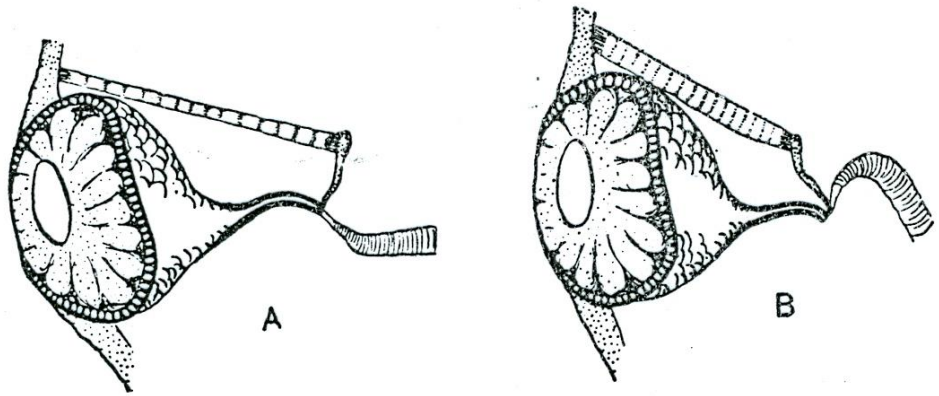
Solunum Sistemi

Açık – kapalı stigma

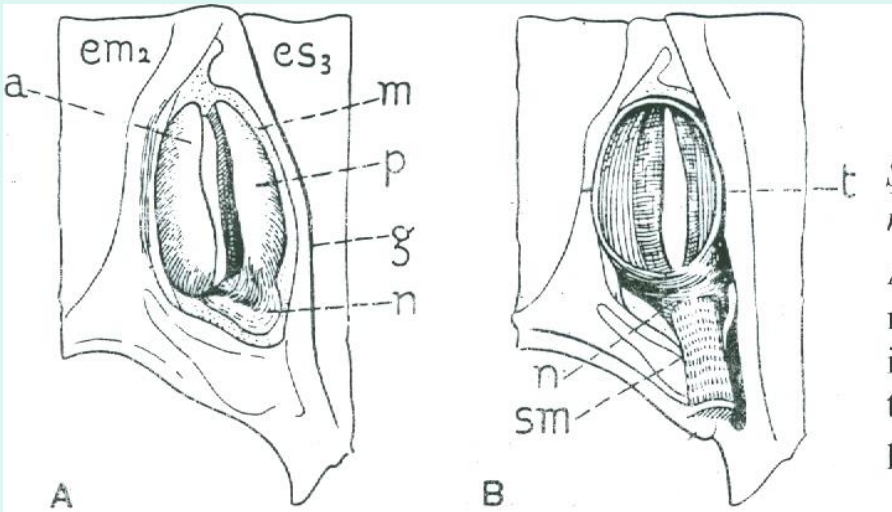


Şekil 58. Trichodectes (Mallophaga)'de stigma ve kapana cihazının yarı-diagramatik şekli (Harrison'dan).

A- açık, B- kapalı.

Mallophaga

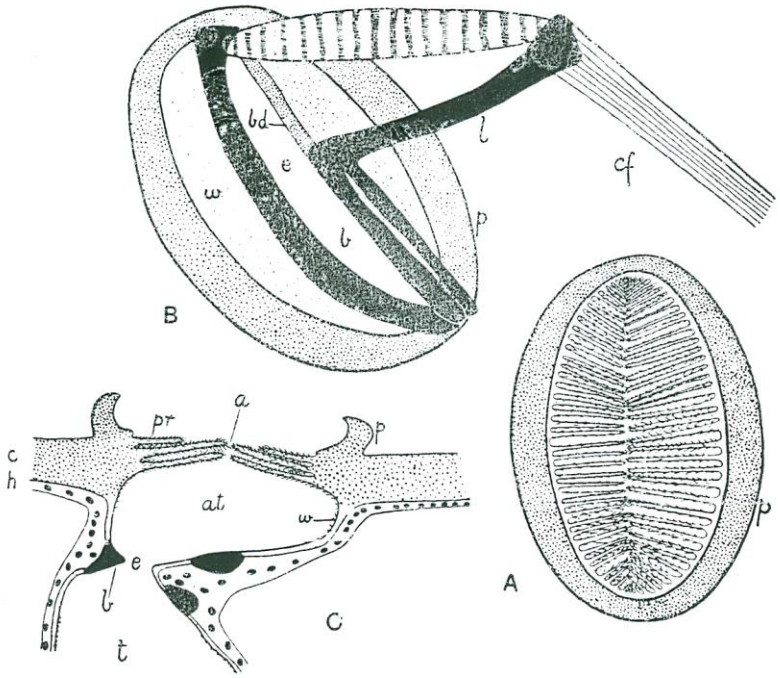
Metatorasik bölge stigması



Şekil 59. Dissosteira (Acrididae)'nın metatorasik stigması (Snodgrass'dan).

A- Dıştan görünüş, B- İçten görünüş, em_2. mesepimeron, es_3. metepisternum, g. intersegmental katlanma, m. membran, t. trake, sm. kapama kası, n. ventral lob, a, p. stigma dudakları.

