

Emergency Transboundary Outbreak Pest (ETOP) Situation Bulletin for April with a forecast through mid-June 2021
résumé en français est inclus

SUMMARY

The **Desert Locust** (*Schistoseca gregaria* - **SGR**¹): In the Central Outbreak Region (COR) there was a significant decline in swarm numbers due largely to intensive control and delayed seasonal rain in Ethiopia and Somalia. As rains began falling in breeding areas in Ethiopia, swarms began maturing and laying eggs and some began moving east to northwest Somalia. In northeast Somalia, swarms remained immature due to dry conditions. Control operations treated 14,370 ha in Ethiopia and 5,120 ha in Somalia during this month. In Kenya, where a significant swarm decline was reported, only 136 ha were treated during this month. An immature swarm was reported in northeast Tanzania. Fledging occurred on the Red Sea coast of Sudan and treated 4,640 ha. In Saudi Arabia, widespread hatching and band formations were reported in the interior of the country where fledging and immature adults were formed towards the end of April; control operations treated 8,250 ha during this month. Strong southerly winds carry mature adult groups and small swarms from Saudi Arabia to Iraq (140 ha controlled), Jordan (1,500 ha treated), Syria (2,867 ha treated), Lebanon (406 ha treated), Israel, and Sinai in Egypt (307 ha treated). In the western outbreak region (WOR, limited localized breeding occurred in Algeria and scattered adults were detected in northern Mali. In the eastern outbreak region (EOR) only a few mature swarms from Saudi Arabia arrived in southwestern part of Iran and were treated on 1,521 ha during this month. <http://www.fao.org/ag/locusts/en/info/info/index.html>

Forecast: In COR, hatching and band formations began in areas of recent rainfall in Ethiopia. A similar situation is likely in northern Somalia and perhaps in localized areas in northern Kenya. *Active surveillance and timely control interventions remain critical to abate any potential increase in locust numbers during the forecast period.* Limited hatching and band formation is likely in Iraq, Jordan, Syria, and Israel and Sinai (Egypt). Immature adult groups and small swarms will likely form in the interior of Saudi Arabia and move to the interior of Yemen and other countries along the Persian Gulf, during southerly winds, to Jordan and Iraq. Breeding is likely in the interior of Yemen and the situation will remain calm in Sudan and Eritrea during the forecast period. In WOR, the situation will remain relatively calm during the forecast period. In EOR, small adult groups will likely form in southwest Iran and may be supplemented by groups and small swarms likely arriving from the Arabian area and move east along the southern coast towards Pakistan, but no major activity is expected during the forecast period. <http://www.fao.org/ag/locusts/en/info/info/index.html>

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

Red (Nomadic) Locust (*Nomadacris septemfasciata*) (**NSE**): NSE swarms are expected to have begun developing in primary outbreak areas in Malawi, Mozambique and Zambia. Aerial surveys revealed scattered isolated populations in Ikuu Katavi plains and Bahi Valley, Tanzania.

African Migratory Locust: *Locusta migratoria migratorioides* (**LMI**): LMI was reported in Zambia and Zimbabwe where ground control operations were carried out using motorized knapsack sprayers in both countries.

Tree Locusts, *Anacridium spp.* (**ASP**): No report on ASP during this month.

Central American Locust, *Schistocerca piceiferons* (**SPI**)(**CAL**): CAL was in recession in Mexico and Central America and expected to begin breeding at the foothills of the seasonal rains from late April/early May on.

South American Locust, *Schistocerca cancellata* (**SCA**): No update was received at the time this bulletin was compiled; however, locust activities are expected in Argentina and adjacent areas during the month.

Italian (CIT), Moroccan (DMA), and Asian Migratory Locusts (LMI): No update was received on DMA, CIT or LMI in CAC during this month.

Fall Armyworm (*Spodoptera frugiperda*) (**FAW**): FAW was reported attacking maize in Kenya, Tanzania; a similar situation is likely elsewhere where maize and other similar crops are in season.

African Armyworm (AAW) (*Spodoptera exempta*): AAW outbreaks were not reported during this month.

Quelea spp. (QSP): QSP outbreaks were reported on small grain cereal crops several regions in Tanzania and controlled.

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

USAID/OFDA/PSPM regularly monitors ETOPs 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, and research centers, academia, private sector, NGOs and others and issues concise, analytical Bulletins to stakeholders. **End summary**

