

**Emergency Transboundary Outbreak Pests (ETOPs) Situation for March
with a forecast through mid-May 2019**
résumé en français est inclus

SUMMARY

The **Desert Locust** (*Schistoseca gregaria* - **SGR**¹) situation continued improving in winter breeding areas along both sides of the Red Sea coasts in the central outbreak region (COR) during March due to a combination of intensive control operations and deteriorating ecological conditions. The western outbreak region (WOR) remained generally calm and only a few adults and hoppers were reported (but not confirmed) in northern Mali and limited breeding began in eastern Algeria. In the eastern outbreak region (EOR), control operations continued against adult groups and swarms in Iran and commenced in Pakistan during March.

Forecast: With ecological conditions further deteriorating along both side of the Red Sea coast, locusts will progressively migrate to the interior of Saudi Arabia and Yemen and move along the Nile Valley to northern Sudan. In EOR small-scale breeding will continue in Iran and Pakistan and locust numbers will slightly increase during the forecast period.

Red (Nomadic) Locust (*Nomadacris septemfasciata*) (**NSE**): No major NSE activities were reported in the primary outbreak regions during March. However, favorable breeding conditions may have caused hoppers and bands to have begun developing in some of these regions during March.

Tree Locust, *Anacridium sp.* Tree locust outbreak was reported in Turkana, Kenya where aerial control operations were launched by MinAgri in collaboration with the Desert Locust Control Organization for Eastern Africa (DLCO-EA).

Central American Locust, *Schistocerca piceifrons piceiferons* (CAL): No update was received at the time this Bulletin was compiled.

South American Locust, *Schistocerca cancellata* (SCA): No update was received at the time this Bulletin was compiled.

Italian (CIT), Moroccan (DMA), and the Asian Migratory Locusts (LMI): The locust situation in the CAC region is expected to have remained generally calm during March and only some hatching was reported in Afghanistan.

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

Fall Armyworm (*Spodoptera frugiperda*) (FAW): Mild FAW outbreaks were reported in late planted maize in Malawi, Zambia and Zimbabwe during March. The pest was also reported in Ethiopia, Kenya and perhaps a similar situation may have occurred in other countries in the region and beyond during this month (for additional information, please, refer to pages 8-10).

African Armyworm (AAW) (*Spodoptera exempta*): No AAW outbreak was reported during March.

Southern Armyworm (*Spodoptera eridania*) (SAW): Though not reported in Africa, a pest, native to the Americas, could be a serious threat to small-holder farmers across the continent if arrived.

Quelea spp. (QSP) birds: QSP outbreaks were reported in Tanzania and Ethiopia and aerial control operations were carried out by DLCO-EA in collaboration with the national Ministries of Agriculture during March.

Active surveillance, monitoring, reporting, sharing information and timely implementation of preventive interventions remain critical to abate the threats ETOPs pose to food security and livelihoods of vulnerable communities.

*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 research centers, academia, private sector, NGOs and others and issues concise analytical reports and forecasts to stakeholders across the globe through its monthly Bulletins. **End summary***

RÉSUMÉ

La situation du Criquet pèlerin (*Schistoseca gregaria* - SGR) s'améliore dans les zones de reproduction hivernale situées de part et d'autre des côtes de la mer Rouge dans la région du foyer central (COR) en mars en raison d'une combinaison d'opérations de lutte intensives et d'une dégradation des conditions écologiques. La région de la flambée occidentale (WOR) est restée généralement calme et seuls quelques adultes et des larves ont été signalés dans le nord du Mali et une reproduction limitée a commencé dans l'est de l'Algérie. Dans la région de la flambée orientale (EOR), les opérations de lutte contre les groupes d'adultes et les essaims se sont poursuivies en Iran et ont débuté au Pakistan en mars.

Prévisions: Les conditions écologiques se détériorant de plus en plus des deux côtés de la côte de la mer Rouge, les criquets migreront progressivement vers

l'intérieur de l'Arabie saoudite et du Yémen et se déplaceront le long de la vallée du Nil jusqu'au nord du Soudan. En EOR, une reproduction à petite échelle se poursuivra en Iran et au Pakistan et augmentera légèrement les effectifs acridiens au cours de la période de prévision.

