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A NEW SPECIES OF *ODONTOMYIA* MEIGEN (INSECTA: DIPTERA: STRATIOMYIDAE) FROM SABAH, BORNEO

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ABSTRACT. - Both sexes and larva of *Odontomyia latitibia*, new species, are described. The species was reared from the aquatic larvae found in bamboo phytotelmata in Sabah, East Malaysia. It seems to be related to the Eurasian *O. ornata* (Meigen) but differs from all the known species of the genus by the specific colour combination, the enlarged fore tibiae and tarsi, and the characteristic wing darkening in the adults. The presence of ventral hooks on the 2nd abdominal segment in the larva is also unique.

INTRODUCTION

The genus *Odontomyia* Meigen belongs to the subfamily Stratiomyinae characterized by the long antennae, the flagellum of which consists of 5-6 mainly cylindrical flagellomeres, by the scutellum bearing two mostly strong spines and the specialized wing venation (m-cu crossvein present, medial veins usually weak and evanescent towards wing margin, M_3 vestigial or entirely absent). The wing microtrichia are entirely absent in all the members of this subfamily and 3 semiglobular spermathecae are present in all the females examined. The larvae of Stratiomyinae are mostly aquatic and provided with an apical coronet of hydrofuge float-hairs on the anal segment. The posterior ventral setae on the head are shifted laterally and the dorsal setae on the thoracic and abdominal segments are inserted in two transverse rows. The ventral setae of the abdominal segments are arranged in a semicircular position.

Generic characters of *Odontomyia* Meigen may be summed up as follows: the basal antennal segments are mainly subequal and the scape is at most twice as long as the pedicel; the antennal flagellum consists of six flagellomeres and the two last flagellomeres form a short apical stylus; at most two M veins are distinct; the aedeagal complex is smooth, without any spines, the parameres are simply pointed in dorsal aspect; the female genital fork consists of a narrow frame and a pair of pointed posterolateral projections. The aquatic larvae possess a subconical or almost oblong anal segment which is only rarely elongated into a distinct breathing tube. The conspicuous ventral hooks are frequently developed at the posterior margin of abdominal segment 7 and sometimes also 6.

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This worldwide distributed genus is represented in the Oriental Region by 24 species (James, 1975), the majority of which need a modern revision. In the identification key published by Brunetti (1923) 34 species are included, three of which now belong to the genus *Oplodontha* Rondani and one to the genus *Afrodontomyia* James. Moreover, 10 Australasian species are also treated in Brunetti's key in addition to the Oriental forms. Further Oriental species were added by Lindner (*O. quadrata* Lindner, 1937, from southern India and *O. bipunctifacies* Lindner, 1951, from Sumba). Brunetti (1923) described *O. notatifrons* from Singapore and recorded *O. luteiceps* de Meijere from Borneo (Mahakkam). In a later paper by Brunetti (1927) only a single specimen of a peculiar *Odontomyia* sp. from Malaya was mentioned but not described. Virtually no further species of *Odontomyia* is known from Malaysia, Singapore or the adjacent area of Borneo.

Our paper represents the third contribution to the knowledge of Malaysian Stratiomyidae (cf. Rozkošný & Kovac, 1991, 1994).

SYSTEMATICS

FAMILY STRATIOMYIDAE

Odontomyia latitibia, new species
(Figs. 1-21)

Material examined. - Holotype - male, East Malaysia, Sabah, Mt. Kinnabalu Park, Poring Hot Springs, altitude c. 500 m, ex puparium, coll. D. Kovac, 5.v.1993.

Paratypes - 1 female from the same locality, reared from puparium on 15.v.1993, 1 male from the same locality, reared from puparium on 7 June 1993, all D. Kovac leg. The type material is deposited in the Forschungsinstitut Senckenberg, Frankfurt, Germany (holotype) and in the Natural Science Faculty, Masaryk University, Brno, Czech Republic (1 male and 1 female paratypes).

