



**CCM** Data & Business  
Intelligence

# Forecasts on crop pests and diseases in China in 2024

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## Executive summary

In China, it is predicted that the occurrence area of 22 major pests and diseases will occur heavily on main grain crops (wheat, rice, corn, potato, etc.) in 2024, threatening more than 70% of crop production areas nationwide, with potential yield losses of 150 million tonnes+.

In 2023, the occurrence area of major wheat pests (wheat aphid and wheat spider) and diseases (wheat sheath blight, powdery mildew, fusarium crown rot of wheat and wheat stripe rust) decreased from that in last year; the occurrence of major rice pests (rice stem borer, rice leaf roller, rice planthopper and *Chilo suppressalis*) have caused harms for years, esp. *Chilo suppressalis*, the occurrence area of which marked double-digit increases from the average of the last five years in most regions of China. In 2023, China's corn production experienced different levels of occurrence of major pests (armyworm, *Spodoptera frugiperda* and corn borer) in different regions. As of 10 Dec., 2023, a poor resistance was witnessed in the most oilseed rape-growing areas around China to major pests and diseases (Sclerotinia, downy mildew, rape aphid, virus diseases, etc.) During 2019–2023, China's average occurrence area of soybean root rot and downy mildew was around 1 million ha annually.

## **Methodology**

The report is drafted by diverse methods as follows:

### **- Desk research**

The sources of desk research are various, including published magazines, journals, government websites and statistics, industrial statistics, association seminars as well as information from the Internet. A lot of work has gone into the compilation and analysis of the obtained information.

### **- Internet**

CCM visited government websites and contacted with players in the domestic agrochemical industry through B2B websites and software.

### **- Data processing and presentation**

The data collected and compiled are sourced from:

- √ CCM's database
- √ Published articles in periodicals, magazines, journals and third-party databases
- √ Statistics from governments and international institutes
- √ Telephone interviews with domestic producers, joint ventures, service suppliers and governments
- √ Third-party data providers
- √ Comments from industrial experts
- √ Professional databases from other sources
- √ Information from the internet

The data from various sources have been combined and cross-checked to make this report as precise and scientific as possible. Throughout the process, a series of internal discussions were held in order to analyse the data and draw the conclusions.

## **1 Prediction for overall occurrence of major crop pests and diseases**

On 12–13 Dec., 2023, the National Agro-tech Extension and Service Centre (NATESC) convened a consultation meeting on occurrence trend of major pests and diseases on crops in China for 2024. At the meeting, crop protection departments of 12 provinces including Henan, Shandong, Hebei, Anhui gauged results of prevention and control of pests and diseases on wheat, rice, corn and other crops in 2023, which reached 31.91% of ratio of retrieved loss to yield. The meeting also predicted that 22 major pests and diseases on wheat (5), rice (5), corn (6) and oilseed crops and vegetables (6 for total) including rape, soybean and potato are expected to see heavy occurrence for 2024, with a total occurrence area of 155.30 million ha, up by 26.2% and 18.4% on 2023 and 2018–2022 average, respectively, which will threaten more than 70% of crop production areas nationwide and cause potential yield losses exceeding 150 million tonnes.

## 2 Review on control of pests and diseases on major crops in China, 2023

### 2.1 Occurrence of major pests and diseases on wheat in China

In most China's wheat production areas, winter wheat varieties feature low resistance to diseases such as wheat scab, fusarium crown rot, stripe rust, powdery mildew and sheath blight. In the autumn of 2023, delayed wheat sowing and large seeding volume in part areas have led to a high plant density that is apt to the occurrence of pests and diseases.

**Wheat aphid:** The occurrence of the pest was frequent on autumn seedlings in winter, aggregating to 545,194.50 ha of area across the country, down by 30.8% from the 2018–2022 average. The average pest number in wheat-growing areas in North China (Hebei and Shanxi provinces) hit 7.9–11.0 aphids per 100 plants, higher than that in 2022.

**Wheat spider:** The pest afflicted 553,594.50 ha of autumn seedling area in Huang-Huai region, Jiang-Huai region, North China, Northwest China and etc., down by 26.0% compared with the average in 2018–2022. The single-line population per chi (about 33 cm) was 2.0–6.4 in Hebei, Henan, Shandong, Shanxi and Shaanxi provinces, lower than that in 2022 and normal years.

