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Scanning electron micrographs of *Blomia tropicalis* (Acari: Astigmata: Echimyopodidae), a common house dust mite in Malaysia

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Abstract. Many finer taxonomic characters of *Blomia tropicalis* are not distinctly visible under conventional light microscopy. Scanning electron micrographs of this mite are therefore presented in this paper for better appreciation of the inconspicuous features of the morphology of the species. The differences in morphology of male and female *B. tropicalis* are also briefly discussed.

INTRODUCTION

Early surveys indicated that *Dermatophagoides pteronyssinus* was the most common and abundant house dust mite species in Malaysia (Ho & Nadchatram, 1984; 1985). However, another dust mite species, *Blomia tropicalis* Bronswijk, Cock & Oshima, 1973, an astigmatid mite of the superfamily Glycyphagoidea was found to be the most common and abundant species recovered in a recent dust mite survey (Mariana & Ho, 1996; Mariana *et al.*, 2000). Excluding *D. pteronyssinus*, *B. tropicalis* counts were significantly higher than all other species of dust mites found in mattresses in that survey and densities of *D. pteronyssinus* and *B. tropicalis* were not statistically significant ($p = 0.51$). As much as 8934 mites per gram of dust have been recovered from a single mattress (Mariana, 2002). Frequency of its distribution, habitat, comparison of the abundance of the species along with many other species found in Malaysian, Singaporean and Hawaiian houses were reviewed (Nadchatram, 2005). *Blomia tropicalis* has been shown to produce allergens responsible for asthma and rhinitis (Mariana, 2002; Pereira *et al.*, 2005; Almeida *et al.*, 2006). Sixty-seven percent (67%) of 208 rhinitis patients in Malaysia are allergic to this mite (Mariana, 2002).

Blomia tropicalis from house dust was first described by Bronswijk *et al.* (1973 a). Its morphology had been compared with other species under the same genus (Bronswijk *et al.*, 1973 b). A pictorial key for the identification of commonly found domestic mites has simplified the identification of this species from other mites (Colloff & Spieksma, 1992). Many finer characters of *B. tropicalis* are not distinctly visible under conventional light microscopy. Scanning electron micrographs of this mite are presented in this paper for better appreciation of the inconspicuous features of the morphology of the species. *Blomia tropicalis* is characterised by the long whip-like setae of the idiosome.

General morphology

Blomia tropicalis is a minute mite, measuring about 0.23 to 0.47 mm in length (Figure 1). It is almost globular in shape, broad across the scapular region and somewhat tapering towards its posterior end. Body of the mite is composed of an

anterior portion, the gnathosoma and a posterior portion, the idiosoma. Only the mouth and mouthparts of the mite are found in the gnathosoma (Figure 2). Other organs and structures are found in the idiosoma. The idiosoma has a rugose cuticle (Figure 3) that under electron microscopy (2000x) is shown to be covered with short rod-like setae (Figure 4). This is an important character that differentiates this species from other dust mite species. Attached to the body are 4 pairs of legs (only 3 pairs are present in the larval stage). Each leg has 5 free segments, the most distal segment, the tarsus, is slender and elongated (Figure 5).

Altogether there are 15 pairs of setae on idiosome i.e 2 pairs of vertical setae, 2 pairs of scapular setae, 5 pairs of dorsal setae, 5 pairs of lateral setae and a pair of humural setae. This mite species has a pair of short vertical external setae (v*e*) extending from the outer margin of the body and a pair of longer vertical internal setae (v*i*) on the inner part of the body (Figure 6). *Ve* and *vi* setae are clustered together near the anterior margin of the idiosoma. *Vi* setae are situated posterior-medially of those of *ve* and bases of these vertical setae form a trapezium. Both scapular external setae (*sce*) and scapular internal setae (*sci*) are of similar length (Figure 6). All dorsal setae are long and serrated, whip-like except for *d2* (Figure 6).