RÉSUMÉ

La situation du Criquet pèlerin (*Schistoseca gregaria* - SGR): Dans la région centrale de l'épidémie (COR), il y a eu une baisse significative du nombre d'essaims en raison principalement d'un contrôle intensif et du retard des pluies saisonnières en Éthiopie et en Somalie. Alors que les pluies ont commencé à tomber dans les zones de reproduction en Éthiopie, des essaims ont commencé à mûrir et à pondre et certains ont commencé à se déplacer vers l'est vers le nord-ouest de la Somalie. Dans le nord-est de la Somalie, les essaims sont restés immatures en raison des conditions sèches. Les opérations de lutte ont traité 14 370 ha en Éthiopie et 5 120 ha en Somalie au cours de ce mois. Au Kenya, où un déclin significatif des essaims a été signalé, seuls 136 ha ont été traités au cours de ce mois. Un essaim immature a été signalé dans le nord-est de la Tanzanie. L'envolée a eu lieu sur la côte de la mer Rouge au Soudan et a traité 4 640 ha. En Arabie saoudite, des éclosions et des formations de bandes généralisées ont été signalées à l'intérieur du pays, où des ailés à l'envol et immatures se sont formés vers la fin avril; les opérations de lutte ont traité 8 250 ha au cours de ce mois. De forts vents du sud transportent des groupes d'ailés matures et de petits essaims de l'Arabie saoudite vers l'Irak (140 ha contrôlés), la Jordanie (1500 ha traités), la Syrie (2867 ha traités), le Liban (406 ha traités), Israël et le Sinaï en Égypte (307 ha traité). Dans la région ouest de l'épidémie (WOR, une reproduction localisée limitée a eu lieu en Algérie et des ailés épars ont été détectés dans le nord du Mali. Dans la région de l'épidémie orientale (EOR), seuls quelques essaims matures d'Arabie saoudite sont arrivés dans le sud-ouest de l'Iran et ont été traités sur 1 521. ha pendant ce mois. <http://www.fao.org/ag/locusts/en/info/info/index.html>

Prévisions: Au COR, des éclosions et des formations de bandes ont commencé dans les zones de pluies récentes en Éthiopie. Une situation similaire est probable dans le nord de la Somalie et peut-être dans des zones localisées du nord du Kenya. Une surveillance active et des interventions de lutte en temps opportun restent essentielles pour réduire toute augmentation potentielle des effectifs acridiens au cours de la période de prévision. Des éclosions et une formation de bandes limitées sont probables en Irak, en Jordanie, en Syrie, en Israël et dans le Sinaï (Égypte). Des groupes d'ailés immatures et de petits essaims se formeront probablement à l'intérieur de l'Arabie saoudite et se déplaceront vers l'intérieur du Yémen et d'autres pays le long du golfe Persique, lors des vents du sud, vers la Jordanie et l'Irak. Une reproduction est probable dans l'intérieur du Yémen et la situation restera calme au Soudan et en Érythrée pendant la période de prévision. Au WOR, la situation restera relativement calme pendant la période de prévision. Dans l'EOR, de petits groupes d'ailés se formeront probablement dans le sud-ouest de l'Iran et pourraient être complétés par des groupes et de petits essaims susceptibles d'arriver de la zone arabe et de se déplacer vers l'est le long de la côte sud en direction du Pakistan, mais aucune activité majeure n'est prévue au cours de la période de prévision. <http://www.fao.org/ag/locusts/en/info/info/index.html>

Criquet nomade (*Nomadacris septemfasciata*) (NSE): NSE s'attend à ce que des essaims de NSE aient commencé à se développer dans les principales zones de foyers au Malawi, au Mozambique et en Zambie. Des prospections aériennes ont révélé des populations isolées dispersées dans les plaines d'Ikuu Katavi et la vallée de Bahi, en Tanzanie est restée calme au cours du mois.

Criquet migrateur africain: *Locusta migratoria migratorioides* (LMI): LMI a été signalée en Zambie et au Zimbabwe où des opérations de lutte au sol ont été menées à l'aide de pulvérisateurs à dos motorisés dans les deux pays.

Le criquet arborial, *Anacridium spp*: (ASP): Aucun rapport sur ASP au cours de ce mois.

Criquet Amérique centrale, *Schistocerca piceifrons piceiferons* (SPI): CAL était en récession au Mexique et en Amérique centrale et devrait commencer à se reproduire au pied des pluies saisonnières à partir de fin avril / début mai.

Criquet d'Amérique du Sud, *Schistocerca cancellata* (SCA): Aucune mise à jour n'a été reçue au moment de la compilation de ce bulletin; cependant, des activités acridiennes sont attendues en Argentine et dans les zones adjacentes au cours du mois.

Criquets italiens (CIT), marocains (DMA), Asian Migratory Locust (LMI): Aucune mise à jour n'a été reçue sur le DMA, le CIT ou ILMI dans la CAC au cours de ce mois.

Chenille Légionnaire d'automne (*Spodoptera frugiperda*) (FAW): FAW a été signalée attaquant du maïs au Kenya, en Tanzanie; une situation similaire est probable ailleurs où le maïs et d'autres cultures similaires sont en saison.

Chenille Légionnaire africaine (AAW), *Spodoptera exempta*: AAW aucune épidémie d'AAW n'a été signalée au cours de ce mois.

***Quelea spp. oiseaux* (QSP):** Des foyers de QSP ont été signalés sur des cultures de céréales à petits grains dans plusieurs régions de Tanzanie et contrôlés.

La surveillance active, le suivi et les interventions préventives et curatives opportunes ainsi que le partage des information ETOP restent essentiels pour réduire les menaces que les ETOP font peser sur la sécurité alimentaire et les moyens de subsistance des communautés vulnérables.

