

What do fewer inductive days mean for mango cultivars in the Katherine region?



Photo: Maddison Clonan

The Katherine mango production region is highly vulnerable to a decline in inductive days due to rising temperatures.

By the end of the century, there will be fewer than five inductive days for May and August so flowering will be concentrated in June/July.

Orchards further south will be less vulnerable.

Calypso and Kensington Pride are the least vulnerable of the studied cultivars.

Taking on-farm action now may reduce the impact of these changes.

Warming trend set to continue

The average temperature in the Northern Territory has increased by around 1°C over the past 100 years, and the number of extreme heat days has increased. This trend is set to continue.

As it gets warmer, important temperature thresholds for mango production will be crossed, including the threshold for flower induction.

In the Katherine region this means that cultivars that are currently grown will become more vulnerable.

Temperatures limiting flower induction in Katherine

The Katherine production region (which includes the Katherine, Mataranka and Pine Creek production areas) typically experiences cooler minimum temperatures and higher maximum temperatures than the Darwin region.

Mango flowering in the Katherine production region is primarily limited by the number of days with maximum temperatures above 32°C.

Fewer inductive days

We analysed climate projections for both high and lower emissions futures to find how rising temperatures would affect the number of inductive days in the Katherine production region.

Both minimum and maximum temperatures are projected to limit mango flower induction; however, higher maximum temperatures are the most limiting.

At present, this production region averages around 74 days in the May to August period with maximum temperatures below 32°C. By the end of the century, this could decline to 32 days under the lower emissions scenario and just seven days under the high emissions scenario.

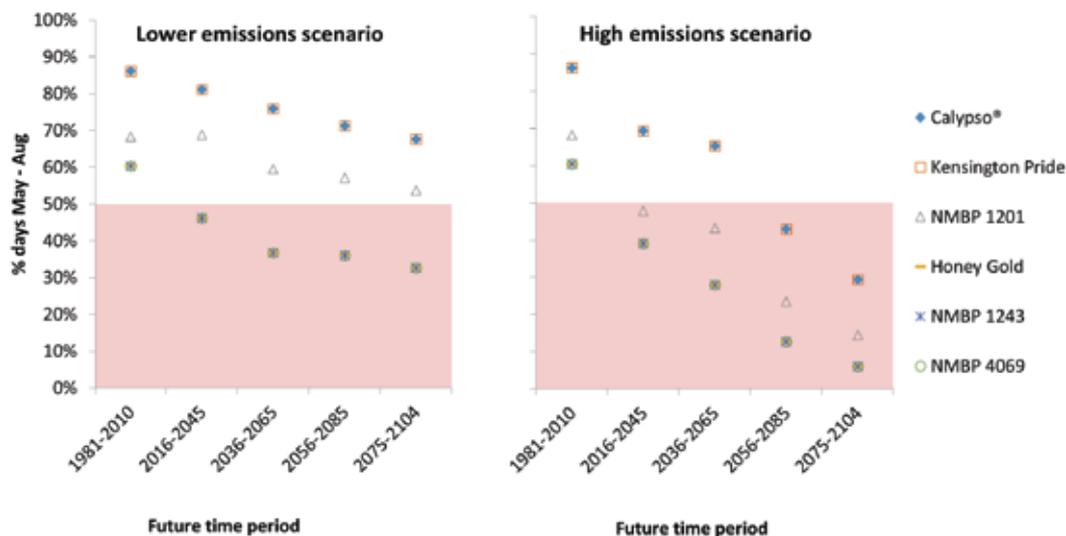
May and August are the most vulnerable months, projected to have fewer than five inductive days by 2090. Flower induction may be restricted to June and July, with more opportunities for induction in July.

Orchards positioned further south will be less vulnerable.



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Percentage of inductive days in May to August for each mango cultivar in Katherine, as projected by the upper range model for each emissions scenario compared with historical values (1981–2010). Cultivars with less than 50% inductive days in May to August are deemed vulnerable (indicated by red shading).



Vulnerable cultivars

Taking the number of inductive days into account, we looked at how six cultivars – Kensington Pride, Calypso®, Honey Gold and cultivars 1201, 1243 and 4069 from the National Mango Breeding Program (NMBP) – would fare under both high and lower emissions futures.

In the lower emissions future, Calypso®, Kensington Pride and NMBP 1201 could experience more than 50% inductive days between May and August up until the end of the century. The remaining cultivars are projected to experience change from 60% inductive days from historical averages, to fewer than 50% in the near future. This suggests that some cultivars may become vulnerable within the next decade in the Katherine region.

In a high emissions future, all cultivars except Calypso® and Kensington Pride are expected to become vulnerable within the next decade. By the end of the century, all cultivars could experience fewer than 29% inductive days between May and August.

Staying viable

Growers will need to consider on-farm adaptation actions to reduce the impacts of climate change and maintain the ongoing sustainability of mango production in the Northern Territory. These actions include canopy management, moving to new cultivars, relocating orchards and employing orchard cooling practices. As extreme heat becomes more prevalent, the health and safety of farm works will also need attention.

Farm-level actions will need to be supported by an industry response that may include education and extension, commercialisation of new cultivars, market development for resilient cultivars, and management of changes in fruit supply to market.

Grower and industry activity will need to be supported by policies and regulations at all levels of government that are considerate of short-term transformational change, while also accounting for the incremental change required to address longer term climate challenges.

Ongoing research to better understand climate-resilient genotypes, the climatic limits of artificial chemical flower induction, protective cropping, mango genetic adaptation and development in a changing climate, harvest timing and new production sites will continue to provide information to support adaptation.

Find out more

The impact assessment report contains full details of the climate change analysis and additional information about adaptation options. It is available at www.nesplclimate.com.au.

For information about research on impacts of climate change on mango production

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