

Two Nests of the Hornet *Vespa wilemani* (Hymenoptera, Vespidae)

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Abstract A queenless nest and an abandoned embryo nest of *Vespa wilemani* are described. The queenless nest contained 292 cells, 10 adult workers and 11 adult males. The possibility that this species is synonymous with *Vespa vivax* is discussed.

Key words: Hornet; *Vespa wilemani*; Colony; Taiwan.

Introduction

Vespa wilemani MEADE-WALDO is a rare hornet which is restricted to the altitude range of 1,500 m-2,500 m in the mountains of central Taiwan (SONAN, 1929; KUO & YEH, 1990; STARR, 1992). Despite a previous one year study (KUO & YEH, 1990), the nest of this elusive species remains unknown.

This report describes an active, mature colony and a small, abandoned embryo nest of *V. wilemani* which were located in the Alishan area of Taiwan.

Method

Both nests were located under the eaves of disused wooden railway huts along the Alishan-Monkey Rock railway on 30 September 1992. The mature nest was found near Mieh-Yueh station at an altitude of 2,300 m, while the embryo nest was located near Alishan station at 2,100 m. Both nests were 2-3 m from the ground and well sheltered from the elements. The mature nest was collected during the day by blocking the entrance and catching the returning workers. The nest was removed intact from the underside of a roof using a knife. The nest site was revisited several hours later to ascertain that all workers had been taken. The adults and a small number of larvae were preserved in 70% alcohol. Adult head width (outer orbital distance) was measured using a 'Telock' thickness gauge accurate to 0.01 mm. Cell size was measured from a corner to the opposite corner using a vernier calliper.

Results

The embryo nest contained 4 cells (Fig. 1 A) and was uniformly buff in colour. The petiole was not yet coated with any lustrous substance.

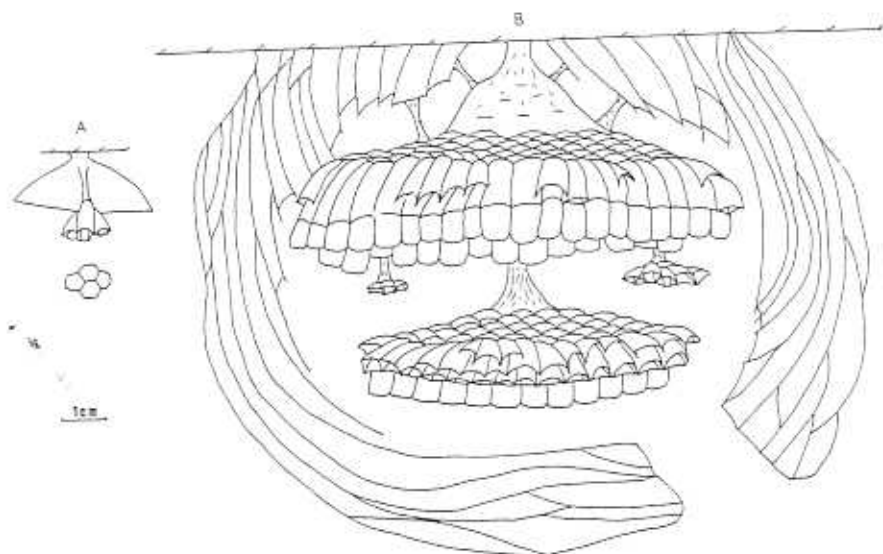


Fig. 1. Cross sections of embryo nest (A) and mature nest (B) of *Vespa wilemani*.