**Wheat sheath blight:** In the winter of 2023, wheat sheath blight occurred on 236,131.00 ha of wheat seedling areas in Jiang-Huai region, Huang-Huai region and North China, down by 47.2% compared with the 2018–2022 average. In Henan Province, the diseased plant rate averaged at 1.4%, slightly higher than that in 2022, topping at 4.0% in Yongcheng of Shangqiu City. In Hebei, Shanxi and Shandong provinces, the average diseased plant rate ranged from 0.4%–1.2%, lower than the rates recorded in 2022 and before.

**Powdery mildew:** In winter 2023, the disease saw less occurrence in part autumn wheat seedling areas in Northwest and Southwest China in general, hitting 113,332.20 ha of area, down by 47.2% from the 2018–2022 average. The disease mainly occurred in parts of the early-sown fields, but was hardly seen in Sichuan Province, Henan Province and other winter breeding areas. The average diseased leaf rate registered 0.8%–1.5% in Gansu and Shanxi provinces and lower than 0.1% in Shaanxi, Ningxia and Yunnan provinces/regions.

**Fusarium crown rot of wheat:** Before the winter, fusarium crown rot has infested 72,199.28 ha of wheat-growing areas in Shandong, Henan, Hebei, Shaanxi and other provinces, lighter than that in 2022. In recent years, the disease continued to take serious strikes in Huang-Huai wheat-growing areas with an expanding momentum, averaging at a diseased plant rate of 0.1%–0.6% in Shandong, Henan, Hebei and Shaanxi provinces and up to 1.8%–5% in parts of Heze City of Shandong and Zhengzhou City of Henan.

**Wheat stripe rust:** The disease mainly occurred on autumn wheat seedling in Northwest China. As of 8 Dec., 2023, the disease has reported 41,292.92 ha of occurrence area in 39 counties of Gansu, Ningxia, Qinghai and Shaanxi provinces/regions in the year, lightest since 2010, down by 64.4% compared to the 2018–2022 average. However, it was commonly seen in cities like Dingxi of Gansu, Haidong of Qinghai and Guyuan of Ningxia and severe in the fields. By county, the average diseased field rate was 71.5%–77.8% in Xunhua and Yuanzhou and 36.0–42.5% in Weiyuan, Longde and Yanchi; three counties in Sichuan and Guizhou provinces, the winter breeding areas in Southwest China, have seen diseased patches sporadically, with later occurrence than in the normal years.

**Wheat scab:** The occurrence of the disease has been heavy in wheat-growing areas in the middle and lower reaches of the Yangtze River, Jiang-Huai region and Huang-Huai region, where large quantity of wheat, corn or rice straws remained and provided sufficient host conditions for infestation and accumulation of fusarium. As per the pre-winter investigation by Shaanxi Province, Huyi, Zhouzhi, Linwei and other districts/counties registered a pathogen bearing rate of 57.1%–97.1% in 2023.

## 2.2 Occurrence of major pests and diseases on rice in China

Most rice-growing areas in South China boast favourable environment for major rice pests such as *Chilo suppressalis*, rice leaf roller and rice planthopper to reoccur and take a toll.

*Chilo suppressalis* (data collected before winter)

- In Jiangnan rice-growing areas (Hunan, Jiangxi and Zhejiang provinces), the average number of *Chilo suppressalis* was 135,000–165,000 per ha, up by 24% from the average of the last five years. Thereinto, the average number in the central and southern parts of Hunan, regions surrounding Dongting Lake, northern and central Jiangxi and southern Zhejiang, as well as regions along the coast topped 300,000 per ha.
- Southern China rice-growing areas (Guangxi and Fujian provinces) recorded an average number of 36,000–52,500 per ha, an increase over 18% compared to the 2018–2022 average, with that in parts of the south and north of Guangxi and northern Fujian exceeding 150,000 per ha.
- In Hubei, Anhui and Henan provinces, the rice-growing areas of middle and lower reaches of the Yangtze River and Jiang-Huai region, the average number was 34,500–60,000 per ha, up by over 9% from the average in last five years. In the southern parts of Jiangnan Plain, Henan, Anhui and areas along the Yangtze and Huai rivers, the average number was up to 75,000–255,000 per ha, laying a base for outbreaks next year.