Description. - Diagnosis: Conspicuously bicoloured, deeply bluish black and bright yellow; head chiefly yellow but with black frons in male, abdominal dorsum yellow in male and black in female; bases of wing blackish, much more extensive in female; fore tibia and tarsus remarkably dilated in both sexes.

Male: Head conspicuously transverse, concave posteriorly, large eyes with protuberant posterolateral angles and contiguous in lower half of frons. Ommatidia distinctly smaller in lower third of eye. Upper part of frons black, narrowly triangular, ocellar tubercle slightly protuberant. Vertex beyond posterior ocelli barely as long as ocellus is wide. Dense but very short black hairs distinct on ocellar tubercle and vertex, hardly visible on upper frons. Posterior part of head completely shining black with a bluish shade. Lower frons (above antennae) and narrow rings around bases of antennae shining black, face and gena contrasting yellow. Scape barely longer than pedicel, both shining black and with short black hairs. Flagellum about 2.5 times as long as both basal segments. Three basal flagellomeres dull black with scattered greyish sensory pits. Last three flagellomeres about as long as flagellomere 3, tip of flagellomere 4 and both apical flagellomeres yellowish, last flagellomere short, conical and sharply pointed. Face with a low middle tubercle below antennae and with a transverse groove at level of mid-anterior corner of oral cavity. Further lateral groove separating lower face and gena on each side. Gena with sparse, moderately long yellowish hair. Proboscis and two-segmented palpi deeply black. Labellae with projecting brownish hairs.

Thorax completely bluish black, subshining, densely punctate, with short and mostly upright rigid black hairs. Hairs on scutellum adpressed, scutellar spines about as long as scutellum at level of spine insertions. Some hairs on pleura denser and elongate, e.g. groups on proepisternum, at upper posterior corner of anepisternum, at upper and posterior margin of anepimeron, and on outer sides of laterotergites.

Wing base deeply black up to level of humeral crossvein including upper half of alula. Other parts of venation yellow and wing membrane hyaline, without any microtrichia. R_{2+3} ending just above anterior crossvein being placed in middle of discal cell. R_4 present, crossvein m-cu well developed, about as long as anterior crossvein. Knob of halter green, squamae black and black-haired.

Legs black and with short black hairs, only dorsal side of fore and middle tibia each with a longitudinal, silverish white patch consisting of dense adpressed pubescence. Patch on fore tibia somewhat longer than the middle third of this tibia, that on middle tibia leaving only extreme ends free. Fore legs strong, fore tibia remarkably dilated in distal half and somewhat flattened on sides. Lateral depression partly distinct also on fore basitarsus but following tarsal segments rather low in lateral aspect and in comparison with other legs, broadened transversely. Middle and hind tibiae and tarsi normal, without any dilatation. Last tarsal segments with a row of long setae along distal margin each.

Abdomen completely bright yellow including male terminalia, only a transverse and low basal spot black. Longer yellowish hairs distinct on sides of abdominal base and at apex. Abdominal disc with adpressed yellow pile. Ventral pile somewhat longer but also almost adpressed. Male terminalia symmetrical, resembling those of some Palaearctic *Odontomyia* species. Epandrium relatively small, cerci large and oval. Gonostylus with a distinct inner lobe, gonocoxal apodemes not overreaching proximal margin of synsternite. Medial process low, transversely broadened, with pointed lateral corners. Aedeagal complex relatively short, parameres somewhat dilated before apex and pointed distally in dorsal view.

Female: Head extensively yellow. Frons about as broad as one eye, bright yellow, only small ocellar tubercle black. Frons with symmetrical depressions and tubercles: oblique deep groove going from ocellar tubercle to eye margin on each side; two median depressions separated by a middle rib continuing as a middle line to bases of antennae; lower half of frons with a pair of low transverse-oval tubercles. Very short and rigid black hairs distinct on vertex and especially dense in depressions. Rings around bases of antennae, scape and pedicel shining black, flagellum dull black. Flagellomere 4 with distinct inner depression. Also upper occiput extensively yellow from eye margins to posterior aperture. Rest of posterior concave side of head shining black. Face, gena and lower head yellow as in male, proboscis contrasting black. Gena distinctly broader than in male.