Acrididae



Şekil 61.Lepidopter (Sphingidae) larvalarında stigma yapısı (Imms'den)

A.stigma dudaklarından uzanan parmaksı çıkıntıların dıştan görünüşü, B. aynı yapıların içten görünüşü (dudaklar gösterilmemiş), C.aynı yapının kesiti. a. spirakular açıklık, at. atrium, b. yay, bd.bant, c. kutikula, cf.stigmayı açan elastik lifler, e.trake girişi, h. hipodermis, l. manivela, p. peritreme, pr. dudakların parmak şeklindeki çıkıntıları, w. atrium duvarı, t. trake.

Gelişmiş stigma

Lepidoptera - Sphingidae Larva

Stigma – Trake – Trakeol yapısı

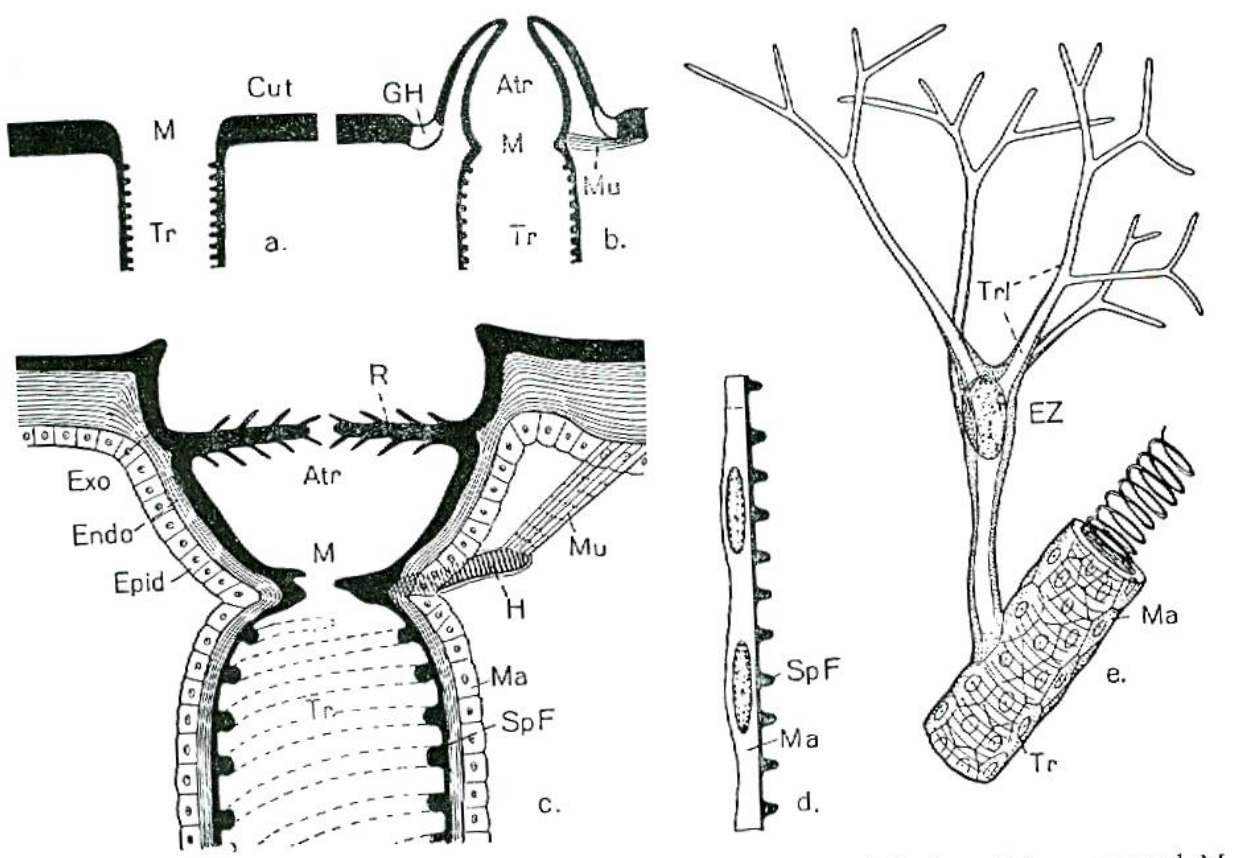
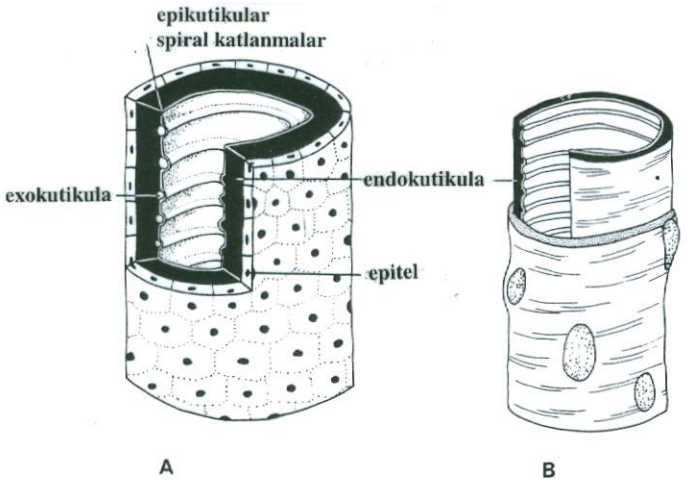


