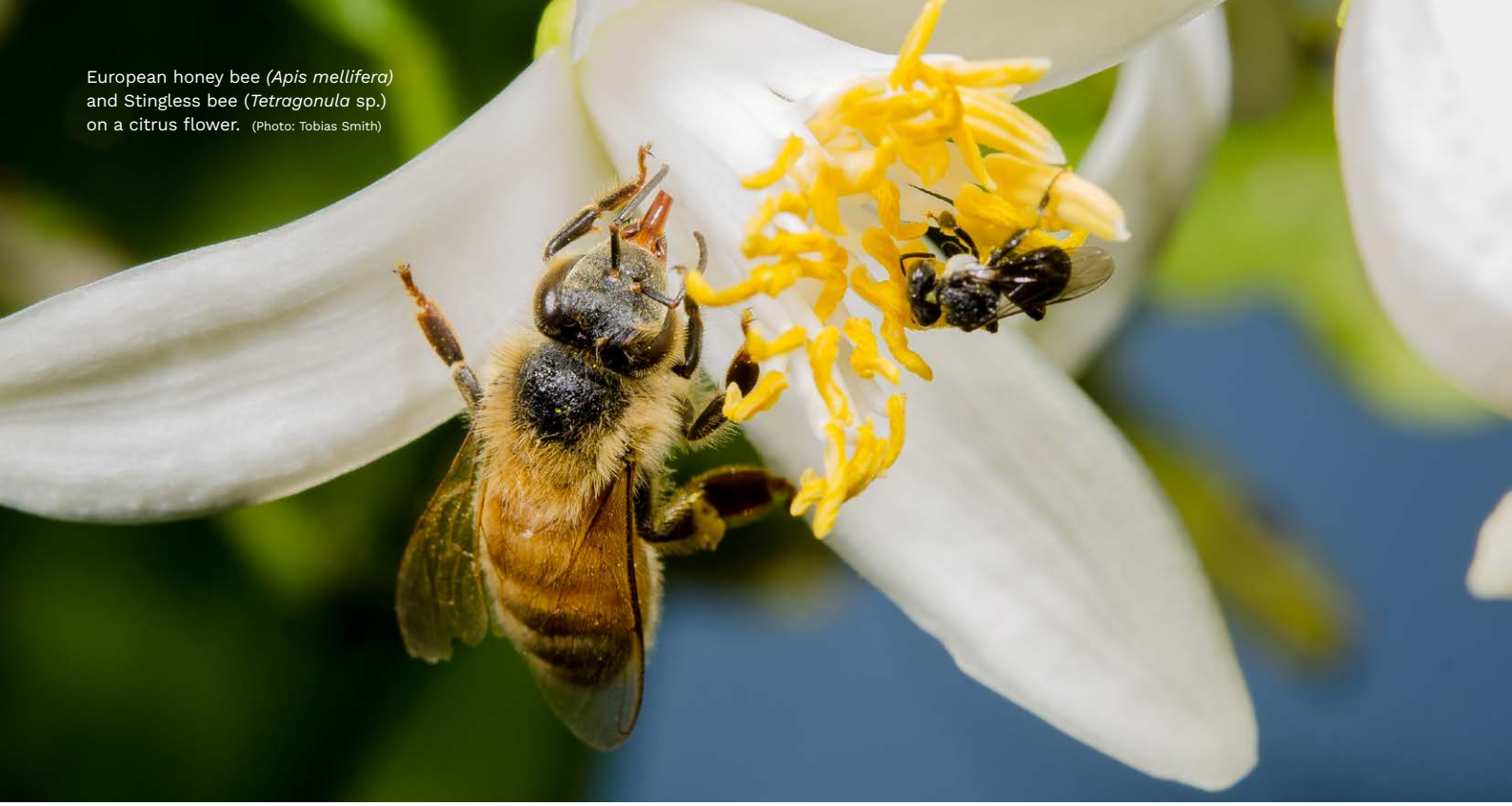
Pollination Security CRC

Scope Summary & Prospectus

The Pollination Security CRC will drive threat adaptation for pollinators, boosting agricultural productivity and environmental sustainability for all Australians. Invasive Varroa mite's arrival adds the world's greatest honey bee threat to many pre-existing challenges pollinators face from climate change, habitat degradation and disease.