USAID / OFDA / PSPM surveille régulièrement les ETOP en étroite collaboration avec son réseau de PPD / DPV nationaux, d'entités régionales et internationales de surveillance et / ou de lutte antiparasitaire, y compris la FAO/ECLO, la CLCPRO, le CRC, le DLCO-EA et l'IRLCO-CSA, et des centres de recherche, universités, secteur privé, ONG et autres et publie des Bulletins analytiques concis à l'intention des parties prenantes. Fin de résumé

Note: All ETOP Bulletins, including previous issues can be accessed and downloaded on USAID Pest and Pesticide Monitoring website:

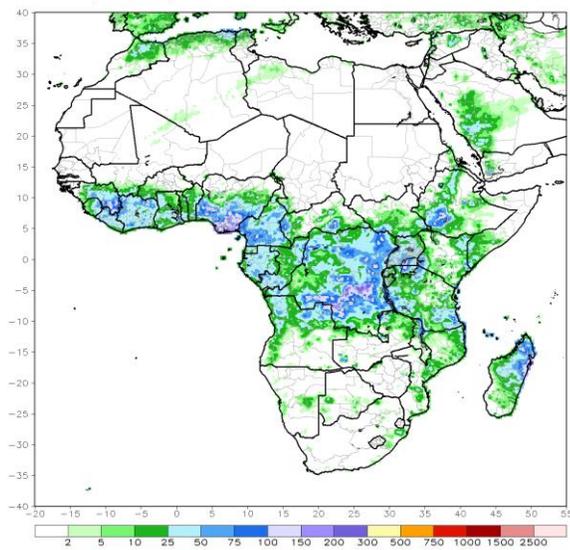
[USAID Pest and Pesticide Monitoring](#)

Additional resources on ETOPs can be found on the last pages of this Bulletin.

Weather and Ecological Conditions

During April 24 to May 1, in East Africa, rainfall was above-average over many parts of Ethiopia, northern Somalia, northern South Sudan, and parts of Tanzania. Below-average rainfall was observed over southern South Sudan, much of Kenya, and southern Somalia. In Central Africa, rainfall was above-average over many parts of DRC.

RFE2 7-Day Total Rainfall (mm)
Period: 11Apr2021 - 17Apr2021



During 13-19 April, a moderate to high chance (over 70%) for rainfall to exceed 50 mm over parts of southern Cameroon, Equatorial Guinea, Gabon, northern Angola, parts of southern and eastern DRC, Rwanda, Burundi, southern Uganda, much of Tanzania and parts of southern Ethiopia.

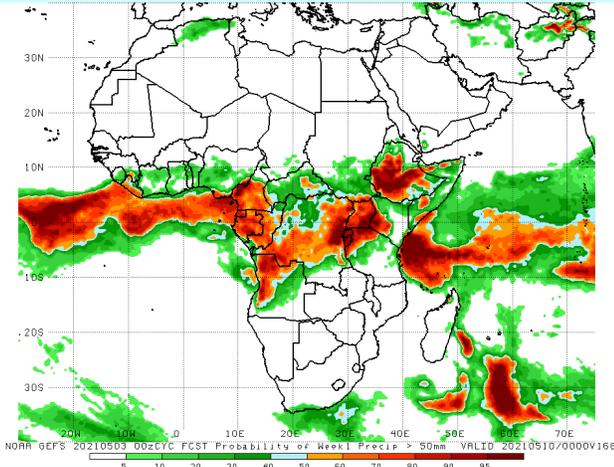
From April 11-17, rainfall was below-average over eastern and southeastern Ethiopia, much of Kenya, southern Somalia and parts of South Sudan in East Africa. Above-average rainfall was observed over parts of Ethiopia and pockets of Tanzania. In Central Africa, rainfall was below-average over much of Gabon, Congo, CAR, and parts of western and northern DRC. Above-average rainfall was observed over parts of southern and eastern DRC.

During 2-12 April, rainfall was slightly below-average over parts of Ethiopia and northern Kenya in East Africa. Rainfall was above-average over Uganda, western and southern Kenya, and northern Tanzania. In Central Africa rainfall was below-average over much of Gabon, Congo, CAR, and parts of northern DRC. In West Africa, above-average rainfall was observed over pockets of the Gulf of Guinea countries.

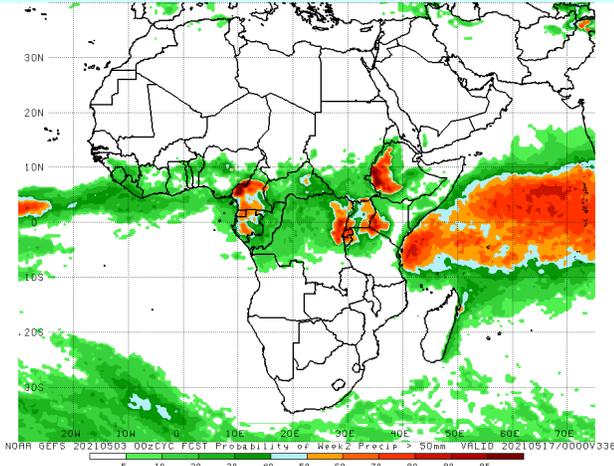
Forecast: From May 4-10 and 11-17, there is a moderate to high chance (over 70%) for rainfall to exceed 50 mm over western Kenya, western Tanzania, many parts of Ethiopia,

portions of Somalia, DRC, Rwanda, Burundi, western and northern Angola, DRC, Cameroon, Equatorial Guinea, and Gabon, (see maps below) (NOAA).

