

## **Provespa wasp arrival in Queenstown, another unwanted import**

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### **Introduction**

New Zealand has no native social wasp species, with five species inadvertently introduced over the last 150 years. This includes two *Vespula* species, the German wasp, *Vespula germanica*, first reported in 1945 (in Hamilton) (Thomas 1960, Donovan 1992); and the common wasp, *V. vulgaris*, established in 1983 (Dunedin) although queens had been collected from Wellington as early as 1978 (Donovan 1984); along with three paper wasp *Polistes* species, including the Australian paper wasp, *Polistes humilis*, arriving in the 1880's, the Asian paper wasp, *P. chinensis*, identified in 1979 (Auckland) (Clapperton et al. 1996), and the European paper wasp, *P. dominula*, identified in 2011 (Nelson and Picton) (MPI 2016).

The German wasp was first located at the Royal New Zealand Air Force (RNZAF) base in Hamilton (formerly known as RNZAF Station Te Rapa) in 1945 and it was suggested that hibernating queens were transported in crates of aircraft parts arriving from Europe after the second World War (Thomas 1960, Donovan 1992). The remaining social wasp species first detections seem to be associated with cities where ports and airports are located.

Social wasps have a detrimental impact on native ecosystems, human health, disrupt recreational activities and cause economic loss to beekeepers (Ward 2013). The estimated percentage of all living beehive colonies entering winter, lost by wasps, over the last eight years (2017-2024) ranged from 0.5 – 1.5% (2024 NZ Colony Loss Survey). German and common wasps are predators of beehives in late summer and autumn (February-May) when their diet switches from protein to carbohydrate.

Any arrival of a new social wasp species would be cause for concern for native insects, human health, recreation activities and the beekeeping industry, especially given the significant effort required to control these predators. The aim here is to discuss the potential arrival of a previously found and reported Vespidae species.

## Discussion

A few days prior to 20 April 2017, a live ‘bee-like’ specimen was found and photographed by a landowner in a residential property, possibly in a woodpile, in Queenstown and placed in a jar (Bev Bradford pers. comm.). The local beekeeper, with hives on the property, reported the find to the authors to determine the identity of the specimen (Bruce Thurlow pers. comm.). The specimen was sent to Barry Donovan. Photos of the live specimen (Fig. 1) were sent to the curator at the Division of Invertebrate Zoology, American Museum of Natural History in New York to identify.



**Figure 1:** Live *Provespa* wasp identified in Queenstown garden. (courtesy Bev Bradford).

Whilst in bad condition, the specimen was identified of the genus *Provespa* (Ashmead 1903) (Hymenoptera: Vespidae), known as nocturnal hornets (they fly at night). There are three species, found in India, southern China and parts of Southeast Asia in origin, but one of them, *P. nocturna* van der Vecht 1935, was supposed to have been introduced into Queensland, Australia, but did not establish (Australian Government report 2023). This might be the species identified in Queenstown, but it could also be *P. anomala* (de Saussure 1854). It would be necessary to see the clypeus (a broad plate at the front of an insect's head) to be able to determine the species identity (Carpenter 2017, 9 May, pers. comm.).

The longitudinally folded wings are about the only visible character that might be definitive and are typical of the Vespidae (wasp) family. Vespidae include solitary species which can be hairy all over. *Provespa* is a small genus of Vespidae, made up of nocturnal, tropical wasps sometimes referred to as 'night wasps' or 'night hornets', though they are not true hornets. They are the only nocturnal members of the subfamily Vespinae, and also the only vespines where new colonies are formed by swarming. *Provespa* can be easily recognized by their yellow brown body, enlarged ocelli (simple eyes) (Madl 2012) and long antennae. Large ocelli may be important for detecting changes in light intensity and orientation while flying at night. *Provespa* tend to build their nests from fibrous plant material, making them a uniform greyish brown colour, which is often difficult to locate. The larvae and pupae of *Provespa* species are consumed by people in China and Indonesia (Madl 2012).

If the *Provespa* species was to establish, which would seem extremely unlikely given the cold winter conditions in Central Otago, being nocturnal, any impacts on insects (as a new predator) would be restricted to night-flying insects. If *Provespa* wasp numbers increased to anything approaching the German and common wasp (*Vespula* species) population, there could be a reduction in the nocturnal insects available to bats and moreporks, as food.

Perhaps beehive entrances could be attacked at night, but these are usually well guarded by worker guard bees. Native bees and wasps which are all in their nests at night should be safe from attack. People would encounter the wasps only when the wasps were drawn to lights.

So how does a live, nocturnal, tropical wasp, that reproduces by swarming, with a natural distribution from India (East Himalayas) to Indonesia (East

Java), end up in a domestic garden in Queenstown? The chances of a swarm reaching Queenstown from Queensland or Asia would seem minimal. It is conceivable that an individual wasp could be blown across the Tasman Sea but unlikely that it would end up in Queenstown. Also, a report of a *Provespa* species being present in Queensland appears to be based on dead wasps found on ships (Madl 2012), and the species did not establish (Australian Government report 2023).

The possibility that a swarm settled, or a nest established on the inside or outside of a container in an Asian port and travelled by ship to a southern New Zealand port, was transported by road to Queenstown and then when opened swarmed off to arrive in the domestic garden, seems possible but unlikely. The most likely entry point into New Zealand would appear to be via luggage, equipment or the cargo hold of an aircraft arriving at Queenstown airport, with over 2.14 million people arriving in the year ending June 2018 (Queenstown airport statistics). This would appear to be how the German wasp, *V. germanica*, was introduced into New Zealand and ports and airports would appear to be associated with other social wasp entry points. The swarm, nest or single wasp specimen would have to survive the trip from Asia via Australia or Auckland and then migrate from the aeroplane equipment or luggage to a Queenstown garden. Again, the likelihood would seem small but still a possibility. *Provespa*, being a tropical species, would be unlikely to survive the Queenstown winter, especially given the specimen was most likely a sterile worker. Had the specimen been a queen, with the ability to hibernate over winter in a dormant state (diapause), possibly seeking refuge in a protected location such as hidden in a dark dry place, a wood pile, in crevices around structures, or even inside homes, then it is possible, although unlikely, that the wasp could have survived and established a new nest in spring. However, as far as we know, the *Provespa* wasp species never established in New Zealand.

It is worth pointing out, that even though the odds are low, foreign organisms including mites, insects such as wasps and other organisms can still reach New Zealand shores. *Varroa destructor*, deformed wing virus, giant willow aphid, Queensland fruit fly, myrtle rust, *Mycoplasma bovis* and the wool carder bee, to name a few, are testimony to the daily biosecurity threats facing the apiculture and other primary industries in New Zealand.

## Reporting

The arrival of the *Provespa* species was reported to Graham Burnip in MPI at the time of identification. Because the wasp was highly unlikely to propagate, due to its tropical origins and the live specimen almost certainly being a worker (sterile female), MPI had no concerns and did not plan to follow up the report.

## Acknowledgements

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