Sexual dimorphism

Female and male mites can be differentiated by their sex organs. Genital opening of both sexes is located between coxae III and IV. For the females, the genital opening is covered by a paragynial flap (Figure 7). Their copulatory tube is short and bent (Figure 8). Genital opening for the male is smaller and concealed by 2 folds (Figure 9).

Other than different external appearance of sex organs, male and female mites also differ in the number of anal setae. Females have 6 pairs of anal setae of which 4 pairs ventral and another 2 pairs dorsal (Figure 8). Only 3 pairs of anal setae are found in the males and all are located at the ventral aspect (Figure 10). Short disc-shaped genital suckers present on the venter of females (Figure 11). There is none on the male. Tarsus IV is another important character to differentiate male and female mite. Tarsi IV of the female is long and slender with small pretarsi (Figure 11) whereas for the male it is narrow and hinged at the apex of the tibia (Figure 12).

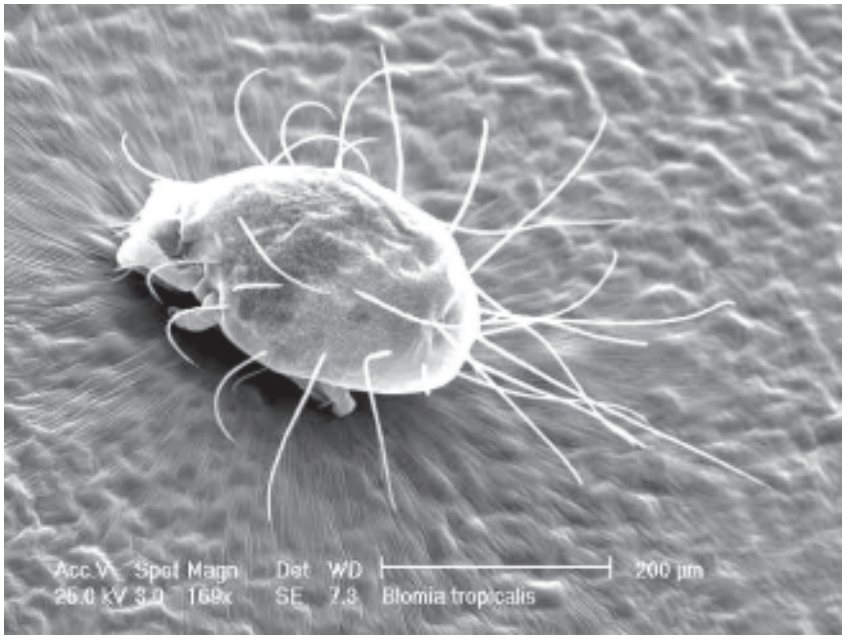

Figure 1. *B. tropicalis*, a globular shape mite with long setae.