Week 1 forecast



Week 2 forecast



In **WOR**, mainly dry conditions prevailed during April throughout the region with no significant precipitation reported, pushing breeding to irrigated perimeters in the Adrar Valley in the Central Sahara of Algeria. In Morocco, vegetation was green south of the Atlas Mountains in a few places in the Draa and Ziz-Ghris valleys. In other WOR regions, above average rain was reported in the Gulf of Guinea countries. During the last week of

April, below-average rainfall was observed over much of Equatorial Guinea, Gabon (CNLAA/Mauritania, CNLAA/Morocco, CNLP/Mali, FAO-DLIS, DPV/Tunisia NOAA).



Heavy rainfall on Bale Mountains, Oromia Region, Ethiopia (FAO)

In **EOR**, light to moderate rains fell in coastal and subcoastal areas of Khuzestan province in southwest Iran during the 1st dekad of April and extended to Bushehr in the 2nd sustaining favorable ecological conditions for breeding in the southwest. However, southeast Iran and southwest Pakistan were impacted by little rain and dry conditions. Light to moderate showers fell in southern Sindh province north of Karachi during the 2nd dekad (FAO-DLIS).

In the NSE regions, rain was recorded in some stations located near NSE outbreak areas in Mozambique and Tanzania, but low to no rain occurred in some of the stations showing tapering of the rainfall season (NOAA, IRLCO-CSA).

CAC Region: Most of CAC remained cool and dry and significant precipitation was not reported.

ETOP proliferation vis-a-vis climate factors

Note: Changes in the weather pattern such as increased or decreased temperatures and precipitation can

contribute to an ecological shift in ETOP habitats and could increase or decrease the risk of pest outbreaks, resurgence and/or emergence of new pests. The extended ETOP appearance, prevalence, outbreaks, and upsurges are partially attributed to the change in the weather pattern, i.e., extensive and above normal rainfall partly associated with the occurrence of multiple cyclones over a period of less than two years – May 2018 to December 2019 in the COR region.

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

The **Desert Locust** (*Schistoseca gregaria* - **SGR²**): In the COR, there was a significant decline in swarm numbers due largely to intensive control and much delayed/absence of rain till early April in the primary breeding areas in Ethiopia and Somalia. In Ethiopia swarms began maturing and laying eggs in areas where rainfall occurred. Some swarms began moving east to northwest Somalia. In northeast Somalia swarms remained immature due to dry conditions. Control operations treated 14,370 ha in Ethiopia and 5,120 ha in Somalia during this month. In Kenya a significant swarm decline was reported and only 136 ha were treated during this month remain immature. An immature swarm was also reported in northeast Tanzania. The situation remained calm in Eritrea during this month. In Sudan, survey and control operations continued in Central and Southern coast in winter breeding area where fledging was detected on the Red Sea coast and control operations treated 4,640 ha. In Saudi Arabia, Widespread

hatching and band formations were reported in the interior of Saudi Arabia where fledging and immature adults were formed towards the end of April and control operations treated 8,250 ha during this month. Strong southerly winds carry mature adult groups and small swarms from Saudi Arabia to Iraq (140 ha controlled), Jordan (1,500 ha treated), Syria (2,867 ha treated), Lebanon (406 ha treated), Israel, and Sinai in Egypt (307 ha treated). In Yemen, surveys were conducted during the 1st half of April in winter breeding areas on the Red Sea coast in Hodeida and Hajjah and the Gulf of Aden coast at Lahj and Shabwah governorates. Only low numbers of scattered immature and mature solitarious adults were observed in a few locations on the Red Sea coast, but no locusts were detected in the Gulf of Aden coastal plains. No locusts were reported in Djibouti or Oman (DLMCC/Yemen, FAO-DLIS, LCC/Oman, PPD/Eritrea, PPD/Ethiopia, PPD/Sudan, SPPV/Djibouti).

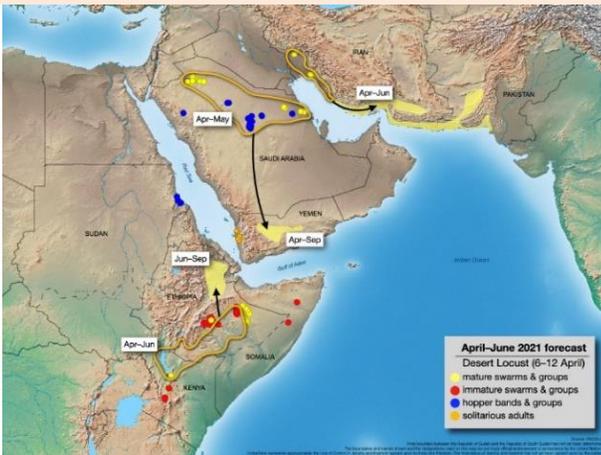


Locust situation in the greater Eastern Africa region, April 3, 2021; FAO-ECLC

Forecast: Ethiopia, Kenya, and Somalia will likely experience new swarms and hoppers and bands during the forecast period due to above normal rain fall that

² Definitions of all acronyms can be found at the end of the report.

occurred the pest weeks and will likely continue. *Intensive monitoring and timely control operations remain critical to break the cycle that had rampaged the greater Horn and Eastern Africa region over the past year and a half and avert any additional threats to crops and pasture in the months to come (BHA/TPQ, DLMCC/Yemen, FAO-DLIS, LLC/Oman, PPD/Eritrea, PPD/Ethiopia, PPD/Sudan, SPPV/Djibouti).*



Projected locust dispersal April-June 2021 (ECLO)

