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Some data on sensilla and sculpture of antenna in adult Tortricidae (Insecta: Lepidoptera)

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ABSTRACT. The sensilla and sculpture of the adult antenna are examined under SEM in 14 species belonging to two subfamilies and eight tribes of Tortricidae. In the present paper several earlier observations are confirmed or completed.

Key words: entomology, morphology, sensilla, antenna, Lepidoptera, Tortricidae.

INTRODUCTION

The structure of the tortricine antenna has been recently described only in a few species. ALBERT & SEABROOK (1973) studied the morphology and histology of the male antenna of *Choristoneura fumiferana* (CLEMENS), CALLAHAN (1975) illustrated the sensilla in *Argyrotaenia velutinana* (WALKER), GEORGE & NAGY (1984) the utrastructural differences of sensilla trichodea and basiconica in *Grapholita molesta* (BUSCK), LANGMAID & SEABROOK (1985) the micromorphology of the antennae in *Acleris curvalana* (KEARFOTT), WALL (1978) that of *Cydia nigricana* (FABRICIUS) and BAKER & CHAN (1987) the sensilla of the adult and larval antennae in *Celypha cespitana* (HÜBNER), and DEN OTTER & al. 1979 in *Adoxophyes orana* (FISCHER v. ROESLERSTAMM). Various data are also to be found in HORAK (1991) who illustrated *Epiphyas postvittana* (WALKER).

MATERIAL AND METHOD

The material examined consisted of 14 species of Tortricidae belonging to two subfamilies and eight tribes listed as follows. Tortricinae. Tortricini: *Tortrix viridana* LINNAEUS; Cochylini: *Aethes hartmanniana* (CLERCK); Cnephasiini: *Cnephasia incertana* (TREITSCHKE); Euliini: *Eulia ministrana* (LINNAEUS); Archipini: *Philedone gerningana* (DENIS & SCHIFFERMÜLLER), *Pandemis heparana* (DENIS & SCHIFFERMÜLLER), *P. cerasana* (HÜBNER), *Archips crataeganus* (HÜBNER). Olethreutinae. Bactrini: *Bactra furfurana* (HAWORTH); Olethreutini: *Hedya salicella* (LINNAEUS), *H. nubiferana* (HAWORTH); Eucosmini: *Epiblema sticticanum* (FABRICIUS); Grapholitini: *Cydia pomonella* (LINNAEUS), *Grapholita caecana* (SCHLÄGER).

Observations and photographs of morphological structures were taken by means of scanning electron microscope JEOL JSM-5410 in Scanning Microscopy Laboratory of the Biological and Geological Sciences of the Jagiellonian University.

RESULTS

Sensilla

Five types of sensilla were identified in the male and female antennae. We do not follow here the subdivisions of the particular types into subtypes (cf. ALBERT & SEABROOK 1973, CALLAHAN 1975, GEORGE & NAGY 1984, WALL 1978).

Sensillum trichodeum. This sensillum is a long, simple or longitudinally grooved seta occurring numerously mainly on the ventral surface of the antenna (Figs 1-12). The sexual dimorphism is expressed in the number of sensilla being higher in males than in females (eg. *Grapholitha molesta,* cf. GEORGE & NAGY 1984). In the male of *gerningana* sensilla of this kind are situated chiefly on ventral surfaces of ventro-lateral pectination (rami, the processes of joints of antenna; Figs 5, 6). They are distributed rather irregularly, however, in some species (*crataeganus*) they may be arranged in anterior parts of flagellar segments in transverse rows. On scapus the sensilla trichodea are short (Figs 11, 12) and situated basally. Usually they are dense in the anterior, rounded part of the scapus often differentiated as a distinct sclerite.

Sensillum chaeticum is a strong seta perpendicular to flagellomere (Figs 1, 2) with well developed flexible socket (Fig. 4) and longitudinal ribs. It serves as a mechanoreceptor and occurs along the entire antenna. In some species e.g. *incertana* or *furfurana* several sensilla chaetica are found in the terminal part of antenna including the apical joint (Fig. 10).