Thorax subshining black, densely punctate and covered by short, adpressed, black and yellow to gold pile. Gold pile dense on mesonotum and along posterior margin of scutellum in particular. Longer pale hairs distinct only below humeral calli, rigid black hairs almost upright above base of wing.

Wing darkening much more extensive than in male, occupying wing membrane to end R_{2+3}, slightly overreaching distal margin of discal cell and leaving clear only lower third of alula.

Legs as in male, including swollen fore tibia and tarsi and silverish dorsal patches on fore and middle tibia, though both patches somewhat shorter (covering only middle third on fore tibia and not extending over distal third of middle tibia).

Abdominal dorsum entirely black, densely punctate. Black and partly silverish to gold pile inconspicuous, adpressed. Abdominal venter greenish yellow. Female terminalia small, black in dorsal view, not examined in detail.

Length: body 9.8-12.0 mm, wing 7.9-8.6 mm.

Larva: Yellowish brown in ground colour, with yellow and dark brown pattern. Head predominantly dark brown with paler proximal half and yellowish brown eye-prominences. Dorsum of thoracic segments mainly dark brown, with rather dense and partly confluent yellow circular spots in broad lateral bands along thoracic segment 1. Traces of yellow longitudinal stripes distinct at posterior margin of thoracic segment 3. Four yellow longitudinal stripes bordered by dark brown patches distinctly broadened at boundaries of abdominal segments 4-7. Moreover, also abdominal segments adorned with numerous, yellow, circular spots which are partly confluent along lateral sides. In this way lateral thirds of abdominal segments predominantly yellow and also anal tube yellowish laterally in basal half. Venter mainly dark brown, diffuse yellow pattern more distinct on thoracic segments 1 and 2, circular yellow spots more expressive on abdominal segments 4-7. In addition to this pale pattern also ventrolateral margin of abdominal segments 2-7 yellowish.

Head partly retracted into thoracic segment 1, about twice as long as wide. Basal segment of antenna about four times as long as wide, its apical segment short conical, barely longer than wide, a small rodlike sensilla at base of apical segment distinct. Apical part of mandibular-maxillary complex with 4-5 rows of flat setae forming characteristic combs, labrum with dense and partly flat setae ventrally, eyes placed directly on head capsule.

