

Notes on *Varroa destructor* (Acari: Varroidae) parasitic on honeybees in New Zealand

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Abstract

The honeybee mite *Varroa destructor* Anderson & Trueman, previously known as *V. jacobsoni* Oudemans in Europe, Middle East, South Africa, Asia, North America and South America, is recorded from specimens found in New Zealand. This parasitic mite attacks honeybees (*Apis mellifera* L.) in the North Island.

Key words: Acari, Varroidae, *Varroa jacobsoni*, *Varroa destructor*, honeybee, parasite, distribution, New Zealand.

Introduction

The parasitic mite *Varroa jacobsoni* Oudemans (Acari: Mesostigmata: Varroidae) has been known as a major pest of honeybees around the world (Sammataro *et al.* 2000). Before April 2000, this mite was thought to attack honeybees in all major beekeeping countries with the exception of New Zealand, Australia, Hawaii and parts of Africa (Matheson 1996; De Guzman & Rinderer 1999). On 11 April 2000, *Varroa jacobsoni* was detected in three beehives on a property in South Auckland on the North Island. The author was able to examine the specimens and confirmed the identification. Despite the fact that New Zealand has prohibited the import of live honeybees for the last 40 years (Stone *et al.* 2000), a seven-week intensive survey ending in mid

June of 55,305 hives on 2874 apiaries revealed 284 infested apiaries clustered around South Auckland, Pukekohe, the Hauraki Plains, Orewa/Kumeu and Te Puke, with also some infected apiaries on the Coromandel Peninsula, Rawene (Northland), Te Awamutu, Otorohanga and Raurimu (southern Waikato and King Country) (Parsot *et al.* 2000). It is unknown where exactly these mites came from and how long they have been present in New Zealand. However, the economic impact of this species on New Zealand is estimated to be in the range of \$400 million to \$900 million (Anonymous 2000).

Recently, Anderson and Trueman (2000), after studying mtDNA Co-I gene sequences and morphological characters of many populations of *V. jacobsoni* from different parts of the world including Australia but not New Zealand, considered it to be a species complex and split it into two species. *Varroa jacobsoni* s.s. infests *Apis cerana* F. in the Malaysia-Indonesia region. *Varroa destructor* Anderson & Trueman, 2000 infests its natural host *A. cerana* on mainland Asia and also *A. mellifera* L. worldwide. The purpose of this paper is to determine the specific status of the New Zealand *Varroa* in light of the new result of Anderson and Trueman (2000).

Material and methods

Specimens examined were three females collected in South Auckland by the New Zealand Ministry of Agriculture and Forestry Quarantine (R3/00/772/1) on 11 April 2000 when they were first detected in New Zealand. Additional mites of all stages were collected on 2 June 2000 from *A. mellifera* combs from a hive at 133 Walmsley Road, Mangere, Auckland, and 81 randomly selected capped cells were examined for mites. To confirm the specific identity, mite morphology was examined using both light microscopy and scanning electronic microscopy.

Measurements of mite specimens were made in micrometers (μm) and were obtained from five females prepared in Hoyer's medium on glass microslides.

Results and discussion

Examination of mite sample

An examination of the capped comb cells of *A. mellifera* from Mangere, South Auckland revealed that 16 of the 81 cells were attacked by the mites, with an infection rate of 19.8%. All stages of mites were found in the comb cells, with adult females accounting for 30%, adult males 45%, nymphs 15% and larvae 10% (sample size 20).