Fig. 87. **Stigmen- und Tracheenbau.** a Primitives Stigma mit einfachem Stigmenmund M. b Stigma mit beweglichen Atrialklappen. c Stigma mit Atrium (Atr), Reuse (R) und Verschlußvorrichtung. (a–c Schnitte, in a und b nur die Kutikula dargestellt). d Stück der Wand eines stigmenfernen Tracheenasts mit Spiralfaden SpF, Längsschnitt. e feiner Tracheenzweig mit Tracheenendzelle (EZ) und Tracheolen (Trl). Ein Stück Spiralfaden frei gezeichnet.
Cut = Kutikula, Endo, Exo = Endo-, Exokutikula, Epid = Epidermis, GH = Gelenkhaut, H = Verschlußhebel, M = Stigmenmund, Ma = Matrix, Mu = Schließmuskel, Tr = Trachee, Trl = Tracheole.

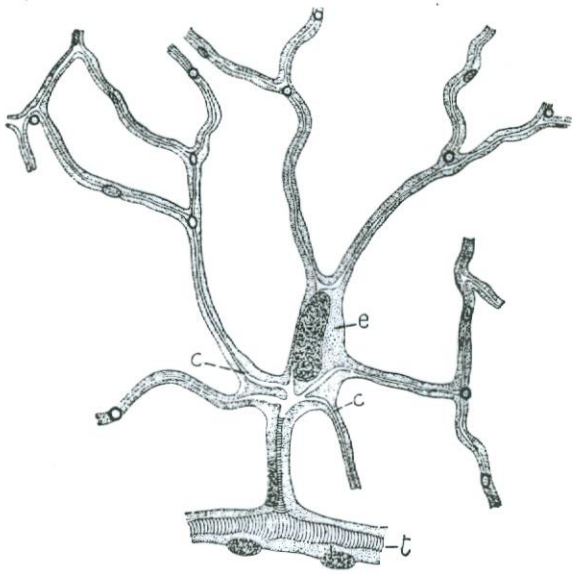
Hemiptera

Primitiv stigma

Trake – Trakeol yapısı



Şekil 62. Trake yapısı (Gillot'tan),
A.. Büyük trake, B. Küçük trake



Şekil 63. Phalera bucephala (Lepidoptera tükrük bezinde trake uç hücreleri ve trakeoller, (Holmgren ve Liljeborg'dan).
e. uç hücresi, c. trakeoller, t. trake.

