February 2020

No.1 Total:1

Aerospace Information Research Institute, Chinese Academy of Sciences

Key laboratory of Digital Earth Science, Chinese Academy of Sciences

Big Earth Data Science Engineering Project (CASEarth)

Sino-UK Crop Pest and Disease Forecasting & Management Joint Laboratory

Key Lab of Aviation Plant Protection, Ministry of Agriculture and Rural Affairs, P.R. China

National Engineering Research Center for Agro-Ecological Big Data Analysis & Application

Report of Monitoring and Assessment of Desert Locust in Africa and Asia

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 'Vegetation 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.

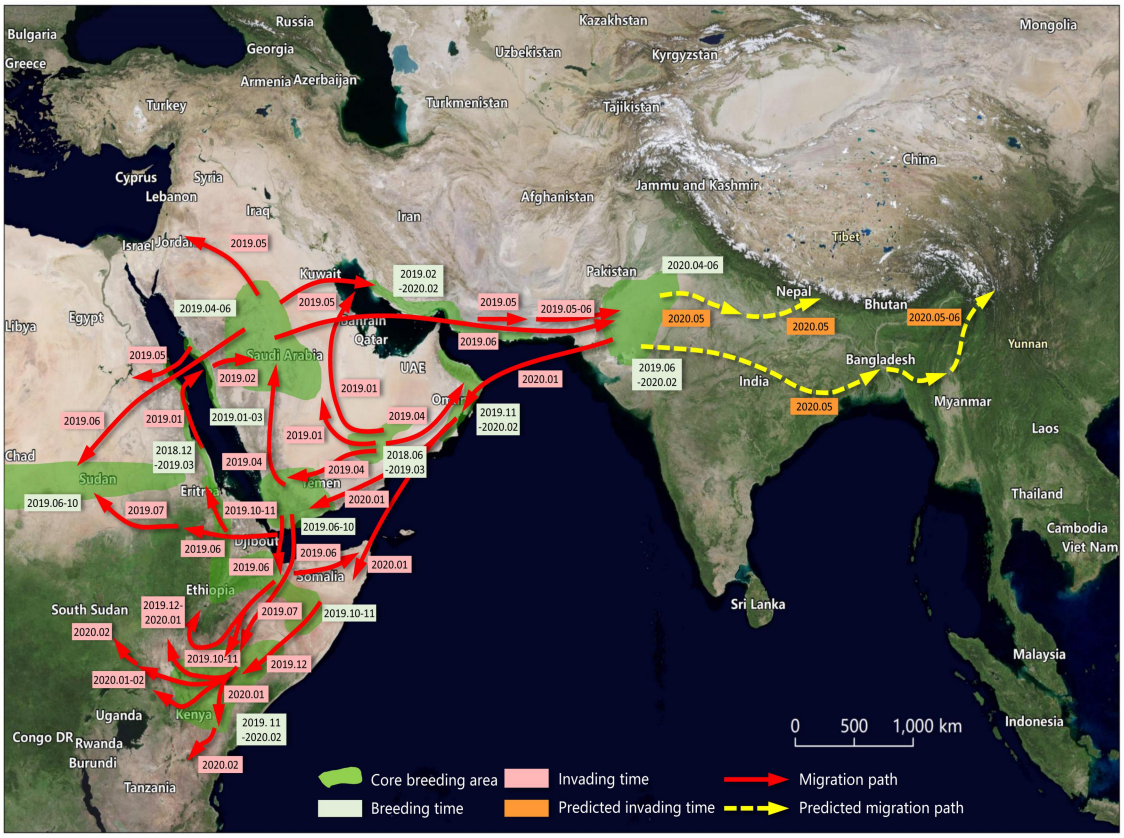


Figure 1 *Migration path of Desert Locust (Year 2018 – 2020)*

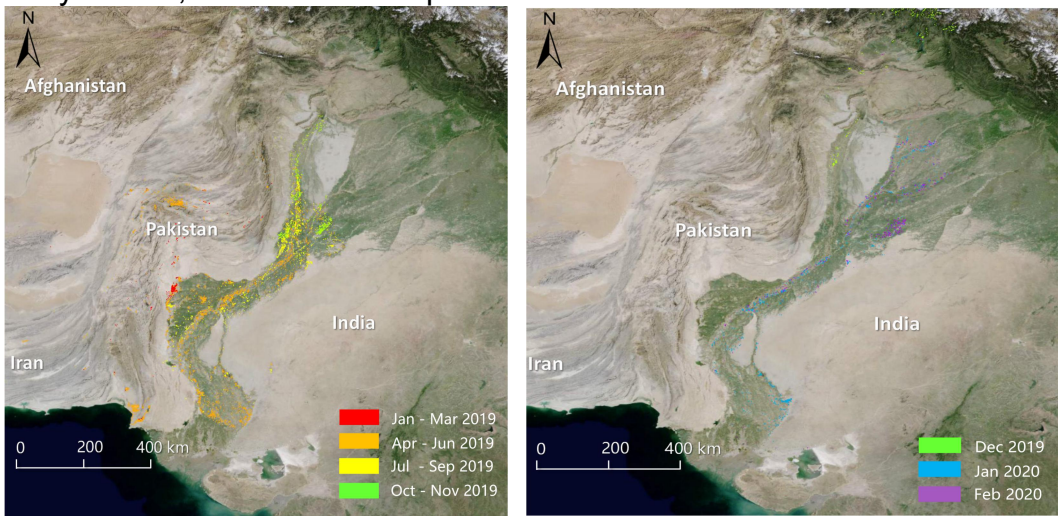