Specific status of New Zealand Varroa

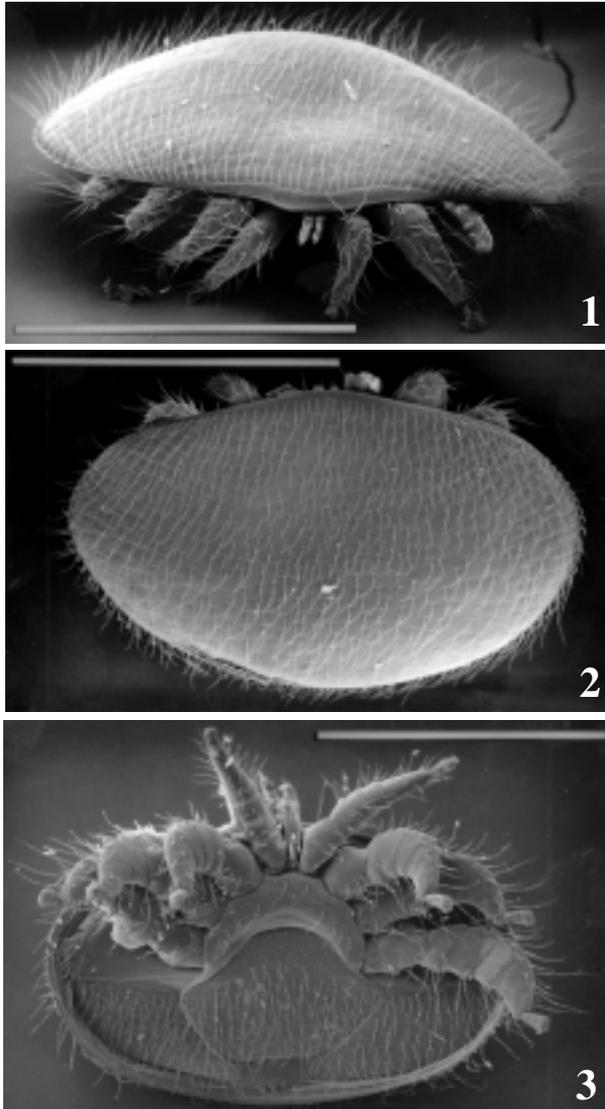
In separating *V. destructor* from *V. jacobsoni* s.s., Anderson and Trueman (2000) showed that the two species differ mainly in mtDNA Co-I gene sequences, but can also be separated by female body size: the former is larger than the latter (Table 1). The specimens from Auckland are typical *V. destructor* (Table 1): the 95% confidence interval for body length is 1132.2-1185.8 μm and for body width is 1642.3-1757.7 μm . The Auckland specimens are also similar to *V. destructor* from Japan/Thailand-Vietnam in that they are both less spherical than *V. jacobsoni* s.s (Figs. 1-3 cf. fig 5 of Anderson & Trueman 2000).

TABLE 1. Body lengths and widths (in μm) of *Varroa destructor* females from New Zealand compared with those of *V. jacobsoni* s.s. from Flores-Java and *V. destructor* from Japan/Thailand-Vietnam reported by Anderson and Trueman (2000).

Species	Body length		Body width	
	Mean	SD	Mean	SD
<i>V. destructor</i> (NZ)*	1159.0	21.6	1700.0	46.5
<i>V. jacobsoni</i> **	1063.0	26.4	1506.8	36.0
<i>V. destructor</i> **	1167.3	26.8	1708.9	41.2

* Data based on 5 females.

** Data from Anderson and Trueman (2000).



FIGURES 1-3. *Varroa destructor* Anderson & Trueman (female). 1, frontal view; 2, dorsal view; 3, ventral view. Scale bar approximately 1,000 μm .

Anderson and Trueman (2000) identified two haplotypes of *V. destructor* that infest *A. cerana* in Asia and have become pests of *A. mellifera* worldwide. The Korea haplotype is the common one, being a parasite of *A. cerana* in Korea and now a pest of *A. mellifera* in Europe, the Middle East, Africa, Asia, North America and South America. The Japan/Thailand haplotype is less common, being a parasite of *A. cerana* in Japan and Thailand and also a pest of *A. mellifera* in Japan, Thailand and the Americas. The Korea haplotype of *V. destructor* appears more pathogenic to *A. mellifera* than the Japan/Thailand type (Anderson & Trueman 2000). The New Zealand *V. destructor* is likely to be the widespread Korea haplotype. However, sequencing its DNA in the future is required to confirm this.

Varroa destructor is much more widespread than *V. jacobsoni* s.s., and the Korea haplotype of *V. destructor* has the greatest geographical range among four *Varroa* species (Anderson & Trueman 2000). Although the origin of New Zealand *Varroa* is unknown at present, it is almost certain that it could not have come from Malaysia-Australia-Papua New Guinea, because only *V. jacobsoni* s.s. is distributed there. Thus the New Zealand *Varroa* is of Asian, European, American or, less likely, African origin.

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