Vegetation pests and diseases monitoring and forecasting Global

September 2021

Pests will occur heavier than diseases on rice
Affected areas are estimated to reach 20 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 forecasting of pest and disease occurrence in 38 Asian, European and North American countries that entered the mid-to-late growth stage of rice during September 2021. The results showed that the rice planting area in above countries is about

Content

1 billion hectares, rice planthopper (*Nilaparvata lugens*) and rice blast (*Magnaporthe oryzae*) are the main types of rice pests and diseases, the cumulative occurrence areas of the pest and disease reach 20 million hectares. Of which, the affected areas of rice planthopper are estimated to reach 14.7 million hectares, accounting for 15% of the total planting area, and the total affected areas of rice blast are estimated to reach 5.3 million hectares, accounting for 5% of the total planting area. Overall, pest will occur heavier than disease. The analyses of specific forecasting results of the spatial distribution and occurrence area of the main pest and disease in 14 major rice producing and pest and disease

occurrence countries (India, Thailand, Bangladesh, Myanmar, Vietnam, Philippines, Cambodia, Pakistan, Nepal, Japan, the United States, South Korea, Laos and Iran) are as follows.
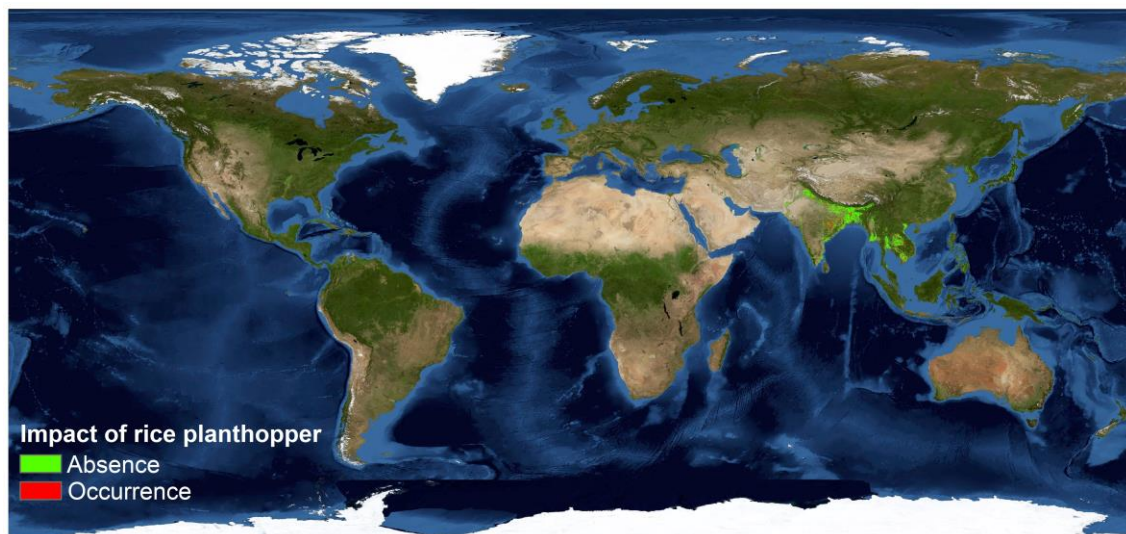
Rice planthopper

The distribution, occurrence area and ratio of rice planthopper in main rice production countries is shown in Figure 1 and Table 1. The rice planted area of India is 44 million hectares, the total affected areas of planthopper are estimated to reach 894 ten thousand hectares, accounting for 20% of the total planting area, will mainly occur in central region of India and Ganges Plain. The rice planted area of Thailand is 12.7 million hectares, the total affected areas of planthopper are estimated to reach 156 ten thousand hectares, accounting for 12% of the total planting area, will mainly occur in single-season rice planting area. The rice planted area of Bangladesh is 10 million hectares, the total affected areas of planthopper are estimated to reach 42 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in the western region of the Ganges Plain. The rice planted area of Myanmar is 7.3 million hectares, the total affected areas of planthopper are estimated to reach 38 ten thousand hectares, accounting for 5% of the total planting area, will mainly occur in the central plains. The rice planted area of Vietnam is 7.3 million hectares, the total affected areas of planthopper are estimated to reach 161 ten thousand hectares, accounting for 22% of the total planting area, will mainly occur northern and southern Vietnam. The rice planted area of Philippines is 4 million hectares, the total affected areas of planthopper are estimated to reach 22 ten thousand hectares, accounting for 5% of the total planting area, will mainly occur in the northern lowland agricultural area. The rice planted area of Cambodia is 3.3 million hectares, the total affected areas of planthopper are estimated to reach 67 ten thousand hectares, accounting for 20% of the total planting area, will mainly occur in the main crop producing area and the Tonle Sap Lake area. The rice planted area of Pakistan is 2.7 million hectares, the total affected areas of planthopper are estimated to reach 33 ten thousand hectares, accounting for 12% of the total planting area, will mainly occur in northern Punjab. The rice planted area of Nepal is 2 million hectares, the total affected areas of planthopper are estimated to reach 4 ten thousand hectares, accounting for 2% of the total planting area, will mainly occur in central Nepal. The rice planted area of Japan is 1.5 million hectares, the total affected areas of planthopper are estimated to reach 12 ten thousand hectares, accounting for 8% of the total planting area, will mainly occur in central and southern Japan. The rice planted area of South Korea is 0.8 million hectares, the total affected areas of planthopper are estimated to reach 7 ten thousand hectares, accounting for 9% of the total planting area, will mainly occur in western South Korea. The rice planted area of Laos is 0.7 million hectares, the

total affected areas of planthopper are estimated to reach 24 ten thousand hectares, accounting for 35% of the total planting area, will mainly occur in southern Laos.

