A SEM STUDY ON AEDEAGUS AND SPERMATHECA OF *CASSIDA HABLITZIAE* MOTSCHULSKY, 1838 (COLEOPTERA: CHRYSOMELIDAE: CASSIDINAE) FROM TURKEY

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ABSTRACT: The paper presents ultrastructures observed by SEM of aedeagus and spermatheca of *Cassida hablitziae* Motschulsky, 1838 (Coleoptera: Chrysomelidae: Cassidinae) from Turkey for the first time. Male genitalia are not diagnostic, spermathecae are partly diagnostic within the genus *Cassida* Linnaeus, 1758. Accordingly, ultrastructural investigations of aedeagus and spermatheca are very important to obtain new diagnostic characters in the genus *Cassida*. Photos in SEM as weel as photos in stereo microscope are also given in the text. *Cassida hablitziae* Motschulsky, 1838 is the first record for Düzce province in Turkey.

KEY WORDS: *Cassida hablitziae*, SEM, ultrastructures, aedeagus, spermatheca, Turkey

Cassida hablitziae Motschulsky, 1838 is in the subgenus *Alledoya* Hincks, 1950 of the genus *Cassida* Linnaeus, 1758 (Chrysomelidae: Cassidinae).

The Cassidinae fauna of Turkey includes 51 species of 6 genera. The genus *Cassida* Linnaeus, 1758 numbers 41 species (Ekiz et al., 2013; Özdikmen et al., 2014; Özdikmen & Kaya, 2014).

The Western Palaearctic subgenus *Alledoya* Hincks, 1950 numbers only two species. It includes both species in Turkey as *Cassida seraphina* Ménétries, 1836 and *Cassida hablitziae* Motschulsky, 1838 (Ekiz et al., 2013; Özdikmen et al., 2014; Özdikmen & Kaya, 2014).

The aim of this work, ultrastructures observed by SEM of aedeagus and spermatheca of *Cassida hablitziae* Motschulsky, 1838 (Coleoptera: Chrysomelidae: Cassidinae) from Turkey reveal for the first time.

MATERIAL AND METHODS

The available specimens (a total of 11 specimens) for the present work were collected from Bolu and Düzce provinces in Turkey in 2001, 2003. The specimens are deposited at Gazi University (Turkey, Ankara).

The spermathecae and aedeagi were dissected from abdomen, remaining tissue were removed with fine tweezers.

For light microscopic examination after cleaning, the samples were placed 70% ethanol and examined with Olympus SZX7 stereomicroscope.

For scanning electron microscopy (SEM), cleaned samples were dehydrated using an ascending series of ethanol (70%, 80%, 90%, and 100%) and then air dried. After that the specimens were mounted onto SEM stubs using a double-sided adhesive tape, coated with gold using a Polaron SC 502 Sputter Coater, and examined with a JEOL JSM 6060 Scanning Electron Microscope (SEM) at 10 kV.

RESULTS

Cassida hablitziae Motschulsky, 1838

Cassida hablitziae Motschulsky, 1838 is a SW-Asiatic species. It is distributed in Armenia, Georgia, South European Russia, Kazakhstan and Turkey of Western Palaearctic region (Borowiec, 2007a,b; Warchalowski, 2010; Borowiec & Sekerka in Löbl & Smetana (2010)).

The species is distributed only in North Turkey. It has been recorded only from 4 provinces in 2 (Marmara and Black Sea regions) of 7 Turkish regions. It is reported only from Bolu, İstanbul, Trabzon and Zonguldak provinces in Turkey (Ekiz et al., 2013; Özdikmen & Kaya, 2014).

Material examined: Turkey, Bolu prov.: Yedigöller, waterfall, 11.VIII.2001, 5 specimens, **Düzce prov.:** Exit of Dutlar village, 8 km to Yığılca, 12.V.2003, 170 m, 1 specimen. **Remark:** New to Düzce province.