NOTE: *Potential use of innovative technologies, such as drones, for high-resolution images in remote sensing is being explored. On trial bases, drones were used for locust monitoring, and control in localized and sensitive, hard to reach areas showed promising results. While range coverage of agricultural drones may be limited, there are interests among countries and partners to work on several parameters associated with such technologies, including air space access protocols and other issues. Crowd and cloud sourcing for data collection, sharing, etc. is another effort that can be of value to ETOP operations. Dynamic population modeling and biotope modeling, from CIRAD and ICIPE, respectively, and accounting for associated parameters such as soil moisture, vegetation, etc. will likely contribute to better understand ETOP –*

*DL phenology, ecology, habitat range, etc. **End note.***

SGR - EOR: In EOR, the situation generally remained calm and only a few mature swarms from Saudi Arabia arrived in southwestern part of Iran and treated on 1,521 ha during this month (BHA/TPQ, FAO-DLIS).

Forecast: In EOR, small adult groups will likely form in southwest Iran and may be supplemented by groups and small swarms likely arriving from the Arabian region and move east along the southern coast towards Pakistan, but no major activity is expected during the forecast period (FAO-DLIS).

SGR – WOR: In WOR, local breeding was reported in Algeria and scattered adults were detected in northern Mali during April (ANLP/Chad, CNLCP/Mali, CNLAA/Mauritania, CNLAA/Morocco, FAO-DLIS).

Forecast: In WOR, the situation will remain relatively calm during the forecast period (ANLA/Chad, CNLAA/Mauritania, CNLAA/Morocco, CNLCP/Mali, CNLA/Tunisia, FAO-DLIS).

Active surveillance, monitoring, preparedness and timely preventive and curative interventions are critical to avert any significant locust developments and the potential threat they pose to food security and livelihoods of vulnerable communities (FAO-DLIS, OFDA/PSPM).

Red (Nomadic) Locust (NSE): Adult NSE completed breeding and swarms were expected to have begun developing in some of the outbreak areas located in Malawi (Lake Chilwa/Lake Chiuta plains, Mpatsanjoka Dambo); Mozambique (Buzi Gorongosa plains, and Dimba plains) and in Zambia (Kafue Flats and Lukanga

Swamps). Aerial surveys in NSE outbreak areas in Tanzania revealed low to medium density isolated and scattered populations in Ikuu Katavi plains and Bahi Valley (IRLCO-CSA).

Forecast: NSE situation will likely continue being a problem in Lake Chilwa/Lake Chiuta plains in Malawi, and Buzi Gorongosa and Dimba plains in Mozambique as ledging has occurred and swarms formations may be in progress. Active surveillance and monitoring and timely control operations remain critical to prevent swarm invasions in neighboring areas and threaten crops and pasture (BHA/TPQ, IRLCO-CSA).

African Migratory Locust (LMI): LMI populations persisted in Western and Southern Zambia where ground control operations were carried out by the MoA staff using motorized sprayers. LMI outbreaks were also reported in sugarcane fields in Chisumbanje (Manicaland Province) in Zimbabwe where 16 ha of the infested area were controlled using Lambda Cyhalothrin. Monitoring continued in areas where pockets of LMI are still visible. No update was received from neighboring countries in Botswana, Namibia and Angola during this time, but it is likely that the pest persisted conditions are favorable for breeding (BHA/TPQ, IRLCO-CSA).

Forecast: Due to favorable ecological conditions from above-normal rainfall, breeding will likely continue requiring extensive control operations in Botswana, Namibia, Zambia, Angola, etc. Intensive surveillance and timely control operations remain critical to prevent significant damage to crops and grazing land in the region (BHA/FSL, FAO-ROS, IRLCO-CSA).

Central American Locust - *Schistocerca piceifrons* (SPI): SPI (CAL) which was in recession in Mexico and Central America during the previous months is expected to commence at the foothills of the seasonal rain that is expected to start in late April/early May. Preparations are underway in Mexico etc., to launch surveillance and timely interventions in the coming months (SENESA, Pech – Mexico).

[Note: CAL is a pest of economic importance in Mexico and Central America and attacks hundreds of species of plants including agave, banana, beans, corn, cotton, peanut, rice, sesame, soybean, sorghum, sugarcane, several fruit trees, etc. **End note]**



Adult Central America Locust SPI (source: M. Poo-Pech, April 2021).

South American Locust, *Schistocerca cancellata* (SCA) (a.k.a. Flying lobster): A late received update indicated the presence of groups of hoppers and adults in Chaco and Formosa provinces in Argentina in March. Control operations were launched to avoid swarm formation. Surveillance and control operations continue throughout the country (SENESA, Argentina). A similar situation may be present in neighboring areas in Uruguay and/or Paraguay.

<https://www.voanews.com/americas/argentina-battles-locust-plaque-northern-province>.

Italian (CIT), Moroccan (DMA) and Migratory (LMI) Locusts in Central Asia and the Caucasus (CAC): No activities were reported, however, as the weather conditions improves (rains and increased temperatures), DMA will likely begin hatching in the southern part of the CAC regions (BHA/TPQ/FSL)

<http://www.fao.org/locusts-cca/en/>

Fall armyworm (FAW): FAW outbreaks was reported in Kenya where the pest was reported attacking maize and control operations were carried out by the affected farmers with assistance from MoA. No update was received elsewhere, although it is likely that FAW continued with its presence neighboring countries and others where maize and other grain crops are in season (BHA/TPQ, IRLCO-CSA, FAO-FAW).

