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Desert Locust monitoring and forecasting

February 2020

Desert Locust invasion in Africa and Asia

Overview

Integrated with multi-source Earth Observation data, e.g. meteorological data, field data, and remote sensing data (such as GF series in China, MODIS and Landsat series in US, Sentinel series in EU), and self-developed models and algorithms for Desert Locust monitoring and forecasting, the research team constructed the 'Crop pests and diseases monitoring and forecasting system', which could regularly release thematical maps and reports on Desert Locust.

The Desert Locust has ravaged the Horn of Africa and Southwest Asia, posing serious threats on agricultural production and food security of the inflicted regions. The Food and Agriculture Organization of the United nations （FAO）has issued a worldwide Desert Locust warning, calling for joint efforts from multiple countries in prevention and control of the pest to ensure food security and regional stability. The migration path of the Desert Locust and make a detailed analysis on the possibility of the Desert Locust invasion of China has been tracked.

Content

Migration path and prediction of Desert Locust in Africa and Asia

Fig.1 shows the migration path of the Desert Locust from Year 2018 to 2020. Due to the influence of Northeast Monsoon and the barrier of Qinghai-Tibetan Plateau, it has a lower probability of the Desert Locust in the Indo-Pakistan border invading China at present. However, if the locust in Pakistan and India cannot be controlled effectively, and even disasters erupt, then when the Southwest Monsoon is extremely strong, it may has a higher probability for the locust moving from India to Myanmar via Bangladesh, and higher risk to invading China's Yunnan and Tibet in May to June 2020, according to the analysis.