According to Bordy & Doguet (1987), Borowiec & Świętojańska (2001) and Borowiec (2007a), male genitalia are not diagnostic within the genus *Cassida* Linnaeus, 1758. Spermathecae in the genus *Cassida* are partly diagnostic. With this reason, ultrastructural investigations of aedeagus and spermatheca are very important in the genus *Cassida*.

Aedeagus and spermatheca of *Cassida hablitziae* Motschulsky, 1838 were studied with both stereo microscope and SEM for the first time. Obtaining observations on ultrastructures of them are presented as follows:

Aedeagus: In lateral view, median lobe distinctly curved median foramen to apex. More or less sharpened towards to apex (Figs. 1, 3, 11).

In dorsal view, median lobe at the apex curved to backward and so apex seems like truncated (Figs. 1, 10-13). Upper and lateral margins of orifice more or less rounded (Figs. 1, 11-13). Dorsal plate distinct and largish bipartite basally (Figs. 1, 11-13). Median lobe in lateral parts and fore part of orifice thickened. Thickening in lateral parts smaller than the fore part (Figs. 1, 11-14). Median lobe behind the dorsal plate more or less elevated medially (Figs. 1, 6, 8, 11-13). The area behind orifice broadly closed basally (Figs. 1, 11-13).

Median lobe especially in anterior half with scattered, irregular and sparsely ultrastructural pits (Figs. 6-9, 12-14). The pits on ventral parts of median lobe much more than on dorsal parts (Figs. 6-9, 12-14). The pits located only in lateral parts of terminal part of median lobe in dorsal view (Figs. 12-14). Dorsal plate and the area behind it without ultrastructural pits in dorsal view (Figs. 12-14). Also the terminal area from upper margin of orifice to aedeagal apex without ultrastructural pits in dorsal view (Figs. 10-13).

Spermatheca: General view of spermatheca falcate like a fish hook (Figs. 2, 15). Cornu C-shaped. Cornu gradually narrowed towards to apex and apex of cornu strongly sharpened (Figs. 2, 15). Nodulus swollen like a thigh (Figs. 2, 15-17). Collum + ramus reduced and hardly visible (Figs. 2, 15-19, 21). Ductus spermatheca long, thick and distinctly spiral (Figs. 2, 15-18, 21-23). Spermathecal gland ruptured (Figs. 15-18, 21). Nodulus, cornu, collum + ramus with scattered, irregular and sparsely ultrastructural pits (Figs. 15-21, 26). Ductus spermatheca without ultrastructural pits (Figs. 18, 21-23).

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Warchalowski, A. 2010. The Palaearctic Chrysomelidae. Identification keys. Vol. 1 & 2. Warszawa, 2010. 1212 pp.

Figure 1. Aedeagus in streo microscope, Lateral view (left), Dorsal view (right).

Figure 2. Spermatheca in streo microscope, Lateral view.

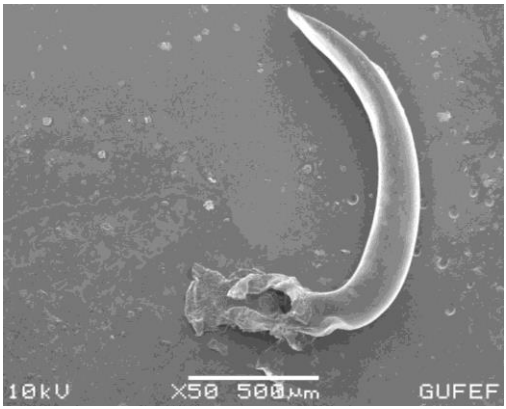

Figure 3. Aedeagus, lateral view.

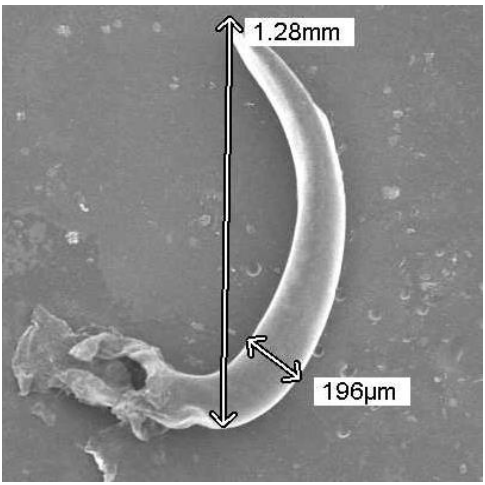

Figure 4. Aedeagus, lateral view.