Forecast: FAW is likely to continue affecting rain-fed and/or irrigated maize and other cereal crops across sub-Saharan Africa, Asia, the Pacific Regions and elsewhere during the forecast period. *Active monitoring, surveillance, reporting and timely actions remain critical to abate any major crop damage (BHA/TPQ).*

Events on FAW: The Food and Agriculture Organization of the United Nations (FAO) proposed a bold, transformative and coordinated Global Action for Fall Armyworm Control (GAFC) (<https://www.ippc.int/en/the-global-action-for-fall-armyworm-control/>). A total budget of USD 500 million (USD 450 million for the Global Action and USD 50 million for global coordination) is estimated to implement the GAFC in 65 target countries in Africa, Near East and Asia-Pacific from 2020 to 2022.



(source: Prasanna, 2021)

Areas suitable to Fall Armyworm

Regions with little forest cover, a minimum annual temperature of 18-26 °C and receiving 500-700 mm of rainfall in the three wettest months are prone to fall armyworm infestation as predicted by the species distribution models based on occurrences in Africa and the Americas.

ENVIRONMENTAL SUITABILITY INDEX

Not suitable Marginal Suitable Highly suitable
0 10 20 30 40 50 60 70 80 90 100



Source: CAB, 2019. Invasive Species Compendium, Wallingford, UK: CAB International.
P. K. Dutta, 19/06/2019

REUTERS

The GAFC is a pioneering initiative that aims to take radical, direct and coordinated measures to fight FAW at a global level. The 3 key objectives of the GAFC are to:

- 1. Establish a global coordination and regional collaboration on monitoring, early warning, and intelligent pest management of FAW:*
- 2. Reduce crop losses caused by FAW and*
- 3. Reduce the risk of further spread of FAW to new areas (Europe and South Pacific).*

*The first meeting of the Technical Committee of the GAFC was conducted on **May 18, 2020** and thereafter, webinars were launched.*

Key Activity update: BHA/TPQ/FSL is working on innovative intervention projects to benefit small-scale farming communities in affected countries with the intention to scale-up across different FAW prone regions in the spirit of the GAFC program. This initiative will build on experiences gained over the past several years, including Legacy OFDA, RFS, FAO and other partners and affected nations.

Note: Several species of FAW natural enemies have been identified in Ethiopia, Kenya, Tanzania, Madagascar, India, etc. and are under rigorous investigations to determine their efficacy, effectiveness, environmental impacts, safety and other relevant parameters before they are released for extensive use. **End note.**

African Armyworm (AAW): AAW was not reported during this month (BHA/TPQ, IRLCO-CSA).

Forecast: AAW presence may be detected in Kenya and northern Tanzania during the forecast period, but no major threat is posed at this time (BHA/TPQ, IRLCO-CSA).

Note: Legacy OFDA developed printable and web-based interactive maps for AAW:
<http://usaid.maps.arcgis.com/apps/Viewer/index.html?appid=8ff7a2eefbee4783bfb36c3e784e29cb> BHA/TPQ is considering a similar map for the CBFAMFEW countries.

Strong surveillance, monitoring and quarantine enforcement remain critical to prevent invasive pest species.

Quelea species (QSP): QSP outbreaks were reported on rice and sorghum crops in several regions in Tanzania - Dodoma, Mwanza, Singinda, Geita, Mayara, Iringa, Tabora, Shinyanga and Mbeya. Aerial operations were carried out in

collaboration with DLCO-EA and MoA treated close to 570 ha. Survey operations continued to locate roosting sites to control QPS. QSP outbreaks were not reported elsewhere in the region (IRLCO-CSA).

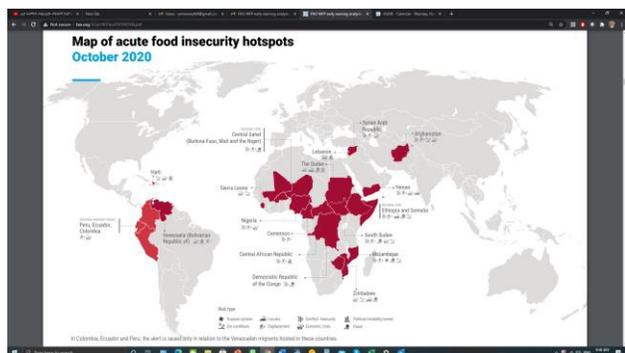
Forecast: QSP outbreaks likely continued to be a problem to small grain cereal growers in several regions in the Rift Valley, Eastern and Nyanza Provinces of Kenya; in Kilimanjaro, Morogoro, Manyara, Dodoma Singinda, Mbeya, Mwanza and Shinyanga Regions of Tanzania and to Irrigated wheat growers in Zimbabwe in the IRLCO-CSA regions (BHA/TPQ, IRLCO-CSA).

Facts: QSP birds can travel ~100 km/day in search of food. An adult QSP can consume 3-5 grams of small grain and destroy the same amount each day. A medium density QSP 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 (TPQ/P&PM).

Rodents: No report was received during this month, but it is likely that the pest continues being a problem to crops and produce (BHA/TPQ).