Criquet nomade rouge (*Nomadacris septemfasciata*) (NSE): Aucun développement majeur n'a été signalé en mars dans les principales régions touchées par le foyer. Cependant, des conditions de reproduction favorables peuvent avoir provoqué le développement de larves et de bandes dans certaines de ces régions au cours du mois de mars.

Criquet Amérique centrale, *Schistocerca piceifrons piceiferons* (CAL): Aucune mise à jour n'a été reçue sur le CAL au moment de la rédaction du présent Bulletin.

Le criquet pèlerin, *Anacridium spp.*: Une invasion de criquets pèlerins a été signalée à Turkana, au Kenya, où des opérations de lutte aérienne ont été lancées par MinAgri en collaboration avec l'Organisation de lutte contre le criquet pèlerin en Afrique de l'Est (DLCO-EA).

Criquet d'Amérique du Sud, *Schistocerca cancellata* (SCA): Aucune mise à jour n'a été reçue à la date de rédaction du présent Bulletin.

Criquets italiens (CIT), marocains (DMA), Asian Migratory Locust (LMI): La situation acridienne dans la région de la CAC devrait être restée globalement calme en mars et seules quelques éclosions ont été signalées en Afghanistan.

Chenille Légionnaire d'automne (*Spodoptera frugiperda*) (FAW): de légères épidémies de FAW ont été signalées dans du maïs semé tardivement au Malawi, en Zambie et au Zimbabwe en mars. Le ravageur a également été signalé en Éthiopie et au Kenya. Une situation similaire pourrait s'être produite dans d'autres pays de la région et au-delà au cours de ce mois (pour plus d'informations, veuillez vous reporter aux pages 8 à 11).

Chenille Légionnaire africaine (AAW), *Spodoptera exempta*: aucun foyer d'AAW n'a été signalé en mars.

La chenille légionnaire du Sud (*Spodoptera eridania*) (SAW): Bien qu'il ne soit pas signalé en Afrique, un ravageur, originaire des Amériques, pourrait constituer une menace sérieuse pour les petits agriculteurs du monde entier s'il arrivait.

Quelea spp. oiseaux (QSP): Des foyers de QSP ont été signalés en Tanzanie et en Éthiopie et des opérations de lutte aérienne ont été menées par DLCO-EA en collaboration avec les ministères nationaux de l'Agriculture en mars.

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 opérations ETOP en étroite collaboration avec son réseau de PPD / DPV nationaux, d'entités régionales et internationales de surveillance et / ou de lutte contre les ravageurs, notamment la FAO, la CLCPRO, le CRC, le DLCO-EA et l'IRLCO-CSA, ainsi que centres de recherche, universités, secteur privé, ONG et autres et publie des rapports analytiques concis et des prévisions aux parties prenantes du monde entier par le biais de ses bulletins mensuels. Fin du résumé

OFDA's Contributions to ETOP Abatement Interventions

OFDA-BFS co-funded FAW Field Guide for Integrated FAW Management:

https://www.usaid.gov/sites/default/files/documents/1867/Fall-Armyworm-IPM-Guide-for-Africa-Jan_30-2018.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.

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 to benefit farmers and rural communities.

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.

Note: This ETOP Bulletin and previous SITREPs can be accessed on USAID Pest and Pesticide Management website: [USAID Pest and Pesticide Monitoring](#)

Weather and Ecological Conditions

During the past 30 days, rainfall was above-average over eastern Guinea, eastern Liberia, southern Cote d'Ivoire,

southern Ghana, southern Togo, southern Benin, local areas in Nigeria, southern Cameroon, western and Central African Republic (CAR), portions of Democratic Republic of Congo (DRC), parts of northern and southwestern Ethiopia, many parts of Tanzania, southern Malawi, northern Mozambique, portions of South Africa, and many parts of Madagascar. Below-average rainfall was observed over western Liberia, northern Cote d'Ivoire, parts of Nigeria, portions of Cameroon, Equatorial Guinea, Gabon, Congo, portions of DRC, much of Angola, Namibia, Botswana, portions of South Africa, Zimbabwe, Zambia, South Sudan, Uganda, parts of Ethiopia, Kenya, parts of Somalia, northern and eastern Tanzania, northern Malawi, parts of western and southern Mozambique, and local areas in Madagascar (NOAA, 4/2019).