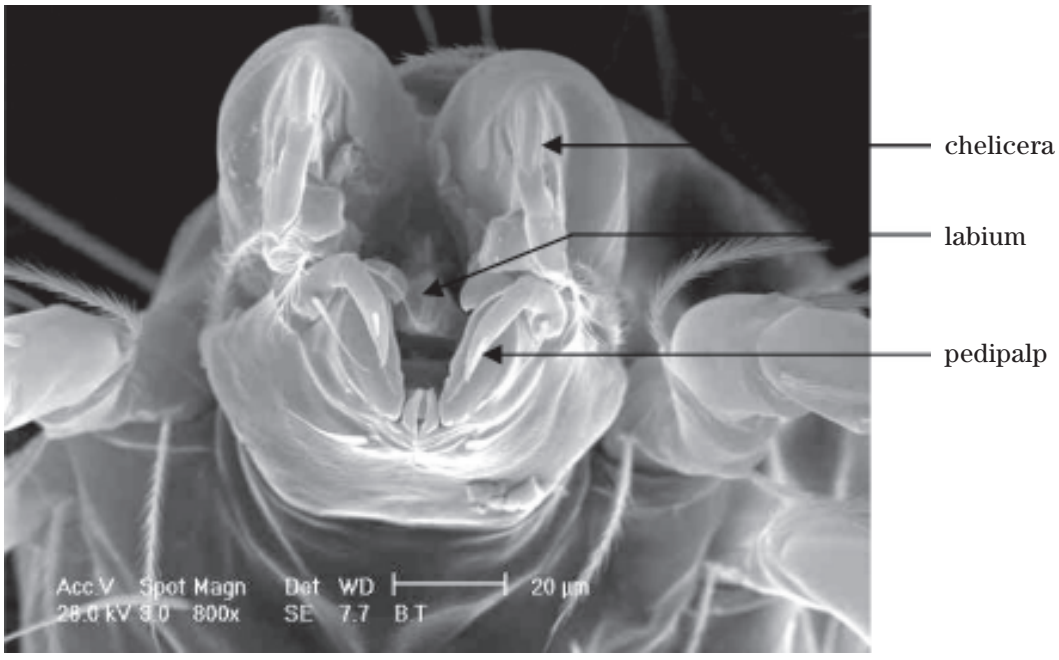

Figure 2. Gnathosoma and mouthparts of *B. tropicalis*.

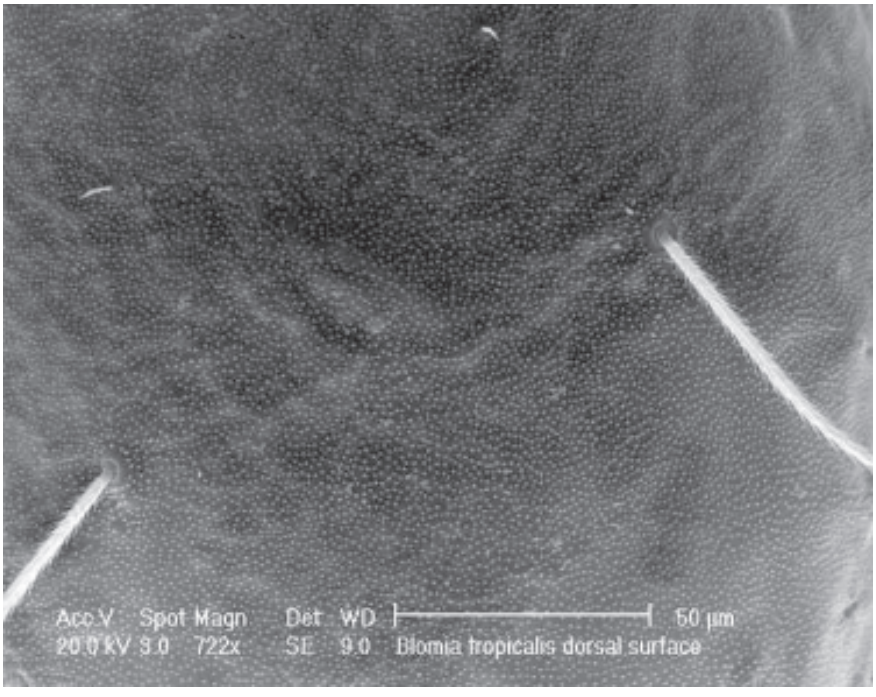

Figure 3. Rugose surface of cuticle of *B. tropicalis*.