NOTE: Acute food insecurity hotspots map (see below) shows several countries and regions that are exposed to and/or are highly vulnerable to locust invasions plus other stressors – eastern Africa and the Horn, the Arabian Peninsula (Yemen), southern Africa (Zimbabwe). Other countries that are not list on the map as hotspots, including Eritrea, Botswana, Zambia, Namibia, Angola, Malawi, Tanzania, and Mozambique are also exposed to serious locust threats (source FAO and WFP, October 2020). **END NOTE**

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, and contaminate making it unfit for human consumption, and the zoonotic diseases the pest can carry/transmit.



All ETOP front-line countries must maintain regular monitoring and surveillance and launch control interventions as needed. Regular crop scouting is critical to avoid damage/losses. Invasion countries must also remain on alert. Regional and national ETOP entities - DLCO-EA, IRLCO-CSA, DLCCs, DLMCC, CNLAs, National DPVs and PPDs, ELOs, etc., are encouraged to continue sharing ETOP information with stakeholders as often as possible. Lead farmers, field scouts, community forecasters and others must remain vigilant and report ETOP detections to relevant authorities as quickly as possible.

OFDA's Contributions to ETOP Abatement Interventions

USAID/BHA/TPQ is supporting an operational research through Arizona State University to develop a tool to manage the Senegalese grasshopper (OSE).

OSE is a notorious pest of cereal and vegetable crops and pasture and causes serious affects small-holder farmers in its wide geographic coverage extending from the Canneries to Cape Verde to nearly all sub-Saharan Africa regions to India and beyond. This pest occurs more frequently than several other grasshopper/locust species and is a constant threat to small-holder farmers.

USAID/BHA/TPQ continuously explores parties interested in developing and expanding innovative technologies to help minimize the impacts of ETOPs on food security and livelihoods of the most vulnerable peoples and communities across regions.

The online Pesticide Stock Management System (PSMS) that was developed by FAO with financial assistance from donors, including USAID Legacy OFDA, that continued benefiting participating countries across the globe was halted due to security and server switch. FAO will be reinstating the system. Thanks to the system, SGR frontline countries and others had been able to effectively manage their strategic pesticide stocks and minimize/avoid accumulation of unusable pesticides and empty pesticide containers.

Note: A sustainable Pesticide Stewardship (SPS) can contribute to strengthening 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 boundaries and geographic regions. **End note.**

BHA/TPQ promotes an IPM approach to minimize risks associated with pesticide poisoning, stockpiling, and environmental contamination. An informed procurement and judiciously executed triangulations of surplus stocks from countries with large inventories of usable products to countries where they are much needed is worth considering.

Inventory of Strategic Pesticide Stocks for SGR Control

During April, control operations treated some 42,410 ha, less than half of areas treated in March (95,795) the previous month and one eighth of that of February.

Table 1. Estimated inventory of strategic SGR Pesticide Stocks in frontline and invasion countries.

Country	Quantity, l/kg*
Algeria	1,186,034~
Chad	34,100
Egypt	10,253 ULV, 45,796
Eritrea	14,150
Ethiopia	110,543~
Libya	24,930~
Kenya	~
Madagascar	206,000~ + 100,000 ^D
Mali	3,540
Mauritania	39,803
Morocco	3,412,374 ^D
Niger	75,701~
Oman	9,953~
Saudi Arabia	23,379~
Senegal	156,000~
Somalia	~
Sudan	103,482
South Sudan	
Tunisia	62,200 obsolete
Uganda	
Yemen	35,000 ^D ; 180 kg GM~

*Includes different pesticides 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*TM (fungal-based biological pesticide, e.g., NOVACRID)

LIST OF ACRONYMS

- AAW *African armyworm (Spodoptera exempta)*
- AELGA *Assistance for Emergency Locust Grasshopper Abatement Services, Tanzania*
- 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)	IGAD	Intergovernmental Authority on Development (Horn of Africa)
CNLA(A)	Centre National de Lutte Antiacridienne (National Locust Control Center)	IRIN	Integrated Regional Information Networks
COR	Central SGR Outbreak Region	IRLCO-CSA	International Red Locust Control Organization for Central and Southern Africa
CPD	Crop Protection Division	ITCZ	Inter-Tropical Convergence Zone
CRC	Commission for Controlling Desert Locust in the Central Region	ITF	Inter-Tropical Convergence Front = ITCZ)
CTE	Chortoicetes terminifera (Australian plague locust)	FAO-DLIS	Food and Agriculture Organizations' Desert Locust Information Service
DDLC	Department of Desert Locust Control	Hoppers	young, wingless locusts/grasshoppers (Latin synonym = nymphs or larvae)
DLCO-EA	Desert Locust Control Organization for Eastern Africa	JTWC	Joint Typhoon Warning Center
DLMCC	Desert Locust Monitoring and Control Center, Yemen	Kg	Kilogram (~2.2 pound)
DMA	Dociostaurus maroccanus (Moroccan Locust)	L	Liter (1.057 Quarts or 0.264 gallon or 33.814 US fluid ounces)
DPPQS	Department of Plant Protection and Quarantine Services, India	LCC	Locust Control Center, Oman
DPV	Département Protection des Végétaux (Department of Plant Protection)	LMC	Locusta migratoriacapito (Malagasy locust)
ELO	EMPRES Liaison Officers –	LMI	Locusta migratoria migratorioides (African Migratory Locust)
EMPRES	Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases	LPA	Locustana pardalina
EOR	Eastern SGR Outbreak Region	MoAFSC	Ministry of Agriculture, Food Security and Cooperatives
ETOP	Emergency Transboundary Outbreak Pest	MoAI	Ministry of Agriculture and Irrigation
Fledgling	immature adult locust /grasshopper that has pretty much the same phenology as mature adults, but lacks fully developed reproductive organs to breed	MoARD	Ministry of Agriculture and Rural Development
GM	GreenMuscle® (a fungal-based biopesticide); NOVACRID, Green Guard	NALC	National Agency for Locust Control
ha	hectare (= 10,000 sq. meters, about 2.471 acres)	NCDLC	National Center for the Desert Locust Control, Libya
ICAPC	IGAD's Climate Prediction and Application Center	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
 QSP *Quelea species (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 United 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 relatively 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*

