in above-average rainfall over Sudan. Figure 1 shows the current position (**red**) of the ITF compared to the climatological position (**black**) during the 3rd dekad of August and its previous (**yellow**) position during the 2nd dekad of August.

Figure 1



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).

Figure 2.

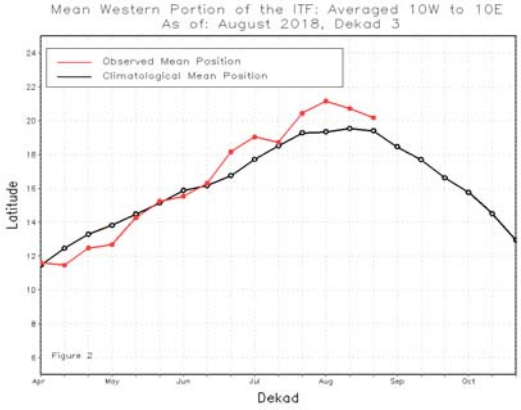
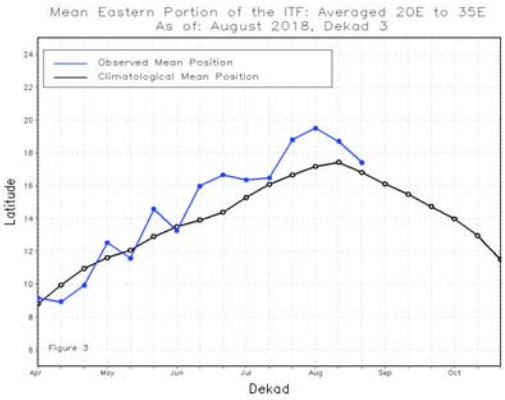


Figure 3.



NSE Outbreak Regions: Generally dry weather prevailed in the IRLCO region during August. Temperatures were relatively low at the beginning of the month but increased towards the end of the month in the outbreak areas. Vegetation burning and dry weather conditions will continue forcing locusts to further concentrate in patches of green vegetation (IRLCO-CSA, NOAA).

In CAC, warm and dry weather prevailed during August. Significant rainfall was not reported.

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: Good rains created favorable conditions in summer breeding areas in Sahel West Africa during August, but the SGR situation generally remained calm. Only a few solitary adults were reported in central **Algeria**, southeastern **Mauritania**, and northeastern **Chad**. Control operations were carried out on 106 ha near irrigated fields in central Algeria during this period. In **Mali**, two survey teams were deployed to the Kayes region along the Mali-Mauritania borders during the 2nd dekad of August. The teams surveyed close to 7,280 ha, but did not detect any SGR. The SGR remained calm in other countries in the Region (CNLA/Mauritania, CNLCP/Mali,

CNLAA/Morocco, CNLA/Tunisia, INPV/Algeria, FAO/DLIS).

Forecast: Good rains that continued in several places in **WOR** continued improving ecological conditions for SGR to start developing. Small-scale breeding will likely start in summer breeding areas in Sahel West Africa in Mauritania, Mali and perhaps Niger and Chad and southern Algeria during the forecast period, but significant developments are not expected (INPV/Algeria, CNLCP/Mali, CNLA/Mauritania, CNLAA/Morocco, CNLA/Tunisia, FAO/DLIS, PSPM/PMI).

SGR (Desert Locust) - COR: A few isolated solitary adults were detected in summer breeding areas in the interior of **Sudan** during August. No locusts were reported in Djibouti, Eritrea, Ethiopia, Oman, Somalia, or Saudi Arabia during this month and surveys were not possible in Yemen and the situation is unclear in summer breeding areas in the interior of the country due to ongoing insecurity situation (DLMCC/Yemen, FAO-DLIS, LCC/Oman, PPD/Sudan).

Forecast: Small-scale breeding is likely in summer breeding areas in the interior of **Sudan** and western **Eritrea**. Some locusts may also breed on a small-scale in southern **Oman**, southern and the Red Sea coast in **Sudan**, **Eritrea** as well as in **Yemen** and **Saudi Arabia** where favorable ecological conditions from cyclone Mekunu and other light to medium showers persisted. Limited activities may occur in northern **Somalia** and eastern **Ethiopia** where cyclone Sagar brought heavy rains, but overall, significant developments are not likely in COR during the forecast period (DLMCC/Yemen, FAO-DLIS, LCC/Oman, PPD/Sudan).

SGR - EOR: The SGR situation generally remained calm in EOR during August and only a few solitary adults were detected along the Indo-Pakistan borders where heavy rainfall caused vegetation to develop (FAO-DLIS).