According to a forecast model for the next two weeks, there is an increased chance for weekly rainfall totals to exceed 50 mm over local areas in Gabon, DRC and northern Angola, parts of Ethiopia, southern Tanzania, and eastern South Africa, parts of Cameroon, northwestern Angola, eastern DRC, eastern Uganda, southwestern Kenya, and parts of Tanzania (NOAA, 4/2019).

In **WOR**, ecological conditions remained generally unfavorable in the region during March and only pockets of green

vegetation were detected in wadis and low laying areas.

In Mali, ecological conditions were becoming increasingly unfavorable for SGR to survive in the grangerization areas. Annual plants are drying out except for some patches of *Schouwia sp.* (CNLC/Mali). In Mauritania, ecological conditions were unfavorable and patches of green vegetation were reported in the wadis and Grara in Adrar (CNLAA/Mauritania).

In Morocco, stormy showers were reported on the Atlas and neighboring areas in the western plains and elsewhere in the region. Moist soil was reported in the southeast, the northern and central plains, and the northern provinces. The temperature was ranging from as low as -3 °C on the Atlas mountains to 37°C in the extreme south of country during March. Vegetation was generally dry in the southern part of the country and patches of green vegetation were only reported in wadis and low laying areas across the Draa Valley, Sakia El Hamra and southeastern part of the country (CNLAA/Morocco). In Tunisia, insignificant showers were recorded in Kebili (1 mm) and Chebiba-Gafsa (15 mm) and patches of sparse green vegetation were detected in some locations during this month (DGSV&CIA/Tunisia).

In Chad, dry and hot weather prevailed with temperatures progressively rising to reach 41°C in some localities in the northern and central northern parts of the country. Northwesterly and northerly wind prevailed, bringing dust storms during March (ANLA/Chad).

In **COR**, although light showers were reported on the coast areas in Eritrea and adjacent areas in Sudan and in Djibouti, ecological conditions are rapidly

deteriorating in winter breeding areas. Vegetation is still green and viable in the Nile Valley, Kassala and the interior of northern Sudan (PPD/Sudan).

In **EOR**, heavy rainfall was reported in Pakistan and Iran during later March and early April, respectively. These and good rains that fell in the coastal and the interior of Baluchistan in southwest Pakistan during the 2nd dekad of February will create favorable conditions for SGR to further develop (FAO-DLIS).

NSE Outbreak Regions: Normal to below normal rainfall was reported in areas near the NSE outbreak areas during March. Flooding from cyclone Idai affected NSE outbreak areas in Buzi-Gorongosa plain during March and a similar situation likely occurred in Malawi as well (IRLCO-CSA).

In **CAC**, no update was received at the time this Bulletin was compiled, but cooler and drier weather is expected to have prevailed in the region during March.

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: The SGR situation remained generally calm in WOR in March. Only a few immature and mature adults mixed with 5th instar hoppers were reported by the watch brigade/nomads and villagers (but yet to be confirmed) in areas near Inchekar and Tadakite in northern Mali. A few solitary adults were detected in wadis and the Draa Valley in Morocco during this month and a local breeding was reported in eastern Algeria. The situation remained calm in Mauritania, Tunisia and Chad and a similar situation is likely in Burkina Faso, Niger, Senegal and Libya where updates were not received during March (ANLA/Chad, CNLA/Mauritania, CNLAA/Morocco, CNLAP/Mali, DGSCVIA/Tunisia, FAO-DLIS).

Forecast: In WOR, limited breeding is likely in the Draa Valley in Morocco and parts of the Sahara in Algeria where ecological conditions are favorable. The situation in other countries in WOR will likely remain calm during the forecast period (CNLAA/Mauritania, CNLAP/Mali, CNLAA/Morocco, DGSCVIA, FAO-DLIS).

SGR – COR: In COR, SGR situation began gradually improving in winter breeding areas along both sides of the Red Sea coasts during March due to a combination of intensive control operations and deteriorating ecological conditions. Control operations treated 4,021 ha in Egypt, 25,950 ha in Sudan, 7,115 in Eritrea and 45,705 ha in Saudi Arabia during March.

In **Yemen**, limited survey was conducted during the first 3 days of March in Lahij in the Gulf of Aden area and locusts were not detected along the coastal areas. A few hopper bands were detected in Wadi Safe west Al Qhydah in Almahara Province. A similar situation may exist in areas between eastern Romah and Wadi Hadhramout to near Omani border in the eastern part of the country. The situation on the Red Sea coastal areas is unclear due to lack of survey operations caused by insecurity situation. No locusts were reported in Oman, Djibouti or elsewhere in the region during March (DLMCC/Yemen, LCC/Oman, FAO-DLIS, UNAA/Djibouti).

