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Vegetation pests and diseases monitoring and forecasting Global
May 2024

Pests will occur heavier than diseases on winter wheat
Affected areas are estimated to reach 24.9 million ha

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 vegetation pest and disease 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 main vegetation pests and diseases at global scale.

This report focuses on remote sensing monitoring and forecasting of pest and disease occurrence in the main producing countries entering the middle and late growth stage of

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wheat during May 2024. The results showed that occurrence areas of rust and aphid are estimated to reach 24.9 million hectares, will mainly occur in India, Russia, United States, Kazakhstan, Canada, Pakistan, Turkey, Iran, Ukraine, France, Germany, Morocco, Poland, Afghanistan, Romania, Spain, Italy, United Kingdom, Iraq and Uzbekistan. Among them, the total affected areas of rust are estimated to reach 8.2 million hectares, accounting for 5.4% of the total planting area, and the total affected areas of aphid are estimated to reach 16.7 million hectares, accounting for 10.9% of the total planting area during May 2024.

Overall, pest will occur heavier than disease. The specific research results of spatial distribution and occurrence area are as follows.

Wheat rust

The distribution, occurrence area and ratio of wheat rust in main wheat production countries is shown in Figure 1 and Table 1. The wheat planted area of India is 31 million hectares, the total affected areas of rust are estimated to reach 126 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in Indus River plain and Gangatic plain. The wheat planted area of Russia is 28 million hectares, the total affected areas of rust are estimated to reach 112 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in the Caucasus. The wheat planted area of the United States is 15 million hectares, the total affected areas of rust are estimated to reach 135 ten thousand hectares, accounting for 9% of the total planting area, will mainly occur in the northern Great Plains and around the Great Lakes. The wheat planted area of Kazakhstan is 13 million hectares, the total affected areas of rust are estimated to reach 38 ten thousand hectares, accounting for 3% of the total planting area, will mainly occur in northern zone. The wheat planted area of Canada is 9 million hectares, the total affected areas of rust are estimated to reach 56 ten thousand hectares, accounting for 6% of the total planting area, will mainly occur in the southern regions. The wheat planted area of Pakistan is 9 million hectares, the total affected

areas of rust are estimated to reach 83 ten thousand hectares, accounting for 9% of the total planting area, will mainly occur in central Punjab and eastern Balochistan. The wheat planted area of Turkey is 7 million hectares, the total affected areas of rust are estimated to reach 27 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in southeastern Anatolia region. The wheat planted area of Iran is 7 million hectares, the total affected areas of rust are estimated to reach 78 ten thousand hectares, accounting for 12% of the total planting area, will mainly occur in the western and northern regions. The wheat planted area of Ukraine is 7 million hectares, the total affected areas of rust are estimated to reach 28 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in Southern wheat area. The wheat planted area of France is 5 million hectares, the total affected areas of rust are estimated to reach 36 ten thousand hectares, accounting for 7% of the total planting area, will mainly occur in Northern wheat area. The wheat planted area of Germany is 3 million hectares, the total affected areas of rust are estimated to reach 15 ten thousand hectares, accounting for 5% of the total planting area, will mainly occur in Southeastern wheat areas. The wheat planted area of Morocco is 3 million hectares, the total affected areas of rust are estimated to reach 9 ten thousand hectares, accounting for 3% of the total planting area, will mainly occur in northern region. The wheat planted area of Poland is 3 million hectares, the total affected areas of rust are estimated to

reach 10 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in Northern-central wheat and cane areas, and Western wheat areas. The wheat planted area of Afghanistan is 2 million hectares, the total affected areas of rust are estimated to reach 15 ten thousand hectares, accounting for 8% of the total planting area, will mainly occur in Northeastern regions. The wheat planted area of Romania is 2 million hectares, the total affected areas of rust are estimated to reach 4 ten thousand hectares, accounting for 2% of the total planting area, will mainly occur in Western regions. The wheat planted area of Spain is 2 million hectares, the total affected areas of rust are estimated to reach 9 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in Northern, Eastern, and Southern regions. The wheat planted area of Italy is 2

million hectares, the total affected areas of rust are estimated to reach 7 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in Central and Southern region. The wheat planted area of United Kingdom is 2 million hectares, the total affected areas of rust are estimated to reach 13 ten thousand hectares, accounting for 7% of the total planting area, will mainly occur in Southeastern wheat-barley mixed areas. The wheat planted area of Iraq is 1 million hectares, the total affected areas of rust are estimated to reach 11 ten thousand hectares, accounting for 7% of the total planting area, will mainly occur in Southeastern region. The wheat planted area of Uzbekistan is 1 million hectares, the total affected areas of rust are estimated to reach 9 ten thousand hectares, accounting for 7% of the total planting area, will mainly occur in Eastern cereals zone.