**Rice sheath blight, rice blast and rice false smut:** The diseases are expected to be moderate or heavy in frequently occurring areas in 2023 on pathogen accumulation over years.

## 2.3 Occurrence of major pests and diseases on corn in China

China's corn boasts the largest planting area and the widest distribution among food crops, maintaining around 43.33 million ha of area. Uneven sowing seasons of varying corn production areas, from the *Spodoptera frugiperda* year-round breeding regions in Southwest and South China that grows corn crop all year round, to the migration pathway along the Yangtze River and key control area of Huang-Huai-Hai region where spring, summer and autumn corn crops intermix, has contributed to the pest's occurrence. Polyphagous pests like *Helicoverpa armigera*, beet armyworm and peach pyralid moth are prone to accumulate and cause harms to corn field, in response to no-tillage, straw returning, long-term continuous cropping and other cultivation methods and the expansion of soybean-corn mixed cropping and facility vegetable cultivation.

**Armyworm:** In 2023, the third-generation armyworm mainly occurred lightly or much more mildly in most parts of North China, with an occurrence area dropping 88% to 0.23 million ha compared with normal years.

**Spodoptera frugiperda:** In 2023, *Spodoptera frugiperda* mainly afflicted Southwest and South China, with an occurrence area of 0.13 million ha and a pest overwinter area of 28,666.38 ha. The year-round breeding region of the pest experienced overall light occurrence and heavy hits in parts. In places like Yunnan, Guangxi, Hainan and Guangdong provinces, the capture quantity was 5–15 per lure in a single day, and the average population was 1–4 per 100 plants. In particular, fields with no pest control or poor controlling effects in Yuxi, Pu'er, Xishuangbanna and other cities/regions in Yunnan Province registered an infested plant rate above 80% and an average number exceeding 50 per 100 plants.

**Corn borer:** According to NATESC's pre-winter survey, the average number per 100 plants of corn borer

- rose a bit in southern Huang-Huai region and Jiang-Huai region, reaching 41.9 in Henan Province, up 43% from the 2020–2022 average, and 34.5 in Jiangsu Province;
- registered 29 in Shandong Province in northern Huang-Huai region;
- remained low in Northeast and North China, hitting 16–18 in Heilongjiang, Liaoning and Inner Mongolia provinces/regions and 19 in Hebei Province;
- counted less than 15 in other provinces.

**Corn diseases:** Main corn varieties grown in Northeast and North China were less resistant to corn northern leaf blight, and those in Huang-Huai-Hai region were vulnerable to southern corn rust, corn brown spot, etc.



## 2.4 Occurrence of major pests and diseases on rape in China

In 2023, winter rape spanned an area over 7.33 million ha around China, but most of them featured poor resistance to sclerotinia, downy mildew, rape aphid, virus diseases, etc. Moreover, the employment of direct sowing technology has caused high planting densities, which further reduced rape resistance.

**Rape sclerotinia and downy mildew:** In 2018–2023, the annual occurrence area of the two diseases reached 2.73 million ha and 1.27 million ha on average, respectively. Rape-growing areas in Southwest China, middle and lower reaches of the Yangtze River, Jiangnan region and etc. saw continuous and wide occurrence of rape sclerotinia over years, with extensive pathogen source available to cause moderate or heavy occurrence every year.

**Rape aphid:** As of 10 Dec., 2023, the pest has afflicted 0.38 million ha of area. The pre-winter aphid was frequent in main rape production areas along the Yangtze River with a high population in part areas.

- In Southwest China, the average number of the pest was 50–120 per 100 plants in general but reached 439 per 100 plants in Sichuan Province, close to the 2022 amount, with the highest figure up to 6,364 per 100 plants in Nanxi District of Yibin City among others.
- In the middle and lower reaches of the Yangtze River and Jiangnan region, the pest's average number was 130–240 per 100 plants. Thereinto, Anhui and Hunan provinces reported a yearly increase of 22.4% and 22.6% respectively in this regard, in which Liling City of Hunan Province registered the highest average number of 5,000 per 100 plants.