Lepidoptera

Phalera bucephala

Trake sistem yapısı

Dorsal ← → Ventral

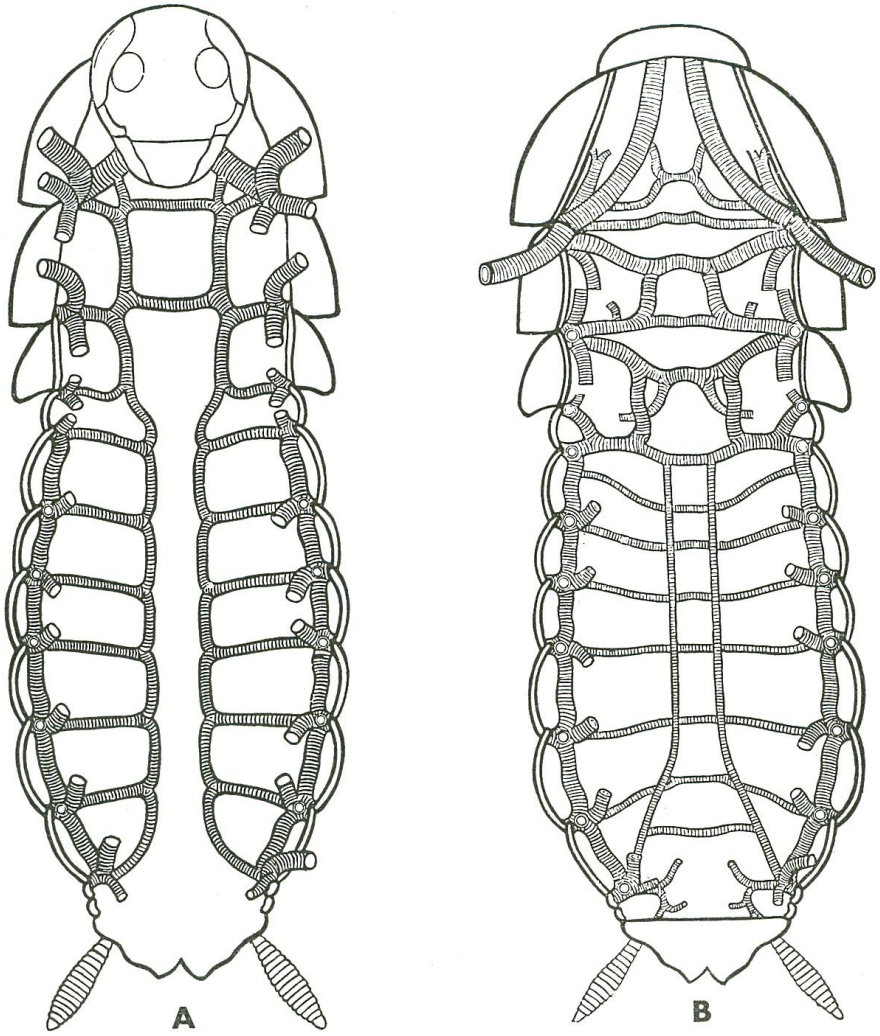
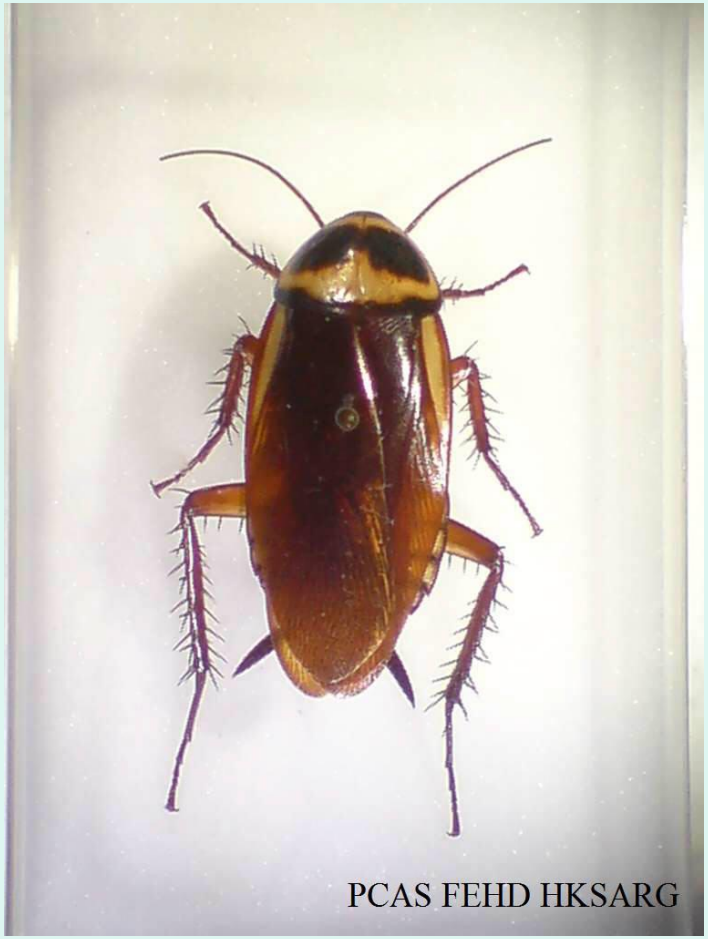


FIG. 114 Tracheal system of *Periplaneta*

A, with the ventral integument and viscera removed showing dorsal tracheae; B, with dorsal integument and viscera removed showing ventral tracheae. *After* Miall and Denny.

Periplaneta



Trake sisteminden (enine kesit)