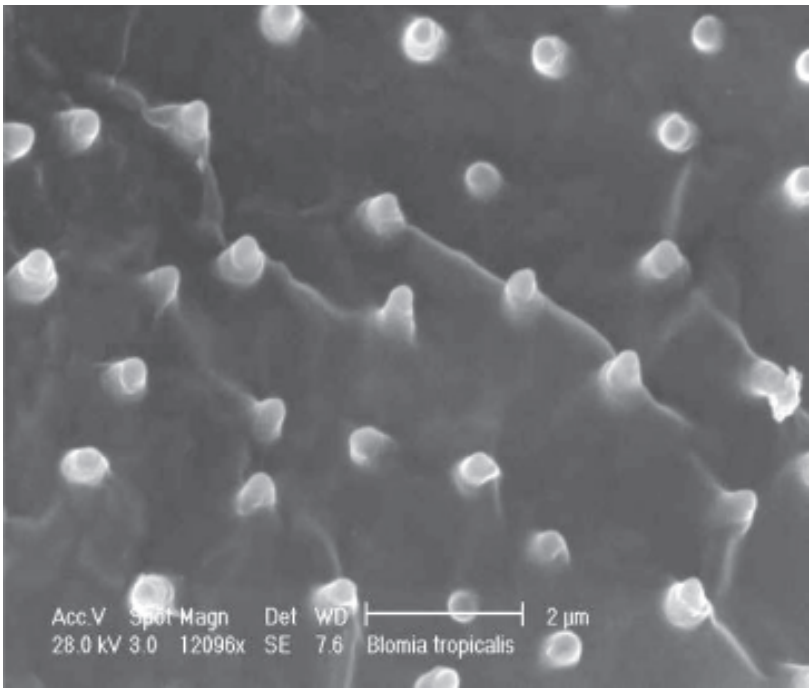

Figure 4. Short rod-like setae on cuticle of *B. tropicalis*.

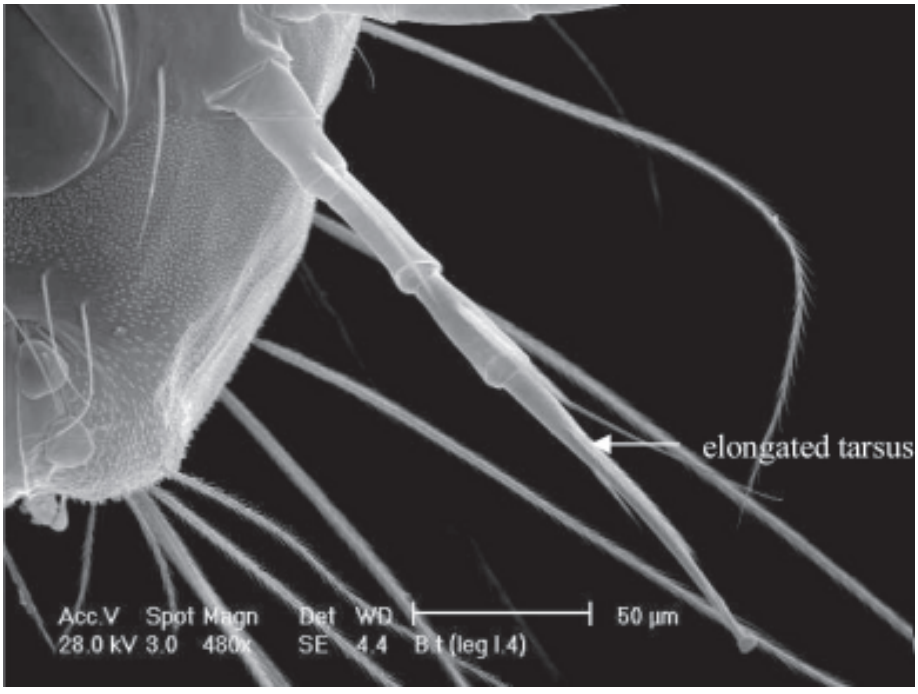

Figure 5. Leg IV of *B. tropicalis* adult with elongated tarsus.