Sensillum styloconicum occurs on the flagellar segments, except for two basal ones. This is a stout sensillum provided with a distal pore. The size, number and

distribution of the styloconic sensilla are similar in the tortricines as already found by some authors (cf. BAKER & CHAN 1987). These observations are now confirmed on the examined SEM material and some not photographed examples. Two stout sensilla are found in the terminal joint in *cespitana* (BAKER & CHAN). In our material the terminal joint is elongate, provided with a terminal sensillum only (Fig. 8) or, in *cerasana*, with one subapical sensillum (Fig. 9).

Sensillum coeloconicum is developed as a peg in a concavity of integument surrounded by various number of usually slenderer pegs. In *cerasana* (Fig. 4) there are ca 20 slender, curved guard sensilla. The number of sensilla coeloconica may differ in the male and female (in *curvalana*, cf. LANGMAID & SEABROOK 1985). Their number is 1-5 per segment in *Choristoneura funiferana* (cf. ALBER & SEABROOK 1973). We have found as many as five sensilla on one side of the flagellomere of *crataeganus* (Fig. 2) and thus one can suppose that their total number must be higher. They are grouped mainly in distal parts of antennal segments and are most abundant in median and subterminal portions of flagellum. In the terminal part of flagellum we found a much lower number of sensilla (often two ones as on apical segment in *cerasana* (Fig. 9) or without any (Figs 8, 10 in *hartmanniana* and *furfurana*).

Sensillum basiconicum was observed by GEORGE and NAGY (1984) in *molesta*. We have seen sparce sensilla of this group in some species, e.g. in *crataeganus*. They are numerous in *hartmanniana* (Fig. 7) showing an indistinct dorsal flattening (but not a concavity as it is in auricillicum) and being bent postbasally as in sicula (cf. CALLAHAN 1975).

Sensillum auricillicum. In *cerasana* (Fig. 4) and many other Tortricidae it is elongate, broad medially, tapering terminally, pointed. Often there are a few, usually 2 to 4 sensilla of this type per flagellomere (in *cerasana*, Fig. 3). In some flagellomeres or parts of antenna we have not found any sensilla of this type (in *gerningana*, Figs 5,6).

Sculpture

Between and around the sensilla there is variable, more or less complicate sculpture in form of irregular ridges or a net (Figs. 1, 4 ,6, 8-10). In lateral processes (rami) of the male antenna of *gerningana* (Fig. 5) dominate longitudinal, more or less regular ribs.

