

A New Type Covering Setae Morphology in Crab Spiders (Araneae)

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Abstract: The present study aims to determine the covering setae in two crab spiders using scanning electron microscopy (SEM). The setae on the prosoma of *Runcinia grammica* (C. L. Koch, 1837) and *Thomisus onustus* Walckenaer, 1805 were examined. This study reveals a new type of covering setae in the members of Thomisidae family.

Keywords: Cuticular structure, SEM, setae, thomisidae, araneae, surface morphology.

Yengeç Örümceklerinde (Araneae) Yeni Bir Tip Örtü Setası Morfolojisi

Öz: Mevcut çalışmada taramalı elektron mikroskobu kullanılarak iki yengeç örümceği türünde örtü setalarının morfolojisinin belirlenmesi amaçlanmıştır. *Runcinia grammica* (C. L. Koch, 1837) ve *Thomisus onustus* Walckenaer, 1805 türlerinin prosomaları üzerindeki setalar bu amaçla incelenmiştir. Thomisidae familyası üyelerinde ilk kez görülen bir örtü setası tipine rastlanılmıştır.

Anahtar kelimeler: Kütikular yapı, sem, seta, thomisidae, araneae, yüzey morfolojisi.

Setae in spiders have different morphologies and diverse functions depending on their location on the body (Ovtsharenko 1985; 1989). Only 13 of the 134 known spider families have been studied on setae morphology (Townsend & Felgenhauer, 1998). Although the studies have mostly focused on ground spiders (Gnaphosidae), lynx spiders (Oxyopidae), and jumping spiders (Salticidae), there have been little or no studies on other families.

Covering setae are specialized, hair-like structures found on the bodies of spiders. These are not just ordinary hairs; they are essential for a spider's survival, locomotion, and environmental adaptation. They are located mostly on the abdomen and may also cover the cephalothorax, legs, pedipalps, and spinnerets. They have no connection with sensory receptor cells (Townsend & Felgenhauer, 1998). It has been recognized that there are 10 different types of setae on the cuticle of all spiders. The morphology of covering setae varies among different spider genera. Researchers have identified several major types of covering setae such as plumose, squamose, lanceolate, pinnate, arborate, and sicate forms, each with distinct characteristics (Zakharov & Ovtsharenko, 2015).

In the Thomisidae family, covering setae were studied in *Stephanopsis* cf. *scabra* L. Koch, 1874 and *S. cambridgei* Thorell, 1870 and found 3 different types of setae that are finger-shaped with dentation. The dentate structure of the setae is related to the fact that they live among the debris and use these debris as camouflage (Gawryszewski, 2014).

The aim of this study is to determine the new covering setae type morphology from the species *Runcinia grammica* (C. L. Koch, 1837) and *Thomisus onustus* Walckenaer, 1805 that live on vegetation and belong to the

Thomisidae in the Araneae class.

The species of the Thomisidae family used in this work were obtained from the Niğde Ömer Halisdemir University Arachnology Museum (NOHUAM). These species are *Runcinia grammica* (C. L. Koch, 1837) (♀) and *Thomisus onustus* Walckenaer, 1805 (♀♂). The scanning electron microscope (SEM) was used in the Central Research Laboratory of Niğde Ömer Halisdemir University to determine the seta morphology of these crab spiders. For each species, these body parts (prosoma, opisthosoma, and legs) were placed on the stapes in the proper position and the surface of these specimens was coated with gold with a Sputter Coater (Cressingto Auto 108) brand device to obtain clearer images. The specimens were then photographed using an EVO LS 10 ZEISS device to examine the surface morphology (Fig. 1).

The setae morphology on the prosoma of *Runcinia grammica* (C. L. Koch, 1837) and *Thomisus onustus* Walckenaer, 1805 from Thomisidae was examined by SEM and a new covering type setae morphology has been identified for the first time. (Figs. 2-4).

Studies on the setae of spiders have mostly focused on members of the families Salticidae, Oxyopidae, and Gnaphosidae. Considering the spider families examined, lanceolate, spatulate, and plumose setae are commonly observed in spiders. There are almost no studies covering setae morphology in members of the family Thomisidae (Townsend & Felgenhauer, 1998; Gawryszewski, 2014; Baltayeva et al., 2024). According to these studies, Baltayeva reported that there are no cover setae in species *Synema plorator* (O. Pickard-Cambridge, 1872), *Xysticus laetus* Thorell, 1875, and *Diaea dorsata* (Fabricius, 1777), while Gawryszewski reported that there are 3 different types of finger-shaped setae with denticles in species of

genus *Stephanopis*. He also reported that crab spiders *Stephanopis* spp. adapt to their environment by attaching debris to their bodies with the help of setae. In this study, finger-shaped setae morphology was found in *Runcinia grammica* (C. L. Koch, 1837) and *Thomisus onustus*

Walckenaer, 1805 from Thomisidae family. This type of setae is similar to that of the crab spider genus *Stephanopis* but of a different type. While the other types (type I, II, and III setae) have denticles, this new type of seta does not have denticles.