Forecast: Small-scale breeding is likely during the forecast period in areas that received good rains along the Indo-Pakistan borders, but significant development is not expected.

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, prevent, and abate locusts in the sub-region.*

Red (Nomadic) Locust (NSE): In **Malawi**, IRLCO-CSA in collaboration with the Ministry of Agriculture, Irrigation and Water Development conducted aerial surveys and detected 14 low to medium-high density swarms and concentrations (8-30 locusts/m^2) on 2,050 ha in Mpatsanjoka Dambo in Salima district. The Organization's Bell 206 aircraft was utilized for the survey operations and its helicopter was employed to control the locust on the areas that were surveyed. Low to medium density swarms and concentrations (8-20 locusts/m^2) were also detected and controlled on 4,500 ha in Lake Chilwa/Lake Chiuta plains using a

hired Turbo Thrush spray aircraft that was hired (IRLCO-CSA).

In **Mozambique**, low to medium density locusts persisted in Buzi-Gorongosa and Dimba plains. Vegetation burning that was briefly disrupted in August due to the July rain is expected to commence and force locusts to further concentrate and form swarms.

In **Tanzania**, swarms/concentrations are expected to have developed in Ikuu-Katavi plains, Rukwa Valley plains and Malagarasi Basin and vegetation burning that is in progress in these areas is expected to force locusts to further concentrate.

In **Zambia**, NSE and *Cataloipus* grasshopper are expected to have started concentrating with the onset of vegetation burning which is reported to have commenced in the Kafue Flats.

Forecast: Formations of more swarms and population concentrations will be exacerbated by dry conditions and extensive vegetation burning. Some of the swarms will migrate to neighboring areas. Timely preventive controlled operations remain essential before the seasonal rains create favorable conditions for the locusts to further develop (IRLCO-CSA, OFDA/AELGA).

Routine survey and preventive interventions remain critical before the onset of the rains in these areas. IRLCO-CSA continues appealing to its Member-States to avail necessary resources to launch surveillance and the necessary control in the primary outbreak areas in Tanzania, Mozambique and Zambia (IRLCO-CSA).

Central American Locust - Schistocerca piceifrons peceifrons (CAL): *Mixed populations of the first generation (May-September) hoppers as well as mating and egg laying locusts were reported in* Yucatán Peninsula in **Mexico**. Preventive control operations using chemical and biological means effectively minimized crop damage (CESVY/Mexico)

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

In **Nicaragua**, only residual low density populations of CAL were detected in the gregarious zone where control operations were launched in León. In **El Salvador**, population increase declined in August due to preventive control interventions. A slight increase was only reported in San Vicente, but overall the situation remained calm.

Forecast: Second generation CAL populations will likely appear and develop in the Yucatan Peninsula in **Mexico** and in León, **Nicaragu**a during the forecast period.

Note: *CAL (SPI) is native to Central and South America and belongs to the same genus as the Desert Locust. It is an important pest in the tropical regions of the Americas. It is found in Belize, México, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panamá. The Pest is bi-voltine - has two generations per year. Outbreaks often occur in the Yucatán Peninsula every 4 years, probably this year the locust may*

appear in higher density due to favorable ecological conditions. National entities routinely monitor the pest. The Federal and State Governments coordinate with farmers to prevent increased 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): As part of the regional plan for the management of the South American Locust (SAL), Senasa, Argentina and Senaga, Bolivia carried out intensive cross-border surveillance in August in border area in Aguas Blancas - Villazon. Significant populations or outbreaks were not detected in Argentina, Bolivia or Paraguay during August and only isolated adult locusts were sighted in Chaco Province in Argentina (Senasa/Argentina).

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

***Tropidacris collaris* (Tucura quebrachera – TCO** - grasshopper-): High density populations of TCO was detected and controlled in Santiago del Estero, Chaco, Santa Fe and Cordoba provinces in Argentina during August. Increased temperature caused adult locust to actively migrate. Ground based spray operations were carried out against groups of adult TCO. The pest has caused severe damage to native trees and shrubs and mild damage to wheat crops. Senasa intensified control operations by involving producers/farmers (see picture of control operations below, Senasa/Argentina, 9/2018).

Italian (CIT), Moroccan (DMA) and Migratory (LMI) Locusts in Central Asia and the Caucasus (CAC): No update was received for August, DMA activities are expected to have stopped in its southern range in Azerbaijan, Georgia and Armenia and Afghanistan, but progressed in its northern range. CIT is hoppers are expected to have continued developing and fledging in Kazakhstan, Tajikistan and Uzbekistan during this month. LMI is expected to have continued mating and laying eggs, Kazakhstan, Uzbekistan, and Russian Federation. Control operations are expected to have continued.

