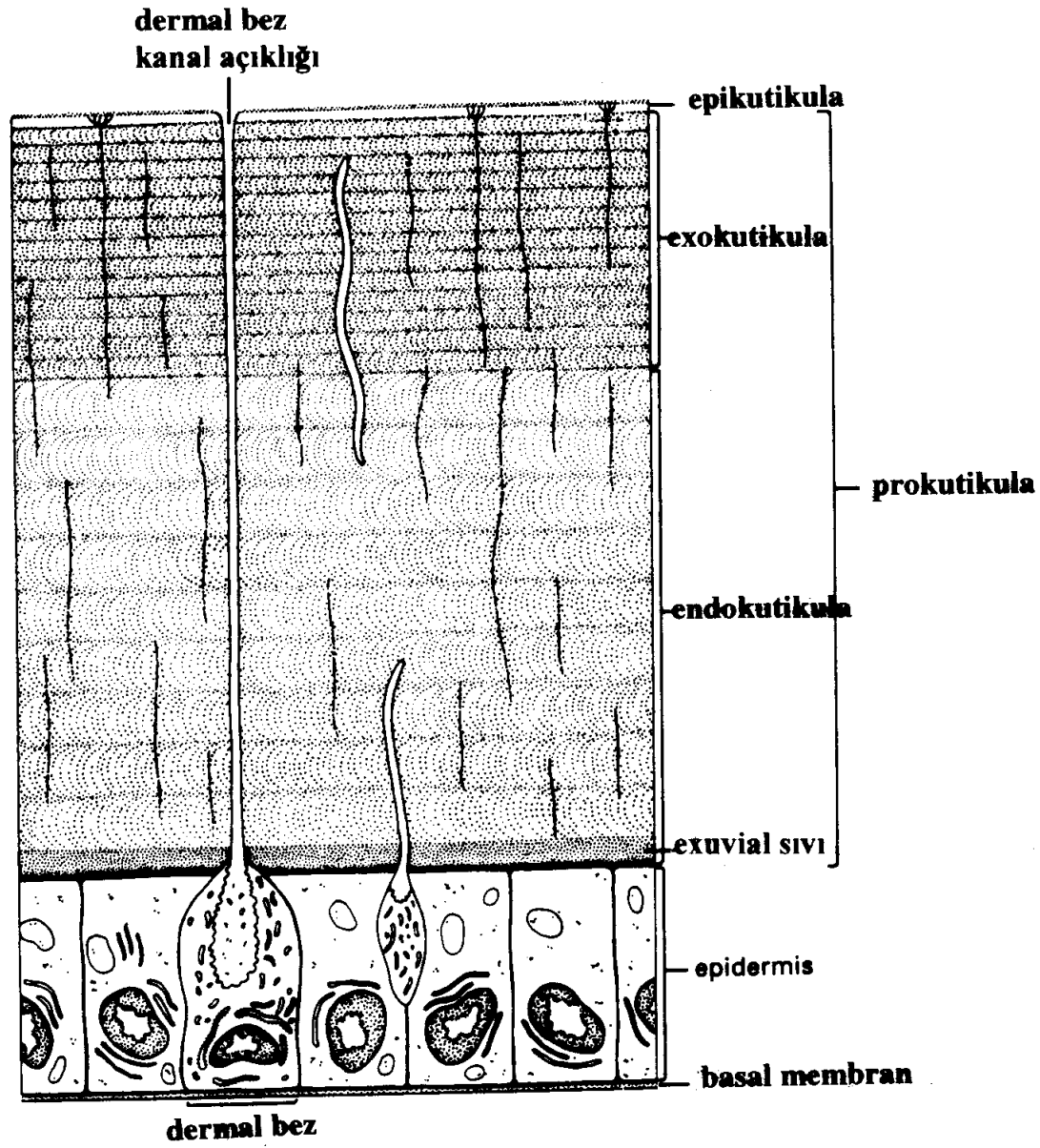
