



Report of Monitoring, Early Warning and Assessment of Desert Locust

[2024] NO.05 Total 56
May 2024

Aerospace Information Research Institute, Chinese Academy of Sciences
State Key Laboratory of Remote Sensing Science
The International Research Center of Big Data for Sustainable Development Goals (CBAS)
Key Laboratory of National Forestry and Grassland Administration on Forest and Grassland Pest Monitoring and Warning
National Engineering Research Center for Agro-Ecological Big Data Analysis & Application
China Biodiversity Conservation and Green Development Foundation
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

Desert Locust Monitoring and Loss Assessment in Saudi Arabia and Yemen (April 2024)

Integrated with multi-source Earth Observation data, e.g. meteorological data, field data, and remote sensing data (such as the MODIS in the US and Sentinel-2 in Europe), 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.

This report focuses on the dynamic updates of desert locust monitoring and loss assessment in Saudi Arabia and Yemen. The remote sensing monitoring results showed that, in April 2024, desert locusts were mainly distributed in the southwestern region of Saudi Arabia and the western region of Yemen, with areas of vegetation affected reaching 13.3 thousand hectares and 29.6 thousand hectares respectively. It is expected that over the next two months, rainfall will decrease along the coast of the Red Sea, leading to dry vegetation and unsuitable conditions for the survival and reproduction of desert locusts. Consequently, the locust population within Saudi Arabia is anticipated to continue decreasing. In contrast, cyclone activity will increase along the coastline of the western region of Yemen, particularly around the Gulf of Aden, resulting in abundant rainfall. This will facilitate small-scale breeding of desert locusts, leading to an increase in the locust population in that area. This period marks the main growing and harvesting seasons for grain crops in Saudi Arabia, as well as the main planting and growing seasons for grain crops in Yemen. Continuous attention to the dynamics of the desert locust disaster remains necessary to prevent losses in agricultural and pasture production. The specific research results are as follows.

■ 1. Desert Locust Monitoring and Loss Assessment in Saudi Arabia

In April 2024, there was a decrease in rainfall along the Red Sea coast in southwestern Saudi Arabia, which was not conducive to the breeding and reproduction of desert locusts. Additionally, due to control efforts, the population of desert locusts in this area experienced a slight decline. The monitoring results showed that in April, the total damaged vegetation area was 13.3 thousand hectares in Saudi Arabia, including 2.7 thousand hectares of cropland, 4.3 thousand hectares of grassland, and 6.3 thousand hectares of shrub (Figure 1), accounting for 1.23%, 0.22%, and 0.15% of the total area of the cropland, grassland, and shrub, respectively. Jizan experienced the most extensive impact, with 7.7 thousand hectares of vegetation affected, followed by Makkah, with 4.5 thousand hectares. Additionally, the affected area in Asīr was 1.1 thousand hectares.

