

# Why pollinator identity impacts blueberry productivity

Which insect species visit a blueberry crop can significantly impact pollination effectiveness and fruit set, according to the findings of a groundbreaking Australian research project.

The project, *Securing Pollination for more Productive Agriculture: Guidelines for effective pollinator management and stakeholder adoption*, delivered as part of the Australian Government Department of Agriculture, Water and the Environment Rural R&D for Profit program, has just wrapped up after a four year project from June 2016 to February 2021.

It saw Australia's most knowledgeable bee and pollination researchers collaborate with Costa Group, a major Australian blueberry grower, to assess the contribution of pollinators to a range of pollination-dependent crops including blueberries.

The project's recommendations are aimed at strengthening pollination security and resilience, and optimising yield by identifying the insects that contribute to crop pollination and the way they relate to the landscape.

## What's visiting your crop?

At blueberry orchards around Coffs Harbour in NSW, Walkamin in Queensland, and in Tasmania, researchers identified what insect species visited and pollinated blueberry and their abundances.

They also assessed the pollination efficiency of the most abundant insect groups that visited the crop flower.

Dr. Rader said across all sites, bees were the most frequently observed group of visitors.

"In New South Wales, honey bees and wild stingless bees (*Tetragonula carbonaria*) comprised 99% of all recorded floral visitors to blueberry flowers," Dr. Rader said.

"The remaining 1% of recorded visitors included three types of native bees – reed bees (*Exoneura*), furrow bees (*Lasioglossum*) and carpenter bees (*Xylocopa*) – and hoverflies, (*Austrosyrphus* and *Simosyrphus*).

"In Tasmania, honey bees accounted for 76% of blueberry visitors, while bumblebees accounted for 19% of visitation. Reed bees were the third most common, accounting for 4% of visitors, with the remaining 1% made up of various other infrequent visitors," Dr. Kendall said.

"In Walkamin, Queensland, managed honey bees contributed 95% of visits to southern highbush blueberry flowers cultivated under polytunnels. Hoverflies (*Syrphidae*) represented by two morphospecies, accounted for 3% of flower visits. Native stingless bees (*T. carbonaria*), butterflies (*Lepidoptera*) and muscid flies (*Diptera*) accounted for the remaining 2% of visits." Mr. Jones said.

Both between and within each cultivar of blueberry, dominant pollinator species differed considerably in their abundance.

"In northern highbush, we observed 59% more honey bees than bumblebees," Dr. Kendall said.

"In rabbiteye, abundances of honey bees and stingless bees were similar (18% difference) but in southern highbush, we observed 42% more honey bees than stingless bees.

"The abundances of both honey bees and stingless bees were higher (76% and 83%, respectively) in rabbiteye than southern highbush. Honey bee abundance was similar between southern highbush and northern highbush."



## Crop pollination effectiveness

The suitability of pollen depends on the crop species, and in blueberry, some species set fruit with pollen from the same variety, and others require cross pollination with pollen from a different variety to achieve fruit set.

Researchers found the pollination effectiveness of the dominant pollinator species differed considerably between blueberry types, and insect identity was important to fruit set.

In rabbiteye, neither honey bees nor stingless bees improved the probability of fruit set with a single visit relative to un-pollinated flowers.

And in southern highbush, honey bees and stingless bees increased the probability of fruit set by 59% and 41% relative to un-pollinated flowers.

Dr Rader said the effectiveness of pollinators is different across different cultivars of the same crop.

“Two evergreen blueberry varieties only required five visits to achieve 100% fruit set, however the third rabbit eye variety, required more than 15 to achieve 65% fruit set,” Dr. Rader said.

See the full journal article published at <http://bit.ly/BB-pol>

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