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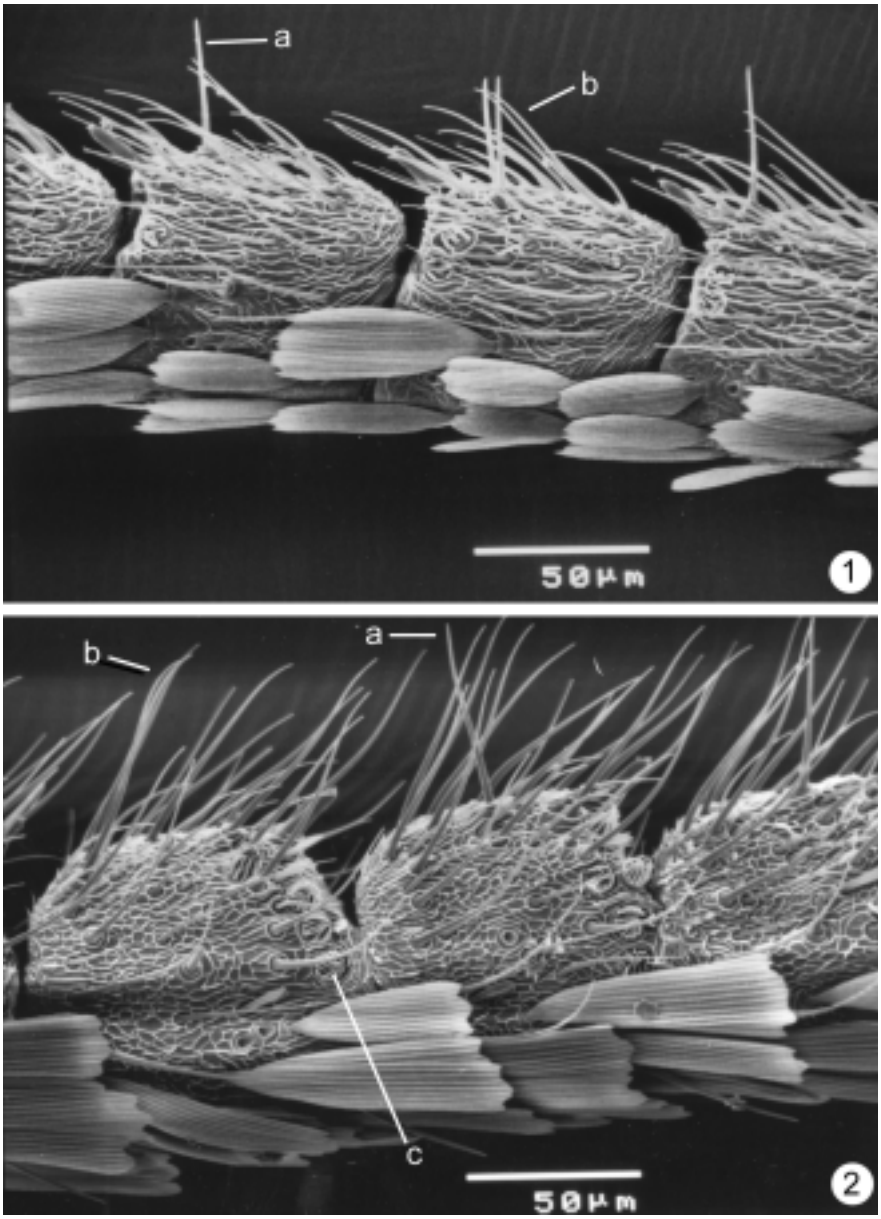