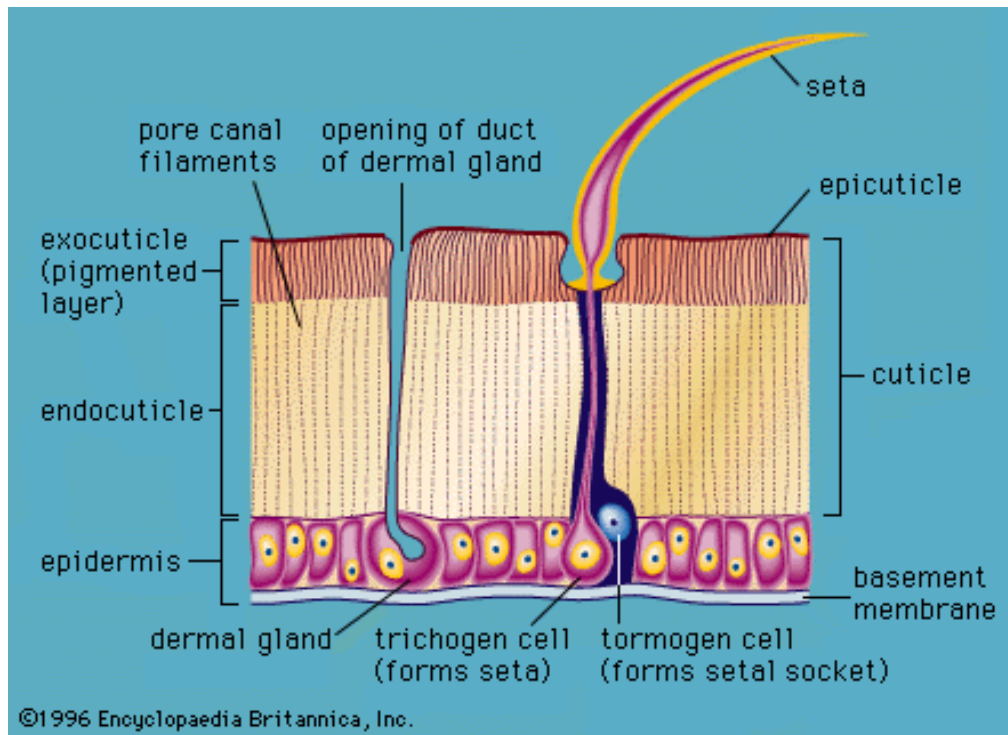


