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CAN DROUGHT AFFECT FLORAL COLOUR OF BEES IN AN AGRICULTURAL POLLINATION SYSTEM?

Priscila Tunes, Hannelise de Kassia Balduino, Maria Luisa de Passos Frigero, Carmen Sílvia Fernandes Boaro, Elza Guimarães

São Paulo State University, Botucatu, Brazil; corresponding author:

priscila.tunes@unesp.br

ABSTRACT

Recent IPCC predictions of climate change, including increased extreme rainfall and drought events, may put pollination interactions at risk. Changes in climatic conditions can affect floral traits, among them flower colour, which acts as visual signalling to pollinators. UN's 2030 Agenda has the goals of ensuring food production and ecosystem processes. However, these goals may be compromised if pollination is affected, as several crops are dependent on pollinators for fruit and seed production, which rely on floral signals to locate flowers.

We investigated whether variations in water availability, simulating a climate change scenario, could induce changes in flower colour of *Cucurbita pepo* L., a bee-pollinated crop. For that, we assigned plants to one of the following three treatments: a 30% reduction in rainfall, extreme drought events, and regular rainfall (control). Both drought scenarios simulate IPCC predictions for the next decades. We measured the reflectance of petals, stigmas and anthers of fresh flowers and used these data to generate colour loci in a colour hexagon vision model, representing the trichromatic vision of bees.

Extreme drought conditions affected floral colour, which might be related to the regulation of the synthesis of carotenoids that are known to confer yellow and orange pigmentation of flowers and are present in *Cucurbita*. However, those changes were not noticeable by bees, according to the visual sensitivity of *Bombus terrestris*, meaning that the visual communication between flower and pollinator, in terms of floral colour, may be maintained in this scenario.

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