Forecast: In Sudan allochthonous locusts/swarms are likely to arrive from Eritrea, but no significant development is expected along the borders where ecological conditions will further deteriorate as vegetation continuously drying up and soil remained dry. Escape swarms and locust groups may appear in Kassala and River Nile states where vegetation is still green. In Saudi Arabia and Yemen groups and swarms will continue to move to spring breeding areas in the interior from Gassim to Hail and Jubail in Saudi and to Marib, Aljawf, Shabwah and Hadhramout in Yemen and begin breeding provided rainfall occurs during the forecast period (DLMCC/Yemen, FAO-DLIS, PPD/Sudan).

SGR - EOR: SGR was reported mating, breeding and laying eggs in southeastern Iran and southwestern Pakistan where control operations treated 2,760 ha in Iran and 345 ha in Pakistan during March (FAO-DLIS).

Forecast: Hatching and further breeding is likely in spring breeding areas along the southeastern/western parts of Iran and Pakistan, respectively. This may cause local infestations and allochthonous swarm invasions in southwestern Pakistan during the forecast period (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.

Red (Nomadic) Locust (NSE):

Although fledging was expected to have taken place, major developments were not reported during March. However, given the favorable ecological conditions that followed Tropical Cyclone Idai, hoppers and bands are expected to have begun developing in the primary outbreak regions (IRLCO-CSA).

Forecast: NSE swarms and groups may start forming in the primary outbreak areas in the Ikuu-Katavi plains, North Rukwa plains, Malagarasi Basin in Tanzania; in Lake Chilwa/Lake Chiuta plains in Malawi/Mozambique and in the Kafue Flats, Zambia where successful breeding is expected to have occurred. Aerial surveys and timely control interventions remain necessary to abate any major threats the pest poses to crops and pasture (IRLCO-CSA, OFDA/AELGA).

Central American Locust - *Schistocerca piceifrons piceifrons*

(CAL): No update was received at the time this Bulletin was compiled.

Forecast: Limited activities may occur in the primary outbreak areas in **Mexico** and **Nicaragua** during the forecast period.

South American Locust, *Schistocerca cancellata* (SAL): No update was received at the time this bulletin was compiled, although it is likely the pest may have been present during March.

Forecast: *SCA will likely continue appearing in areas where ecological conditions persist in Argentina, Bolivia and/or Paraguay.*

***Tropidacris collaris* (Tucura quebrachera – TCO - grasshopper-):** No update was received at the time this Bulletin was compiled.

Italian (CIT), Moroccan (DMA) and Migratory (LMI) Locusts in Central Asia and the Caucasus (CAC): Limited-scale hatching of DMA was reported in Balkh province of Afghanistan on 25 March. No updates were received from other countries in the CAC region during March (FAO-ECLO).

Forecast: DMA will continue hatching further developing and maturing in Afghanistan and start hatching in Kazakhstan and fledge during the forecast period. Hatching is also likely in Turkmenistan, Uzbekistan, Tajikistan, Kyrgyzstan and Georgia, but significant developments are not expected during the forecast period (OFDA/PSPM, FAO-ECLO).

Tree locust: *Anacridium spp.* outbreak was reported in Turkana County in Kenya during March and control operations were

carried out by DLCO-EA aircraft in collaboration with the PPD of MinAgri.

Fall armyworm (FAW) (*S. frugiperda*)

FAW was reported in several countries during this month.

In **Madagascar**, FAW was reported in most of the maize growing regions of the countries in the greater south during February and March. According to a joint workshop by FAO and MinAgri, FAW infestations were reported in 11 of the 23 regions of the country where estimated total maize crops affected were put at 37% and 80%. This implies a potentially serious yield loss that can adversely impact food security and livelihoods of affected communities (**Note**: most of the areas that were assessed were in the southern part of the country that frequently suffers from drought and is largely under development compared to other regions of the country). Minor crops in the region - millet and sorghum - were reported doing well in several places in the country. **End note**).

MinAgri and FAO proposed an immediate intervention (MinAgri proposed pesticide application and FAO proposed biological control and capacity strengthening). MinAgri estimates the total cost of the proposed control interventions at \$3,643,000.