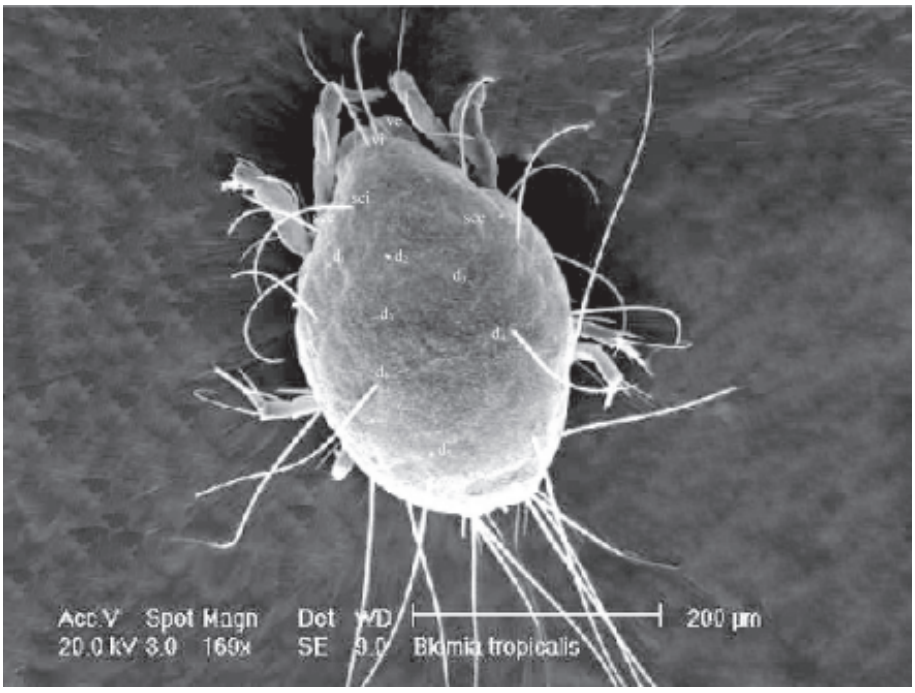

Figure 6. Dorsal setae of adult *B.tropicalis*.

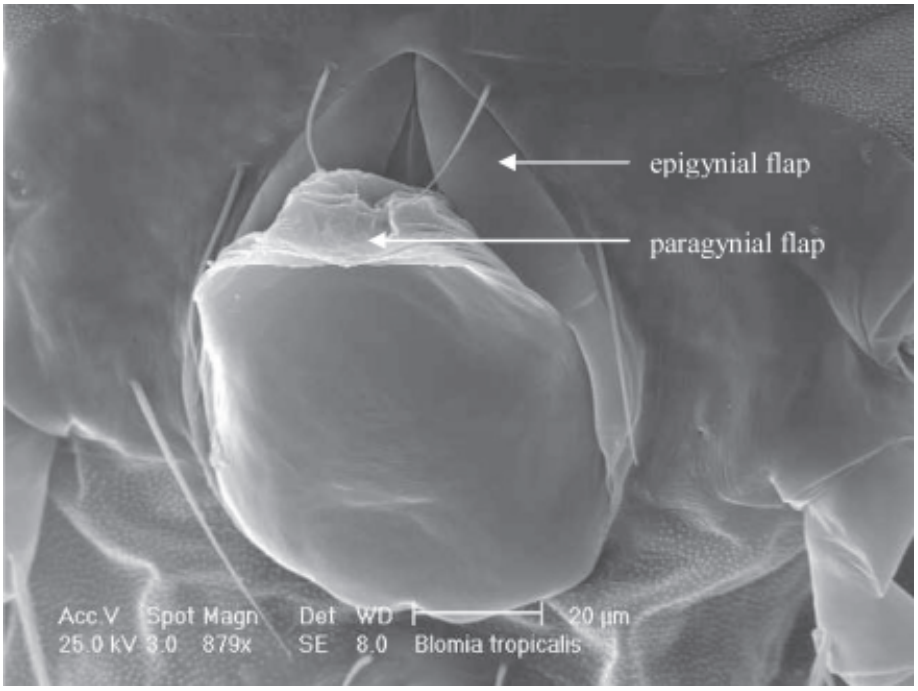

Figure 7. Genital opening of adult female covered by paragynial flap.