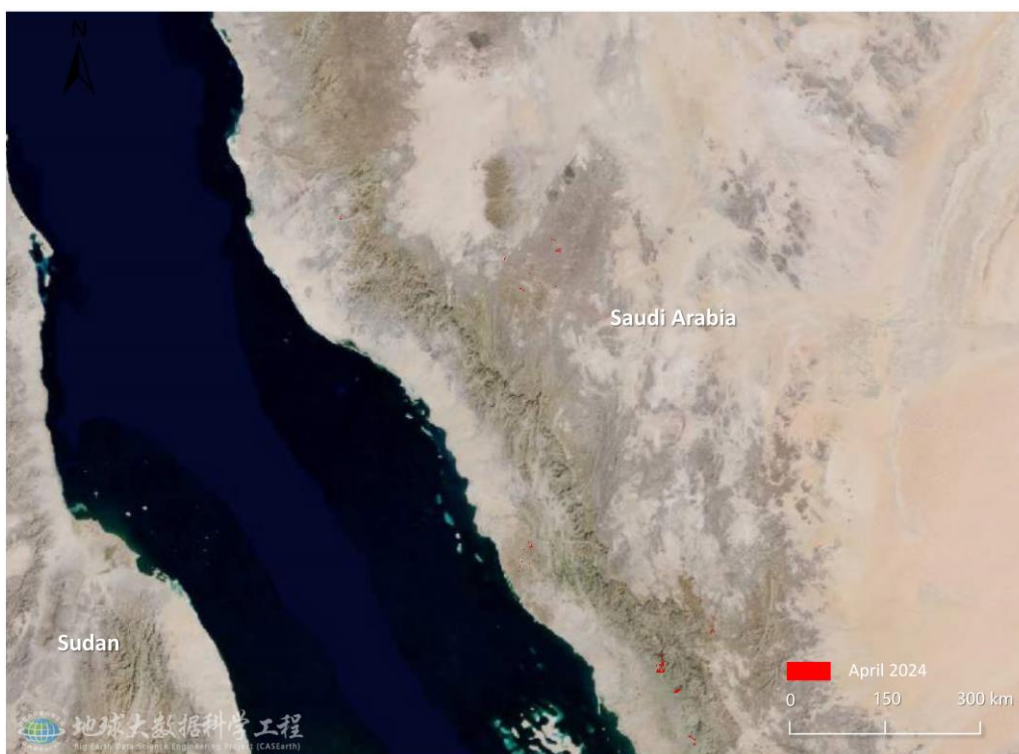


Fig.1 Monitoring of Desert Locust damage in Saudi Arabia (April 2024)

■ 2. Desert Locust Monitoring and Loss Assessment in Yemen

In April 2024, desert locusts were predominantly found in the western plateau region of Yemen. This area received ample rainfall, promoting favorable conditions for locust breeding and reproduction due to the lush vegetation. As a result, there was a slight increase in the number of desert locusts in this region. The monitoring results showed that in April, the total damaged vegetation area was 29.6 thousand hectares in Yemen, including 5.4 thousand hectares of cropland, 10.5 thousand hectares of grassland, and 13.7 thousand hectares of shrub (Figure 2), accounting for 1.09%, 0.27%, and 0.25% of the total area of the cropland, grassland, and shrub, respectively. Al Hudaydah experienced the most extensive impact, with 9.7 thousand hectares of vegetation affected, followed by San'ā, with 7.9 thousand hectares. Additionally, the affected areas in Al-Mahwīt, Ibb, Raymah and Dhamār provinces were 5.0,

3.3, 2.0 and 1.7 thousand hectares, respectively.



Fig.2 Monitoring of Desert Locust damage in Yemen (April 2024)

This study simultaneously utilized Sentinel-2 satellite remote sensing data to monitor disaster-stricken areas in western Yemen (Figure 3). Region 1 is located in the western area of Ibb Province, 78.7 kilometers northwest of Zabid and 42.2 kilometers south of Ta'izz. Region 2 is situated in the border area between Al-Mahwit Province and Sana'a Province, 73.3 kilometers southwest of Al Hudaydah. The total vegetation area in Region 1 is 39.29 thousand hectares, with an affected vegetation area of 5.84 thousand hectares. Among these, the affected areas of farmland and shrubs are 0.27 thousand hectares and 5.57 thousand hectares respectively, representing 8.24% and 15.47% of the total grassland and shrubland area in this region. Region 2 has a total vegetation area of 72.06 thousand hectares, with shrubs being the primary affected type. The affected area covers 8.89 thousand hectares, accounting for 12.25% of the total shrubland area in this region.