Integument

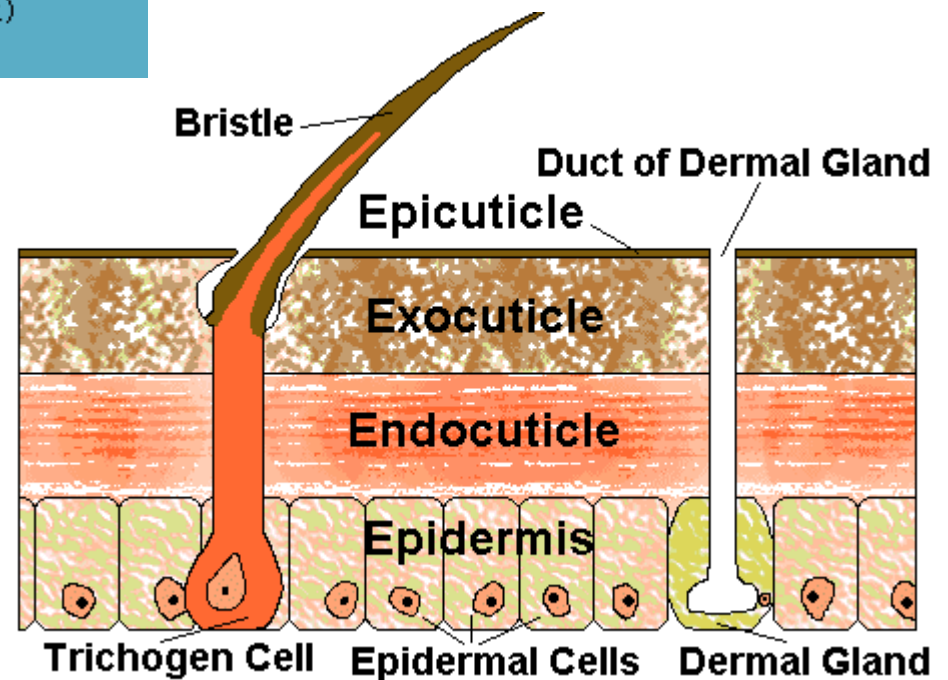




Şekil 1. Böcek integümentinin şematik görünümü (Hepburn, 1985).



Integument (Şematik yapı)



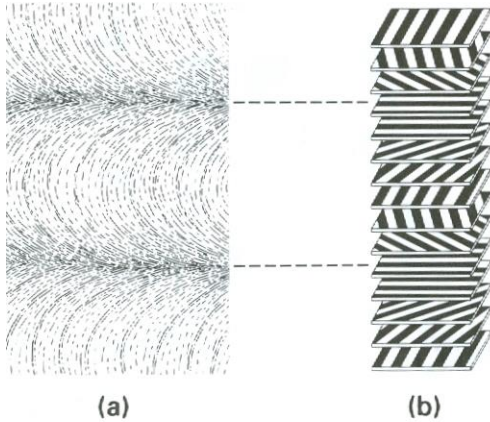
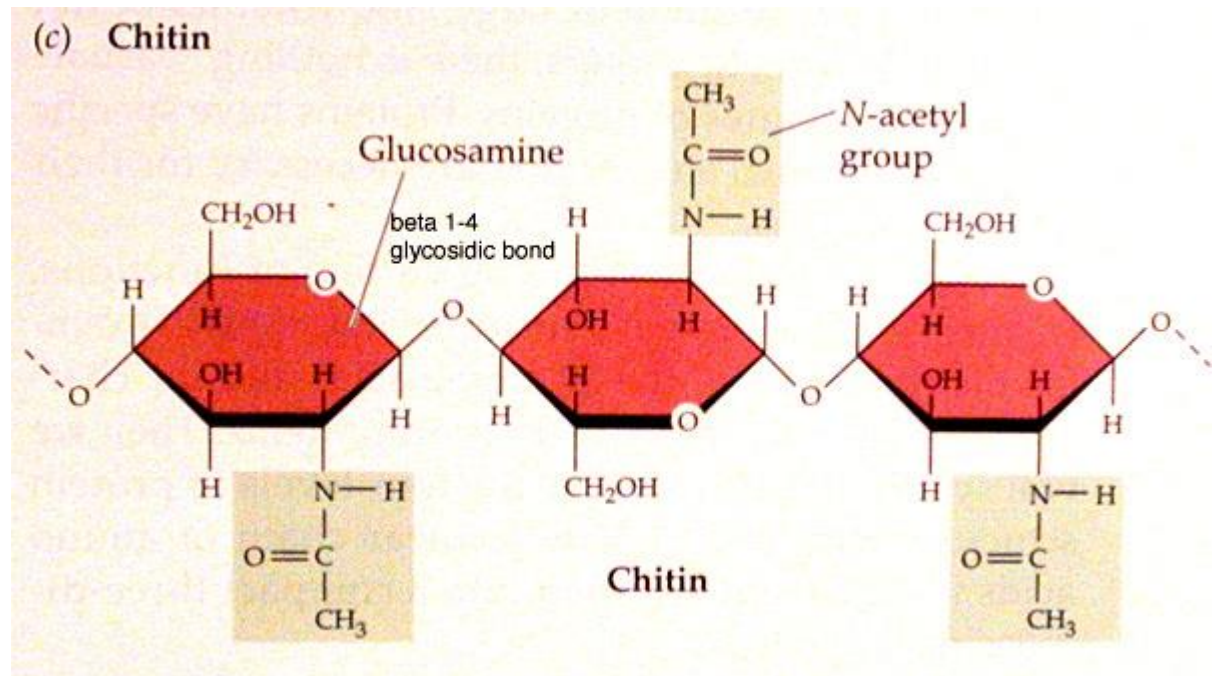


Fig. 2.3 The ultrastructure of cuticle (from a transmission electron micrograph): (a) the arrangement of chitin microfibrils in a helicoidal array produces a characteristic (though artifactual) parabolic pattern; (b) diagram of how the rotation of microfibrils produces a lamellar effect due to microfibrils being either aligned or non-aligned to the plane of sectioning. (After Filshie, 1982.)