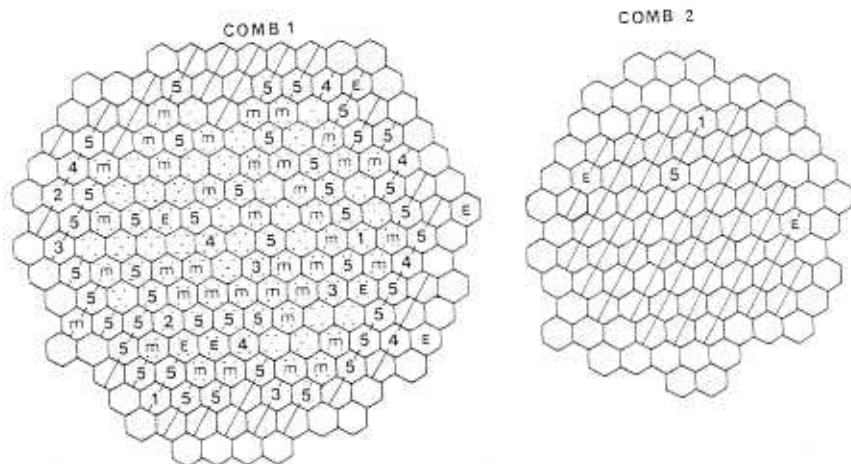


Fig. 2. Cell contents of the mature *Vespa wilemani* nest. E, Egg; 1-5, larval instars; m, male sealed brood, striped cells contain 1 meconium, stippled cells contain 2 meconia. Note: The central few cells of comb 1 probably contain 3 meconia.

The external appearance of the mature nest was very similar in colour and structure to a nest of *V. analis* F. or to a small/young *V. affinis* (L.) nest. It was obvious that the nest was close to the end of its cycle from the worn appearance of the entrance. Four or five workers were still foraging and when the nest was tapped two or three workers rushed out onto the nest surface to guard it.

Ten workers and eleven males were present and the wings of all the workers were very worn. The head sizes of the adults were: worker $\bar{x}=4.68$ mm, s.d.=0.10 mm, $n=10$; male $\bar{x}=4.71$ mm, s.d.=0.17 mm, $n=7$.

The nest structure (Fig. 1 B) and cell contents (Fig. 2) are shown. The nest was typical of the *Vespa* group, with a very thick envelope. All the sealed brood were male which suggests that the mother queen had died some weeks prior to the nest collection. This was further supported by the fact that two small combs had been built between the two main combs (Fig. 1 B). This is often seen in queenless nests but rarely occurs in queenright nests (pers. obs.). From cell size measurements (comb 1, $n=5$, $\bar{x}=7.0$ mm, s.d.=0.8 mm; comb 2, $n=5$, $\bar{x}=8.0$ mm s.d.=0.36 mm) it seems unlikely that any queens had been produced from this nest.

The envelope changed from uniformly buff sheets around the top of the nest near the petiole of the first comb to multi-coloured worker sheets nearer the edge. This, along with the distinctive shape of the first comb, strongly suggests that the nest had not undergone relocation.

Discussion

The nest of *V. wilemani* at 2,300 m is at present the highest known colony among the members of *Vespa*. Workers of *V. vivax* SMITH, a closely related species of or possibly the same species as *V. wilemani* (ARCHER, 1991), have been caught at 2,800 m and 3,200 m in the Himalayan temperate coniferous forests of Kashmir (WILLIAMS, 1983) and between 7,000–11,000 ft from Tibet across to Burma (VECHT, 1959). The fact that both species inhabit similar environments (coniferous forests at high altitudes) supports ARCHER's view that they are in fact the same species. However, this would mean a disjunct Himalayan-Taiwan distribution of the combined *V. vivax* (STARR, 1992). This case is very similar to *Vespula arisana* SONAN, a Taiwan endemic, and its sister Himalayan species *Vl. orbata* (BUYSSON) which again, if combined, would give a disjunct Himalayan-Taiwan distribution (STARR, 1992).

Another closely related but much more widespread species, *Vespa velutina* LEPELETIER also inhabits mountain regions (pers. obs.). However, when cooccurring with *V. velutina*, *V. wilemani*/*V. vivax* always lives at higher altitudes than *V. velutina* (WILLIAMS, 1983; pers. obs.). KUO and YEH (1990) observed that *V. velutina* was better at catching prey (flies, honey bees), as it is a much faster and more agile species than *V. wilemani*. The extent to which this affects the distribution and abundance of *V. wilemani* will only be uncovered by further study of this rare and elusive species.

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