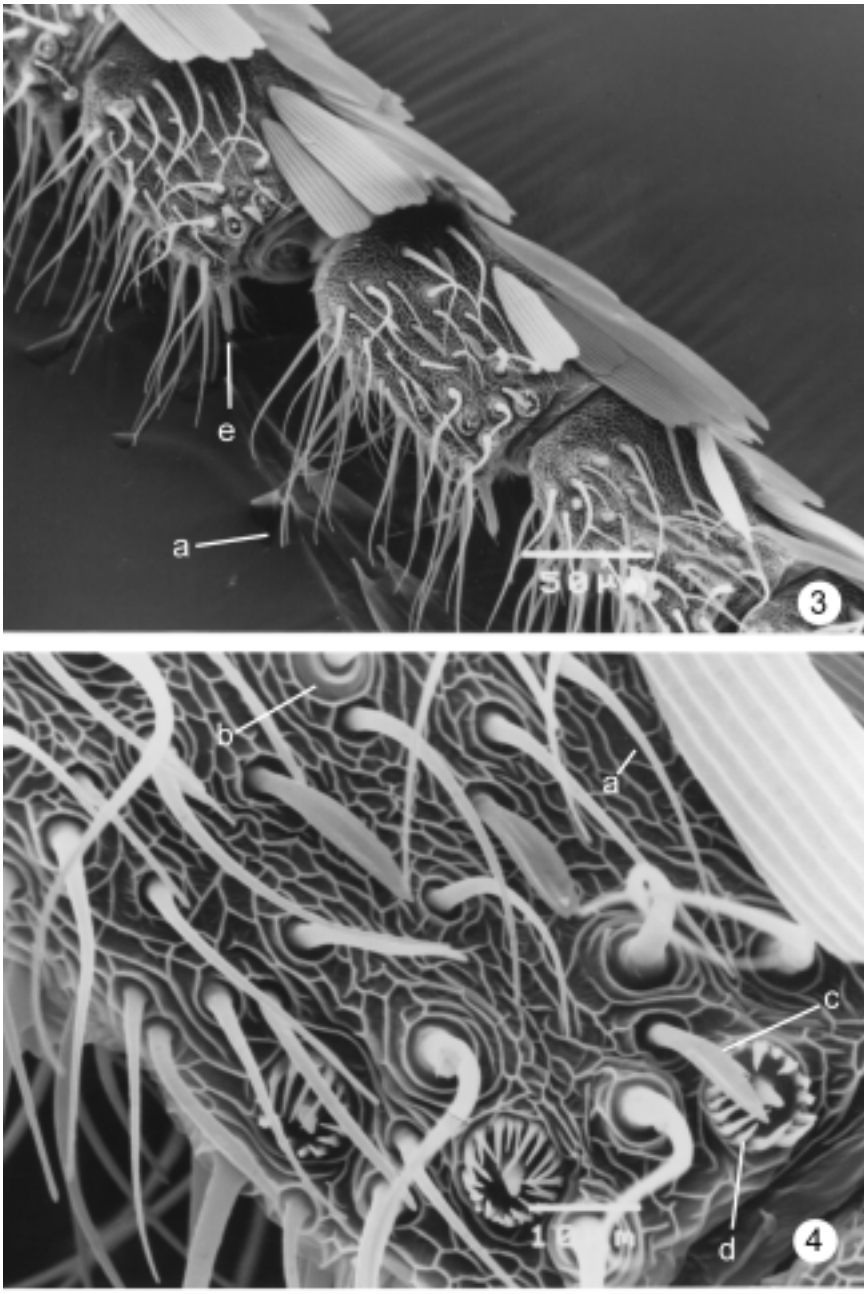
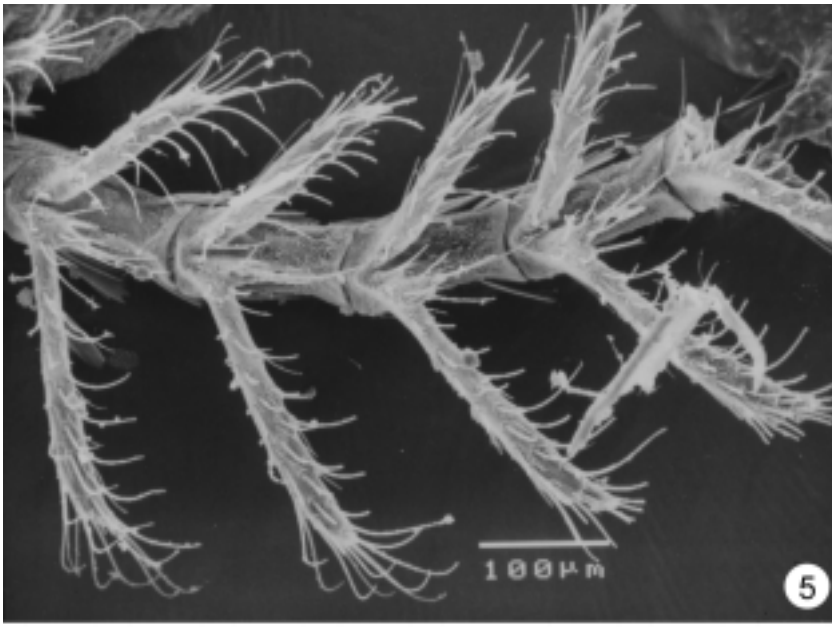
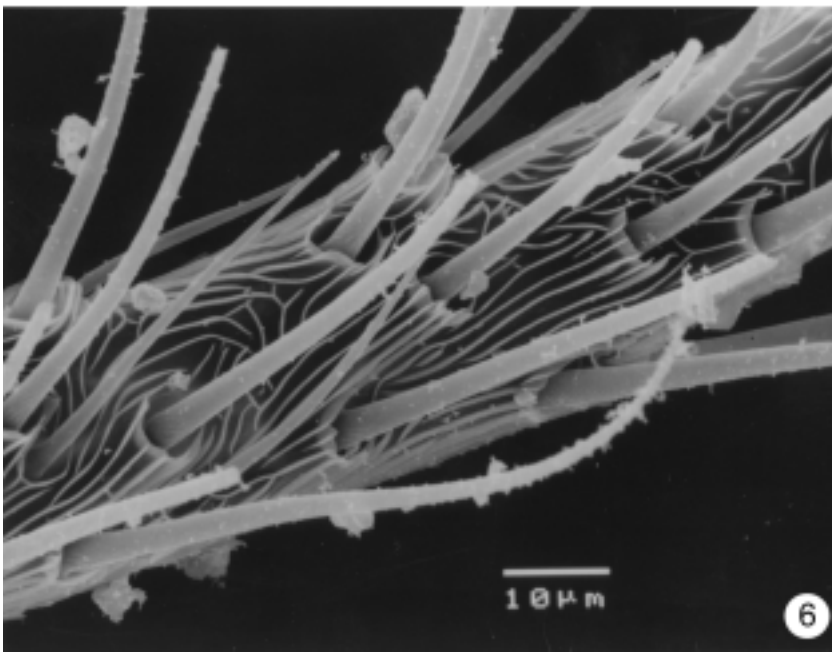