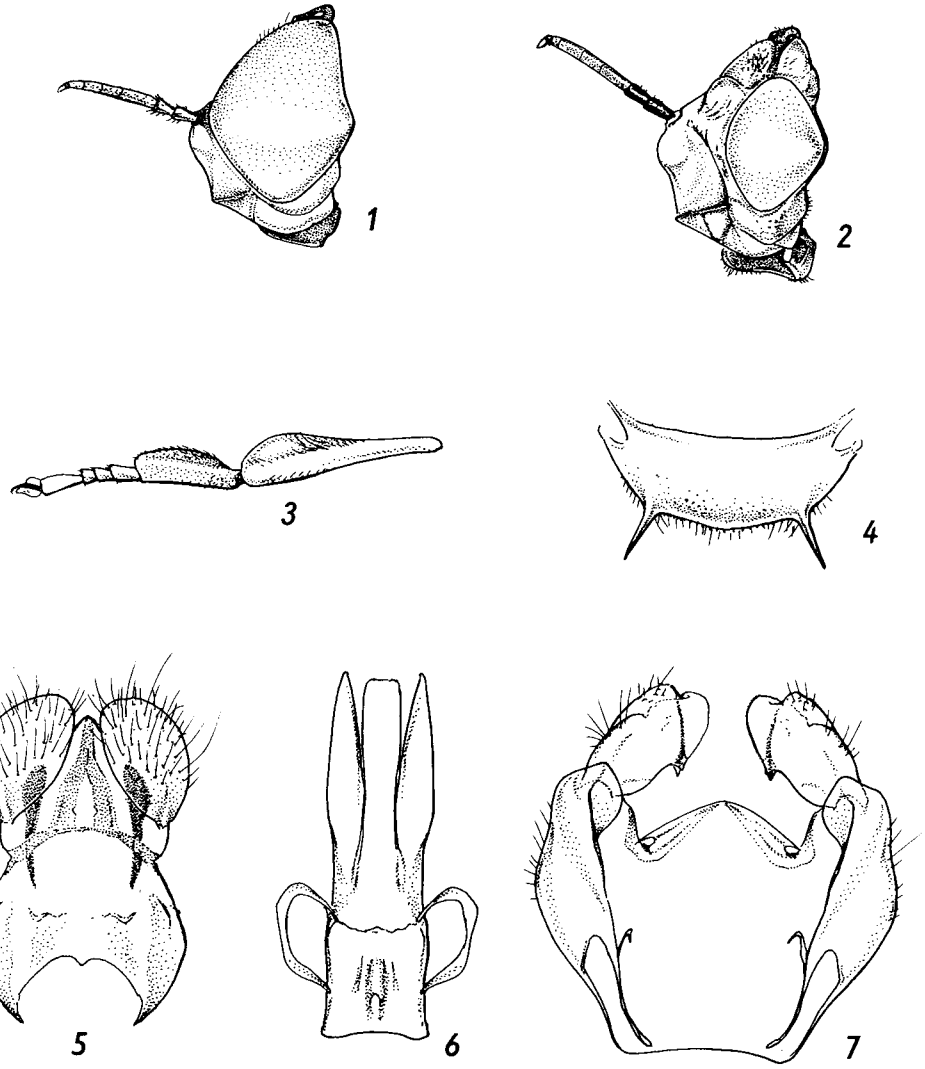
Thoracic segment 1 with relatively small, oval anterior spiracles at lateral margins, also thoracic segment 3 with similarly situated but much smaller circular spiracles. Abdominal segments gradually tapering and elongated toward distal end. Segment 6 subquadrate or slightly longer than broad, segment 7 more than 1.5 times as long as wide and anal segment about 4 times as long as wide. No intersegmental projections and no sternal patch found. Abdominal segments 1-7 with small round spiracles placed close to lateral margin. Anal slit relatively long, reaching middle of anal segment with its distal end. Pairs of strong ventral hooks developed at posterior margin of abdominal segments 6, 7 and surprisingly, also on segment 2. Shortly pinnate float hairs at distal end of anal segment concentrated to middle third of dorsal and ventral lips, usually arranged in 3 groups with 9, 10-14 and 9 stronger hairs on each lip.

Chaetotaxy (for terminology see Rozkošný, 1982): groundplan as in other known larvae of *Odontomyia*. Setae on dorsal side of head mostly slender and long, only posterior clypeofrontal (Cf_2) and posterior labral (Lb_2) setae short and bushlike. On ventral side two pairs of setae (V_1 and V_3) particularly conspicuous, richly ramified and pubescent. Other setae relatively long and simple. Chaetotaxy of thoracic segments complete: 2 pairs of anterodorsal, 3 pairs of dorsal (D_2 shifted anteriorly) and 2 pairs of ventral setae (outer ones of them with 3 branches) on thoracic segment 1. Thoracic segments 2 and 3 with similar configuration of setae but without anterodorsals. Abdominal segments with dorsal setae in 2 transverse rows (D_2 again shifted anteriorly), ventral setae arranged semicircularly but more