Figure 1. SEM imaging process

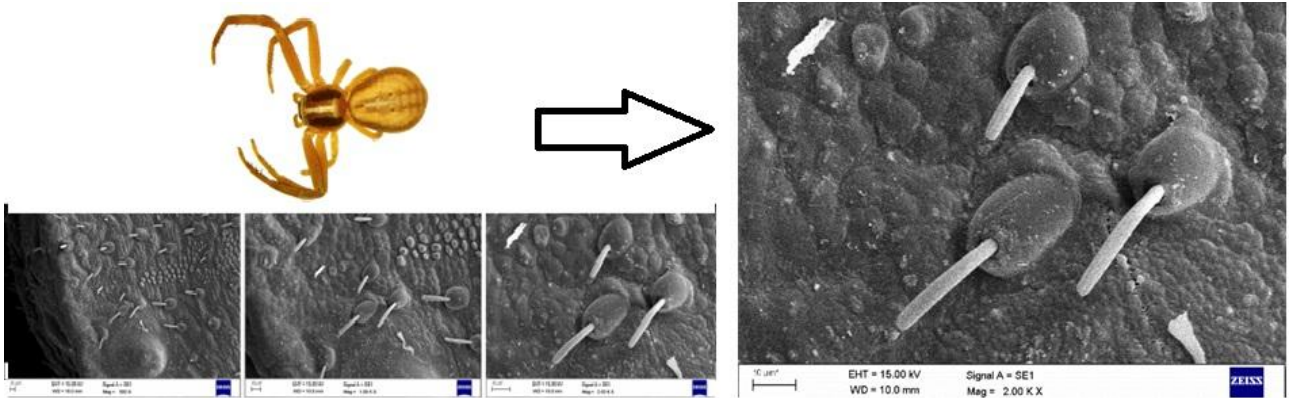


Figure 2. Digital (habitus) and SEM (covering setae) photos of *Runcinia grammica* (C. L. Koch, 1837)

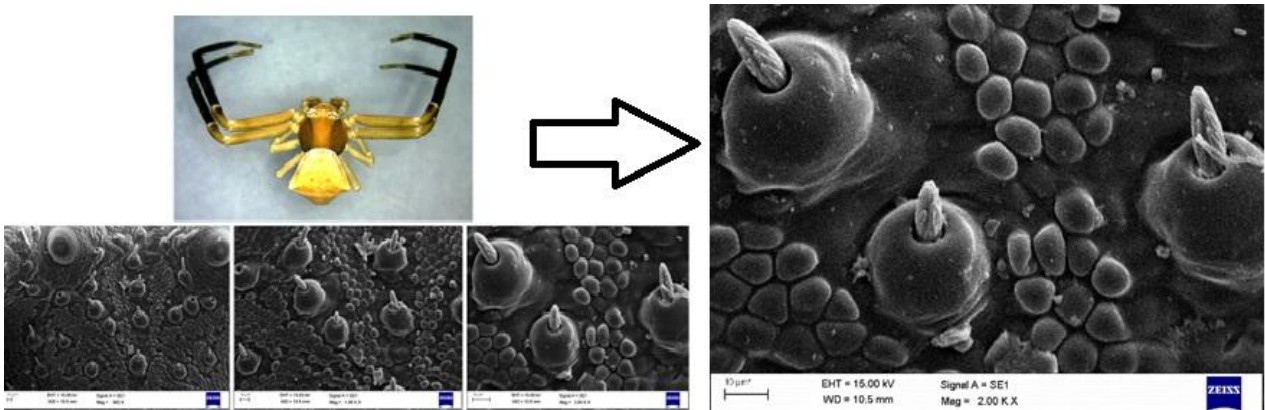


Figure 3. Digital (habitus) and SEM (covering setae) photos of male of *Thomisus onustus* Walckenaer, 1805.

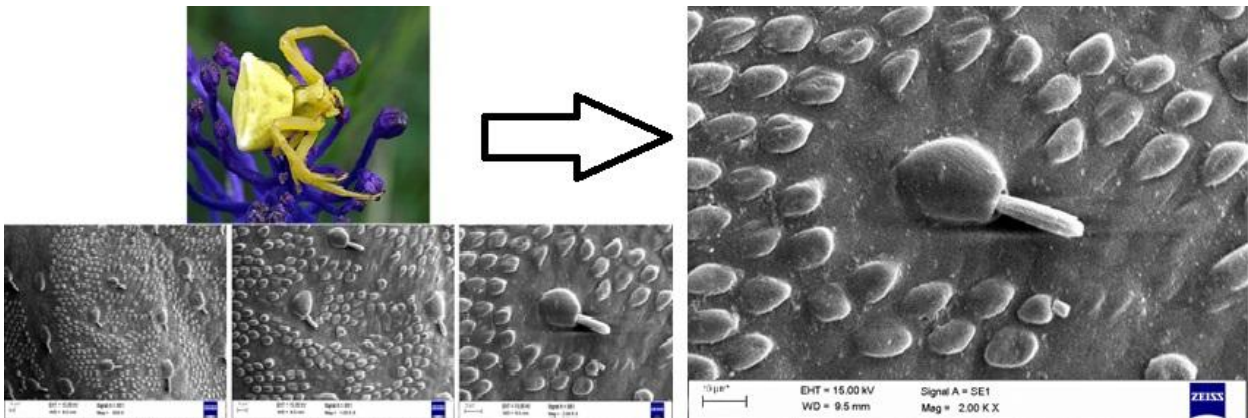


Figure 4. Digital (habitus) and SEM (covering setae) photos of female of *Thomisus onustus* Walckenaer, 1805.

Comparing the new type setae morphology of *Runcinia grammica* (C. L. Koch, 1837) and *Thomisus onustus*

Walckenaer, 1805, it was observed that the setae length was longer in *R. grammica* (C. L. Koch, 1837). In addition, it

was observed that in *Thomisus onustus*, this setae type morphology is different in length for both sexes, with the female having a slightly longer setae length than the male. More studies should be conducted to learn about the covering setae in the crab spider species belonging to the Thomisidae family.

Ethics committee approval: Ethics committee approval is not required for this study.

Conflict of interest: The authors declare that there is no conflict of interest.

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