In **Ethiopia**, FAW infestations were reported in *Belg* (short-rain) Maize and Sorghum crops in the Southern Nations, Nationalities and Peoples Administrative Region. Some 2,590 ha were reported infested in 119 villages in 20 Districts. Control operations were launched on 2,125 ha mainly through mechanical means (larval hand-picking) and by using pesticides. Some 280 Pheromone traps were also distributed to 14 Districts in

Amhara, SNNP and Oromya Administrative Regions to reinforce monitoring and scouting (DLCO-EA).

FAW outbreaks were reported affecting late planted maize in Malawi, Zambia and Zimbabwe during March. Infestations were also reported in Kakamega County in **Kenya** where the pest was detected affecting early planted maize (IRLCO-CSA).

Damage data on affected crops in all countries has yet to arrive.

Forecast: FAW will likely continue affecting irrigated and/or rainfed maize and other crops in several countries in sub-Saharan African and across Southeast Asia during the forecast period.

Forecasters (including Community Focal Persons of the CBFAMFEW project), trap operators, scouting teams and extension agents must remain vigilance and alert PPD staff, farmers, local communities and concerned authorities on egg, larval and moth detections on a timely manner.

Lack of updates from FAW-prone regions or countries during this time does not necessarily herald the absence of infestations given that both rain-fed and irrigated cereal and other crops are susceptible to the pest. OFDA/PSPM continues the search for additional information and issues updates and alerts as necessary (OFDA/PSPM).

Note: To date, FAW has been reported in all of sub-Saharan Africa, but Lesotho as well as in Yemen, India, Sri Lanka, Bangladesh, Myanmar, Thailand and China and perhaps, Nepal. It is highly likely that FAW will continue spreading further to other countries in Southeast Asia and the Pacific regions. In China, the second largest maize producing country

in the world next to the USA, and elsewhere, the impact of FAW on both small-scale and commercial maize production system could be immense.

The detection of FAW in Sudan (more so along the Nile River) could mean a serious threat in its northward spread affecting miles of irrigation schemes along the Nile (Valley) and likely reach the northeastern end of the continent.

Seasonal movements reinforced by trade, land, water and air travel can significantly contribute to further spread of FAW across nations, regions, and even continents and establish in areas with suitable ecological conditions (continued availability of vegetation, ambient temperature and moisture/precipitation).

With its voracious appetite and more than 186 species of plants to choose from, including important staple and commercial crops, many of which are grown in warmer and moist regions across Africa, the Americas, Asia, Australia, the Pacific Region, etc., it is unlikely that FAW will go hungry in anyone of its new invasion territories.

End note.

Activity updates:

USAID/OFDA co-sponsored FAW project being implemented by a consortium or a group composed of the Center for Agriculture and Biosciences International (CABI), the Desert Locust Control Organization for Eastern Africa (DLCO-EA), the International Center of Insect Physiology and Ecology (ICIPE) and National MinAgries and other partners and FAOSFE managing is progressing well.

Through the USAID/OFDA-funded community empowerment project, CABI

in collaboration with other project partners has finalized the first edition of the much awaited Training of Trainers (ToT) manual on FAW monitoring, early warning and management interventions. This comprehensive ToT manual has been posted on FAO website and can be easily accessed and downloaded here:

<http://www.fao.org/3/CA2924EN/ca2924en.pdf>

The project has also prepared twenty eight (28) posters and fliers in 8 languages, including, Amharic, English, French, Luganda, Kinyarwanda, Oromfa, Runyankore and Swahili, and will soon be disseminated across eastern Africa and the Horn.

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 be available in Portuguese language.

USAID/BFS and CABI jointly developed an easy-to-use one-page pest management decision guide (PMDG) for dozens of countries across Africa and more are expected to come out. 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/5rxlpXEK5q8>



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



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

USAID/OFDA senior technical advisor for pests and pesticides and project manager will be visiting OFDA CBFAMFEW project sites in participating countries in the coming months. The technical advisor will be monitoring and assessing project activities and report back.