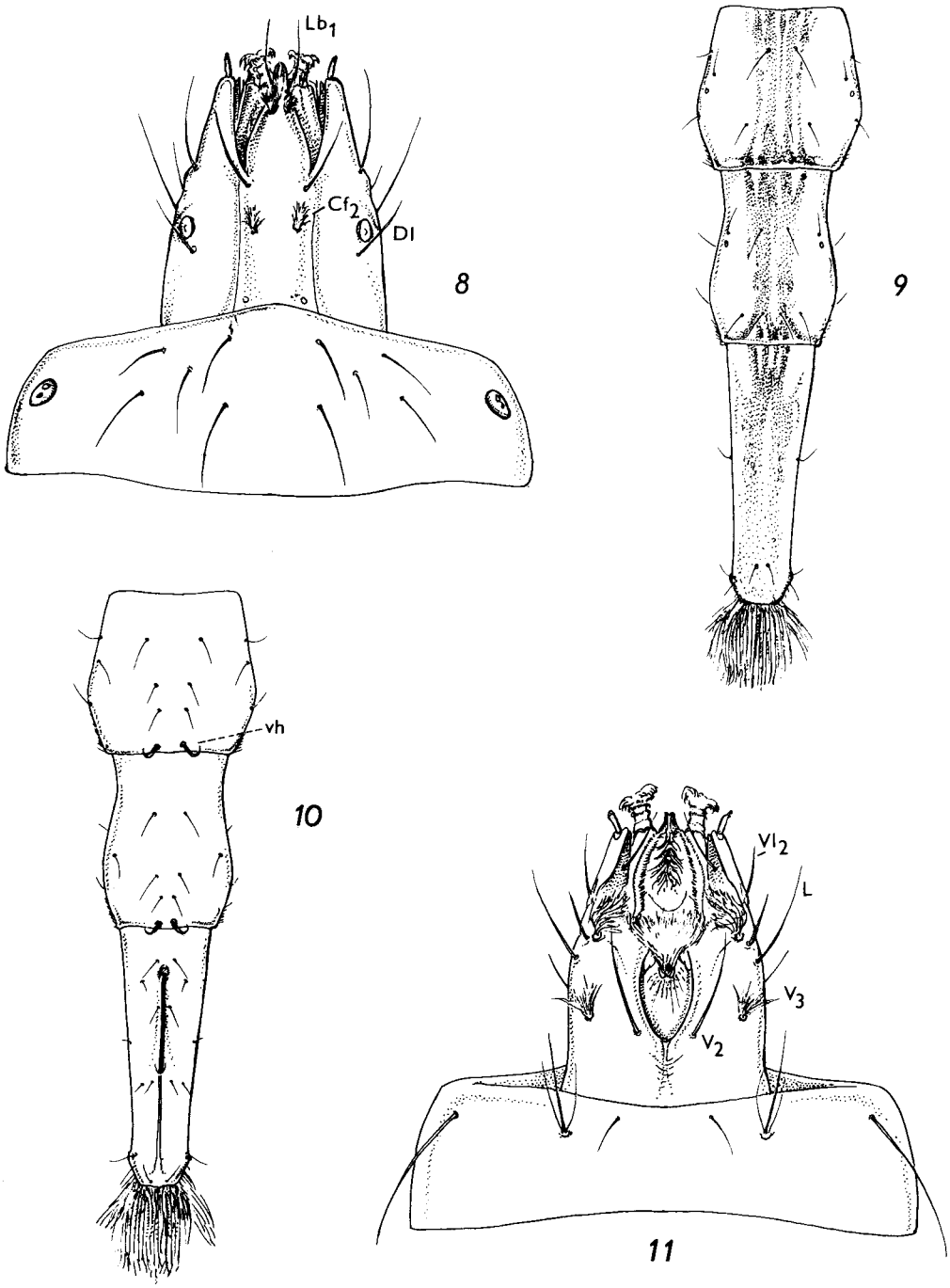
in two oblique longitudinal rows in last 3 segments. Lateral wall of each segment bearing 1 dorsolateral, 2 lateral and 1 ventrolateral seta. On anal segment all five pairs of ventral setae developed, also usual 2 lateral, 1 apical and 1 subapical seta present.