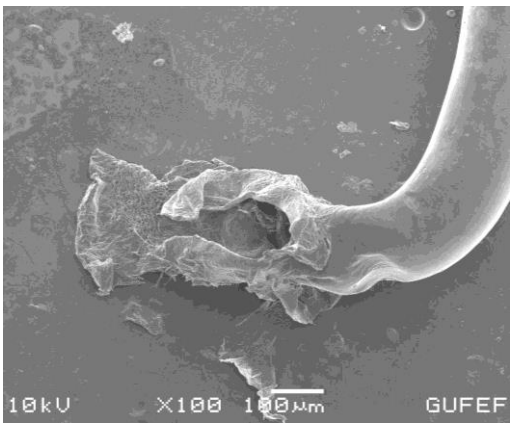

Figure 5. Aedeagus, lateral view of basal part.

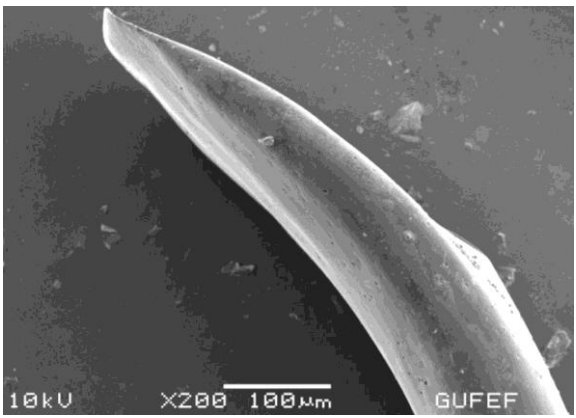

Figure 6. Aedeagus, ventro-lateral view of anterior half of median lobe.

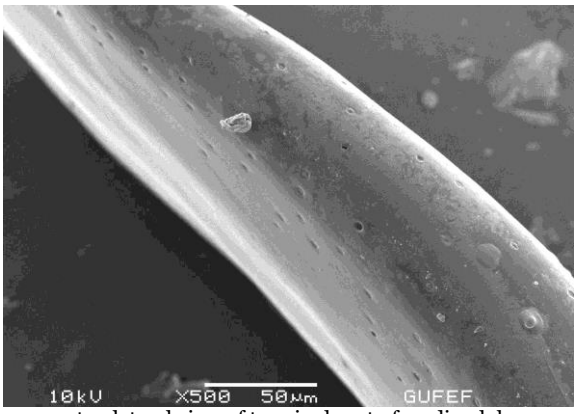

Figure 7. Aedeagus, ventro-lateral view of terminal part of median lobe.

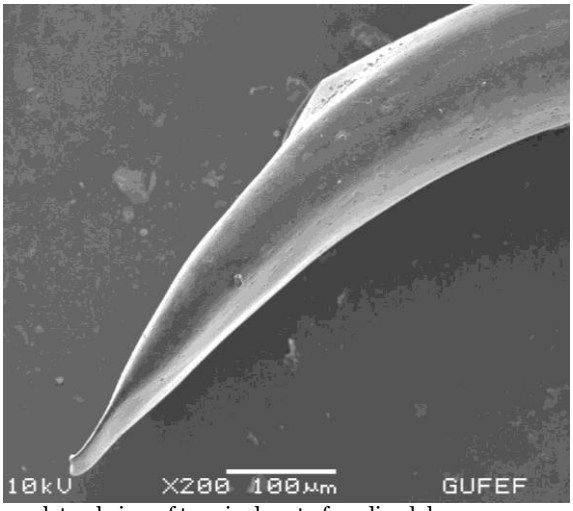

Figure 8. Aedeagus, lateral view of terminal part of median lobe.