## 2.5 Occurrence of major pests and diseases on soybean in China

In 2023, the base number of major soybean pests overwintering approached that in normal years but was high in localised regions. Based on data gleaned by main soybean-producing provinces before winter, the average pest damaged rate of soybean pod borer reached 2.1%–3%, close to the average in the last five years; 10 counties of Heilongjiang Province registered a rate over 5%, with Zhaozhou and Lanxi counties' surpassing 9.7%.

In the recent five years (2019–2023), soybean root rot and downy mildew averaged at an occurrence area of 0.67 million ha and 0.33 million ha, respectively. The diseases mainly concentrated in Heilongjiang, Henan, Shandong and other Northeast China provinces as well as in Huang-Huai-Hai region. Large area of continuous and alternate cropping and popularisation of straw returning and other cultivation methods have encouraged pathogens to overwinter, leading to sufficient fungal source for the initial infection next year.

Besides, the seed coating rate is 60%–80% in Northeast China and 20%–30% in Huang-Huai-Hai region. Uncoated seeds during seed sowing have increased risks of occurrence of soil-borne and seed-borne diseases like root rot as well as under-ground pests.

### 3 Forecasts of major pests and diseases in China for 2024

#### 3.1 Forecasts of major pests and diseases on wheat

According to the predicted data from various regions of China by National Climate Centre, the temperature in winter 2023 (from Dec. 2023 to Feb. 2024) are expected to be relatively high in most wheat production areas, which make it easy for pests and diseases such as stripe rust to survive the winter. In the spring of 2024 (March–May), most regions in the country are expected to see higher temperature than previous years, and wheat-growing areas in lower reach of the Yangtze River and Northwest China will see more rainfall than in the same period of normal years, which serves to the occurrence of diseases like wheat scab and stripe rust; in the middle and lower reaches of the Yangtze River, Jiang-Huai region and southern Huang-Huai region, wheat in the heading-flowering stage are vulnerable to wheat scab due to frequent overcast and rainy days; North China and Huang-Huai region will have approximate precipitation to normal that benefits the occurrence of wheat aphid and fusarium crown rot.

In 2024, the occurrence of major pests and diseases on wheat is predicted to be heavy overall, hitting an area of 59.35 million ha, including 34.67 million ha for diseases and 24.67 million ha for pests. Thereinto, the occurrence area of four major wheat diseases (wheat scab, wheat sheath blight, fusarium crown rot and wheat stripe rust) and one pest (wheat aphid) is estimated to reach 37.33 million ha, jumping 61.3% on 2023 and 34.9% on the 2018–2022 average of actual occurrence.

##### **Wheat aphid**

The occurrence area of wheat aphid is projected to hit 13.33 million ha. With heavy occurrence on the whole, the pest will occur mainly in wheat-growing areas in Huang-Huai region and North China and moderately in most wheat-growing areas in Jiang-Huai region, Southwest China and Northwest China.

##### **Wheat scab**

The occurrence area of wheat scab is estimated to cover 10 million ha nationwide with the control area of 16.67 million ha. The disease will be heavy overall, with high risks of heavy or above epidemics in wheat-growing areas in Jiangnan Plain, eastern Hubei Province, northern Zhejiang Province, most Anhui Province, central and south of Jiangsu Province and Southern Henan Province. Moderate to heavy occurrence is expected to take place in northern Jiangsu Province, central and north of Henan Province, south of Shandong Province and Hebei Province, central Shaanxi Province and northwest and east of Sichuan Province.

##### **Wheat sheath blight**

The occurrence of wheat sheath blight is projected to be heavy in general, hitting 8 million ha of area. The disease is expected to occur heavily in most Henan Province, Shandong Province and Anhui Province, central and north of Jiangsu Province and southern Hebei Province while moderately in Jiang-Huai, Huang-Huai, North China and other wheat-growing areas.

##### **Fusarium crown rot of wheat**

The occurrence of fusarium crown rot of wheat is expected to stay around 4 million ha of area, heavy in general and mainly distributed in the wheat-growing areas in Huang-Huai region, such as central and west of Shandong Province, central and north of Henan Province, southern Hebei Province, southwest of Shanxi Province and central Shaanxi Province.