The CRC will co-design and implement a strategy to improve pollination security that ensures agriculture can thrive and adapt. Outcomes will be enhanced landscape management, new monitoring technologies and boosted pollinator diversity. The CRC will build capability across the pollination sectors and drive practice change to strengthen Australia's food security, market opportunities and ecosystem health.



European honey bee *(Apis mellifera)* and Stingless bee (*Tetragonula* sp.) on a citrus flower. (Photo: Tobias Smith)

The role of pollinators in Australian agriculture

Nearly 90 per cent of flowering plant species and more than 75 per cent of the world's leading global food crops benefit from pollinators for production yield or quality.

Insect pollination of Australia's agriculture crops occurs through a combination of managed honey bees, wild or feral honey bees, native bees and other insect pollinators including flies and wasps.

More than 53 of Australia's agriculture crops depend on pollinators. These include horticulture crops such as nuts, stone fruit, apples, pears, avocados, berries, cherries, melons, passionfruit, lychees, vegetable seeds (eg carrot, onion and brassicas), broadacre crops including oilseeds and canola.

Australia's livestock and dairy industries also rely on pollinators for quality and yield of pasture legumes to support grazing.

Australia's honey and beeswax production was valued at $438 million. The industry also exports live honey bees to support international pollination. Trade relies on the healthy status of Australia's bees.

There are approximately 49,824 registered beekeepers in Australia operating about 855,330 hives.

In 2015, the average Economic Value of honey bee pollination was estimated at $14.2 billion. In that year, Australia's gross value of agriculture production was worth $54 billion.

In 2022, Australia's agriculture production reached $81 billion. The National Roadmap for agriculture has set the industry a target of $100 billion by 2030.

Despite this bold target for agriculture, there is no national roadmap or strategy for Australia's pollination sector.

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The risks

Australia's pollination security is at risk due to several factors:

Habitat

Habitat loss is the greatest threat to pollinators. The reduction of habitat is caused by increasing urbanisation, increasing use of land for agriculture, bushfires and deforestation.

This loss of habitat reduces sources of food and water, reduces essential habitat for breeding and increases the travel distances required to forage.

Biosecurity

Pests and diseases such as Varroa mite, Tropilaelaps, Tracheal mite and American foulbrood have the potential to significantly disrupt Australia's pollination services. Overseas, Varroa mite has devastated honey bee colonies. If the June 2022 Australian Varroa incursion is not controlled, Varroa could virtually eliminate feral honey bee colonies and the free pollination services they provide for a wide variety of crops. Both the agriculture industry and the apiary industry need clear management strategies to maintain bee health and prevent the spread of disease in hives and on farms.

Strategy

There is no national pollination strategy to increase pollinator resources and supply to meet the Federal Government-endorsed plan to increase agriculture production from the current $81 billion to the proposed $100 billion by 2030.

Pollinator-dependent sectors continue to work in silos, with little co-ordination regarding pollination requirements or services across the industry sectors or across states. Reliable data that underpins pollination industry planning and development is largely unavailable.

Chemical use

Insecticides pose a major threat to insect pollinators and other beneficial insects. Exposure can result in lethal and sub lethal impacts. Hives weakened by chemicals are more prone to pests and diseases. Herbicides used to manage weeds affect pollinators by reducing the diversity and availability of floral resources for their diet.

Knowledge

There is limited understanding of the overall combined roles of managed honey bees, wild or feral honey bees, native bees and other insects in the pollination of Australian crops.

There are key knowledge gaps in the health, welfare and resource needs of taxa other than bees.