$(C_8H_{13}O_5)_n - N$ Asetilglukozamin'in uzun zincirli polimeri

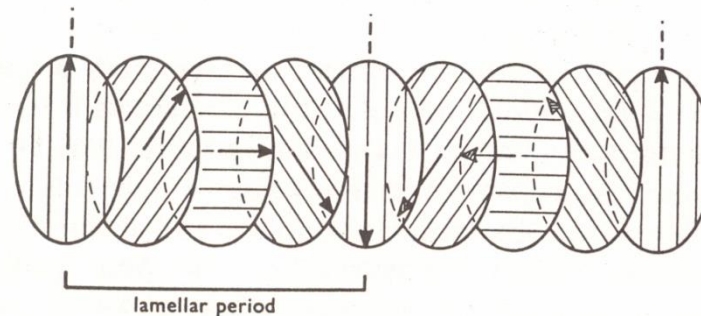
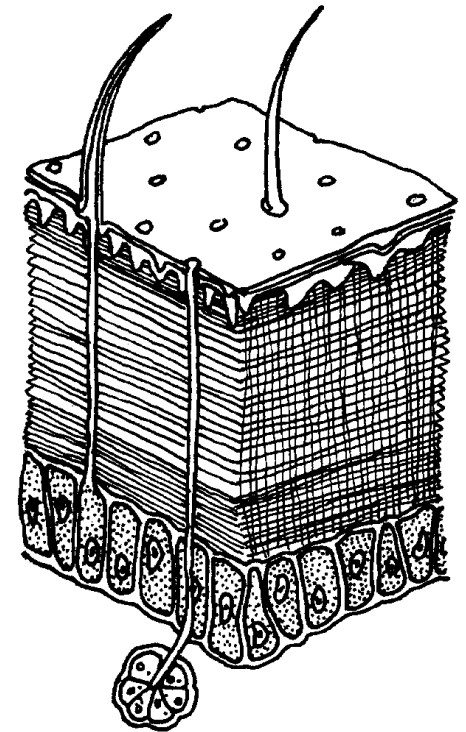
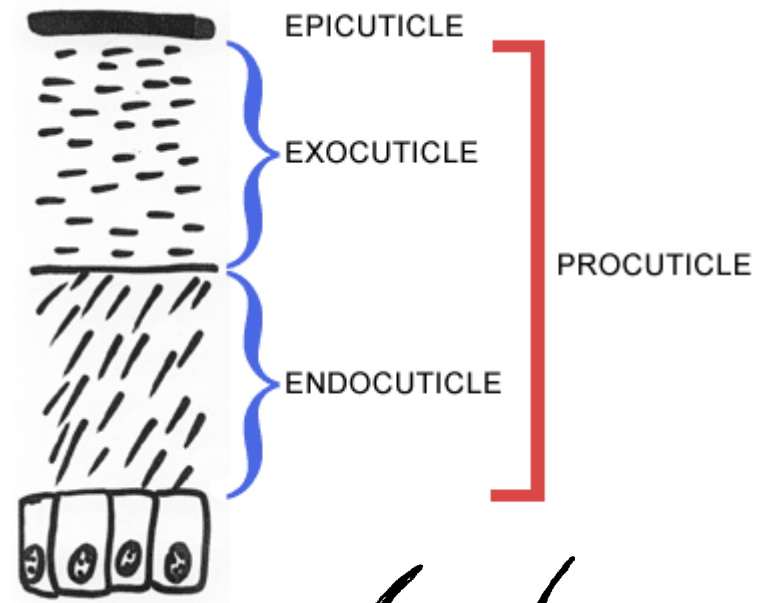
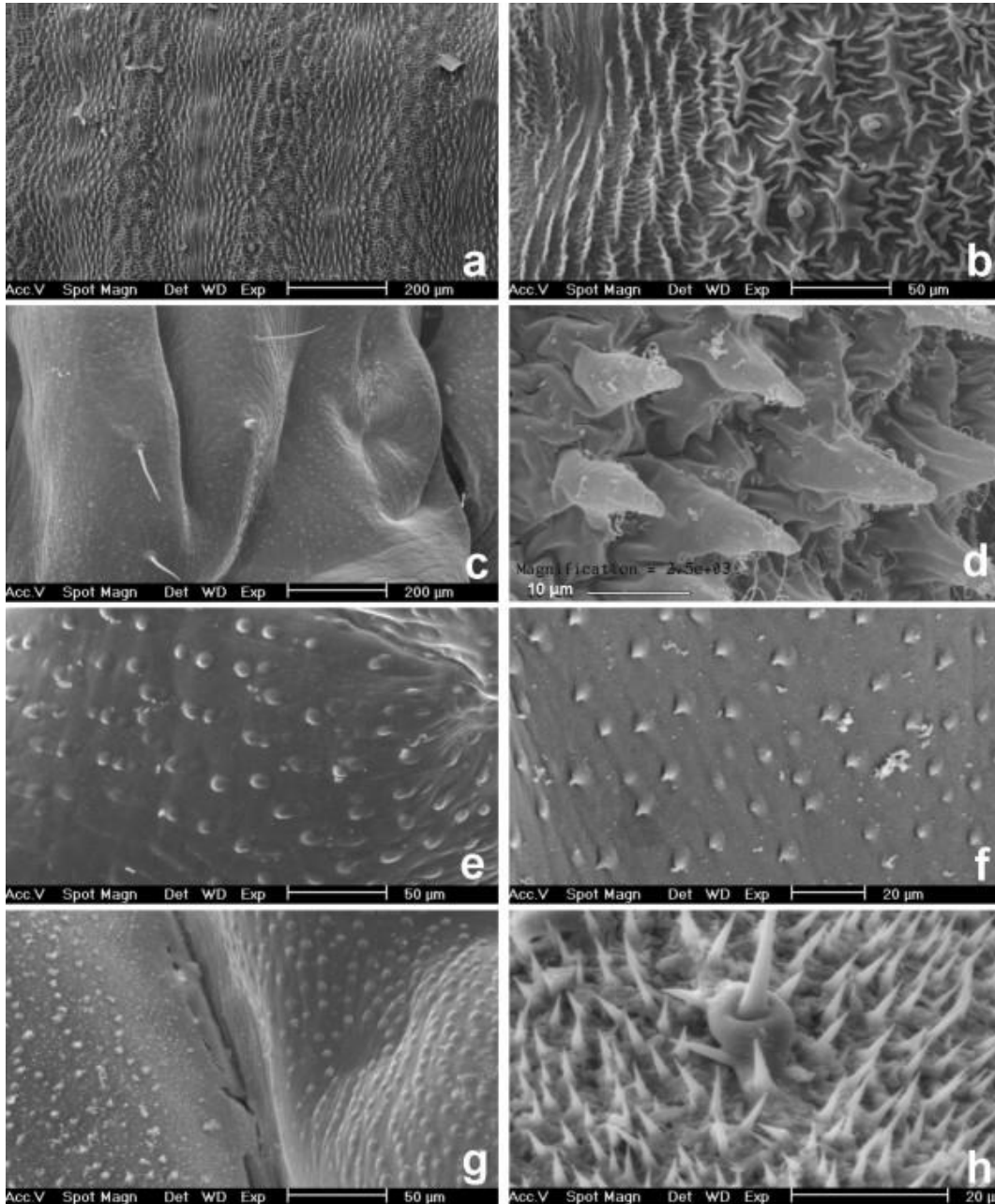