Note: Several species of potentially effective natural enemies of FAW have been identified in Ethiopia, Kenya, Tanzania, Madagascar, India, etc. Studies are being conducted in Africa and Asia on several of these natural enemies (parasites, parasitoids, predators and entomopathogens) to better understand their safety, efficacy, environmental impacts and other important traits. Some are also being tested along-side other agro-ecological tools, including push-pull technology, etc., in an effort to develop effective, affordable, accessible, adaptable and for sustainable means of managing the pest

<http://www.informaticsjournals.com/index.php/jbc/article/viewFile/21707/17850>. **End note.**

Additional sources on FAW

Highly hazardous pesticides cannot and must not be considered or used for FAW control!

USAID Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) contains

a list of pesticides assessed as relatively safer for use against FAW:

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

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

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

CABI FAW Portal within the ISC contains identification guides, manuals (including the USAID/CIMMYT IPM manual), videos, photos, abstracts on the latest FAW research: <https://www.cabi.org/ISC/fallarmyworm>

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>

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/>

FAO developed an interactive FAW Risk-Index heat map to help monitor potential risk of FAW infestation in countries where the pest has been reported

<http://www.fao.org/emergencies/resources/maps/detail/en/c/1110178/>

NURU, a mobile phone application that detects FAW eggs, larvae, pupae and damage on maize crops is developed by Penn State University in collaboration with UNFAO:

<http://www.fao.org/news/story/en/item/1141889/icode/>

Dissemination of safer, affordable, socially acceptable IPM-based pest management and assessment tools remains critical in abating FAW infestations and minimizing crop damage.

African Armyworm (AAW): No AAW outbreak has ended in the southern outbreak regions and no infestations were reported during March (DLCO-EA, IRLCO-CSA).



Forecast: AAW activities may commence in the secondary breeding regions in its central and northern outbreak regions in Kenya and northern Tanzania during the forecast period. <http://www.armyworm.org/>

Pheromone traps must be maintained and monitoring must commence at the foot-hills of the seasonal rains. Trap operators must collect trap data regularly and report to national forecasting officers. Timely and appropriate preventive interventions remain critical to avoid major crop damage (OFDA/AELGA).

Note: OFDA/PSPM has developed printable and web-based interactive maps for AAW project sites in project countries and potential participating countries:

<http://usaid.maps.arcgis.com/apps/Viewer/index.html?appid=8ff7a2eefbee4783bfb36c3e784e29cb>.

<http://usaid.maps.arcgis.com/apps/Viewer/index.html?appid=9d2ab2f918284595819836d1f16a526f>

OFDA/PSPM is considering a similar map for the CBFAMFEW project sites

Southern Armyworm (*Spodoptera eridania*) (SAW/SER). SAW, a pest native to the Americas and present from southern region of the USA to Argentina, could be a serious threat to small-holder

farmers across Africa, Asia and elsewhere where it may invade – much the same way other invasive species, including FAW, tomato leaf miner, Mediterranean fruit fly, weeds, pathogens e.g., *Cuscuta*, Mesquite, Ug99, and many more, cause extensive damage to crops, natural resources and the environment, etc.

Strong quarantine services and vigilance monitoring and surveillance remain essential to prevent such pests from entering and invading a new territory.

Quelea sp. (QSP): QSP outbreaks were reported damaging irrigated rice, sorghum and millets in Kagera, Kilimanjaro, Dodoma and Shinyanga Regions in **Tanzania** and in irrigated wheat Afar Administrative Region in **Ethiopia** during March. Aerial control operations were carried out by DLCO-EA with pesticide, material and ground supports provided by MinAgrs (DLCO-EA, IRLCO-CSA).

Forecast: QSP outbreaks are likely to continue being a problem to small grain cereal growers in Shinyanga, Kilimanjaro, Dodoma, Tabora, Kagera, Singinda and Mbeya regions of Tanzania, as well as elsewhere during the forecast period (IRLCO-CSA, OFDA/PSPM).

Facts: QSP birds can travel ~ 100 km/day in search of food. An adult Quelea bird can consume 3-5 grams of grain and destroy the same amount each day. A medium density Quelea 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 March, 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 promotes an IPM approach to minimize risks associated with pesticide stockpiling. A judiciously executed triangulation of surplus stocks from countries with large inventories to countries that can safely

and effectively 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 changed during March with more than 82,790 ha treated in total in COR region (detail: 25,950 ha in Sudan, 4,021 ha in Egypt, 7,115 ha in Eritrea and 345,705 ha in Saudi Arabia).