Length 35.0-37.0 mm, maximum width 5.0-5.4 mm.

Puparium formed from cuticle of last larval instar and thus bearing all cuticular structures described in larva. But head usually somewhat more retracted into 1st thoracic segment, and mouthparts (especially mandibular-maxillary complexes) much less exposed and partly obscured with particulars of mud. Large anterior spiracles on thoracic segment 1 as in larva, not protuberant. Anal slit often somewhat opened, with distinct marginal teeth. Length and maximum width as in mature larva.

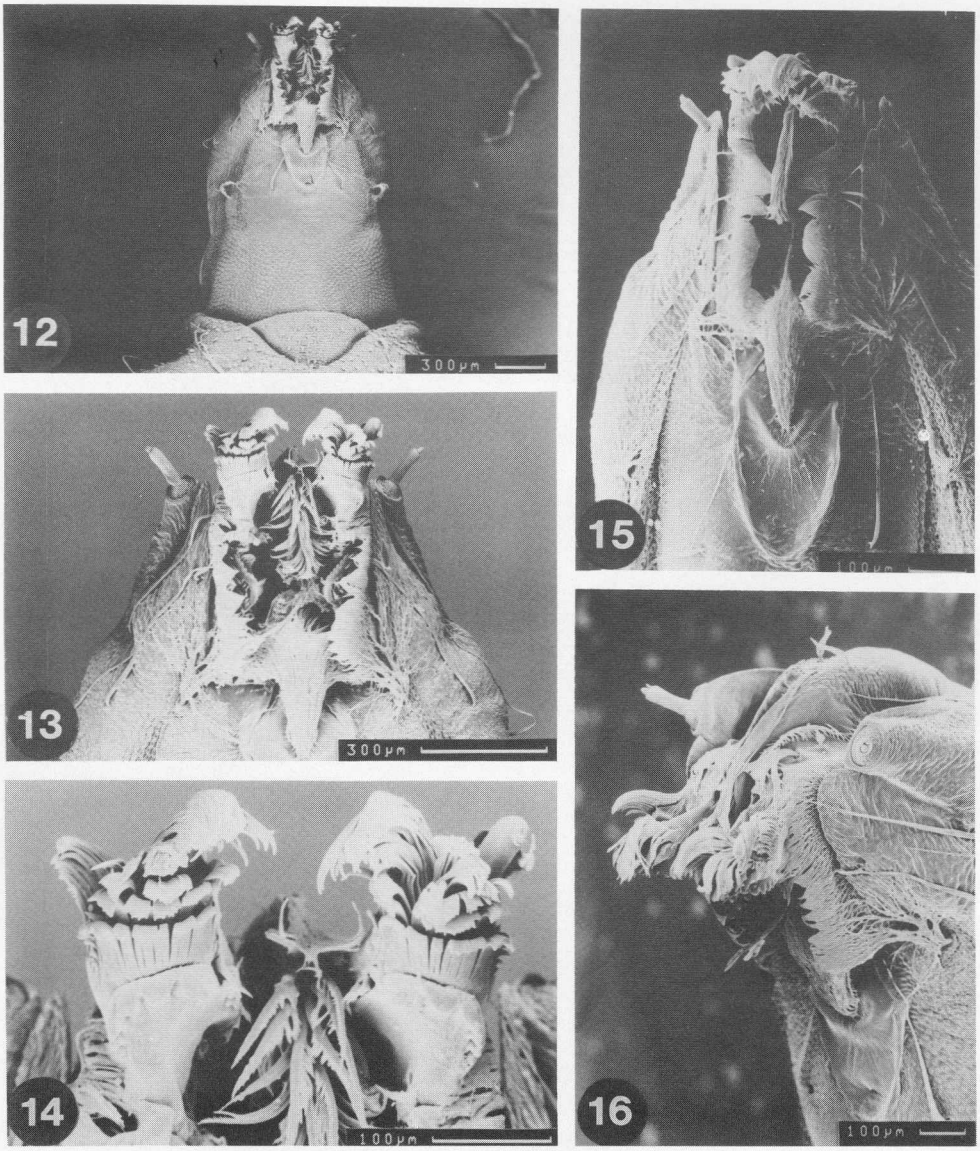


Figs. 1-7. *Odontomyia latitibia*, new species, characters of adults. 1, Male head in lateral view; 2, Female head in lateral view; 3, Male fore tibia and tarsus; 4, Scutellum with spines; 5-7, Male genitalia: cerci, proctiger and epandrium (5), aedeagal complex (6) and synsternite with gonostyli (7).



Figs. 8-11. *Odontomyia latitibia*, new species, larval characters. 