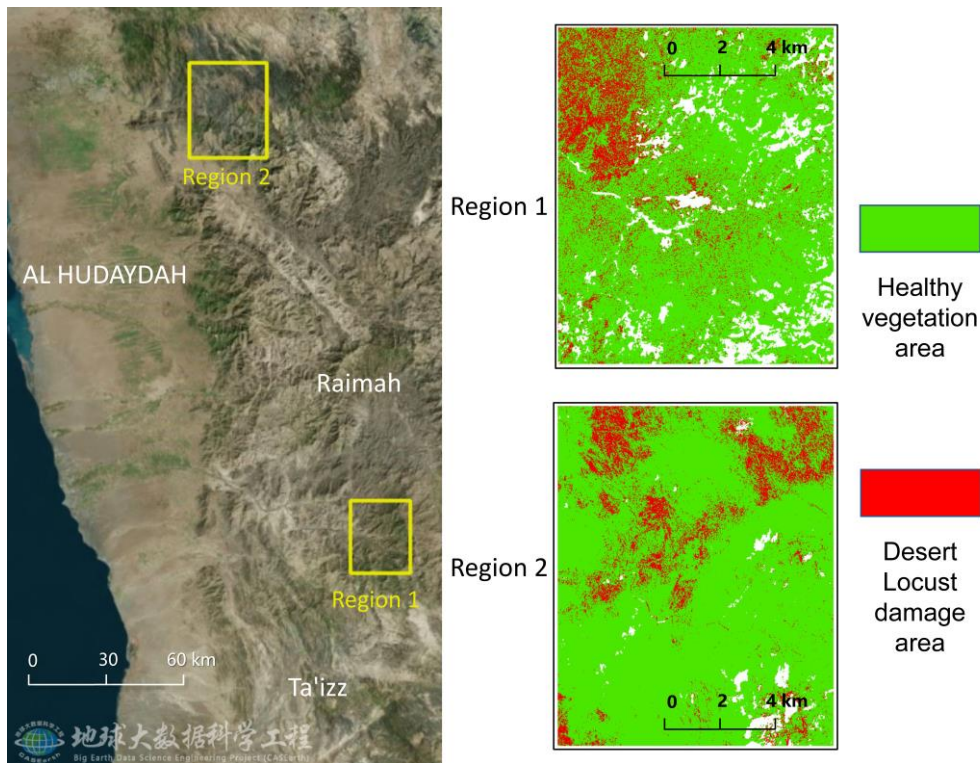


Fig.3 Monitoring of Key Desert Locust Infestation Areas in Yemen Based on Sentinel-2 Imagery (April 2024)

The comprehensive analysis shows that, in the next two months, rainfall will decrease along the coast of the Red Sea, leading to dry vegetation and unsuitable conditions for the survival and reproduction of desert locusts. Consequently, the locust population within Saudi Arabia is anticipated to continue decreasing. In contrast, cyclone activity will increase along the coastline of the western region of Yemen, particularly around the Gulf of Aden, resulting in abundant rainfall. This will facilitate small-scale breeding of desert locusts, leading to an increase in the locust population in that area. Continuous attention to the dynamics of the desert locust disaster in Saudi Arabia and Yemen remains necessary to prevent repeated losses in agricultural and pasture production.

·NO. 20240305056

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, Biyao Zhang, Linyi Liu, Kun Wang, Quanjun Jiao, Xiangmei Qin, Gang Sun, Yanli Zhang, Jingcheng Zhang, Yantao Zhou, Linsheng Huang, Longlong Zhao, Anting Guo, Xueling Li, Yanru Huang, Hansu Zhang, Binxiang Qian, Zhuoqing Hao, Jing Guo, Rui Hou, Mingxian Zhao, Kehui Ren, Xiangzhe Cheng, Bohai Hu, Minghao Wang, Yan Zhang, Xuanli He, Chao Ruan, Huiqin Ma, Yue Shi, Naichen Xing, Qiong Zheng, Xiaoping Du, Huichun Ye, Bei Cui, Huifang Wang, Yu Ren, Chao Ding, Ruiqi Sun, Yingxin Xiao, Weiping Kong, Juhua Luo, Jinling Zhao, Dongyan Zhang, Xiaodong Yang, Yanhua Meng, Yue Liu, Wei Feng, Xianfeng Zhou

Foreign Contributors

Belinda Luke, Bethan Perkins, Qiaoyun Xie, Yue Shi, 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, Yuying Jiang, Jingquan Zhu, Jinfeng Zhou, Dongmei Yan, Xiangtao Fan, Jianhui Li, Tianhua Hong, Yubin Lan, Jingfeng Huang, Huo Wang, Anhong Guo, Zhanhong Ma, Yilin Zhou, Xiongbing Tu, Wenbin Wu, Feng Zhang, Zhiguo Wang, Lifang Wu, Dong Liang, Stefano Pignatti, Giovanni Laneve, Liangxiu Han, Yanbo Huang, Chenghai Yang, Jiali Shang, Jadu Dash, Hugh Mortimer, Jon Styles, Andy Shaw.

Funding Information

National Key Research and Development Program of China (2023YFB3906203 and 2021YFE0194800), National Natural Science Foundation of China (42071320, 42071423 and 32271986), Alliance of International Science Organizations (ANSO-CR-KP-2021-06), GEO Community Activities "Global Crop Pest and Disease Habitat Monitoring and Risk Forecasting", etc.

Citation

Report of Monitoring, Early Warning and Assessment of Desert Locust, (2024). *Desert Locust Monitoring and Loss Assessment in Saudi Arabia and Yemen*. Beijing, China: RSCROP.

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.

Contact Us

Tel: +86-010-82178178 Fax: 010-82178177 Email: rscrop@aircas.ac.cn
Address: No.9 Dengzhuang South Road, Haidian District, Beijing 100094, China
Websites: <http://www.rscrop.com> / <http://desertlocust.rscrop.com> Post Code: 100094