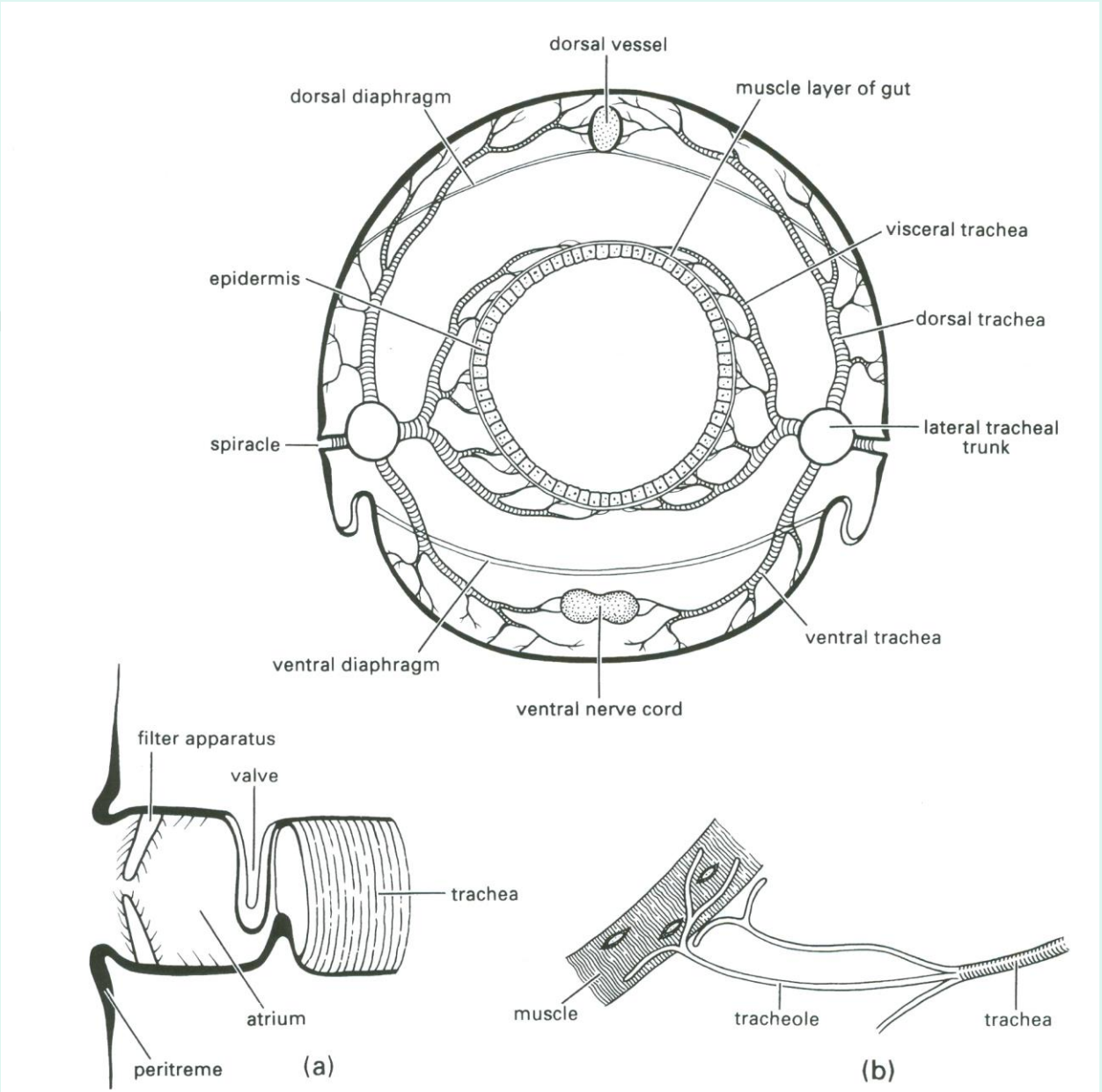


Fig. 3.10 Schematic diagram of a generalized tracheal system seen in a transverse section of the body at the level of a pair of abdominal spiracles. Enlargements show: (a) an atriate spiracle with closing valve at inner end of atrium; (b) tracheoles running to a muscle fiber. (After Snodgrass 1935.)