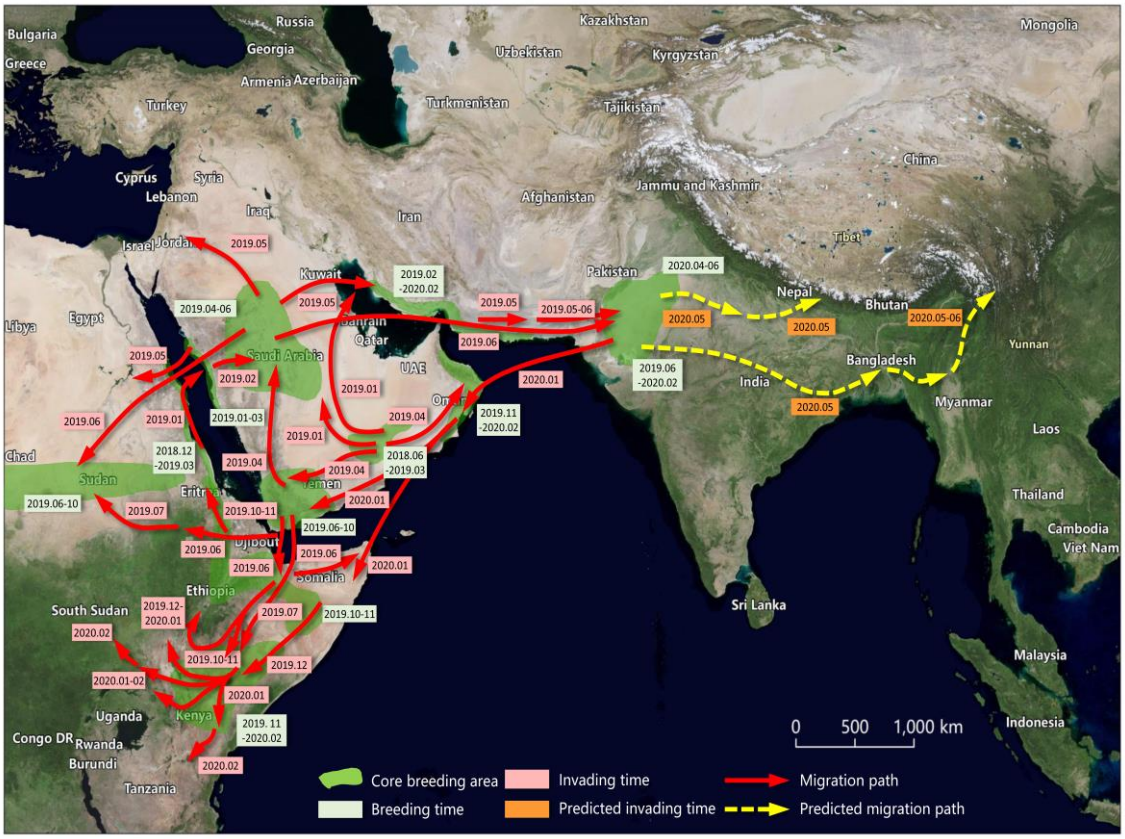


Figure 1 *Migration path of Desert Locust (Year 2018 – 2020)*

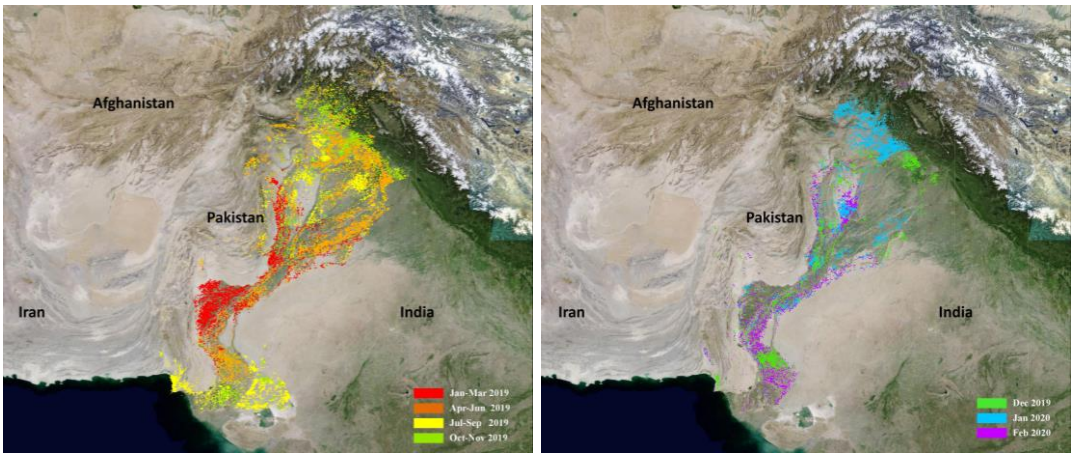
The time series remote sensing monitoring results are shown in Fig.2. From October to December 2019, the locust swarms at the Indo-Pakistan border began to breed in three generations and migrated to spring breeding areas of southern Iran and northern Oman via Baluchistan. From January to February 2020, locust swarms existed in northwest Pakistan, Nara, Tharparkar, and Cholistan. Some of them moved north of Bahawalpur, and some had the trend of migration to southwest Pakistan and southern Iran due to climate impact.

Before May 2020, affected by the Northeast Monsoon, there are three potential migration paths of locusts along the Indo-Pakistan border, which are Indo-Pakistan border—Bahawalpur—Khyber Pakhtunkhwa, Indo-Pakistan border—Quetta and southern Region, Indo-Pakistan border—southwestern Baluchistan, shown in Fig.3.

At present, a large number of locusts on the Indo-Pakistan border have spawned on the ground and are about to enter the next round of spring breeding. In addition, desert locusts on the southeast coast of Iran continue to breed and invade Pakistan. The scientists warn that, if the desert locusts in Pakistan are not effectively controlled in the adult stage in May 2020, the locust plague will continue to outbreak, which may cause a severe blow to Pakistan's agricultural production. In addition, although the Indian locust plague has been controlled to a certain extent, affected by the southwest monsoon from May to June, locusts on the Indo-

Pakistan border may migrate from Pakistan to India, continue to invade Nepal, Bangladesh, Myanmar, and may a higher risk to invade Yunnan and Tibet of China.

Considering China's biodiversity, climate and other conditions are conducive to further breeding and migration of locusts, coupled with the local Migratory Locust, one of the main pests in China, it will bring serious threats to China's food security. The scientists suggested the government to carry out large-scale locust disaster monitoring and early warning, while boosting global cooperation on Desert Locust prevention to help ensure global food security.



(a) January to November 2019 **(b) December 2019 to February 2020**

Figure 2 *Time series remote sensing monitoring of Desert Locust damaged area in Pakistan from Year 2019 – 2020*

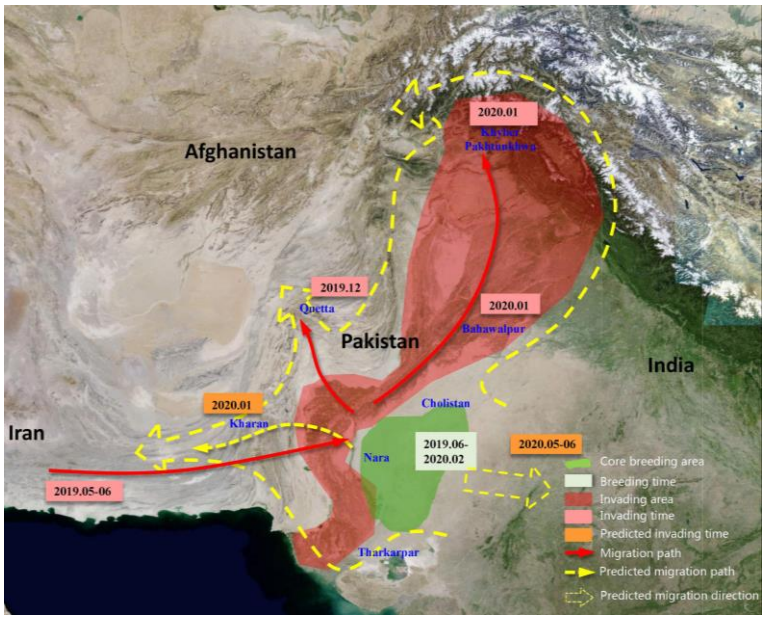


Figure 3 *Migration path of Desert Locust in Pakistan from Year 2019 – 2020*

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The Crop Pests and Diseases Monitoring and Forecasting system are available under:
http://www.rscropmap.com/

Mission statements: As the science and knowledge service, the Sino-UK Crop Pest and Disease Forecasting & Management Joint Laboratory is to support independent evidence for crop monitoring.

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