##### **Wheat stripe rust**

Wheat stripe rust is expected to be moderate with an occurrence area of 2 million ha. The disease is projected to pose severe hit to localised parts in the wheat-growing areas of Jiangnan Basin of Hubei Province, Sichuan Basin and south of Shaanxi Province, Henan Province and Gansu Province, and show moderate occurrence in wheat-growing areas in central Henan Province, central and west of Anhui Province, southwest of Shandong Province, central and west of Yunnan Province, western Guizhou Province, central Shaanxi Province, central and east of Gansu Province, eastern Qinghai Province, southern Ningxia Hui Autonomous Region and Yili Valley of Xinjiang Uygur Autonomous Region.

Table 3.1-1 Forecasts on occurrence area of wheat pests and diseases in China in 2020–2024, million ha

| No. | Pests and diseases          | 2020  | 2021  | 2022  | 2023  | 2024  |
|-----|-----------------------------|-------|-------|-------|-------|-------|
| 1   | Wheat aphid                 | 14.00 | 13.33 | 14.00 | 14.67 | 13.33 |
| 2   | Wheat scab                  | 6.00  | 6.00  | 6.00  | 6.00  | 10.00 |
| 3   | Wheat sheath blight         | 8.00  | 8.00  | 8.00  | 8.00  | 8.00  |
| 4   | Fusarium crown rot of wheat | N/A   | N/A   | N/A   | N/A   | 4.00  |
| 5   | Wheat stripe rust           | 4.00  | 4.00  | 2.00  | 2.67  | 2.00  |

Source:NATESC

### 3.2 Forecasts of major pests and diseases on rice

In Jan.–Feb. 2024, the temperature in South and Southwest China, Jiangnan region and the middle and lower reaches of the Yangtze River is close to normal or higher; in spring 2024, most parts of the early-rice production areas are expected an overall higher temperature and more precipitation, which is conducive to the reproduction and occurrence of *Chilo suppressalis* and other borer pests, the inflow of two migratory pests on rice (rice planthopper and rice leaf roller) and the spread and epidemic of rice blast and sheath blight.

With combined analysis of population base, rice cultivation, variety distribution and other factors, the occurrence of rice pests and diseases is predicted to be relatively heavy in China, covering an area of 82.66 million ha, with 56.67 million ha for pests and 26.00 million ha for diseases. The occurrence area of three major rice pests (rice planthopper, *Chilo suppressalis* and rice leaf roller) and two major diseases (rice sheath blight and rice blast) is estimated to hit 71.33 million ha, accounting for 86.3% of the total and increasing by 24.5% and 20.3% compared to the actual occurrence areas in 2023 and 2018–2022 on average, respectively.

#### Rice planthopper

The occurrence area of rice planthopper is estimated to reach 20.67 million ha, with South China, north and east of Southwest China and the middle and lower reaches of the Yangtze River heavily infested. The pest is projected to make moderate occurrence in other rice-growing areas in South China.

#### Chilo suppressalis

Covering an area of 16.00 million ha nationwide, *Chilo suppressalis* is expected to widely appear in mixed planting areas of single-cropping rice and double harvest rice in Jiangnan region, as well as in rice-growing areas in Anhui Province along the Yangtze River, in the middle and lower reaches of the Yangtze River and in the north of Southwest China. In most other rice production areas, the pest occurrence is predicted to be moderate.

#### Rice sheath blight

The occurrence of sheath blight is estimated to cover 16.00 million ha of rice fields, heavy in the central and western parts of South China, north of Southwest China, Jiangnan region and the middle and lower reaches of the Yangtze River but moderate in other rice-growing areas.

#### Rice leaf roller

The occurrence area of rice leaf roller is projected to be 14.67 million ha. Heavy occurrence will be seen in the east of South China and Southwest China, middle and west of Jiangnan region and rice-growing areas along the Yangtze River and Huanghe River; other rice-growing areas in South China will see moderate occurrence.

#### Rice blast

The occurrence of rice blast is overall moderate, covering 4.00 million ha of area, with high epidemic ricks of rice neck blast in main production areas in Northeast China, hilly areas in the south and rice-growing areas along the Yangtze River as well as areas extensively planted with susceptible varieties.