Kas liflerinde solunum

İstirahat halinde

Kasıldıktan sonra

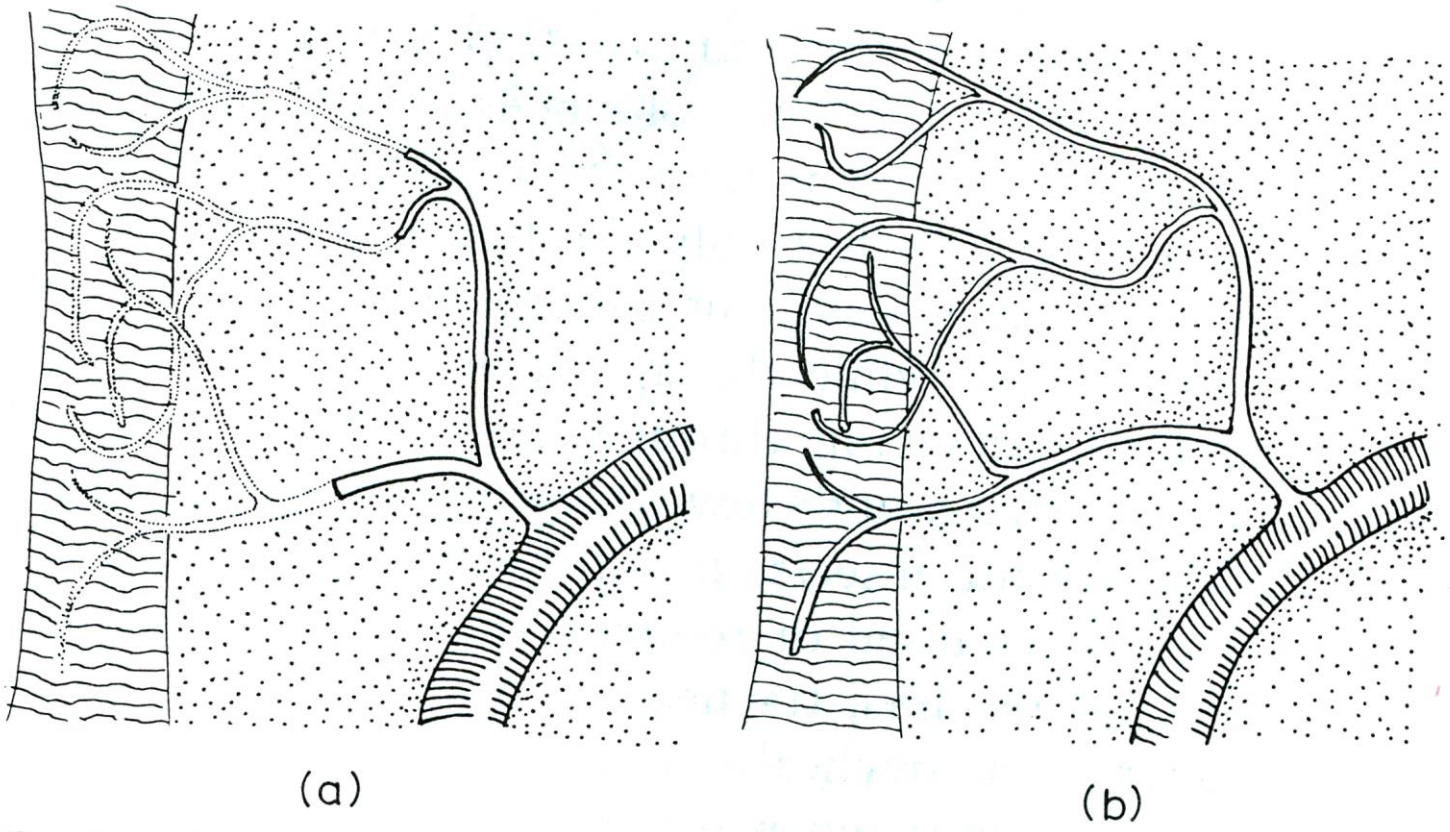


Fig. 38 Tracheation of a muscle fibre (semi-schematic, after Wigglesworth)
(a) Muscle at rest with terminal parts of tracheoles (shown dotted) containing fluid.
(b) Muscle fatigued, with air extending far into tracheoles.

Trakeol solunumu

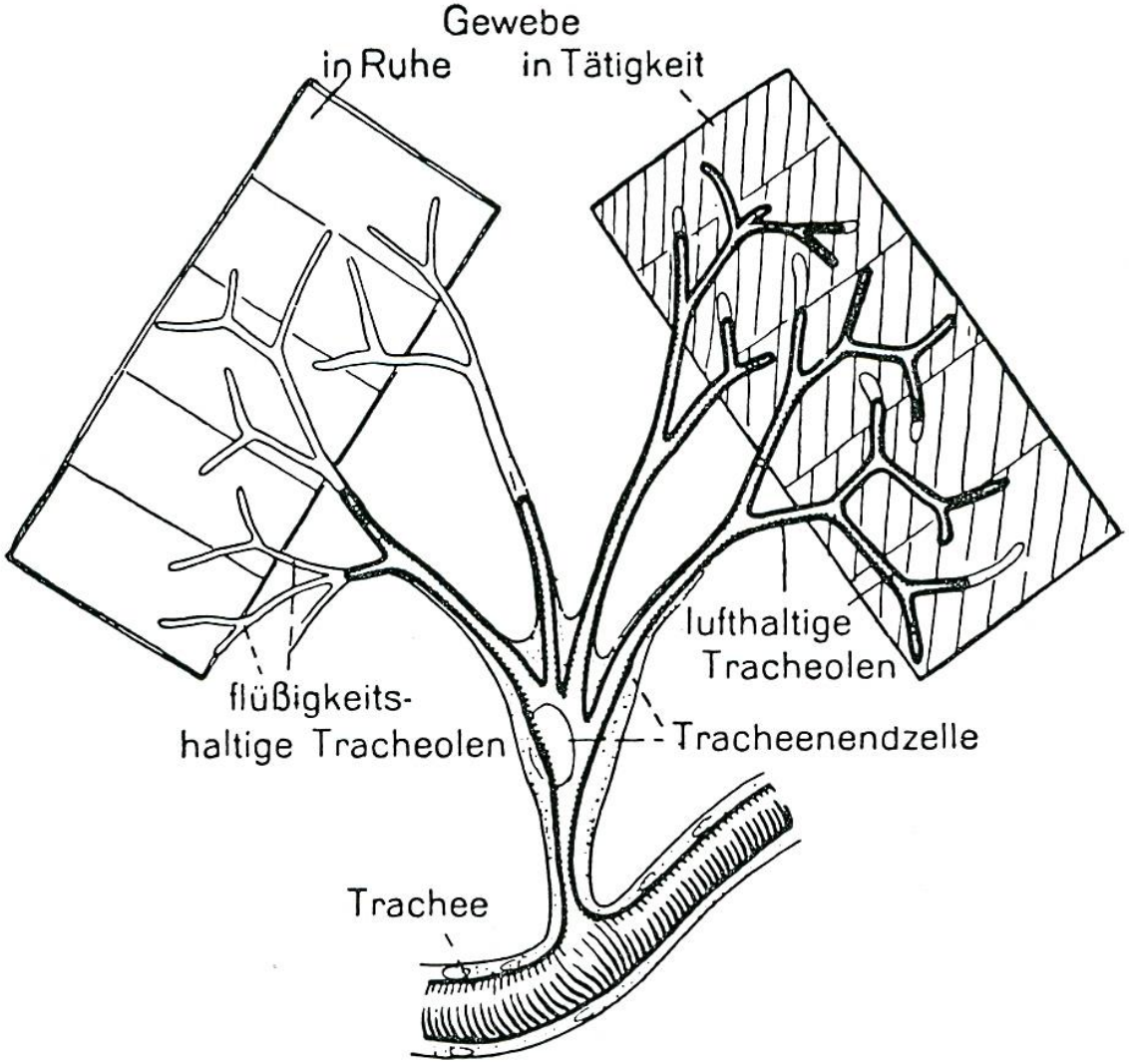


Fig. 91: Die von WIGGLESWORTH aufgestellte, von BULT modifizierte Theorie der **Tracheolenfunktion,** schematisch dargestellt; s. Text.