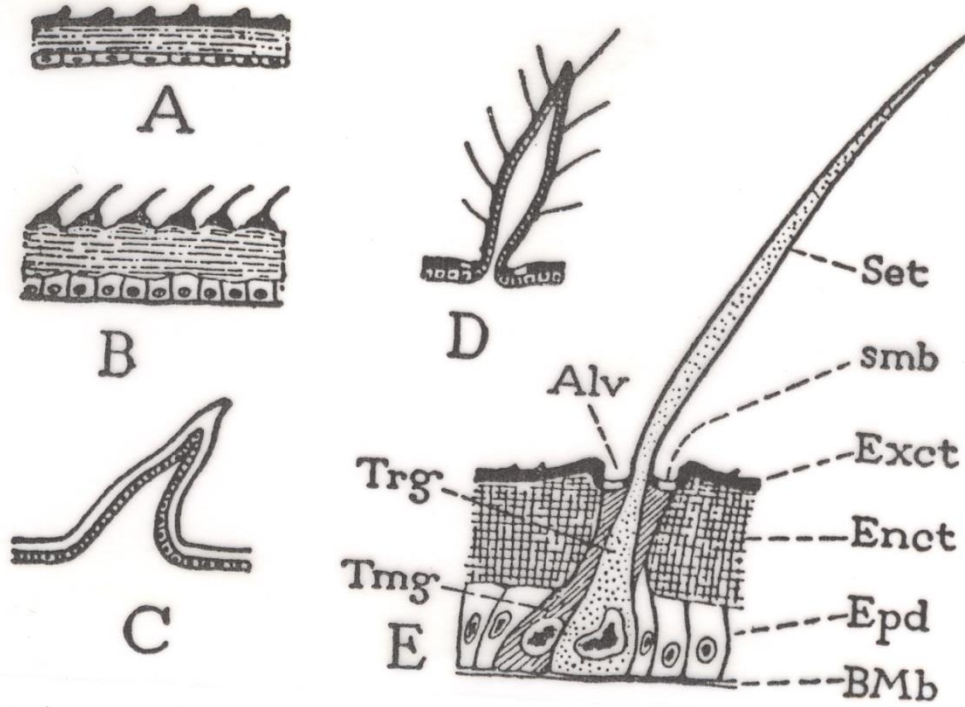
FIGURE 11.2. Diagram showing orientation of microfibrils in lamellae of endocuticle. [From A. C. Neville and S. Caveney, 1969, Scarabaeid beetle exocuticle as an optical analogue of cholesteric liquid crystals, *Biol. Rev.* **44**:531–562. By permission of Cambridge University Press, New York.]

Kutikulanın SEM’de görünümü



Lamellar yapı

Kutikular eklenti ve çıkıntılar



Şekil 2. İntegümentin dış uzantıları. Şematik (Snodgrass'dan).

A-B; Hücresiz kutikular çıkıntılar, C-D; Çok hücreli çıkıntılar, E; Tipik tek hücreli uzantı veya seta. **Set.** seta, **Smb.** seta membranı, **Exct.** eksokutikula, **Enct.** endokutikula, **Epd.** epidermis, **BMb.** basal membran, **Trg.** trikojen hücre, **Tmg.** tormojen hücre, **Alv.** Seta kını veya alveol. (Snodgrass'dan).