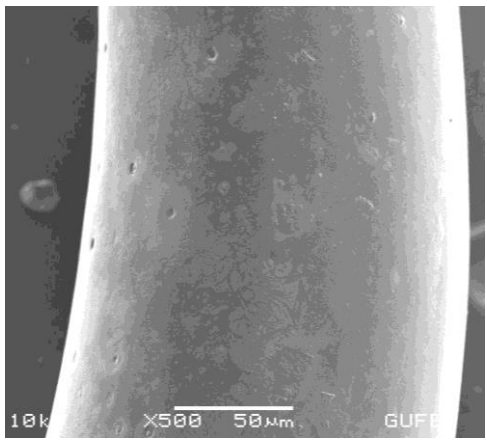

Figure 9. Aedeagus, pits on ventral surface in lateral view of median lobe.

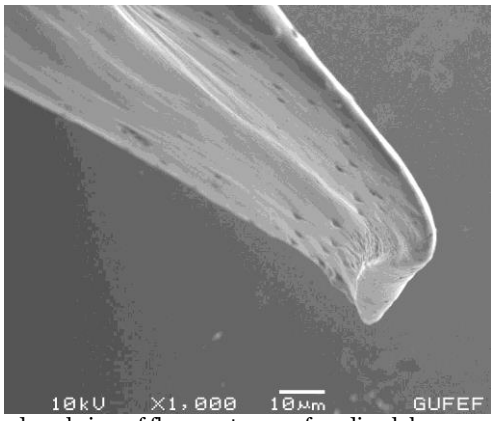

Figure 10. Aedeagus, dorsal view of flexure at apex of median lobe.

Figure 11. Aedeagus, dorso-lateral view.

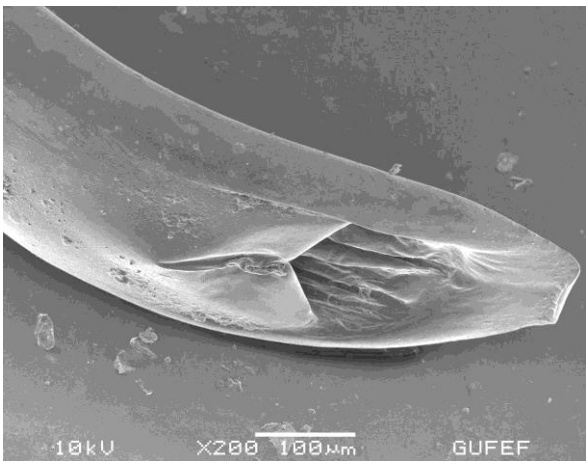

Figure 12. Aedeagus, dorso-lateral view of terminal part of median lobe.

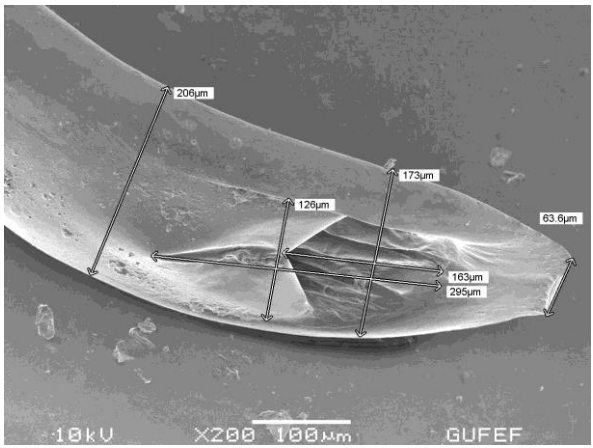

Figure 13. Aedeagus, dorso-lateral view of terminal part of median lobe.