There are key knowledge gaps for all pollinators around pollinator health, nutritional needs, cropping environments, the effect of climate change on pollinators, the capacity for commercial pollinator industry to meet growing demands of the agriculture industry.

There is limited current data on pollinator-dependent industries, including growth expectations of horticulture sectors and the risks to grazing industries reliant on legumes in pastures.

There are key knowledge gaps regarding the impact of crop management practices on pollination outcomes.

Skills

The industry lacks nation-wide coordinated training in beekeeping and pollination skills to meet the increasing demands of Australian agriculture and support beekeeping business succession.

Technology

Technological advancement for the pollination industry is sporadic and lacks appropriate funding, research and coordination. Much of the current tech being developed is difficult to access, expensive and untested for its return on investment or risk-reduction properties.

Climate Change

The impacts of an increasingly variable climate on pollination outcomes is poorly understood. Yield stability is threatened by variable weather patterns and conditions.

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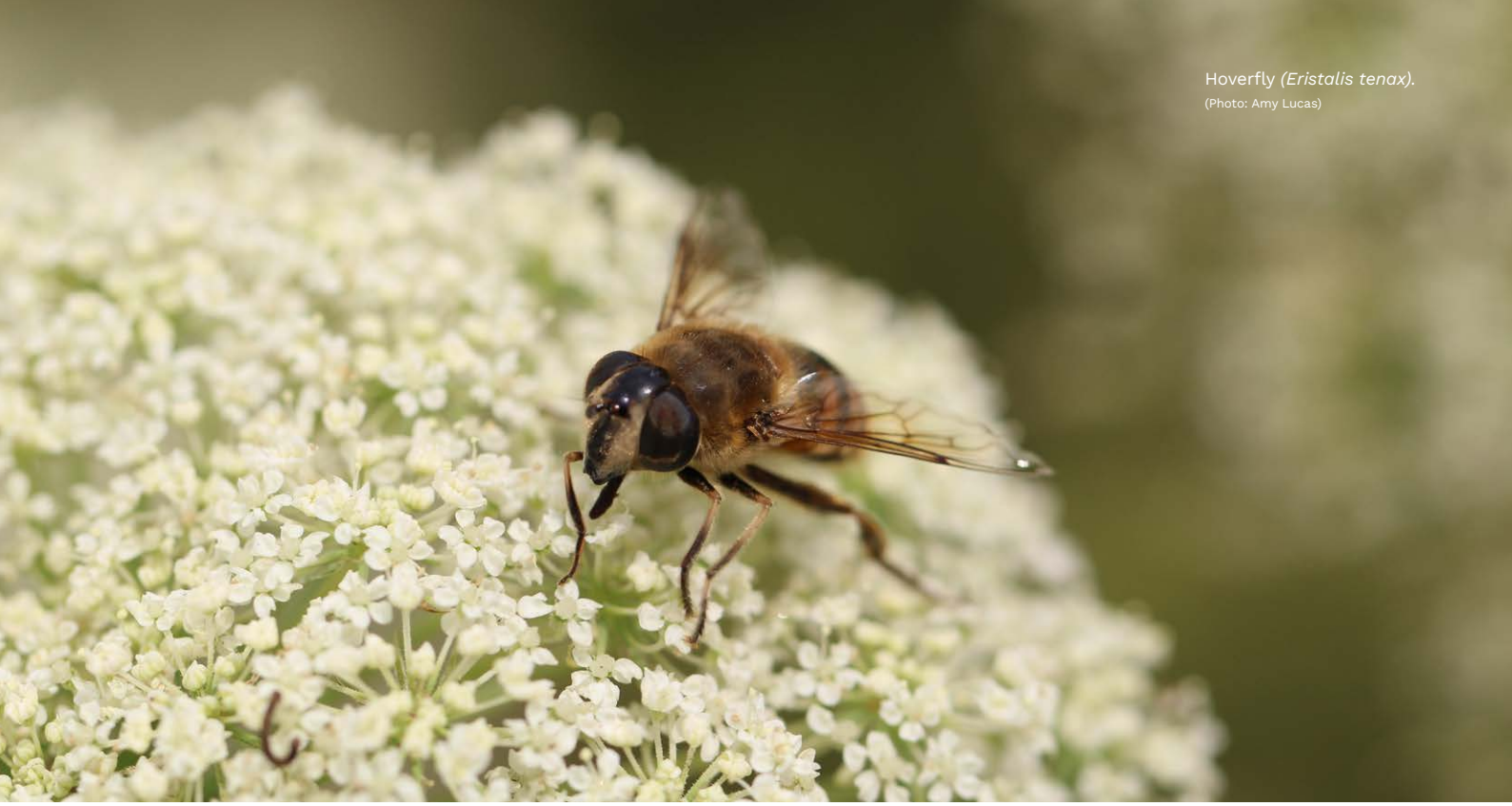

