

1. Aim and objectives of the Response Plan

1.1 Aim

This Response Plan aims to provide an orderly transition from an eradication of *Varroa destructor* (Varroa mite) under a Response Plan to management outside of the Emergency Plant Pest Response Deed (EPPRD), minimising the ongoing effects of Varroa mite naturalisation on the European honey bee (EHB) industry and pollination-reliant industries with a major focus on business continuity.

1.2 Intent and objectives

This program seeks to minimise the impact of Varroa mite on the beekeeping sector and the pollination-reliant industries by supporting business continuity and giving beekeepers across Australia the necessary knowledge and skills to successfully manage Varroa mite within their operations.

Education and engagement will be delivered to beekeepers throughout Australia to promote Varroa mite preparedness in areas that remain free and build resilience in areas where infestation is present.

Providing the beekeeping sector with the information, knowledge and skills to effectively re-establish and rebuild in areas impacted by the attempted eradication is a key priority. There will be no sanctioned destruction of bees under this program.

The National Varroa Mite Transition to Management Program (T2M) will focus on **four objectives**:

1. Completion of activities under Response Plan V3B
2. Build industry capacity and resilience
3. Slow the spread of Varroa mite
4. Supporting future-ready industries

Many of the activities under Objectives 2-4 are scaleable to a proposed upper limit, which will be reviewed regularly by the National Varroa mite T2M Coordination Group against the intent and objectives of the Response Plan. A national Varroa mite data management system/portal will only proceed for example after a scoping study recommending up to \$1.46M in development costs is endorsed by the National Varroa mite T2M Coordination Group and approved by CCEPP.

2. Current status of the Incident

2.1 Emergency plant pest details

Varroa mite (*Varroa destructor* Anderson and Trueman).

2.2 Affected host

European honey bee (*Apis mellifera* Linnaeus) and Asian honey bee (*Apis cerana* Fabricius).
Varroa mite does not affect other hosts, including Australian native bees.

2.3 Diagnostic details

The initial samples of mites received on sticky mats from the Port of Newcastle sentinel hives collected on 20 June 2022 were identified as *Varroa* sp. at the Orange Agricultural Institute (OAI) on 22 June 2022. The samples were subsequently identified morphologically by the Department of Agriculture Fisheries and Forestry (DAFF) as *V. destructor* on 23 June 2022. The identification was further confirmed by molecular analysis by the Elizabeth Macarthur Agricultural Institute (EMAI) at Menangle on the same day.

On 6 July 2022, Dr John Roberts (CSIRO) confirmed that all mites tested were *V. destructor* Korean haplotype.

Extensive virus testing of bees using deep sequencing from infected hives has not detected deformed wing virus A or B. Apis Rhabdovirus 2 (ARV-2) was detected in some samples. Further analysis has

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also confirmed the detection of Apis Rhabdovirus 1 (ARV-1). A lack of detection of other key exotic bee viruses is a good outcome for the Australian bee industry and supported the response effort to focus on the mite itself rather than a mite-pathogen complex, which would add additional complexity to the response effort.

Ongoing laboratory molecular insecticide resistance testing of mites has found no resistance to pyrethroid and amitraz.

2.4 Description and effect

Varroa mite is regarded as the greatest threat to the Australian honey bee industry (Plant Health Australia [PHA], 2012). The genus *Varroa* currently contains 4 recognised species:

V. destructor, *V. jacobsoni*, *V. underwoodi* and *V. rindereri* (Dietemann *et al.* 2013). All these mites are external parasites of *Apis* spp. *Varroa jacobsoni* and *V. destructor* are the most common and widespread species, and until recently, were considered a single species (Anderson and Trueman, 2000).

Infestation of European honey bee (EHB) colonies by *Varroa* spp. results in weak and deformed bees and the slow death of the colony, especially when co-infected with deformed wing and other associated viruses. The presence of mites in a hive might not be obvious until up to 12 to 24 months after the initial infestation, and death of the hive usually occurs within 3 years if the mites are left unmanaged. The effect of Varroa mite on managed EHB hives will also adversely affect the agricultural and horticultural industries that rely on these bees to pollinate crops, including fruits, nuts, some grains, seeds and pastures.

The Asian honey bee (AHB) is a natural host of *V. destructor* and *V. jacobsoni*. These species persist at low levels in AHB colonies (Roberts *et al.* 2015), as mite reproduction in AHB is restricted to drone brood. Both species can reproduce on worker and drone brood in EHB. The AHB is established in some parts of North Queensland.

Varroa destructor, if left untreated, is responsible for the collapse and death of EHB colonies wherever it is present around the world. In Papua New Guinea, host-shifting from *V. jacobsoni* has been responsible for the death of EHB colonies and is considered of equal pathogenicity to *V. destructor* (Anderson, 2008).

Varroa destructor is native to north-eastern Asia, and it likely host-shifted from AHB to EHB when EHB was introduced to that area. It is believed this host shift occurred between 60 and 100 years ago (Oldroyd, 1999) in at least 2 genetically distinct types, designated Korea, and Japan. The same host shift has occurred more recently in *V. jacobsoni*, and in multiple distinct genetic lineages.