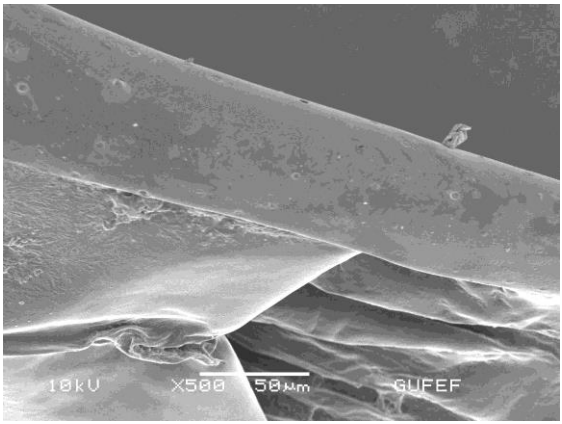

Figure 14. Aedeagus, the pits on lateral part of terminal part of median lobe in dorsal view.

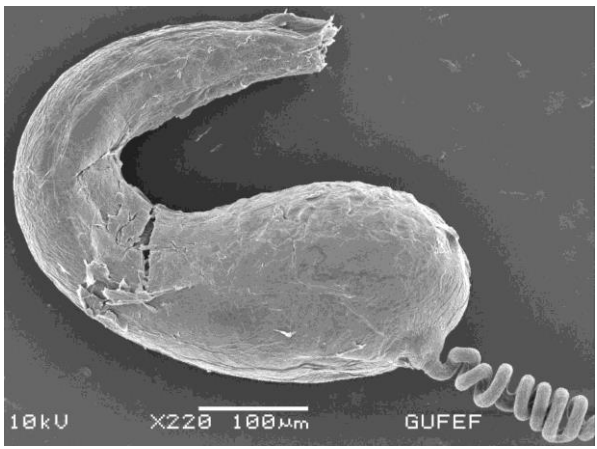

Figure 15. Spermatheca, lateral view.

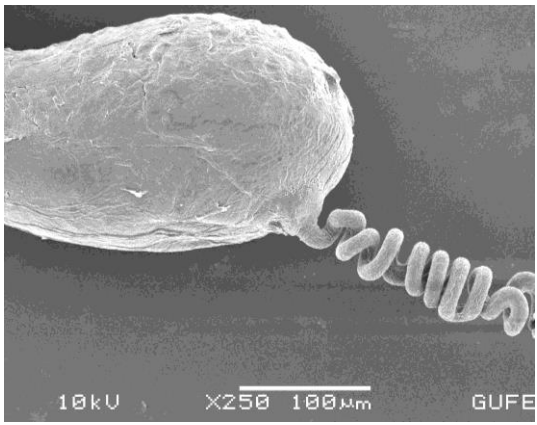

Figure 16. Spermatheca, nodulus, reduced collum + ramus, ruptured spermathecal gland, ductus spermatheca.

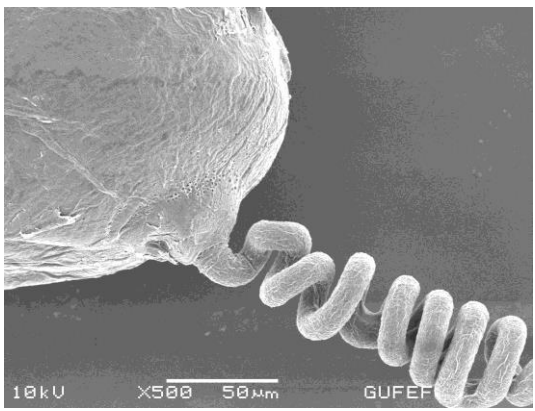

Figure 17. Spermatheca, nodulus, reduced collum + ramus, ruptured spermathecal gland, ductus spermatheca.