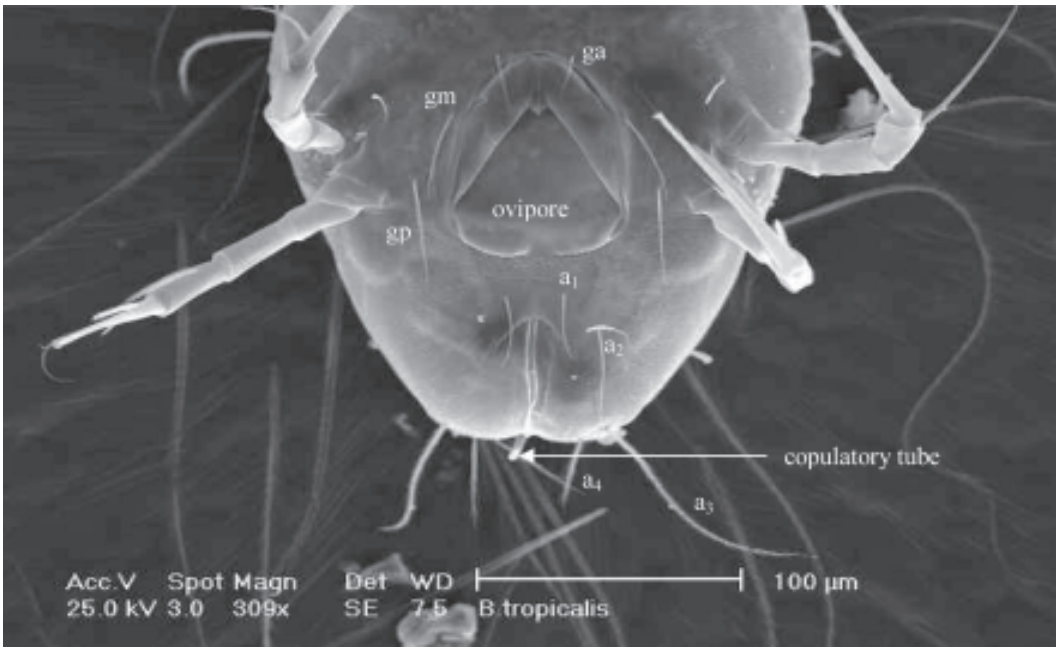

Figure 8. Copulatory tube of adult female *B. tropicalis*.