Kutikular eklentiler

A - Macrotricha (Seta)

a. Örtü kılıarı

Diptera – Tachinidae

Hymenoptera - Apidae



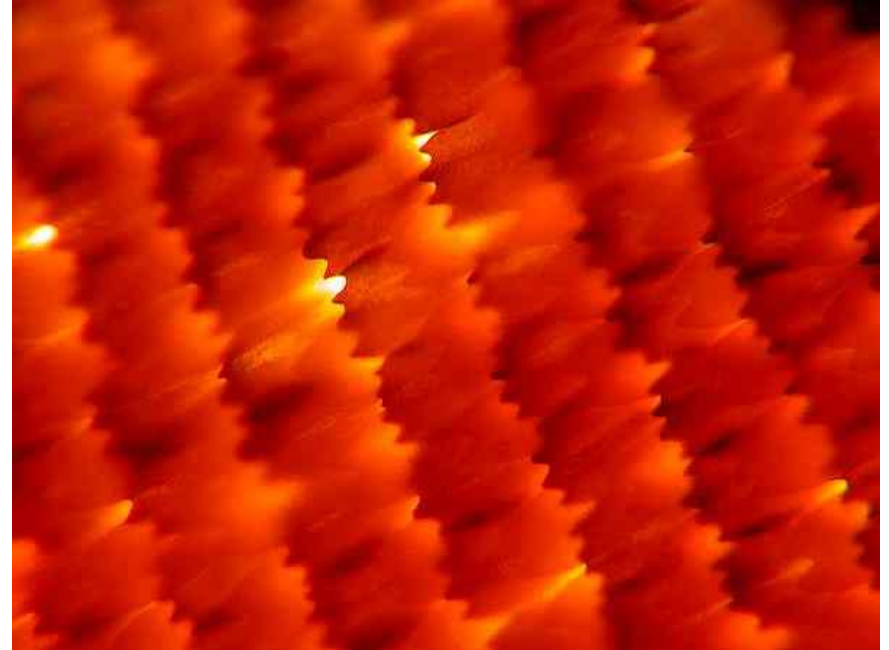
Lepidoptera - larva





b. Pullar – Değişikliğe uğramış kıllar

Lepidoptera





Pollar – Değişikliğe uğramış kıllar

Thysanura



c- bez kılları



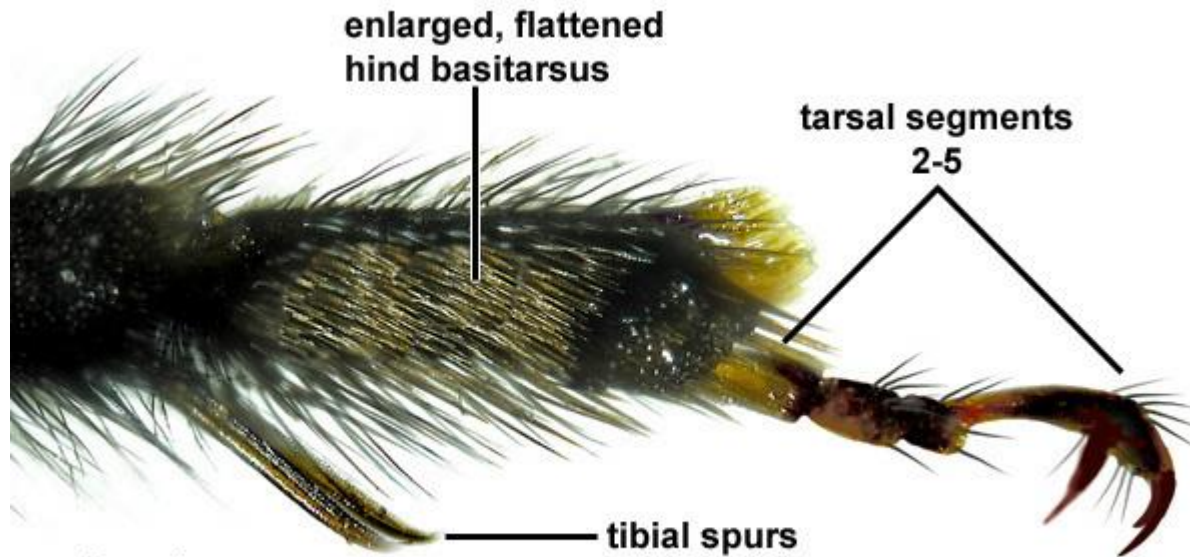
Thaumetopoeidae
(Thaumetopoeinae)