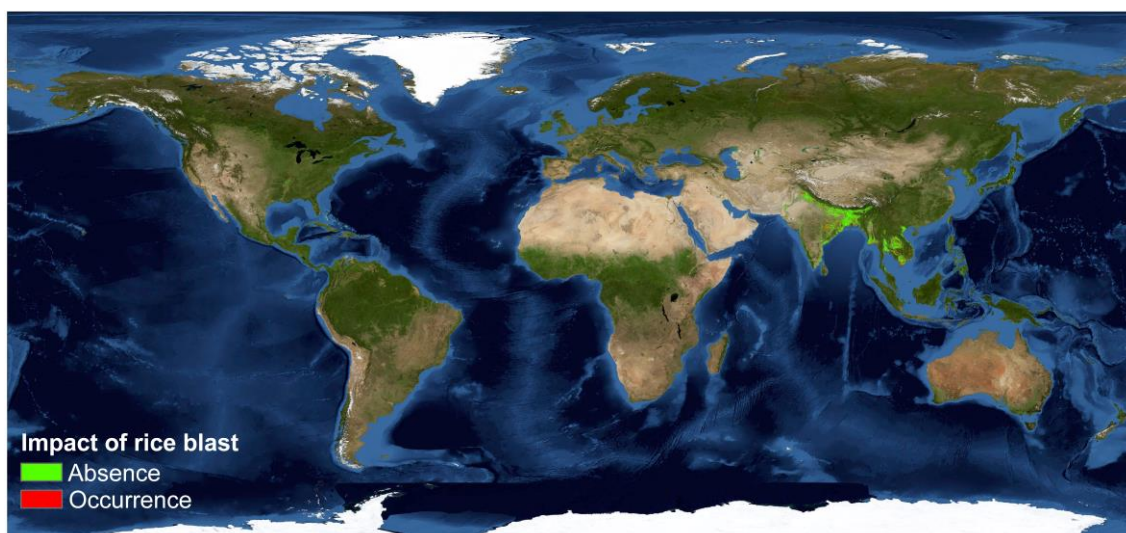*Figure 1 Spatial distribution of rice planthopper in rice production countries*

Rice blast

The distribution, occurrence area and ratio of rice blast in main rice production countries is shown in Figure 2 and Table 1. The total affected areas of blast in India are estimated to reach 197 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in the central region of India, the Ganges Plain and eastern coastal area. The total affected areas of blast in Thailand are estimated to reach 53 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in single-season rice planting area. The total affected areas of blast in Bangladesh are estimated to reach 39 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in coastal area, southern Ganges Plain and Sylhet Basin. The total affected areas of blast in Myanmar are estimated to reach 36 ten thousand hectares, accounting for 5% of the total planting area, will mainly occur in coastal area. The total affected areas of blast in Vietnam are estimated to reach 66 ten thousand hectares, accounting for 9% of the total planting area, will mainly occur in southern Vietnam. The total affected areas of blast in Philippines are estimated to reach 6 ten thousand hectares, accounting for 1% of the total planting area, will mainly occur in agroforestry ecotone area and hilly agricultural area. The total affected areas of blast in Cambodia are estimated to reach 41 ten thousand hectares, accounting for 12% of the total planting area, will mainly occur in Tonle Sap Lake area and southern part of the main crop production area. The total affected areas of blast in Pakistan are estimated to reach 29 ten thousand hectares, accounting for 11% of the total planting area, will mainly occur in north Punjab. The total affected areas of blast are in Nepal estimated to reach 5 ten thousand hectares, accounting for 3% of the

total planting area, will mainly occur in central and eastern Nepal. The total affected areas of blast in Japan are estimated to reach 15 ten thousand hectares, accounting for 10% of the total planting area, will mainly occur in northern Japan. The rice planted area of the United States is 1.1 million hectares, the total affected areas of blast are estimated to reach 13 ten thousand hectares, accounting for 12% of the total planting area, will mainly occur in lower Mississippi. The total affected areas of blast in South Korea are estimated to reach 3 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in western South Korea. The total affected areas of blast in Laos are estimated to reach 3 ten thousand hectares, accounting for 4% of the total planting area, will mainly occur in southern Laos. The rice planted area of Iran is 0.6 million hectares, the total affected areas of blast are estimated to reach 5 ten thousand hectares, accounting for 9% of the total planting area, will mainly occur in western and northern regions of Iran.

Figure 2 Spatial distribution of rice blast in rice production countries

Table 1 Statistics of rice blast and planthopper in main rice production countries

Rice production countries	Planthopper occurrence area and ratio		Blast occurrence area and ratio		Total planting area / million hectares
	Area / ten thousand hectares	Ratio / %	Area / ten thousand hectares	Ratio / %	
India	894	20	197	4	44
Thailand	156	12	53	4	12.7
Bangladesh	42	4	39	4	10
Myanmar	38	5	36	5	7.3
Vietnam	161	22	66	9	7.3
Philippines	22	5	6	1	4
Cambodia	67	20	41	12	3.3
Pakistan	33	12	29	11	2.7
Nepal	4	2	5	3	2
Japan	12	8	15	10	1.5
United States	/	/	13	12	1.1

South Korea	7	9	3	4	0.8
Laos	24	35	3	4	0.7
Iran	/	/	5	9	0.6

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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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