The spread of *Varroa* spp. within an apiary and over long distances is facilitated by bees and humans. Swarming, absconding, foraging, drifting, and robbing behaviour all enable the spread of mites over short distances and within bee populations. Moving infected hives and associated items also helps spread, often over much greater distances and within shorter periods. This is consistent with transmission behaviour witnessed during this incursion.

2.5 Extent of incident

Following the detection of Varroa mite on 22 June 2022, all sentinel hives at the Port of Newcastle were euthanised within 24 hours of the laboratory confirmation. Comb and bees were sent to EMAI for diagnostics including mite counts, tracheal mite testing and virus testing. Of the 6 sentinel hives at the Port of Newcastle only 3 had mites (2 hives contained 1 each and 1 other had 5 Varroa mite). Hives located adjacent to the sentinel hives were also tested for Varroa mite. These were infested with a higher mite count than the sentinel hives and were most likely the infestation source for the sentinel hives. Mite levels in these untreated hives suggest the first Varroa mite arrived in that area no earlier than late February 2022, probably through bee drift from more heavily infested colonies to the north of the port.

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NSW DPI commenced emergency response activities on Thursday, 23 June 2022, with a cost-shared 100-day Response Plan (Version 1 of the Response Plan) approved by the National Management Group (NMG) on 8 July 2022. The NMG met twice in December 2022 to consider Version 2 of the Response Plan. An agreement was reached to only extend the response to 31 March 2023 with an upper limit of cost-shared expenditure of \$55.3M. The NMG met again on 8 March 2023 and agreed the response was to be extended to 30 June 2023. The Version 3 of the Response Plan was approved by the NMG on 27 June 2023 and included an increased cost-shared expenditure Upper Limit of Expenditure of \$132M.

Varroa mite has not been detected from sticky mat surveillance at Port Botany or Port Kembla, where ongoing sentinel hive surveillance continues. Surveillance in other jurisdictions is also yet to detect Varroa mite.

2.6 Summary of eradication phase activities

From 22 June 2022 until 10 January 2024, the Varroa mite response team has completed the following activities as part of the eradication effort:

- 68,184 hives from 4,857 cases have been inspected using a combination of alcohol washes and sticky mat/miticide surveillance.
- 17,430 reports of surveillance actions from 261,240 hives (i.e., 16-week mandated reporting from industry) have been received from industry surveillance activities.
- 47,060 hives from 3,717 cases were euthanised across all eradication zones.
- 436 commercial, 201 purple zone commercial and 2,966 recreational owner reimbursement cost (ORCs) claims have been completed by the Rural Assistance Authority (RAA).
- 1,270 Wild European honey bee (WEHB) feeder stations deployed to eradication zones have now been demobilised.
- 376 alcohol washes were completed on WEHB with Varroa mite detected in 26 colonies.
- 280 swarm traps deployed throughout NSW to monitor WEHB have now been demobilised.
- 4,057 calls have been received by Response Resilience Officers.
- 66 media releases have been issued, 203 interviews conducted with the media and 218 posts made on social media.
- 2,585 personnel have participated in the Response to date.
- Compliance teams currently have 19 open investigations, 109 investigations have been closed, 5 warning letters have been issued, and 31 penalty notices have been issued. Three cases are proceeding to prosecution.
- 3,973 beekeepers have completed the Varroa mite Tocal Agricultural Institute & College (Tocal) online training course.
- 12,688 hive movement declarations have been completed for movements of 1,541,109 hives throughout NSW.
- 47,840 miticide strips have been distributed to 164 beekeepers since 3 September 2023 as part of suppression activities.

NSW response teams worked very closely with Victorian response teams after detecting Varroa mite in the NSW Riverina and Sunraysia regions in late August 2023, particularly once emergency zones crossed the Victorian border. Procedures and policies have been shared, and both the jurisdictions attended each other's incident management team (IMT) briefings for shared situational awareness, promoting rapid capacity and capability building for Victorian teams to respond to Varroa mite.

2.7 Cessation of the eradication phase

On 19 September 2023, the NMG agreed, on the advice from the CCEPP, that eradicating Varroa mite from Australia was no longer technically feasible. This ended the Emergency Response Phase of the response and commenced the Transition to Management (T2M) Phase. At this meeting, the NMG agreed that until the revised Response Plan including T2M activities is agreed by the NMG, NSW will operate under an interim strategy where:

- a) Conditions are documented within a Control Order.
- b) Surveillance Emergency (Purple) Zones and EEZs in regional outliers have been removed and become part of the Suppression Control Zone (SCZ), formerly known as the General Emergency or Blue zone.
- c) Eradication Emergency Zones in the Kempsey, Hunter and Central Coast regions become Management Control Zones (MCZ):
 - i. Free movement is allowed within Management Zones
 - ii. Movement of bees and apiary equipment into the General Emergency Zone under permit will be allowed where a risk assessment determines that it poses a biosecurity risk which is below the Appropriate Level of Protection (ALOP)
 - iii. Movement between Management Zones is allowed under secure conditions.
- d) For other current Eradication Emergency Zones (excluding Kempsey, Hunter and the Central Coast) movement is allowed following monitoring, application of miticide strips if mite numbers per hive exceed a seasonal threshold and completion of a movement declaration.
- e) Beekeepers in all current EEZs were allowed the option of voluntary Euthanasia and subsequent access to ORCs or reimbursement for recreational beekeepers .
- f) All beekeepers in NSW are required to complete hive testing (alcohol washing, soapy water wash or miticide strip and sticky mat) and report results to DPI every 16 weeks. Where results indicated that mite infestation was above a threshold number DPI up until 24 January 2024 supplied miticide strips to be installed in infested hives.
- g) Hive movement declarations must be submitted to DPI for movements of hives from the MCZ into the SCZ. Records must be retained and made available for audit when required.
- h) All miticide treatments must be recorded and reported to DPI.

3. Transition to management activities

The activities to be delivered across Australia under this plan align with the aim, intent and objectives outlined in sections 1.1 and 1.2. A summary of each planned activity is contained in sections 3.2 and 3.3 and in Table 1. The listed activities align with those in the indicative budget outlined in section 8.

Key achievements since end of the Eradication Phase

Many activities have been delivered since the end of the Eradication Phase on 19 September 2023:

The zones previously supporting eradication were immediately removed and replaced with new Management and Suppression zones, lifting many restrictions on beekeepers moving the response away from eradication.

- The NSW DPI Farm Chemicals team has been liaising with the Australian Pesticides and Veterinary Medicines Authority (APVMA) on chemical registrations to hasten the availability of commercial supply of Varroa mite control chemistry across Australia.
- The Public Information team has been advising beekeepers via the hotline, email updates, social media and a webinar hosted with the Australian Honey Bee Industry Council (AHBIC) to communicate the changes to the Response objectives and the path forward for T2M. Website content and beekeeper portals (alcohol wash and hive movement declarations) have been updated to align with the current T2M plan.
- Response teams are still conducting surveillance to assist beekeepers in identifying further

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infested premises (IPs) as part of the “slowing the spread” intent. Intensive surveillance has continued until the end of 2023, comparing a potential new eDNA surveillance tool with alcohol wash and the standard sticky mat surveillance technique (see Activity 3.3 for further details). This will provide technical guidance to the industry and improved understanding of the treatment thresholds identified when using different survey options. The full outcomes of the validation will not be available until 2024.

- All 1,270 WEHB feeder stations have been decommissioned and removed from the environment.

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Table 1. Summary of activities planned under Response Plan V4.0: Transition to Management

Objective and activities	Timeframe	Cost-shareable?
3.2 – Objective 1 Completion of activities under Response Plan V3		
3.2.1 – Finalise tracing and surveillance activities	Dec 2023	Yes
3.2.2 – Finalise outstanding compliance matters	Dec 2023	Ongoing - No
3.2.3 – Final surveillance blitz	Dec 2023	Yes
3.2.4 – Complete euthanasia and disposal	Jan 2024	Yes
3.2.5 – Finalise wild EHB program	Mar 2024	Yes
3.2.6 – Establish legislated biosecurity zones and movement controls in NSW	Sep 2023	Ongoing - No
3.3.1 – Objective 2 Building Industry Resilience		
3.3.1.1 – Develop and deliver Varroa mite management capability program	Jan 2024 – Jan 2025	Yes
3.3.1.2 – Deliver extension and engagement across Australia	Jan 2024 – Jan 2025*	Yes
3.3.1.3 – Update Code of Practice and Biosecurity Manual	July 2024 – Jan 2025	Yes
3.3.1.4 – Facilitating commercial supply of Varroa mite control products	Jan 2024 – Jan 2025	No
3.3.1.5 – Supporting national Varroa mite related diagnostics	Jan 2024 – Jan 2025	Partially
3.3.2 – Objective 3 Slowing the Spread of Varroa Mite		
3.3.2.1 – Regulating to slow the spread of Varroa mite	Jan 2024 – Jan 2025	Partially
3.3.2.2 – Compliance and enforcement	Jan 2024 – Jan 2025	No
3.3.2.3 – Monitoring the impacts of Varroa across Australia	Jan 2024 – Jan 2025*	Yes
3.3.3 – Objective 4 Future-ready industries		
3.3.3.1 – Establish an Australian COLOSS survey	Jan 2024 – Jan 2025	Yes
3.3.3.2 – Enabling a national Varroa mite data management system	Jan 2024 – Jan 2025	Yes
3.3.3.3 – Investigating options for upskilling queen bee breeders	Jan 2024 – Jan 2025	Yes
3.3.3.4 – Investigation of options that will enable pollination in a post-Varroa mite world	Jan 2024 – Jan 2025	Yes

*Note: potential to extend for additional 12 months until Jan 2026 (beyond the scope of this plan)