d- Duyu kılları

Dipterta - Calliphoridae

B - Mahmuz



Apinae Anthophorini

Hymenoptera - Apidae



Kutikular çıkıntılar

a - Microtricha – sabit kıllar

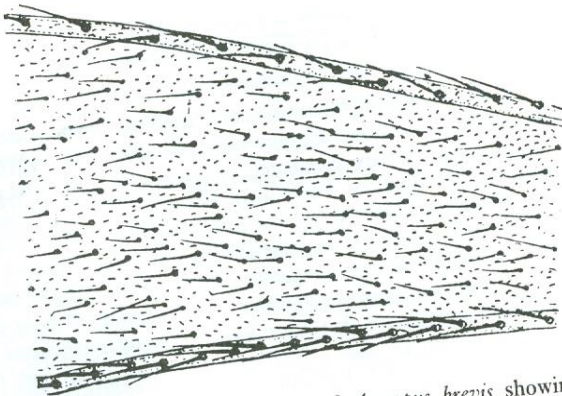
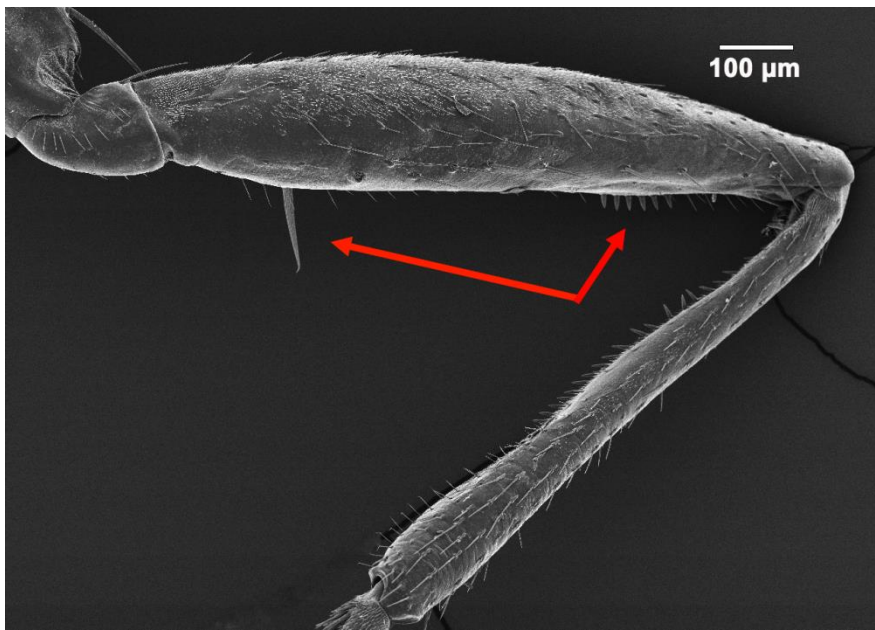


FIG. 26 Portion of a wing of *Anisopus brevis* showing macrotrichia and microtrichia. After Tillyard, *Proc. Linn. Soc. N.S.W.* 43

Diptera - Anisopidae





b - Spinler

Sepsidae: Diptera



Coleoptera

c - Boynuz, Tüberkül, nodül



Böceklerde Renklenme

1. Pigment renkleri



Carotenoids renkli



Melanin renkli Coleoptera



Pteridin renkli



Ommokrom renkli



Antrakininon renkli



Afin renkli



Aphis fabae



2.Strüktürel renkler

a- Işığın yansıtılıp saçılması ile oluşan renkler



Strüktürel beyaz- Pieridae



Tindal mavisi - Odonata

b. Işığın girişimi ile oluşan renkler



Entimus
(Coleoptera)
←

Lepidoptera
Morfo
→



c. Işığın kırılması ile oluşan renkler

Scarabaeidae - Coleoptera



Gyrinidae - Coleoptera



Carabidae - Coleoptera



3. Kariřım renkler

Calotis regina



Teracolus phlegyas





Ornithoptera poseidon



Lycaneidae



Chrysomelidae - Cassida