Hava keseleri

Apis mellifera

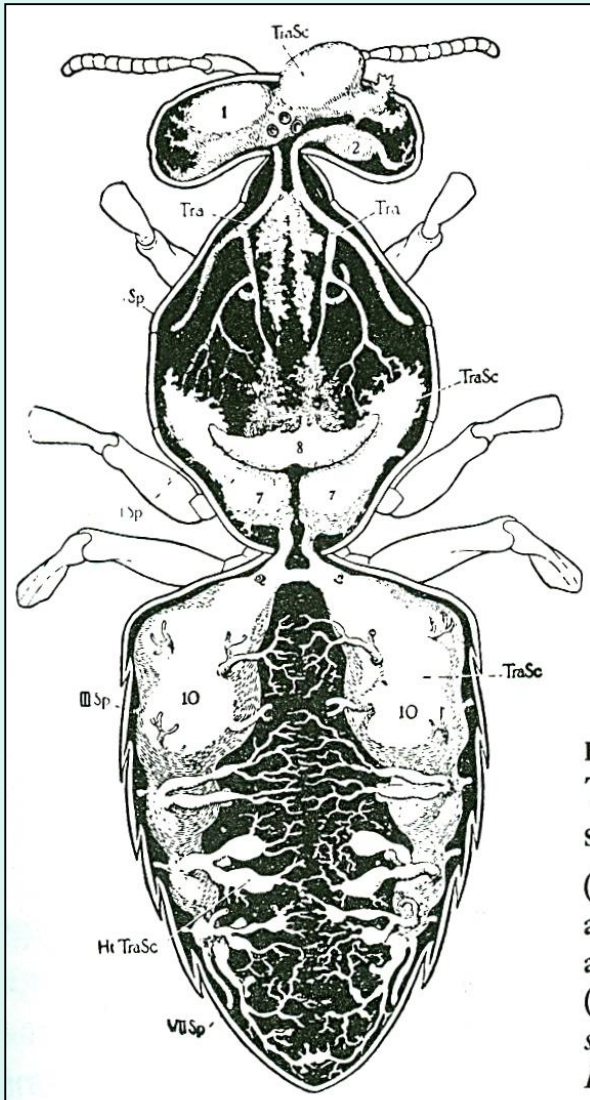


FIG. 115
Tracheal system of worker honey bee seen from above

(One pair of abdominal air-sacs removed and transverse ventral commissures of abdomen not shown.) The air-sacs (*TraSc*) are indicated in arabic numerals: *sp*, spiracles. *After* Snodgrass, *U.S. Bur. Entom. Tech. Ser.* No. 18.