Hoverfly *(Eristalis tenax)*.
(Photo: Amy Lucas)

The role of the Pollination Security CRC

The CRC Bid Scope has four key focus areas:

1. The Environment:

Sustainable management of the pollination ecosystem

This key focus area addresses the pollination environment, including natural and farm habitats to increase the number and diversity of wild pollinators and other beneficial insects in the landscape.

2. The Managed Pollinator:

Improved management of the pollinator and supply chain

This key focus area addresses the capabilities and capacity of Australia's current pollination providers, including managed honey bees, managed native bees and other managed pollinators.

3. The Crop:

Increased pollination efficacy

This key focus area addresses pollinator-dependent crops and plants and how improvements can be made at the plant or crop level to improve pollination outcomes.

4. The Platform Technologies:

Technology supporting the research

This key focus area develops and validates advanced sequencing, bioinformatics, remote sensing, geographical information systems, and artificial intelligence that support the research.

Outcomes

Within each of the key focus areas, the CRC's research and extension projects will:

- Increase national awareness of pollination security and improve coordinated risk management
- Build capability across pollinator-dependent sectors
- Implement practice change across agriculture and bee industries

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Research and extension activities

Each theme has key areas of focus for research and extension activities. These include:

Sustainable management of the pollination ecosystem — the environment

- Improving agriculture landscapes beyond the crop bloom period to increase pollinator survival
- Integrating pollinator needs with best practices for agriculture
- Meeting increased resource needs of bees and other pollinators for habitat and nutritional requirements
- Augmenting pollination services – utilising native bees and wild pollinators to enhance commercial pollination services
- Safeguarding bees from the harmful effects of chemicals and pesticides
- Discovering and documenting Australia's remaining native bee species and evaluating their value as pollinators
- Evaluating and implementing technologies for improved landscape management, including mapping, remote sensing, artificial intelligence
- Valuing natural capital and conserving areas of native remnant vegetation to encourage an increased number and diversity of beneficial insects, including pollinators
- Improving ecosystem health through better integration and management of biodiversity

Improved management of the pollinator and supply chain — managed pollinators

- Assuring the delivery of healthy pollinators to meet Australian agriculture needs
- Improving the health and efficiency of managed pollinators through better husbandry, nutrition and breeding
- Mitigating biosecurity threats, including Varroa
- Increasing Integrated Pest and Pollinator Management strategies to reduce reliance on chemicals
- Collecting trait data and selectively breeding to improve pest and disease resistance
- Understanding the national demand for bees and other pollinators across sectors, over time including how the impact of Varroa on the national supply chain for bees and other pollinators
- Managing stocking rates and timing of hive supply
- Evaluating and implementing technologies that support beekeepers to meet pollinator demand
- Identifying and developing alternative pollinators suited to providing commercial pollination service, eg stingless bees, flies, hoverflies
- Increasing and optimising information on chemical use in agriculture