1, 2. Flagellum of antenna: 1 - median part of flagellum of *Archips crataeganus* HÜBNER, 2 - same species, distal part of flagellum (a - sensilum chaeticum, b - sensillum trichodeum, c - sensillum coeloconicum)

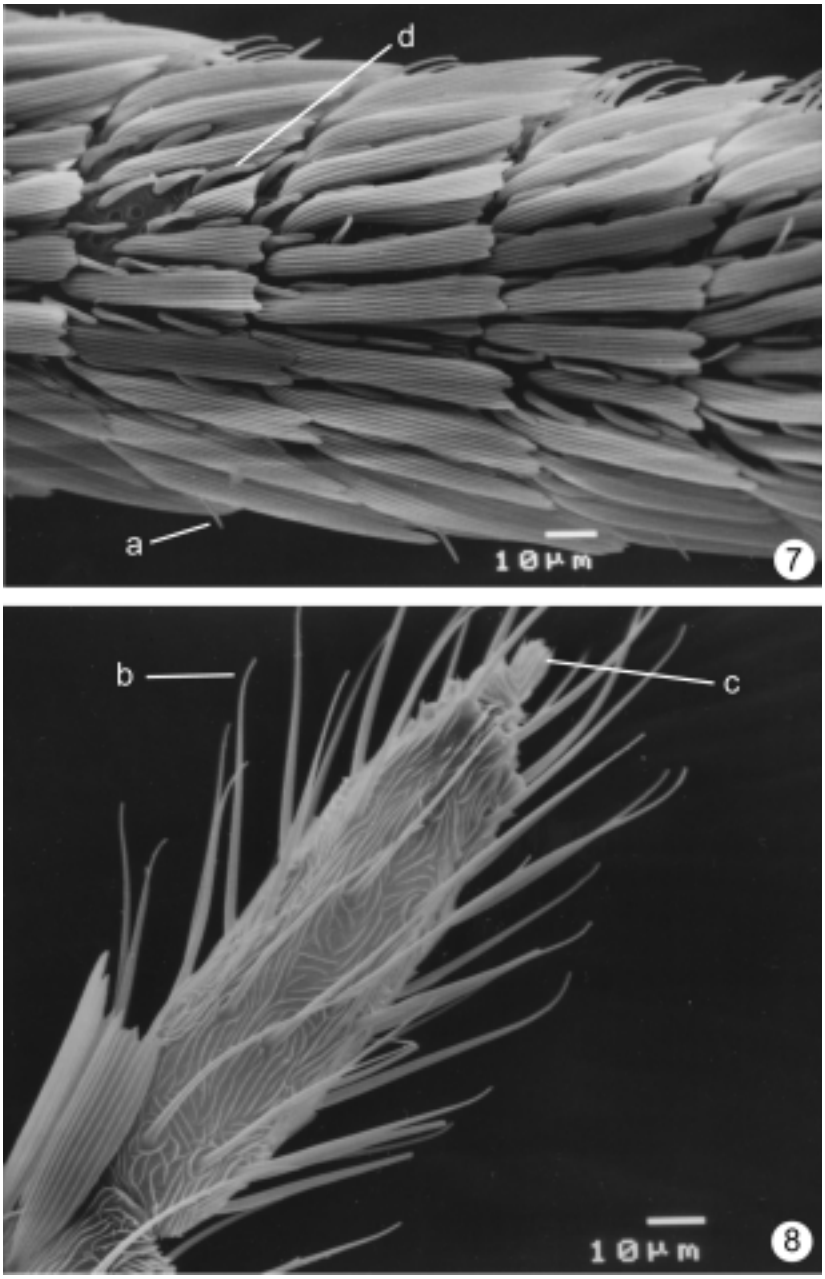


3, 4. Median part of flagellum of *Pandemis cerasana* (HÜBNER): 3 - segment of median part of antenna of *Pandemis cerasana* (HÜBNER), 4 - the same, higher magnification; a - sensillum trichodeum, b - socket of sensillum chaeticum, c - sensillum auricillicum, d - sensillum coeloconicum, e - sensillum styloconicum