The time series remote sensing monitoring results are shown in Fig.2. From October to December 2019, the locust swarms at the Indo-Pakistan border began to breed in three generations and migrated to spring breeding areas of southern Iran and northern Oman via Baluchistan. From January to February 2020, 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*

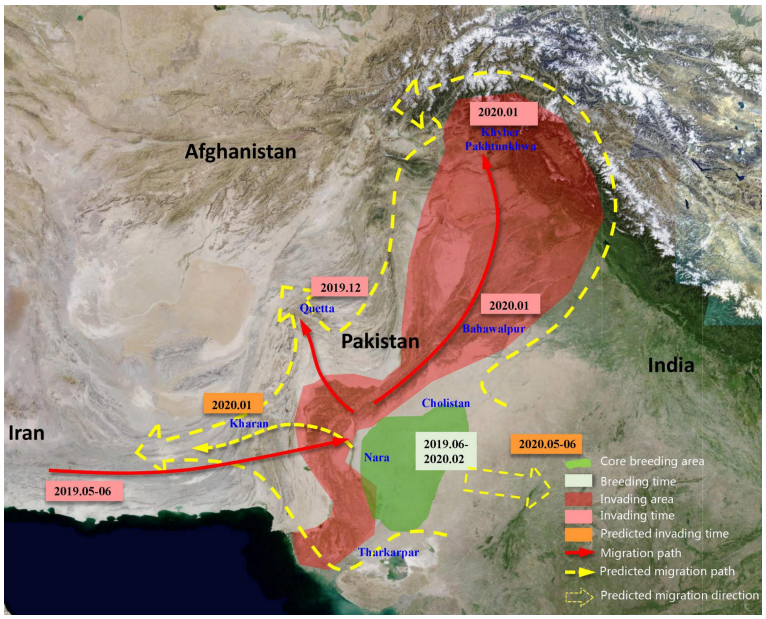


Figure 3 *Migration path of Desert Locust in Pakistan from Year 2019 – 2020*

Contact us

Aerospace Information Research Institute
Chinese Academy of Sciences
No.9 Dengzhuang South Road, Haidian District,
Beijing 100094, P.R.China.
http://www.rscrop.com/
http://www.rscropmap.com

Chinese English

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

Legal Notice

Neither the Aerospace Information Research Institute nor any person action on behalf of the institute is responsible for the use which might be made of the publication.