Table 3.2-1 Forecasts on occurrence area of rice pests and diseases in China in 2020–2024, million ha

| No. | Pests and diseases | 2020  | 2021  | 2022  | 2023  | 2024  |
|-----|--------------------|-------|-------|-------|-------|-------|
| 1   | Rice planthopper   | 20.00 | 23.33 | 20.67 | 20.00 | 20.67 |
| 2   | Chilo suppressalis | 14.00 | 14.00 | 13.33 | 14.67 | 16.00 |
| 3   | Rice sheath blight | 17.33 | 16.67 | 16.00 | 15.33 | 16.00 |
| 4   | Rice leaf roller   | 14.00 | 16.00 | 14.67 | 13.33 | 14.67 |
| 5   | Rice blast         | 4.33  | 4.33  | 4.00  | 3.87  | 4.00  |

Source:NATESC

### 3.3 Forecasts of major pests and diseases on corn

According to National Climate Centre, in Dec. 2023–Feb. 2024, a temperature approaching or higher than that in normal years in early winter occurred in most parts of China, aiding in the pest and disease occurrence in the south and the pest overwintering in northern China; in late winter, with cold waves perking up, periodical low temperatures and sleet and freezing weather will be seen in the south of central and East China, northern part of South China, southeast of Southwest China and etc., which hampers proliferation of *Spodoptera frugiperda*, armyworm among other pests during winter. In the spring of 2024, higher temperature in most parts of China and more rainfall in eastern part of South China are expected, conducive to the pre-accumulation of pests and diseases; precipitation in other regions of the country will be close to normal or relatively low, which disfavours the occurrence of epidemic diseases.

Based on the comprehensive analysis of population base, planting pattern, crop distribution, climatic trend and other factors, the total occurrence area of corn pests and diseases is predicted to hit 65.30 million ha in 2024, breaking down into 46.00 million ha for pests and 19.33 million ha for diseases. The combined occurrence area of four major corn pests (corn borer, *Helicoverpa armigera*, *Spodoptera frugiperda* and armyworm) and two diseases (southern corn rust and northern leaf blight) is estimated to reach 38.33 million ha, accounting for 58.7% of the total, up by 5.6% and 6.9% compared to the 2023 and 2018–2022 average, respectively.

#### Corn borer

The occurrence area of corn borer is expected to reach 16.00 million ha. To be specific,

- The first-generation corn borer will inflict 5.00 million ha of corn fields, occurring moderately in most parts of Northeast China, Huang-Huai region and Northwest China and localised parts of Southwest and South China, and heavily hitting parts of Liaoning and Jiangsu provinces.
- The second generation is predicted to cover a land of 6.00 million ha, moderate in most Northeast China and parts of Southwest China and Huang-Huai region.
- The third generation, with an occurrence area estimated at 5.00 million ha, is expected heavy occurrence in the summer corn-growing areas in Huang-Huai-Hai region.

#### *Helicoverpa armigera*

The occurrence area of *Helicoverpa armigera* (mainly the third- and fourth-generation) is projected to be 6.00 million ha. Heavy strikes are expected to occur in part Huang-Huai-Hai region and south of Northeast China.

#### Southern corn rust

The occurrence area of southern corn rust is expected to reach 5.33 million ha, with heavy epidemic risks in summer corn-growing areas in Huang-Huai-Hai region.

#### Northern leaf blight

The occurrence area of northern leaf blight is estimated to hit 5.00 million ha. It is expected to see moderate occurrence in most parts of and severe strikes in parts of Northeast, North, Northwest and Southwest China.

#### *Spodoptera frugiperda*

The occurrence area of *Spodoptera frugiperda* is predicted to be 3.00 million ha. It is expected to see multi-generation and severe occurrence in Southwest and South China and Jiangnan region, and light occurrence

in middle and lower reaches of the Yangtze River, Jiang-Huai region, Huang-Huai region and Northwest and North China but be heavy on late-sown summer corn.

### Armyworm

The occurrence area of armyworm is projected to be 3.00 million ha. Overall mild strikes are expected to happen in North China, Northeast, Northwest and Southwest China, but some parts may see concentrated attacks.