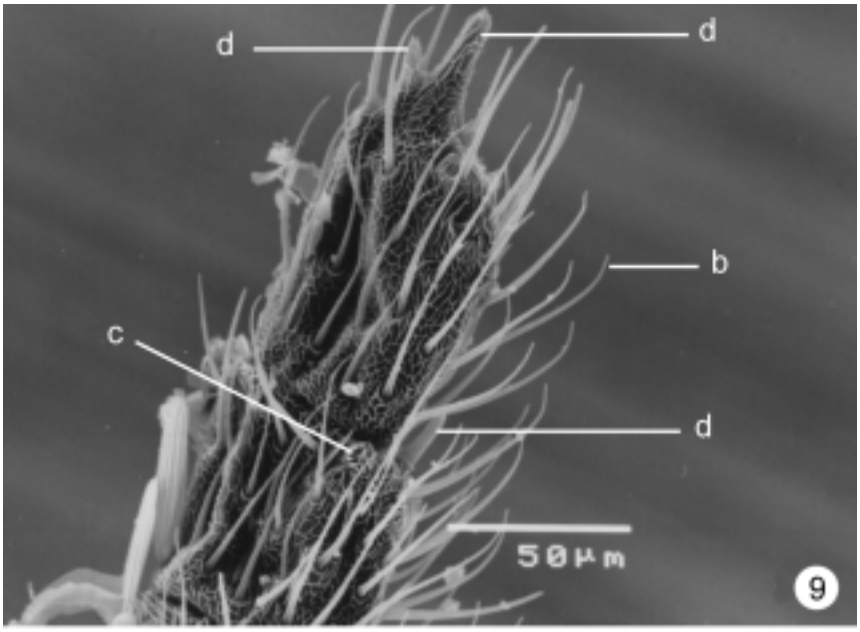


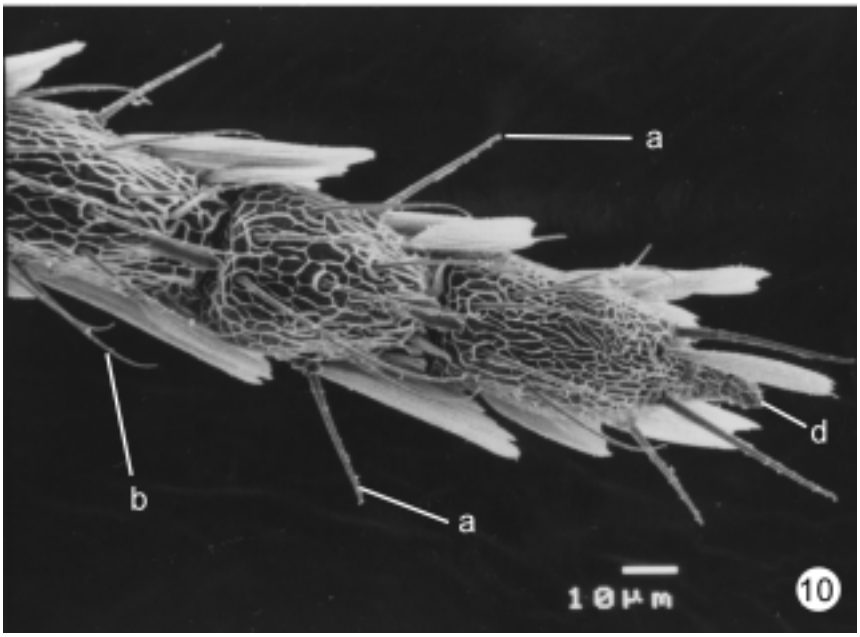


5, 6. Flagellum of the male of *Philodone gerningana* (DENIS & SCHIFFERMÜLLER) with sensilla chaetica, 5 - median part of antenna with rami, 6 - lateral process