8, Head and thoracic segment 1 in dorsal view; 9, Last three abdominal segments in dorsal view; 10, Last three abdominal segments in ventral view; 11, Head and thoracic segment 1 in ventral view. Cf_2- posterior clypeofrontal seta, Dl - dorsolateral seta, L - lateral seta, Lb_1 - anterior labral seta, V_2-V_3 - ventral setae, vh - ventral hook, Vl_2 - middle ventrolateral seta

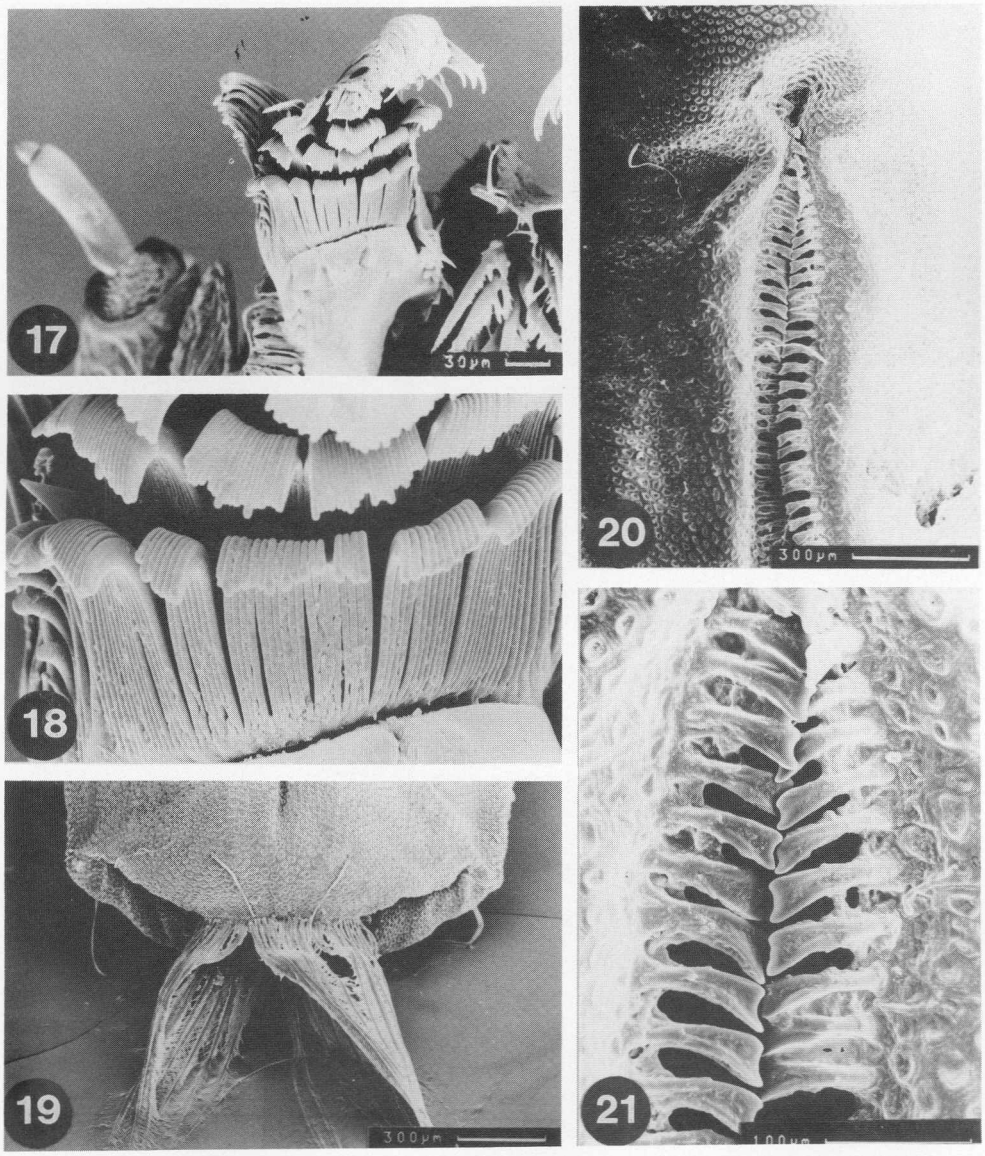
Habitat. - The larvae of *Odontomyia latitibia*, new species, were found in internodes of decaying culms of the bamboo *Gigantochloa levis* (Blanco) Merr. The bamboo culms, which were lying on the ground, had been split along their long axis and as a consequence the internodes have become filled with rainwater and fallen bamboo leaves. The internodes were c. 10 cm in diameter and c. 30-40 cm long. Other aquatic inhabitants of this bamboo phytotelmata included larvae of scirtids (Coleoptera, Scirtidae), tipulids (Diptera, Tipulidae), culicids (Diptera, Culicidae), including the predatory mosquito larvae of *Toxorhynchites*, larvae of dragonflies (Odonata, Libellulidae), as well as tadpoles of the frog *Chalperina fusca*