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 and-pesticide-monitoring](https://www.usaid.gov/what-we-do/working-crises-and-conflict/responding-times-crisis/how-we-do-it/humanitarian-sectors/agriculture-and-food-security/pest-and-pesticide-monitoring)

Additional resources on SGR and other ETOPs

SGR
 USAID Pest Monitoring:
[https://www.usaid.gov/what-we-do/working-
 crises-and-conflict/responding-times-crisis/how-
 we-do-it/humanitarian-sectors/agriculture-and-
 food-security/pest-and-pesticide-monitoring](https://www.usaid.gov/what-we-do/working-crises-and-conflict/responding-times-crisis/how-we-do-it/humanitarian-sectors/agriculture-and-food-security/pest-and-pesticide-monitoring)

Archived ETOP Bulletins:
[https://www.usaid.gov/what-we-do/working-
 crises-and-conflict/responding-times-crisis/how-
 we-do-it/humanitarian-sectors/agriculture-and-
 food-security/pest-and-pesticide-
 monitoring/archive](https://www.usaid.gov/what-we-do/working-crises-and-conflict/responding-times-crisis/how-we-do-it/humanitarian-sectors/agriculture-and-food-security/pest-and-pesticide-monitoring/archive)

UN/FAO Desert Locust Watch
[http://www.fao.org/aq/locusts/en/info/info/index.h
 tml](http://www.fao.org/aq/locusts/en/info/info/index.html)

FAO Locust Hub
<https://locust-hub-hqfao.hub.arcgis.com/>

FAO Locust Emergency Appeal for Greater Horn of Africa and Yemen

http://www.fao.org/fileadmin/user_upload/emergencies/docs/Greater%20Horn%20of%20Africa%20and%20Yemen%20%20Desert%20locust%20crisis%20appeal%20%20May%202020.pdf

<http://www.fao.org/emergencies/crisis/desertlocust/en/>

FAO visuals on SGR

<http://tv.fao.org/>

FAO Desert Locust Crisis

<http://www.fao.org/emergencies/crisis/desertlocust/en/>

<http://www.fao.org/ag/locusts/en/info/info/index.html>

CIT, DMA and LMI – FAO-PPPD

<http://www.fao.org/locusts-cca/en/>

DLCO-EA

<http://www.dlco-ea.org/final/index.php/about-us>

FAO/Central Region Locust Control Commission

<http://desertlocust-crc.org/Pages/index.aspx?CMSId=8&lang=EN>

FAO/Western Region Locust Control Commission

<http://www.fao.org/clcpro/fr/>

FAO Locust Watch - Central Asia and Caucasus

<http://www.fao.org/locusts-cca/en/>

IGAD Climate Predication and Application Centres

<https://www.icpac.net/news/desert-locust-projection-october-2020/>

USAID supports for locust operations in the CAC Region:

<http://www.fao.org/locusts-cca/programme-and-donors/projects-donors/en/>

FAO SGR Response Overview Dashboard

<http://www.fao.org/locusts/response-overview-dashboard/en/>

FAO Locust Hub

<https://locust-hub-hqfao.hub.arcgis.com/>
<http://www.fao.org/ag/locusts/en/activ/DLIS/eL3suite/index.html>

FAW

USAID FtF FAW

<https://www.agrilinks.org/post/fall-armyworm-africa-guide-integrated-pest-management>

<http://www.cabi.org/isc/datasheet/29810>

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

USAID FAW PEA/PERSUAP

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

FAO FAW Monitoring and Early warning System

<http://www.fao.org/3/CA1089EN/ca1089en.pdf>

FAO-USAID Global Action for FAW Control webinars

<http://www.fao.org/fall-armyworm/education/webinars/en/>

FAO NURU FAW Application

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

<https://acbio.org.za/sites/default/files/documents/BT%20Maize%20Fall%20Army%20Worm%20report.pdf>

<https://www.invasive-species.org/wp-content/uploads/sites/2/2019/03/Fall-Armyworm-Evidence-Note-September-2017.pdf>

FAW management animation SAWBO

<https://sawbo-animations.org/video.php?video=/www.youtube.com/embed/5rxlpXEK5q8>

AAW

<http://www.armyworm.org/latest-armyworm-forecast-irlco-csa-oct-2018/>

FEWS NET

<https://fews.net/>

NOAA CPC

<https://www.cpc.ncep.noaa.gov/products/international/itf/itcz.shtml>