Forecast: CIT and LMI will continue developing through October. CIT that

may have developed in the South will begin mating and laying eggs. Hatching and hopper formations will continue in the North during the forecast period. LMI will continue large–scale egg-laying in the Aral Sea during the forecast period.

Tree locust: *Anacridium spp*. outbreaks continued in Turkana, Wajir, Samburu, Marsabit, Garissa and Isiolo Counties in Kenya. Control was carried out by the Crop Protection Services in collaboration with Desert Locust Control Organization for Eastern Africa (IRLCO-CSA).

Fall armyworm (FAW) (S. frugiperda)

FAW continued its presence in several regions in Africa and India where it has been causing damage to rain-fed and irrigated crops. In eastern Africa, the pest was reported attacking crops in Kenya, Uganda, Tanzania, South Sudan, and Ethiopia during August. It is likely that the pest is present in Burundi, DRC and Rwanda where updates were not available at the time this Bulletin was compiled. 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.
http://www.fao.org/emergencies/resources/maps/detail/en/c/1110178/

A perfect biometrics image of FAW larva (File photo KSU)

In **Kenya**, FAW outbreaks were reported attacking early planted maize in Kericho, Nyeri, Embu, Nakuru and Meru Counties. Survey operations continued to assertain the situation FAW in other parts of the country. In **Tanzania**, FAW was reported in the northern region where maize crops are attacked and control is being effected by the affected farmers with technical and material assistance from the MinAgri. Awareness raising by PHS continued. In **Uganda**, FAW continued appearing in western and northeastern parts of the country, including Busoga and Karamoja where largely late planted maize crops were most affected. MinAgri provides technical and material assistance to affected farmers. OFDA co-funded project continued providing training to community focal points. In Burundi, FAW was reported on maize crops that were planted in mid-July (IRLCO-CSA, FAOSFE, PHS/Tanzania, PSMP/PMI).

In **Ethiopia**, the pest was reported in hundreds of districts in seven administrative regions where hundreds of thousands of ha of maize crops have been reported affected. In **Somalia**, the pest was reported attacking sorghum and maize crops, but further details were not available at the time this bulleting was compiled. In **South Sudan**, the pest was reported affecting maize crops in regions in the Western, Central and Eastern Equatorial States where affected farmers are employing handpicking and in places like Yambio they are employing plant-based pesticide with a mixture of extracts of leaves of a common shrub weed, locally known as Babachico (*Chromolaena odorata – common name Siam weed, devil weed, triffid…)* and chili pepper. *C. odorata* contains carcinogenic alkaloids toxic to cattle and cause allergic reactions. The plant is also known for its larvicidal chemical that can affect major mosquito vectors as well as funcigicidal,

nematicidal and other useful properties[https://en.wikipedia.org/wiki/Chromolaena_odorata (FAOSFE, IRLCO-CSA, PPD/Ethiopia, PPD/Somalia).

In **Nigeria**, FAW was reported in 11 communities in in 7 Local Governorate Areas in Borno State in northeastern part of the country during this month. In some communities, economic loss was estimated at 1-5%, but no damage data was available for other communities in the 7 local governorate areas during this time. Control operations were not implemented during this time. In **Mali** FAW was detected in maize fields in July due to early summer rainfall and continued in August) (FAONG, DPV/Mali).

In **Yemen**, FAW was first sighted in April, 2018 in Taizz in southwestern part of the country (not sure if it was confirmed) and by mid-July it was reported in the central highlands south of Sana'a. The pest is expected to have reached the **Seychelles** Island as well, but has yet to be confirmed.

In southern **India**, FAW continued causing severe damage to maize crops in in Chikkaballapur, Hassan, Shivamogga, Davanagere and Chitradurga from July-August 2018. The incidence range was 9.0 to 62.5% at various locations, with the maximum incidence recorded in Hassan district and the least at Chitradurga district. Several species of FAW natural enemies were detected along with the pest during surveys that were created in all five districts in Karnataka State in southwestern part of the country. 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 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. This situation is becoming more evident particularly in countries with more than one rainfall pattern and irrigation systems allow continued presence of favorable ecological conditions for the pest to survive, breed and cause damage to crops.

The seasonal rainfall that started in the Sahel West Africa earlier than usual will likely continue maintaining favorable conditions for the pest to further breed, spread and attack crops. Early detection by PPD/DPV and community forecasters remains critical.