Figs. 12-16. *Odontomyia latitibia*, new species, larval structures (SEM-photographs). 12, Head in ventral view; 13, Mouthparts in ventral view; 14, Mandibular-maxillary complexes and median labrum in ventral view; 15, Anterior part of head (puparium) in ventral view; 16, Anterior part of head (puparium) in ventrolateral view (left antenna missing).

Mocquard. The larvae of *Odontomyia latitibia* were seen scraping off organic matter from the bamboo leaves and internode walls. The pupae were floating on the water surface and were hardly recognizable between the bamboo leaves because of their cryptic coloration.

Remarks. - If the species groups of *Odontomyia* suggested in the monograph of European Stratiomyidae (Rozkošný, 1982/83) are accepted, then *O. latitibia*, new species, appears to be related to *O. ornata*-group in particular. Like the single species of this group (*O. ornata* Meigen) *O. latitibia* displays a distinct vein R_4 and strong scutellar spines and its larva bears



Figs. 17-21. *Odontomyia latitibia*, new species, larval structures (SEM-photographs). - 17. Antenna and mandibular-maxillary complex in ventral view. 18. Magnified combs on mandibular-maxillary complex. - 19. Tip of anal segment in ventral view. - 20. Proximal part of anal slit. - 21. Marginal teeth on anal slit.

ventral hooks on abdominal segments 6 and 7 as well as a remarkably elongated anal segment. On the other hand, vein M_3 is remarkably reduced in the new species and the strong larval ventral hooks are also present on abdominal segment 2.

The combination of the external characters described in *O. latitibia* is not known in any Oriental species. Particularly the shape of the fore legs, the colour characters and the darkening of the wings seem to be highly specific. The sexual dimorphism is conspicuous in the form of the head, in the extent of the wing darkening and in the colour of the abdominal dorsum, but the typical dilatation of the fore tibiae and tarsi is developed almost identically in both sexes.

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