Table 3.3-1 Forecasts on occurrence area of corn pests and diseases in China in 2020–2024, million ha

| No. | Pests and diseases    | 2020  | 2021  | 2022  | 2023  | 2024  |
|-----|-----------------------|-------|-------|-------|-------|-------|
| 1   | Corn borer            | 19.33 | 17.33 | 17.33 | 16.67 | 16.00 |
| 2   | Helicoverpa armigera  | N/A   | N/A   | N/A   | N/A   | 6.00  |
| 3   | Southern corn rust    | 3.75  | 4.33  | 5.33  | 3.67  | 5.33  |
| 4   | Northern leaf blight  | 5.00  | 4.53  | 5.00  | 5.33  | 5.00  |
| 5   | Armyworm              | 4.53  | 5.00  | 4.00  | 4.33  | 3.00  |
| 6   | Spodoptera frugiperda | 6.67  | 2.67  | 5.33  | 3.33  | 3.00  |

Source: NATESC

### 3.4 Forecasts of major pests and diseases on rape

As per the National Climate Centre forecasts, in Jan.–Feb. 2024, the temperature and precipitation in the winter rape production areas are expected to be close to or higher than that in normal years, with an estimated 1–2°C higher temperature and 10%–20% more rainfall in the middle and lower reaches of the Yangtze River, allowing for overwinter survivals of pests and diseases. In this spring, the temperature in winter rape production areas is estimated to rise by 0.5–1.0°C in general, and precipitation will increase by 20%–50% in Shanghai, south of Jiangsu Province and Anhui Province, Zhejiang Province, most Jiangxi Province and eastern Hunan Province in parts.

The weather condition is profit for the resurgence, proliferation and spread of pests and diseases in early spring, especially for the apothecial germination and infestation of rape sclertiniose in the middle and lower reaches of the Yangtze River and Jiangnan region, which is of climatic risks of heavy occurrence to outbreak and requires vigilance. It is predicted that rape pests and diseases will occur moderately for 2024, striking an area of 8.07 million ha, which is heavier than last year.

#### Rape sclertiniose

Rape sclertiniose is expected to impact an area of 3.13 million ha, with Hunan Province, Hubei Province, Sichuan Province, Anhui Province and Jiangxi Province projected to suffer heavy strikes, Southwest China, middle and lower reaches of the Yangtze River and Henan Province anticipating moderate occurrence, and Shaanxi Province and Gansu Province prone to see light occurrence.

#### Rape downy mildew

The occurrence area of rape downy mildew is estimated to be 1.73 million ha. The disease will be heavy in part Jiangxi Province, moderate in most winter rape production areas of Southwest China, middle and lower reaches of the Yangtze River and Jiangnan region, and light or below in Anhui, Henan and Shaanxi provinces.

#### Rape aphid

The occurrence of rape aphid is projected to cover 2.33 million ha of area, heavy in Sichuan Province, moderate in Southwest China, Jiangsu Province and Henan Province, and light in the middle and lower reaches of the Yangtze River, Jiangnan winter rape production areas and Shaanxi Province.

## Others

Other pests and diseases in rape-growing areas totalled an occurrence area of 866,707 ha, accounting for 10.74% of the total.

- Diseases: Rape viral disease is expected to be light in Southwest China and the middle and lower reaches of the Yangtze River, while rape club root tends to spread in rape production areas in localised parts in provinces like Sichuan, Hunan, Hubei, Anhui and Jiangxi.
- Pests: Rape striped flea beetle, rape stem weevil and rape leaf miner will inflict Hunan, Hubei, Shaanxi and Gansu provinces, and rape leaf beetle, rape beetle and rape angle borer are predicted to cause certain harms to provinces like Hunan, Shaanxi, Gansu and other rape production areas.

## 3.5 Forecasts of major pests and diseases on soybean

In Jan.–Feb. and the spring of 2024, the extensively higher temperature will make for the overwintering of pest and disease sources. In addition, more rainfall is expected in Anhui Province, Jiangsu Province and other southern Huang-Huai soybean-growing areas in spring, leading to occurrence and accumulation of pathogen such as fusarium and rhizoctonia on preceding crops, and will consequently exacerbate epidemic of diseases on the succeeding soybean. In summer, continuous high temperature and heat waves are anticipated to strike North China, north and south of Central, north and south of East China, etc. It should be alerted of pest outbreaks like tobacco whitefly, *Helicoverpa armigera*, yellow spotted leaf beetle and beet armyworm in Huang-Huai-Hai soybean-growing areas.