Disclaimer

This report is a product of the Vegetation Remote Sensing & Pest and Disease Application Research Team of the Aerospace Information Research Institute, Chinese Academy of Sciences. The analyses and conclusions in the report do not represent the views of the Chinese Academy of Sciences or the Aerospace Information Research Institute. Users can legally quote the data in this report and indicate the source. However, any judgments, inferences or opinions made based on the report do not represent the views of the Team. The data published in this report are for reference only. The Team does not bear any legal responsibility arising from the use of the report. Official Chinese boundaries are used in the report.

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.

Supported by the Strategic Priority Research Program of the Chinese Academy of Sciences (XDA19080304), National Key R&D Program of China (2017YFE0122400, 2016YFB0501501), National Natural Science Foundation of China (61661136004, 41801338, 41801352, 41871339), Beijing Nova Program of Science and Technology (Z191100001119089), National special support program for high-level personnel recruitment (Wenjiang Huang), and Youth Innovation Promotion Association CAS (2017085).

Citation

Report of Monitoring and Assessment of Desert Locust in Africa and Asia, (2020). Desert Locust Invasion in Africa and Asia. Beijing, China: RSCROP. DOI: 10.12237/casearth.5e620147819aec3b6b5e7da0.

Contact us

Email: rscrop@aircas.ac.cn

Corresponding author

Professor Wenjiang Huang
Aerospace Information Research Institute, Chinese Academy of Sciences
Email: huanwj@aircas.ac.cn
Tel: +86-10-82178178
FAX: +86-10-82178177

Main contributors

This report was released by Professor Wenjiang Huang's and Associate Professor Yingying Dong's research team in Aerospace Information Research Institute, Chinese Academy of Sciences.

Chinese contributors: Wenjiang Huang, Yingying Dong, Longlong Zhao, Huichun Ye, Mingquan Wu, Kun Wang, Xiaoping Du, Changyong Dou, Jun Yan, Jingcheng Zhang, Bei Cui, Linsheng Huang, Dailiang Peng, Hong Chang, Yun Geng, Chao Ruan, Huiqin Ma, Anting Guo, Linyi Liu, Naichen Xing, Yue Shi, Qiong Zheng, Yu Ren, Hansu Zhang, Tingguang Hu, Yanru Huang, Yu Jin, Chao Ding, Biyao Zhang, Zhongxiang Sun, Xiangmei Qin, Xueling Li, , Yingxin Xiao, Zhuoqing Hao, Kang Wu, Yong Liu, Bo Wu, Weiping Kong, Juhua Luo, Jinling Zhao, Dongyan Zhang, Xiaodong Yang, Yanhua Meng, Wenjie Fan, Yue Liu, Gang Sun, Bin Wu, Qing Zhang, Dacheng Wang, Wei Feng, Xianfeng Zhou, Qiaoyun Xie, Muyi Huang, Jing Jiang, Zhaochuan Wu, Cuicui Tang, Fang Xu, Jianli Li, Wenjing Liu, Junjing Lu, Furan Song, Qingsong Guan, Qinying Yang, Chuang Liu.

Foreign contributors: Belinda Luke, Bethan Perkins, Bryony Taylor, Hongmei Li, Wenhua Chen, Pablo Gonzalez-Moreno, Sarah Thomas, Timothy Holmes, Stefano Pignatti, Giovanni Laneve, Raffaele Casa, Simone Pascucci, Martin Wooster, Jason Chapman.

Advisory Experts: Bing Zhang, Gensuo Jia, Jihua Wang, Qiming Qin, Puyun Yang, Guofei Fang, Shouquan Chai, Jingquan Zhu, Yuying Jiang, Zhonghua Zhao, Binyuan Ren, Dongmei Yan, Xiangtao Fan, Jianhui Li, Jie Liu, Yubin Lan, Jingfeng Huang, Anhong Guo, Zhanhong Ma, Yilin Zhou, Xiongbing Tu, Wenbing Wu, Feng Zhang, Zhiguo Wang, Lifang Wu, Dong Liang, Yanbo Huang, Chenghai Yang, Liangxiu Han, Ruiliang Pu, Hugh Mortimer, Jon Styles, Andy Shaw, Jadu Dash.