

What do fewer inductive days mean for mango cultivars in Kununurra?



Photo: Maddison Clinton

The Kununurra 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 Kununurra region this means that cultivars that are currently grown will become more vulnerable.

Temperatures limiting flower induction in Kununurra

The Kununurra production region experiences similar inductive conditions to Katherine. The cool nights and warm days are ideal for mango flower induction; however, daily maximum temperatures tend to be higher than in Katherine.

Historical averages indicate that current conditions for induction in Kununurra are suitable for cultivars with high maximum temperature thresholds.

This is due to a high percentage of days between May and August falling below 20°C at night, but fewer days have maximum temperatures below 32°C. Therefore, the most limiting factor is the number of days below 32°C or daily maximum temperature.

Reports from industry suggest that a dramatic decline in yield from 2006 to 2016 of Kensington Pride grown in Kununurra can be related to warming temperatures.

Fewer inductive days

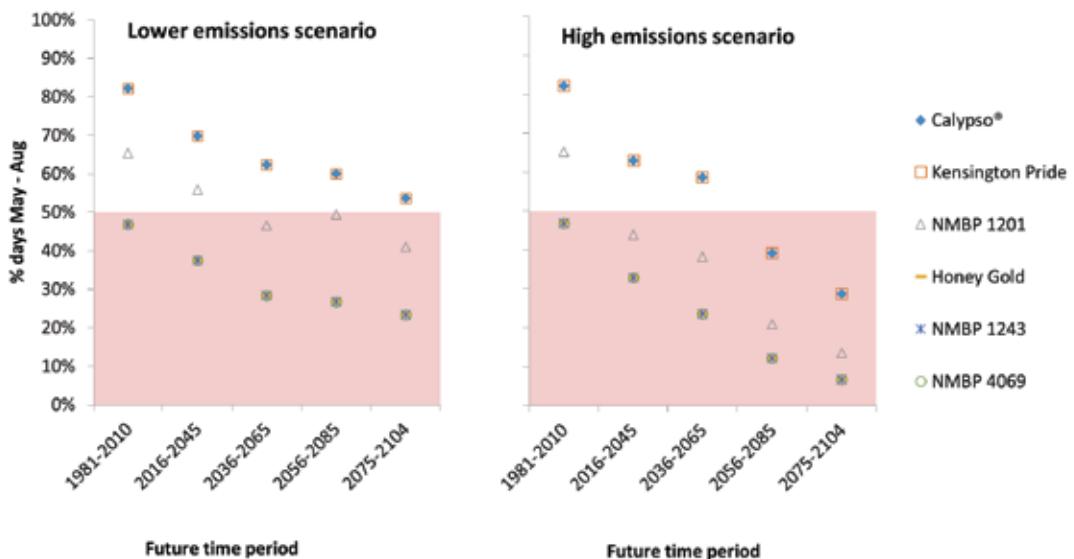
We analysed climate projections for both high and lower emissions futures to find how rising temperatures would affect the number of inductive days in Kununurra.

Under the lower emissions scenario the number of days from May to August with maximum temperatures below 32°C could decline from 57 to 30 by the end of the century. Under the high emissions scenario, the number of days may decline to eight by the end of the century, while it is projected that 17 days will fall below 20°C at night.

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Percentage of inductive days in May to August for each mango cultivar in Kununurra, 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).



Also by the end of the century, under the lower emissions scenario, there may be just 30 days from May to August with maximum temperatures below 35°C, and flower induction could become restricted to June and July.

Orchards further south are less vulnerable.

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.

NMBP 1243 and NMBP 4069 already experience fewer than 50% inductive days between May and August in Kununurra.

In a high emissions future, all cultivars could become vulnerable later in the century, particularly NMBP 1243 and NMBP 4069.

Under the lower emissions scenario, Calypso® and Kensington Pride are the only cultivars projected to experience more than 50% inductive days by the end of the century.

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 workers 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.nespclimate.com.au.

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

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