As per prediction, the occurrence of soybean pests and diseases will be moderate as a whole, with an area reaching 8.67 million ha, heavier than that in last year.

### Soybean root rot

The occurrence area of soybean root rot is expected to hit 1.27 million ha. The disease will be heavy in Heilongjiang Province and moderate in Inner Mongolia Autonomous Region, Sichuan Province and Anhui Province; other soybean-growing areas will see mild occurrence or below.

### Soybean downy mildew

The occurrence area of soybean downy mildew is estimated to be 513,333 ha. Sichuan Province and Hunan Province are expected to see moderate occurrence, and others will see occurrence at a light or below level.

### Soybean pod borer

The occurrence area of soybean pod borer is projected to be 1.40 million ha. Heavy in parts of Northeast China, the pest will occur lightly or at a lower level in other soybean-growing areas.

### Beet armyworm

With an estimated 733,333 ha of occurrence area, beet armyworm will heavily inflict the soybean-corn mixed planting areas in Huang-Huai-Hai region, while be light or below in other soybean-growing areas.

## Others

Other pests and diseases on soybean are projected to cover an occurrence area of 4.75 million ha, accounting for 54.85% of the total.

- Diseases: Soybean rust, virus disease, sclerotinia, brown leaf spot, cyst nematode disease and other soybean diseases are expected to cover 686,667 ha of area with a certain occurrence degree, in which virus disease, rust and brown leaf spot will be heavy in Guizhou Province and Sichuan Province.
- Pests: Pests like soybean aphid, bean bug, tobacco whitefly, stem fly, *Maruca vitrata*, *Spodoptera litura*, *Helicoverpa armigera*, flax bud worm, *Mamestra brassicae*, bean leaf webber, yellow spotted leaf beetle, underground pests are estimated to cover an area of 4.07 million ha and occur at a certain extent in part soybean-growing areas. Thereinto, tobacco whitefly in Anhui Province and eastern Henan Province, flax bud worm and *Mamestra brassicae* in the east and north of Heilongjiang Province, and stem fly, bean leaf webber and *Spodoptera litura* in part southern soybean production areas are expected to occur at heavy or above degree.

### 3.6 Forecasts of major pests and diseases on other crops

Based on comprehensive analysis of previous occurrence of pests and diseases, crop distribution, planting methods, climatic trend and other factors, it is predicted that the occurrence area of other crops' pests and diseases (potato late blight, *Loxostege sticticalis*, vegetable thrips and tomato leaf miner, etc.) will reach 4.00 million ha, registering a year-on-year increase by 15.27%.

#### **Potato late blight**

The occurrence area of potato late blight is estimated to reach 1.27 million ha. The disease is expected to be moderate in general, but at high epidemic risks in Southwest China, mountain areas of Central China, parts of the dank mountain areas in Northwest, North China and Northeast China and on susceptible varieties.

#### **Loxostege sticticalis**

The occurrence of *Loxostege sticticalis* is projected to cover 1.33 million ha of area, heavy in parts of Inner Mongolia Autonomous Region (accounting for 60% of occurrence area) and the vicinity and light in most North China, Northeast and Northwest China.

#### **Vegetable thrips**

The occurrence of vegetable thrips is expected to be heavy overall, affecting an area of 1.33 million ha. The pest mainly infests cowpea, pepper, cucumber, scallion, eggplant and other crops, and the occurrence is projected to be heavy on greenhouse vegetables grown in Huang-Huai region, North China and other northern China as well as vegetables planted in open grounds of the middle and lower reaches of the Yangtze River, Southwest and South China and others, peaking in spring, autumn and winter.

#### **Tomato leaf miner**

The occurrence of tomato leaf miner is estimated to be moderate in general, covering an area of 66,667 ha. The pest is expected to take heavy hits in tomato fields in Xinjiang Uygur Autonomous Region, Gansu Province, Ningxia Hui Autonomous Region, Yunnan Province, Sichuan Province, Shanxi Province, Hebei Province, Liaoning Province and Shandong Province, as well as Chongqing Municipality, Beijing Municipality, Tianjin Municipality in parts, and the occurrence will be heavier inside greenhouses than in open grounds and on autumn crops than spring crops, peaking over flowering period to fruit ripening period.



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