Increased pollination efficacy — crops and plants

- Optimising plant pollen delivery to improve crop yield and quality
- Optimising pollination services to suit individual crop needs
- Rotating pollination services to optimise crop yield and quality
- Understanding crop loyalty and crop foraging behaviour among pollinators
- Trialing robotic, mechanical and other artificial pollination strategies
- Selecting cultivars to reduce reliance on pollination
- Integrating companion planting to optimise pollination services
- Identify conditions for optimising pollination in protected cropping systems
- Design new technologies for pollination monitoring and data-driven precision pollination
- Understanding and optimising the impacts of agronomic practices on crop pollination outcomes

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Funding

This proposal for a Pollination Security CRC seeks to attract funding of $100 million over 10 years. At the time of submission for Stage 1 of the CRC bidding process, the PSCRC has 54 industry partners who have committed $60 million and the PSCRC has requested $40 million from the CRC Scheme.

Industry partners include:

aglive
Almond Board of Australia
Australian Farming Services
Australian Food & Grocery Council
Australian Honey Bee Industry Council
Australian National University
Australian Native Bee Association
Australian Native Food & Botanicals
Australian Oilseeds Federation
Australian Seed Federation
AUSVEG
Balliang Consulting
Bee Scientifics
bejo
berries Australia
Bush Heritage Australia
costa well grown
CropLife Australia
CSIRO
FLOW
Fresh Country Farms Australia
Griffith University Queensland, Australia
HANSEN Tasmania
HiveIQ
Hort Innovation
IMPACT INNOVATION
international BARCODE OF LIFE
Lachlan River Almonds
mla Meat & Livestock Australia
Monash University
Monsons Honey & Pollination
National Farmers Federation
NSW Department of Primary Industries
Northern Territory Government
OCP Organic Crop Protectants
Plant & Food Research Rangahau Ahumāra Kai
Plant Health Australia
Queensland Museum
Reid Fruits Since 1856
Rijk Zwaan
Government of South Australia
South Australian Museum
seed purity
South Pacific Seeds Since 1986
stahmann webster
Taxonomy Australia Discovering our biodiversity
Tasmanian Junior Beekeepers
University of New England
The University Of Queensland Australia
The University of Sydney
University of Tasmania
Victoria State Government Energy, Environment and Climate Action
Department of Primary Industries and Regional Development Government of Western Australia
Western Australian Museum
Wheen Bee Foundation

We are also seeking further co-investment from industry organsations, corporate sector, research institutes, and local, state and federal governments.

Hylaeus species with European honey bee *(Apis mellifera)* on a banksia flower. (Photo: Gary Taylor)

Return on investment

- In the proposed CRC funding model, it is the intent to provide universities/research institutions with a return on investment ratio of 1:3 funding for research.
- Return on investment for corporate sector contributions will be based on individual cash and in-kind contributions and eligibility for claiming a R&D tax offset.
  www.ato.gov.au/business/research-and-development-tax-incentive/eligibility/eligible-entities/

Details of co-investment funding and return on investment models will be finalised in the Stage 2 Bid to be submitted in August 2023.

Timeline for the CRC

- **July 2021:** The proposal for a Pollination Security CRC was launched in July 2021 when the Wheen Bee Foundation conducted a virtual workshop on behalf of a number of industry stakeholders.
- The workshop was attended by 120 people representing pollinator-dependent industries, beekeeping associations, financial institutions, universities, state and federal agriculture departments.
- A Core Group of co-investment stakeholders was established to advance the bid, identifying a framework for future research and working to formalise a future bid.
- **November 2021–January 2022:** Stakeholder consultations held in Vic, Tas, NSW, SA, WA, NT and Qld.
- **February 2022:** Consultation findings circulated.
- **February–June 2022:** Formalise co-investment partnerships and appoint CRC Bid Chair, Dr Anne Astin and CRC Bid CEO, Professor Jean-Pierre Scheerlinck.
- **March 2023:** The Stage 1 CRC Bid has been submitted.
- **August 2023:** Submission of Stage 2.
- **November 2023:** Interview.

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