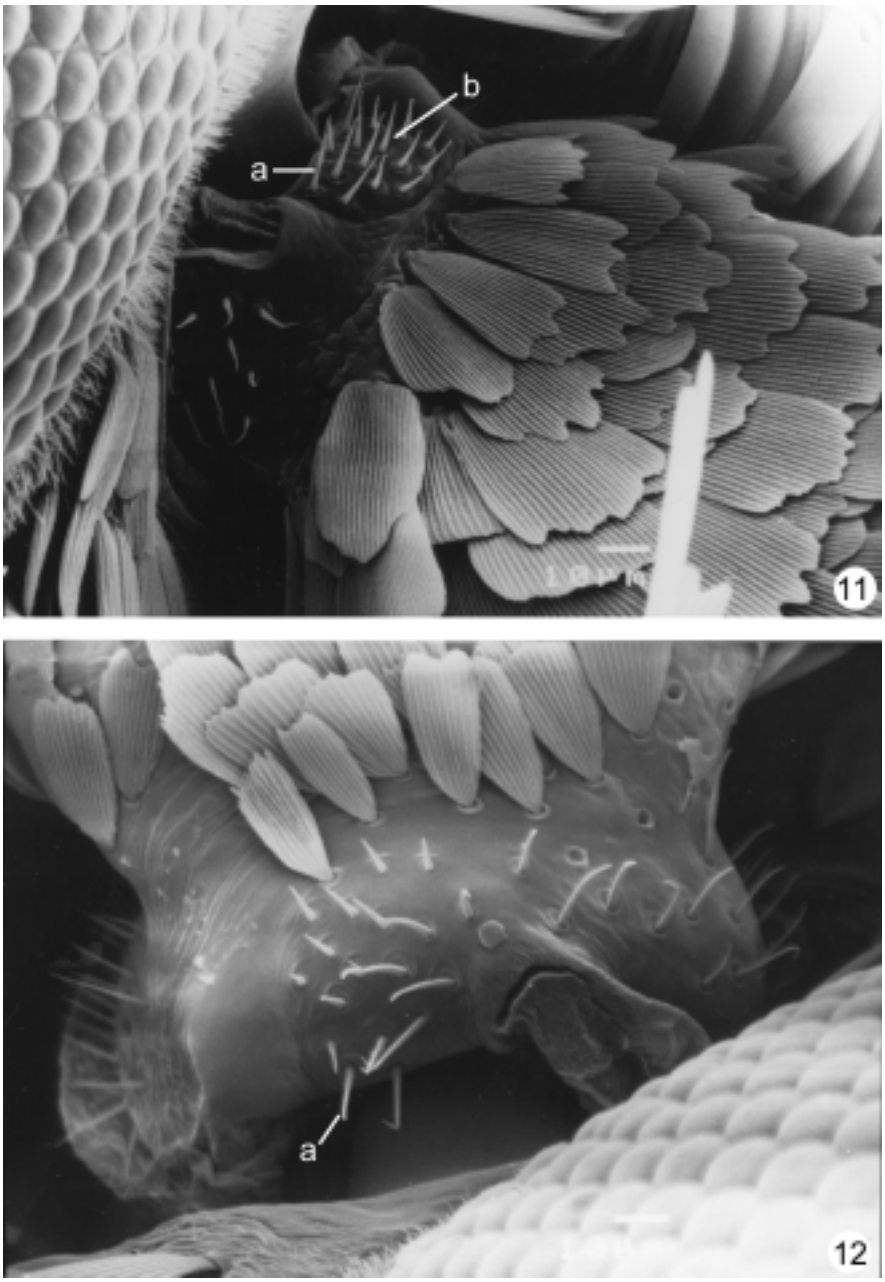


7, 8. Antenna in *Cydia caecana* (SCHLÄGER) with sensilla basiconica between scales: 7 - postbasal part of flagellum, 8 - apical segment; a - sensillum chaeticum b - sensillum trichodeum, c - sensillum styloconicum, d - sensillum basiconicum





9, 10. Terminal parts of flagellum: 9 - *Pandemis cerasana* (HÜBNER), 10 - *Bactra furfurana* (HAWORTH); a - sensillum chaeticum, b - sensillum trichodeum, c - sensillum coeloconicum, d - sensillum styloconicum



11, 12. Base of scapus of antenna: 11 - *Pandemis heparana* (Denis & Schiffermüller), 12 - *Cydia caecana* (Schläger); a - sensillum trichodaeum and sculpture, b - basal sclerite