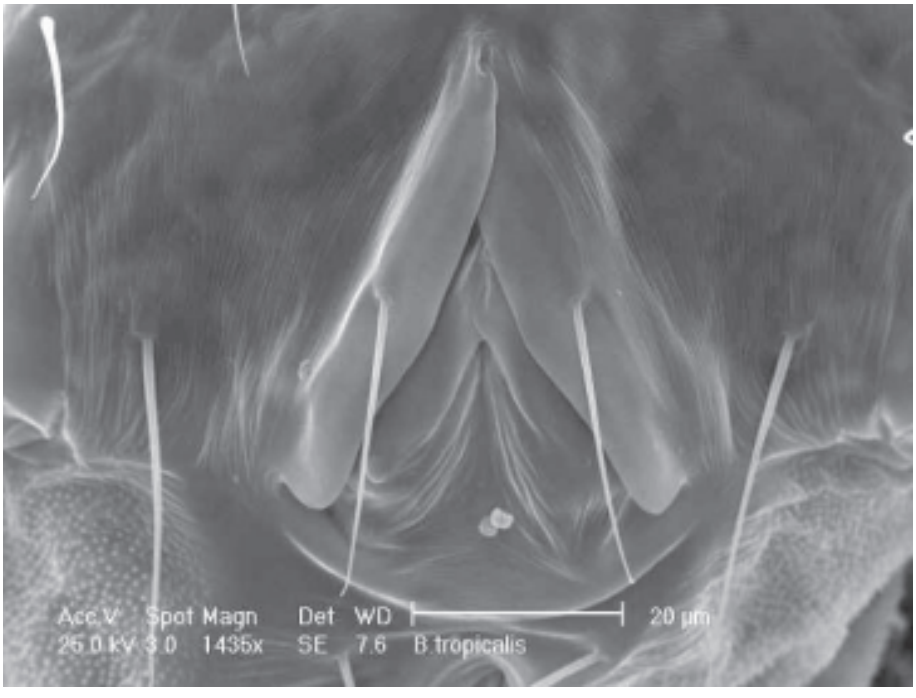

Figure 9. Genital opening of adult male *B. tropicalis*.

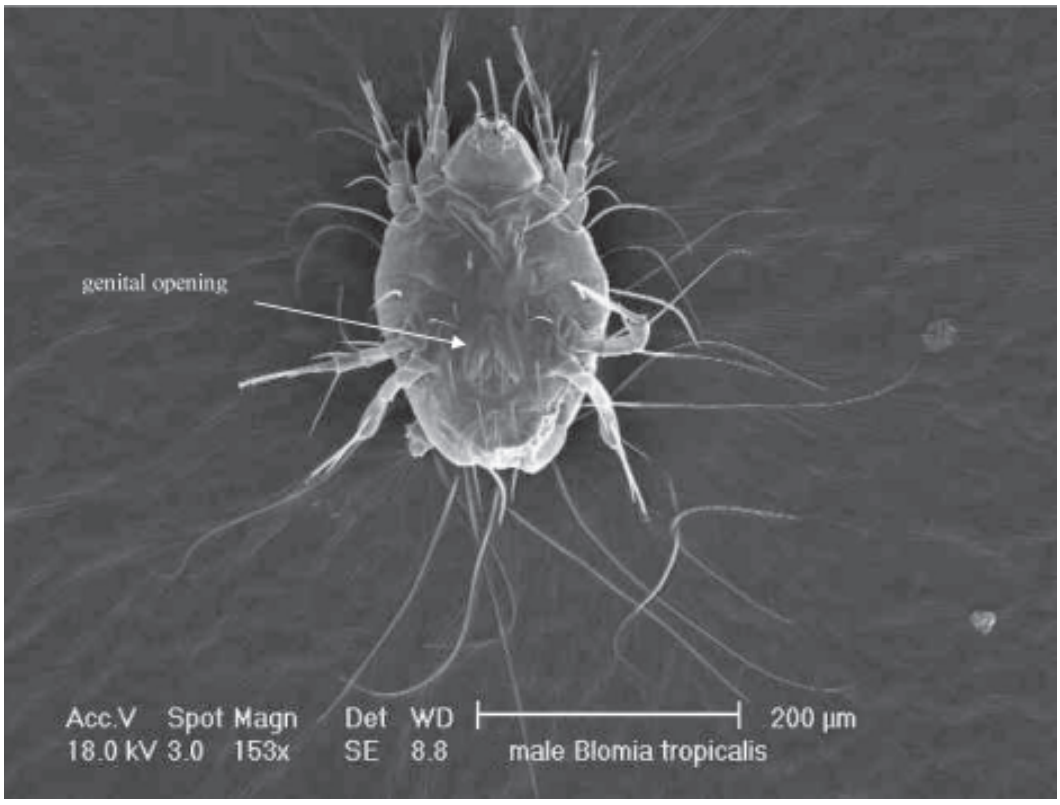

Figure 10. Venter of adult male *B. tropicalis*.