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

Country	Quantity (l/kg)*
Algeria	1,186,842~
Chad	34,100
Egypt	68,070~ (10,257 ULV, 49,770 I)
Eritrea	580~
Ethiopia	9,681~
Libya	25,000~
Madagascar	206,000~ + 100,000 ^D
Mali	3,600
Mauritania	40,000
Morocco	3,415,178 ^D
Niger	75,750~
Oman	10,000~
Saudi Arabia	25,184~
Senegal	156,000~
Sudan	109,081
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 the most 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*TM (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 Criquet 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)

DPPOS 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

<i>ITF</i>	<i>Inter-Tropical Convergence Front = ITCZ</i>	<i>SARCOF</i>	<i>Southern Africa Region Climate Outlook Forum</i>
<i>FAO-DLIS</i>	<i>Food and Agriculture Organizations' Desert Locust Information Service</i>	<i>SCA</i>	<i>Schistocerca cancellata (South American Locust)</i>
<i>Hoppers</i>	<i>young, wingless locusts/grasshoppers (Latin synonym = nymphs or larvae)</i>	<i>SFR</i>	<i>Spodoptera frugiperda (SFR) (Fall armyworm (FAW))</i>
<i>JTWC</i>	<i>Joint Typhoon Warning Center</i>	<i>SGR</i>	<i>Schistoseca gregaria (the Desert Locust)</i>
<i>Kg</i>	<i>Kilogram (~2.2 pound)</i>	<i>SPI</i>	<i>Schistocerca piceifrons piceiferons (Central American Locust)</i>
<i>L</i>	<i>Liter (1.057 Quarts or 0.264 gallon or 33.814 US fluid ounces)</i>	<i>SSD</i>	<i>Republic of South Sudan</i>
<i>LCC</i>	<i>Locust Control Center, Oman</i>	<i>SPB</i>	<i>Southern Pine Beetle (Dendroctonus frontalis) – true weevils</i>
<i>LMC</i>	<i>Locusta migratoriacapito (Malagasy locust)</i>	<i>SWAC</i>	<i>South West Asia DL Commission</i>
<i>LMM</i>	<i>Locusta migratoria migratorioides (African Migratory Locust)</i>	<i>PBB</i>	<i>Pine Bark Beetle</i>
<i>LPA</i>	<i>Locustana pardalina</i>	<i>PSPM</i>	<i>Preparedness, Strategic Planning and Mitigation (formerly known as Technical Assistance Group - TAG)</i>
<i>MoAFSC</i>	<i>Ministry of Agriculture, Food Security and Cooperatives</i>	<i>Triangulation</i>	<i>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.</i>
<i>MoAI</i>	<i>Ministry of Agriculture and Irrigation</i>	<i>UF</i>	<i>University of Florida</i>
<i>MoARD</i>	<i>Ministry of Agriculture and Rural Development</i>	<i>USAID</i>	<i>the United States Agency for International Development</i>
<i>NALC</i>	<i>National Agency for Locust Control</i>	<i>UN</i>	<i>the United Nations</i>
<i>NCDLC</i>	<i>National Center for the Desert Locust Control, Libya</i>	<i>WOR</i>	<i>Western SGR Outbreak Region</i>
<i>NOAA (US)</i>	<i>National Oceanic and Aeronautic Administration</i>	<i>ZEL</i>	<i>Zonocerus elegans, the elegant grasshopper</i>
<i>NPS</i>	<i>National Park Services</i>	<i>ZVA</i>	<i>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</i>
<i>NSD</i>	<i>Republic of North Sudan</i>		
<i>NSE</i>	<i>Nomadacris septemfasciata (Red Locust)</i>		
<i>OFDA</i>	<i>Office of U.S. Foreign Disaster Assistance</i>		
<i>PBB</i>	<i>Pine Bark Beetle (Dendroctonus sp. – true weevils</i>		
<i>PHD</i>	<i>Plant Health Directorate</i>		
<i>PHS</i>	<i>Plant Health Services, MoA Tanzania</i>		
<i>PPD</i>	<i>Plant Protection Department</i>		
<i>PPM</i>	<i>Pest and Pesticide Management</i>		
<i>PPSD</i>	<i>Plant Protection Services Division/Department</i>		
<i>PRRSN</i>	<i>Pesticide Risk Reduction through Stewardship Network</i>		
<i>QSP</i>	<i>Quelea species (Red Billed Quelea bird)</i>		

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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