

The Occurrence of *Varroa destructor* Anderson and Trueman, 2000 on Honey Bees (*Apis mellifera*) in Turkey

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Abstract: The mite formerly known as *Varroa jacobsoni* is one of the major problems in beekeeping worldwide. Recently, it was shown that this pest is not *V. jacobsoni*, which chiefly infests the nests of *Apis cerana* in the Malaysia-Indonesia region, and the widespread pest was recognized with the new name, *V. destructor*. Morphometric analysis was performed on collected *Varroa* specimens from various regions in Turkey and identified as *V. destructor*.

Key Words: Honey bee, *Apis mellifera*, *Varroa destructor*, morphometrics, Turkey

Türkiye Balarılarında (*Apis mellifera*) *Varroa destructor* Anderson and Trueman, 2000'un Bulunuşu

Özet: *Varroa jacobsoni* olarak bilinen parazit *Varroa destructor* olarak tanımlanmış ve dünya arıcılığının en önemli problemlerinden biridir. Son zamanlarda yeni tür olarak tanımlanan *Varroa destructor* oldukça yaygındır. *V. jacobsoni* ise daha çok Malezya-Indonezya bölgesinde *Apis cerana*'da bulaşıcıdır. Değişik bölgelerden toplanan *Varroa* örneklerinin morfometrik analizleri yapılarak Türkiye'de *V. destructor*'un varlığı ortaya konmuştur.

Anahtar Sözcükler: Balansı, *Apis mellifera*, *Varroa destructor*, morfometrik, Türkiye

Varroa spp. were not known to occur in Turkey prior to 1977, and thereafter were only known in the far western region of the country (1). Soon after, however, *Varroa* mites spread to all regions of Turkey due to the large migratory beekeeping industry, with 600,000 colonies reported to have been lost as a result of this parasite alone in the country in 4 years (2). The purpose of this research was to determine which *Varroa* species are present on honey bees in Turkey, since recently what had previously been thought to be one species of *Varroa* has been reported to be 2 species by Anderson and Trueman (3).

Varroa jacobsoni, the name by which the 2 pest species have been known for years, is principally a parasite of *Apis cerana*. Studies on mt DNA Co-I gene sequences and morphological characters of many populations attributed to *V. jacobsoni* from different

parts of the world showed that there were actually 2 species of *Varroa*: *V. jacobsoni* and *V. destructor* (3,4). Adult females of *V. destructor* are significantly larger and less spherical than females of *V. jacobsoni*, and they are also reproductively isolated from females of *V. jacobsoni* (3,4).

V. jacobsoni infests *A. cerana* in the Malaysia-Indonesia region and *V. destructor* infests *A. cerana* in Asia and *A. mellifera* worldwide. Two major strains of *V. destructor* occur, one native to Korea and one native to Japan. The Japan strain, which has been found on *A. mellifera* in Japan and South America, is less virulent and causes less damage to colonies than the Korean strain, which has been identified in North America, Europe, Asia, and the Middle East (3). *V. destructor* is much more widespread and the Korean haplotype of *V. destructor* has the greatest geographical range among the 4 *Varroa*

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species, is more virulent, causes more damage to colonies, and is more reproductive (geometrical increase) than the other strains (3,5).

Turkey's geographical coordinates are lat 36-42°N, long 26-45°E. The females of *Varroa* spp. were collected from worker honeybees from 118 colonies in 24 apiaries. The apiaries were located in intensive beekeeping areas in 17 Turkish provinces (Figure 1).

Marmara region: Edirne (1), Çanakkale (2), Balıkesir (3), and Bursa (4). Aegean region: Aydın (5). Mediterranean region: Mersin (6) and Hatay (7). Black Sea region: Bartın (8), Kastamonu (9), Sinop (10), Samsun (11), Ordu (12), Gümüşhane (13), Bayburt (14), Rize (15), and Artvin (16). Eastern Anatolia region: Erzurum (17) (n = ~ 15 females).

In all, 254 *Varroa* females were collected, mostly from the north, some from the west, and a few from the south of Turkey. All collected samples were stored in 70% ethanol. Mite morphology was examined using light microscopy (100×) in order to confirm the specific identity. Measurements of mite specimens were in micrometers and were obtained from females prepared in Hoyer's medium on glass microslides (6). The first collected samples from 8 provinces in the Black Sea region were sent to the Department of Ecology and Evolutionary Biology, University of Kansas, USA, for studying mt DNA Co-I gene sequences; these samples were identified as *Varroa destructor* by RFLP (5). These researchers also reported that the *V. destructor* samples



Figure 2. *Varroa destructor*: ventral view of a female (photo: Ender Güleğen).

from the 8 Black Sea region provinces belonged to the Korean strain, according to RFLP.

Anderson and Trueman (3), and Zhang (4) demonstrated that 2 species, *V. destructor* and *V. jacobsoni*, differ in mt DNA Co-I gene sequences, and can also be separated by female body size; the former is larger than the latter. The mite samples collected from various regions in Turkey were identified as *V. destructor* in this study, based on morphometric measurements described by Anderson and Trueman (3), and the measurements of these samples were similar to the data reported by them for *V. destructor* (Table). Specimens of *V. destructor* collected in Turkey are less spherical than *V. jacobsoni* (3,4).

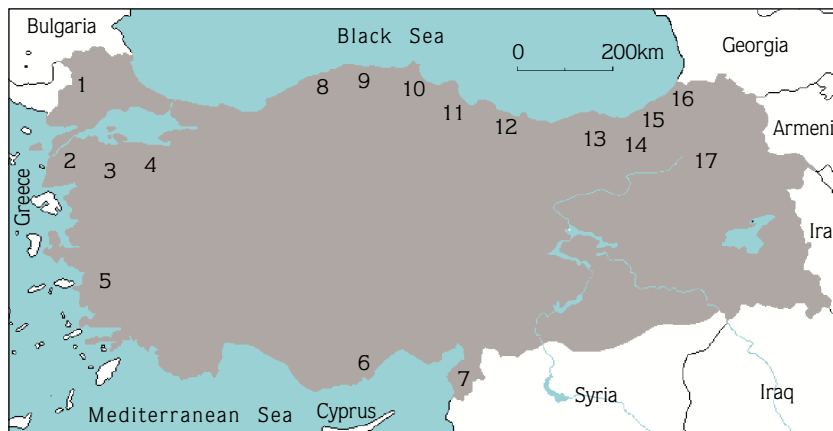


Figure 1. Collecting localities of *Varroa* mites in Turkey.

Table. The measurements of *V. destructor* and *V. jacobsoni* females.

Species	Body length	Body width
	Mean \pm SD	Mean \pm SD
<i>V. jacobsoni</i> *	1063.0 \pm 26.5	1506.8 \pm 36.0
<i>V. destructor</i> *	1167.3 \pm 26.8	1708.9 \pm 41.2
<i>V. destructor</i> **	1138.8 \pm 28.3	1705.1 \pm 49.4
<i>V. destructor</i> ***	1159.0 \pm 21.6	1700.0 \pm 46.5

* Data from Anderson and Trueman, 2000.

** Data based on 254 females examined in this study.

*** Data from Zhang, 2000.

Finally, our results will influence control protocols and treatment methods for varroosis since *V. destructor* is more destructive than *V. jacobsoni* and could kill honeybee colonies within a year. Consequently, the results presented here may help in developing new control strategies in Turkey.

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