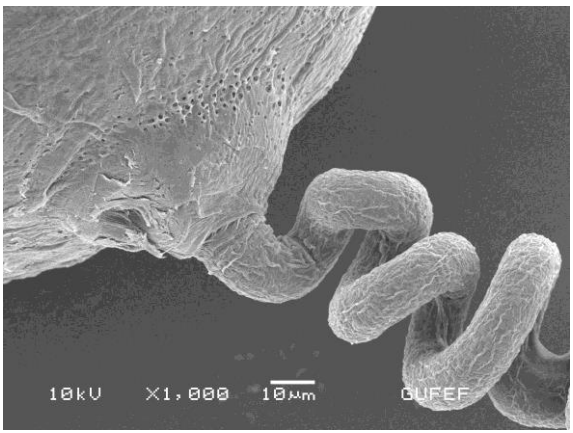

Figure 18. Spermatheca, nodulus, reduced proximal duct, ruptured spermathecal gland, ductus spermathecal and pits on reduced collum + ramus.

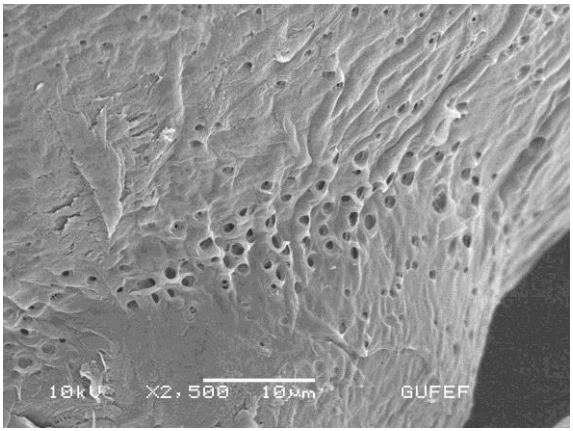

Figure 19. Spermatheca, pits on reduced collum.

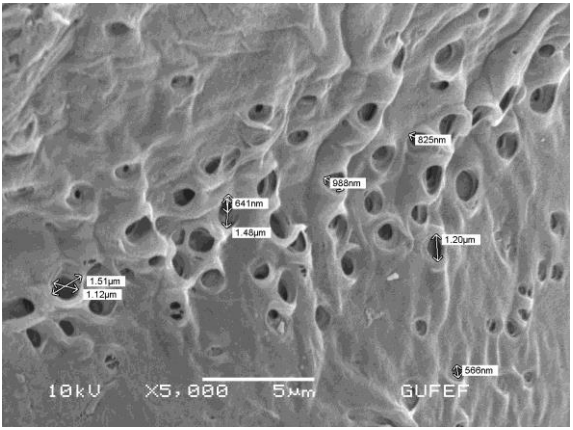

Figure 20. Spermatheca, pits on reduced collum.

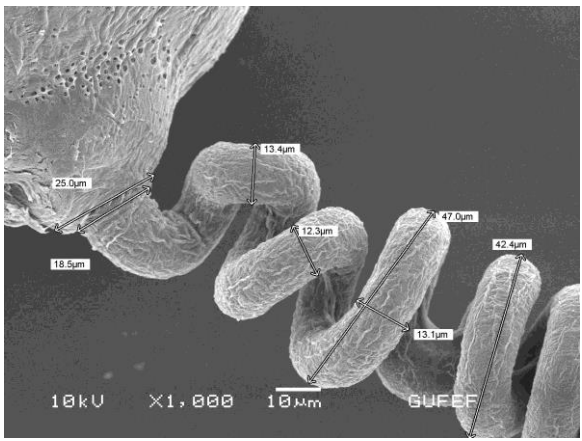

Figure 21. Spermatheca, nodulus, reduced proximal duct, ruptured spermathecal gland, ductus spermathecal and pits on reduced collum + ramus.

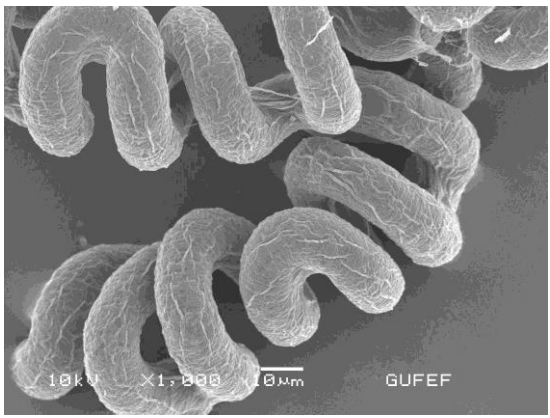

Figure 22. Spermatheca, ductus spermatheca.