Aquatik böceklerde solungaç tipleri

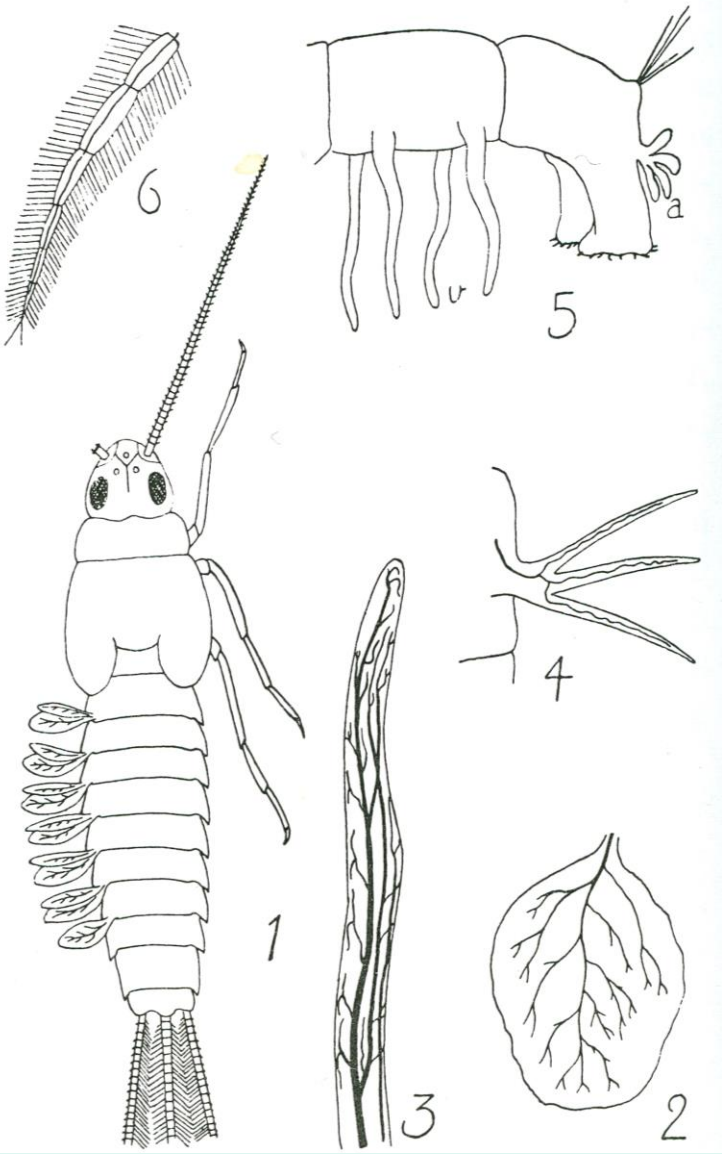


FIG. 116
Gills of aquatic insects

1, Nymph of *Cloeon* showing tracheal gills of left side; 2, 7th tracheal gill of *Cloeon* more highly magnified; 3, tracheal gill of a *Phryganea* larva; 4, tracheal gill of a larva of *Nymphula stratiotata*; 5, hind extremity of a larva of *Chironomus* showing anal blood-gills (*a*) and ventral blood-gills (*v*); 6, jointed tracheal gill of a larva of *Sialis*.

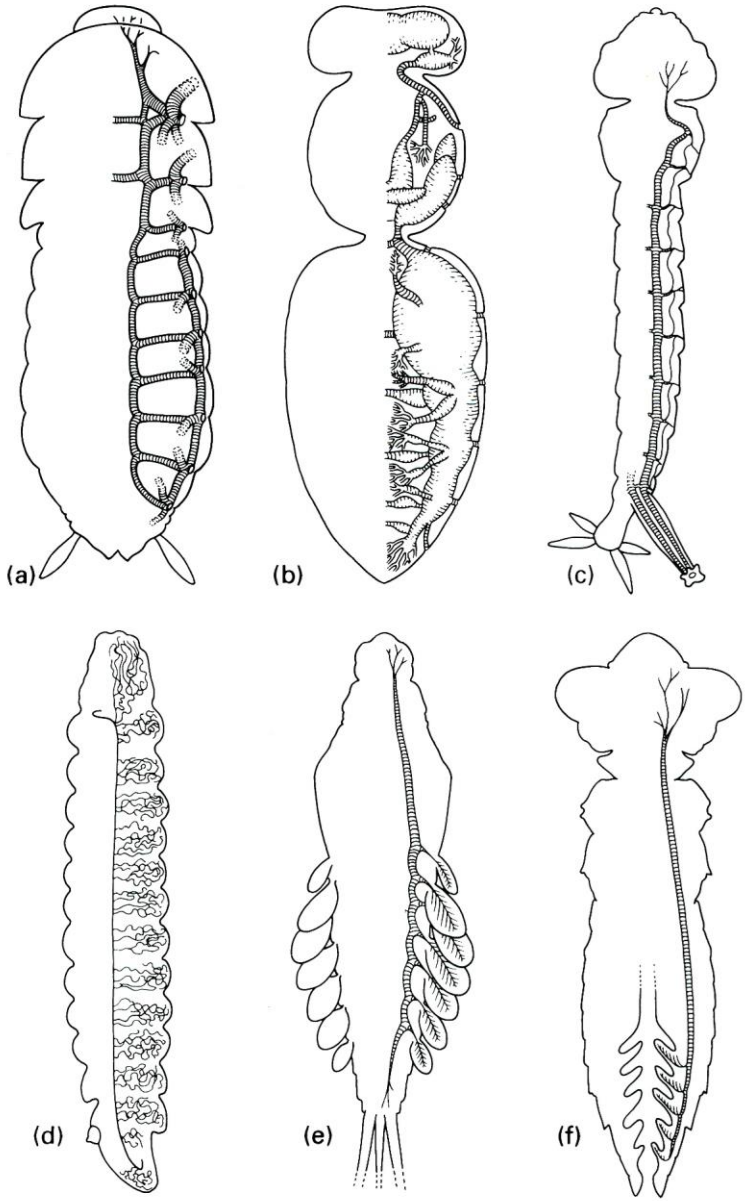


Fig. 3.11 Some basic variations in the open (a–c) and closed (d–f) tracheal systems of insects. (a) Simple tracheae with valved spiracles, as in cockroaches. (b) Tracheae with mechanically ventilated air sacs, as in honey bees. (c) Metapneustic system with only terminal spiracles functional, as in mosquito larvae. (d) Entirely closed tracheal system with cutaneous gas exchange, as in most endoparasitic larvae. (e) Closed tracheal system with abdominal tracheal gills, as in mayfly nymphs. (f) Closed tracheal system with rectal tracheal gills, as in dragonfly nymphs. (After Wigglesworth 1972; details in (a) after Richards & Davies 1977, (b) after Snodgrass 1956, (c) after Snodgrass 1935, (d) after Wigglesworth 1972.)