FAW outbreaks will likely continue spreading to several regions of **India**, and its neighboring countries and countries afar and eventually reaching the northern regions of Australia where favorable ecological and climatic conditions exist. 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/

OFDA co-sponsored empowering community-based FAW monitoring, forecasting and management project continued providing training to the national trainers and community focal points (CFP) in all six project countries. At the time this bulletin was complied, more than 105 national trainers and close to 630 community focal persons had received training through this project. By mid-September, additional 100 CFPs are expected to have been trained (FAOSFE).

BFS has been leading FAW activities from the Agency side. It engaged scores of partners and several dozen experts from across various sectors in Africa and elsewhere and jointly developed an IPM based FAW management guidance document in collaboration with CIMMYT with co-funding from DCHA/OFDA. The document provides information on biology, ecology and control operations and addresses positive and negative impacts of FAW control tools, including pesticides and other means. The field Guide is now available in English Fall Armyworm in Africa: A Guide for Integrated Pest Management and French Fall Armyworm in Africa: A Guide for Integrated Pest Management languages and will soon be translated into Portuguese. USAID through BFS and OFDA has also provided dissemination events across various regions of Africa. It has also funded CABI to develop easy-to-use one-page pest management decision guide (PMGD) for dozens of countries across Africa and continues working on affordable tools. The PMDG is being translated into local languages to benefit communities. BFS and SAWBO (Scientific Animation Without Borders) 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*). BFS works closely with experts from across different sectors, including USAID Bureaus/Offices , academia, research centers, private sector, international and national entities, regional organizations, PIOs, etc. to help evaluate/determine safe, effective, affordable and sustainable means of managing FAW:

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

https://feedthefuture.gov/lp/partnering-combat-fall-armyworm-africa

https://fallarmywormtech.challenges.org/

Global experts on maize and key stakeholders in Asia will gather together in Ludhiana, India, on October 8-10, 2018, for the 13th Asian Maize Conference to discuss pressing issues to the crop across the continent, including the spread of fall armyworm. The conference, organized by the Indian Council of Agricultural Research, the Indian Institute of Maize Research, CIMMYT, MAIZE, Punjab Agricultural University and the Borlaug Institute for South Asia), is expected to attract more than 250 participants from almost all the major maize-growing countries in Asia. *https://www.cimmyt.org/fall-armyworm-reported-in-india-battle-against-the-pest-extends-now-to-asia/*

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.

FAOSFE continued providing support to SSD and Somalia through country specific

Trust Fund projects and other means https://reliefweb.int/report/uganda/uganda-food-security-outlook-update-october-2017-january-2018

Additional info sources on FAW

Armyworm Network: A web resource for armyworm in Africa and their biological control: *http://www.lancaster.ac.uk/armyworm/*

Latest African and Fall Armyworm Forecast from IRLCO-CSA - 5th Jul 2017: *http://www.lancaster.ac.uk/armyworm/forecasts/?article_id=002971*

Plantwise Pesticide Red List *https://www.plantwise.org/pesticide-restrictions*

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 season had ended in the southern and central and eastern outbreak regions. No reports were received from Sahel West Africa at the time this report Bulletin was compiled.

Forecast: AAW may appear in northern Eritrea and a few countries in Sahel West Africa during the forecast period, but significant developments are not expected during the forecast period.

When required, trap operators are advised to actively monitor their traps. Trap monitoring and crop scouting are encouraged for early detection and reporting on the presence of eggs, larvae and damage 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). *A pest native to the Americas widely present from the southern parts of the US down to Argentina, the SAW is probably the most polyphagous (can feed on multiple host plants) of all armyworm species that belong to the Genus Spodoptera.*

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

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*

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.

Foliar damage caused by SAW (file photo UF)

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 Narok County in **Kenya** and in Mashonaland Central, Mashonaland West, Manicaland and Matebeleland North provinces of **Zimbabwe** during August. Control operations were carried out using firebomb in Kenya and ground-based pesticide application in Zimbabwe (IRLCO-CSA).

Forecast: QQU outbreaks will likely continue be a problem to small grain cereal crops in **Kenya, Tanzania**, **Ethiopia** and **Zimbabwe** and other countries where small-grain cereals are grown (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 August, 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 August.

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

Country	Quantity (l/kg)*
Algeria	1,187,993~
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	14,998[DM]
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:

If you need more information or have any questions, comments or suggestions or know someone who would like to freely subscribe to this report or unsubscribe, please, reach out to:

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For previous ETOP SITREPs/Bulletins, click on the following website:

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