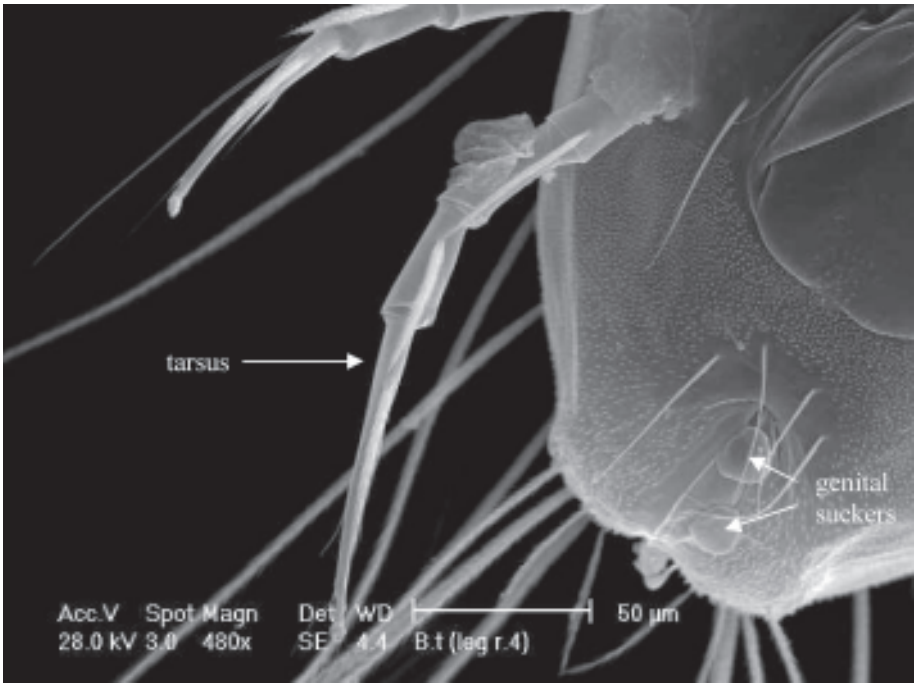

Figure 11. Venter of adult female *B. tropicalis* showing 2 genital suckers.

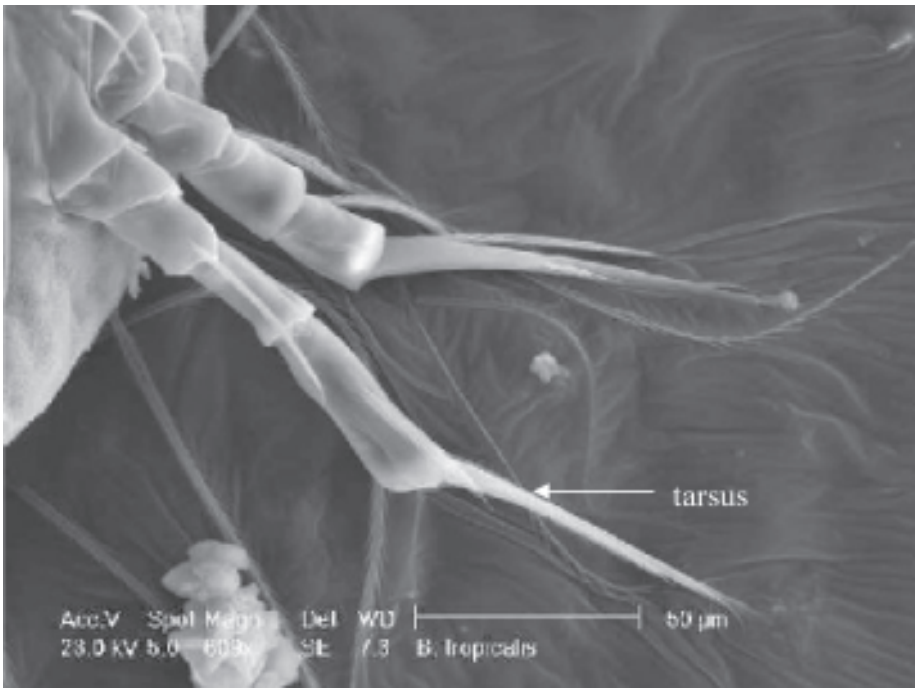

Figure 12. Tarsus IV of adult male *B. tropicalis*.

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