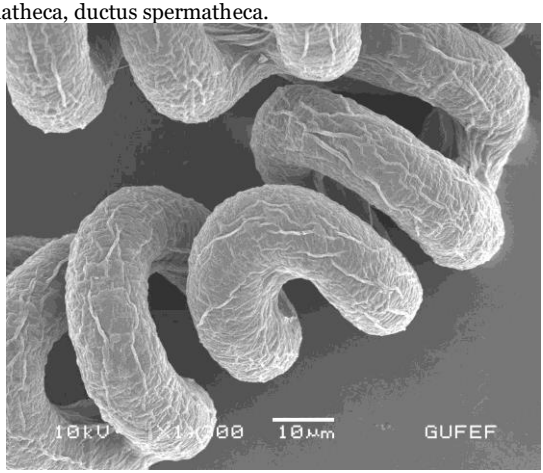

Figure 23. Spermatheca, ductus spermatheca.

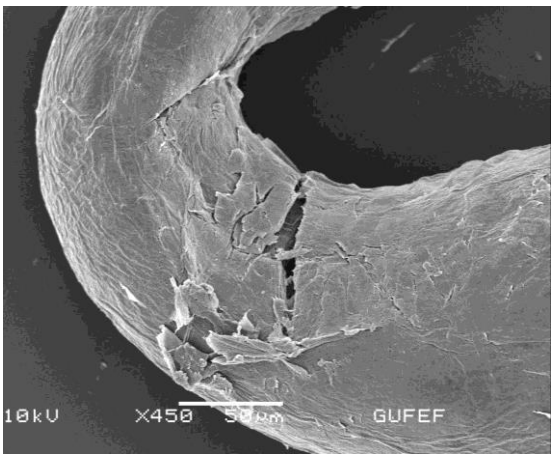

Figure 24. Spermatheca, nodulus, cornu.

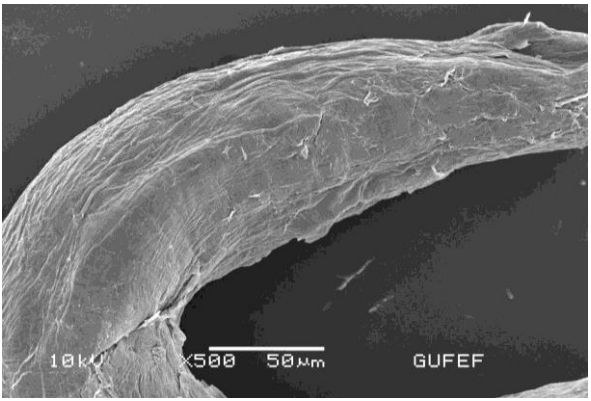

Figure 25. Spermatheca, cornu.

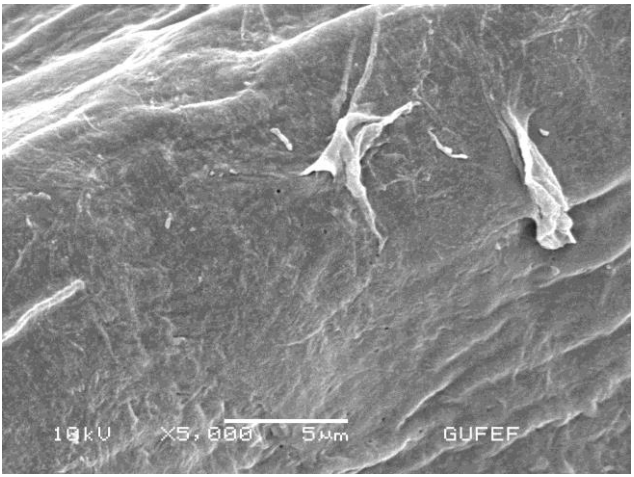

Figure 26. Spermatheca, pits on cornu.