Figure 1 Spatial distribution of wheat rust in winter wheat production countries

Wheat aphid

The distribution, occurrence area and ratio of wheat aphid in main wheat production countries is shown in Figure 2 and Table 1. The total affected areas of aphid in India are estimated to reach 126 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in Indus River plain, and Gangatic plain. The total affected areas of aphid in Russia are estimated to reach 335 ten thousand hectares, accounting for 12% of the total planting area, will mainly occur in the Caucasus region. The total affected areas of aphid in United States are estimated to reach 196 ten thousand hectares, accounting for 13% of the total planting area, will mainly occur in Northern Great Plains. The total affected areas of aphid in Kazakhstan are estimated to reach 64 ten thousand hectares, accounting for 5% of the total planting area, will mainly occur in Northern wheat areas. The total affected areas of aphid in Canada are estimated to reach 74 ten thousand hectares, accounting for 8% of the total planting area, will mainly occur in Southern wheat areas. The total affected areas of aphid in Pakistan are estimated to reach 55 ten thousand hectares, accounting for 6% of the total planting area, will mainly occur in Lower Indus River, and most of Punjab. The total affected areas of aphid in Turkey are estimated to reach 133 ten thousand hectares, accounting for 20% of the total planting area, will mainly occur in Central Anatolia, Eastern Anatolia, and Southeastern Anatolia. The total affected areas of aphid in Iran are

estimated to reach 201 ten thousand hectares, accounting for 31% of the total planting area, will mainly occur in the western and northern regions. The total affected areas of aphid in Ukraine are estimated to reach 114 ten thousand hectares, accounting for 16% of the total planting area, will mainly occur in Southern and Eastern wheat area. The total affected areas of aphid in France are estimated to reach 69 ten thousand hectares, accounting for 13% of the total planting area, will mainly occur in the Western corn, barley, and rapeseed mixed zone, Southwestern corn zone, Dry Massif Central zone, and Mediterranean zone. The total affected areas of aphid in Germany are estimated to reach 21 ten thousand hectares, accounting for 7% of the total planting area, will mainly occur in Central wheat areas, Eastern sparse crop areas, and Northeastern marginal areas. The total affected areas of aphid in Morocco are estimated to reach 75 ten thousand hectares, accounting for 26% of the total planting area, will mainly occur in Northwestern region. The total affected areas of aphid in Poland are estimated to reach 17 ten thousand hectares, accounting for 7% of the total planting area, will mainly occur in Central rye and potatoes area, Northern-central wheat and sugarcane area. The total affected areas of aphid in Afghanistan are estimated to reach 33 ten thousand hectares, accounting for 18% of the total planting area, will mainly occur in Northeastern region. The total affected areas of

aphid in Romania are estimated to reach 39 ten thousand hectares, accounting for 18% of the total planting area, will mainly occur in Southern and Western regions. The total affected areas of aphid in Spain are estimated to reach 51 ten thousand hectares, accounting for 24% of the total planting area, will mainly occur in Southwestern region. The total affected areas of aphid in Italy are estimated to reach 35 ten thousand hectares, accounting for 20% of the total planting area, will mainly occur in Central and Southern regions. The total affected areas of

aphid in United Kingdom are estimated to reach 7 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in South English mixed wheat and Barley zone. The total affected areas of aphid in Iraq are estimated to reach 8 ten thousand hectares, accounting for 5% of the total planting area, will mainly occur in Northeastern region. The total affected areas of aphid in Uzbekistan are estimated to reach 13 ten thousand hectares, accounting for 13% of the total planting area, will mainly occur in Southeastern cereals zone.



Figure 2 Spatial distribution of wheat aphid in winter wheat production countries

Table 1 Statistics of wheat rust and aphid in main winter wheat production countries

Winter wheat production countries	Rust occurrence area and ratio		Aphid occurrence area and ratio		Total planting area / million hectares
	Area / ten thousand hectares	Ratio / %	Area / ten thousand hectares	Ratio / %	
India	126	4	126	4	31
Russia	112	4	335	12	28
United States	135	9	196	13	15
Kazakhstan	38	3	64	5	13
Canada	56	6	74	8	9

Pakistan	83	9	55	6	9
Turkey	26	4	132	20	7
Iran	78	12	201	31	7
Ukraine	28	4	114	16	7
France	37	7	69	13	5
Germany	15	5	21	7	3
Morocco	9	3	74	26	3
Poland	10	4	17	7	3
Afghanistan	15	8	33	18	2
Romania	4	2	39	18	2
Spain	9	4	51	24	2
Italy	7	4	35	20	2
United Kingdom	13	7	7	4	2
Iraq	11	7	8	5	1
Uzbekistan	9	7	16	13	1

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The Vegetation Pests and Diseases Monitoring and
Forecasting system are available under:
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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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