Oriental fruit fly: a potential biosecurity risk under a changing climate

A changing climate is likely to increase the risk of establishment from an incursion of oriental fruit flies in NSW. This poses a threat to the state's horticultural industry.

Developing industry-informed climate planning information

Climate change is altering the biosecurity risks for many agricultural commodities across NSW. Primary producers need evidence-based information about the changing climate, and the risks and opportunities it may bring.

Through its Vulnerability Assessment Project, the NSW Department of Primary Industries is increasing the resilience of our primary industries by providing information and data to help the sector better plan for, and respond to, climate change. The project has determined climate change impacts for extensive livestock, broadacre cropping, marine fisheries, forestry, horticulture and viticulture, and important cross-cutting biosecurity risks to inform sound planning, risk management and adaptation decisions.

Oriental fruit fly in NSW

The exotic pest oriental fruit fly *(Bactrocera dorsalis)* is one of the most destructive horticultural pests in the world, with a reported host range of over 400 types of fruits and vegetables. Fruit flies cause damage by laying their eggs in the flesh of fruit and vegetables, which the resulting larvae consume. This damages the interior of the produce and may cause it to fall to the ground. Oriental fruit fly is one of very few fruit fly species that will infect some immature fruit.

There is not currently an established population of oriental fruit fly in Australia, but it is found on Christmas Island. Oriental fruit fly is established in Papua New Guinea, and there is potential for it to be accidentally introduced into Australia via infested produce, soil or sand.

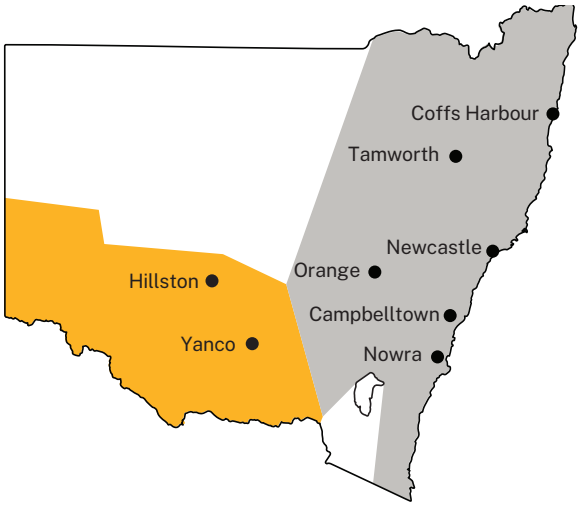


Figure 1. The endemic distribution of Queensland fruit flies across western (yellow) and eastern (grey) regions in NSW. Locations affected by Queensland fruit fly act as proxies for the area of concern for Oriental fruit fly. Locations indicate trapping sites for fruit fly surveillance.

Climate and oriental fruit flies

Overall, the likely impacts of oriental fruit fly by 2050 under a changing climate in NSW are projected to increase in spring and autumn. Changes in climate suitability are likely to occur across all stages of the life cycle.

Climate risks likely to increase the risk of establishment of an endemic population of oriental fruit flies include:

Warmer temperatures and changing rainfall are unlikely to restrict survival of oriental fruit fly in the future.

Climate impacts: what to expect

Egg

- **Increased climate suitability** in both regions from April to October and in the eastern region from November to March (*low to high confidence*).
- **Decreased climate suitability** in both regions from December to February (*low to high confidence*).

Larvae

- **Increased climate suitability** in both regions from April to October and in the eastern region from November to March (*low to high confidence*).
- **Decreased climate suitability** in both regions from December to February (*low to high confidence*).

Pupae

- **Increased climate suitability** in both regions from May to September and in the eastern region from October to April.
- **Decreased climate suitability** in both regions from December to February.

Adult fly

- **Increased climate suitability** in both regions from April to November and in the eastern region in March and December (*low to high confidence*).
- **Maintained historical climate suitability** in both regions in January and February.

Impact on key NSW primary industries

Should an incursion occur by 2050, the NSW climate is not likely to restrict the year-round survival of oriental fruit fly. Milder winters with higher minimum and mean temperatures may allow survival of oriental fruit fly through the colder months in some areas. This persistence through winter may increase the risk of an incursion transitioning to an endemic population in NSW.

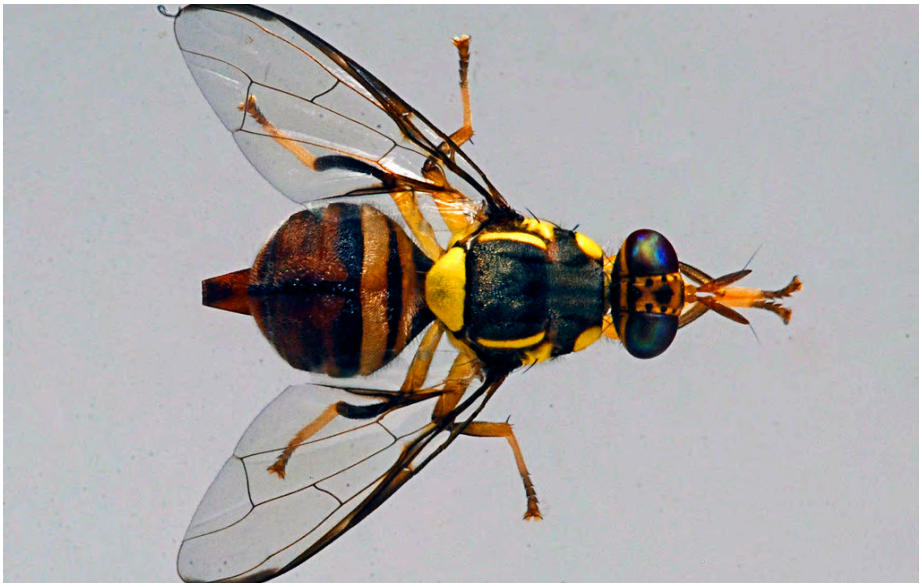
The effects of an oriental fruit fly incursion would depend on the availability of host fruit and vegetables. Climate change may also affect the distribution of some horticultural commodities that the flies depend on.

Due to the large number of potential hosts, industries will need to consider broad reaching oriental fruit fly education programs to raise awareness of the risks and management strategies.

Methodology and data

Climate projections were sourced from Climate Change in Australia's 'Application Ready Data'. This dataset is comprised of projections from an ensemble of 8 global climate models, each presenting a plausible future climate. The models differ in their projections, giving rise to uncertainty in our modelling. Low confidence in the projected changes due to differences between the models is noted in the text. Care should be taken when interpreting these results.

The Vulnerability Assessment Project is intended to highlight potential industry-or regional-level changes. Intermediate and high emissions scenarios were used in the assessments (RCP4.5 and RCP8.5), but these are not the only future scenarios possible. The inclusion of climate variables important to each biosecurity risk was based on published research, expert knowledge and data quality and availability.



FOR MORE INFORMATION

Please get in touch with vulnerability.assessment@dpi.nsw.gov.au

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