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A New Species of the Genus *Chironomus* (Diptera, Chironomidae) from Japan*

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Synopsis A new species of the genus *Chironomus* from Japan, *Chironomus* (*Kiefferulus*) *umbraticola* sp. nov., is described. Description of its immature stages is also given.

Kiefferulus GOETGHEBUER, 1922 was first described as a genus of the tribe Tanytarsini for a European species, *Tanytarsus tendipediformis* GOETGHEBUER, 1921, which has the hairy wings, one of the main characters of the tribe at that time, and 12-segmented antennae unique to the tribe. EDWARDS (1929) treated *Kiefferulus* as a subgenus of *Pentapedilum*, which he recognized as a distinct genus by the fringed squama, oblique r-m crossvein and hairy wings. He classified the genus *Pentapedilum* into the tribe Chironomini for he did not recognize the hairy wings as a key character separating the Tanytarsini from Chironomini, but considered that the oblique r-m crossvein is a main character of the latter tribe.

PAGAST (1936) studied on both the adult and immature stages of the type-species of *Kiefferulus*. He found a close resemblance between *Kiefferulus* and *Chironomus* in many basic structures including the male genitalia and 12-segmented antennae. Considering the hairy wings as superficial, he gave *Kiefferulus* a subgeneric status in the genus *Chironomus*.

In a revision of the Nearctic species of Chironomini, TOWNES (1945) referred *Chironomus dux* JOHANNSEN to the subgenus *Kiefferulus* of *Chironomus* based on the structure of male genitalia and the head which lacks the frontal tubercles, though it has no hairs on the wings. In a revision of the Australian *Chironomus*, FREEMAN (1961) described a new species, *martini*, in the subgenus *Kiefferulus*, and included the Australian *Chironomus intertinctus* and African *Chironomus* (*Dicrotendipes*) *chloronotus* KIEFFER in the same subgenus. He also pointed out that the presence of hairs on the wings has no generic significance. MARTIN (1964) found that *intertinctus* was heterogeneous, and he divided it into *intertinctus* and a new species *paratinctus* as a result of cytological and morphological studies. Thus *Kiefferulus* is composed of six species at present, each one from Europe, North America and Africa, and three from Australia.

Although *Kiefferulus* is regarded as a subgenus of the huge genus *Chironomus*, I think there are still some problems on its systematic position. Among the genera

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of the tribe Chrinomini, *Chironomus* and *Glyptotendipes* are most closely allied to each other in having the 12-segmented male antennae, oblique r-m crossvein, fringed squama and similar tibial combs and in the structure of the male genitalia in addition to the presence of the pulvilli. But in *Chironomus* the pronotum is not interrupted in the middle though usually distinctly notched, while in *Glyptotendipes* it is so completely interrupted that two lateral halves are distinctly separated in dorsal aspect. Concerning with these characters *Kiefferulus* is quite identical with *Chrionomus*, but it has the following peculiar features which are not found in *Chironomus* as far as I know.

In *Kiefferulus* a pair of the uppermost labral setae of larva is situated at the lateroproximal corners of labrum, the occipital invagination of larval head is very broad, and the female 10th abdominal segment is completely separated from the 9th tergum by narrow intersegmental membrane. All of these characters are found in Japanese species of *Glyptotendipes*. The pronotum of adult *Kiefferulus* is similar to that of other subgenera of *Chironomus*, but it has a distinct dorsomedian suture which is also seen in *Glyptotendipes*, but rarely seen in *Chironomus* (in the subgenus *Dicrotendipes*). Moreover, *Kiefferulus* and *Glyptotendipes* share the spatulate ventral appendage of the male genitalia, which is much slender in *Chironomus*. Considering these characters, I incline to think that *Kiefferulus* is much more closely related to *Glyptotendipes* than to *Chironomus*. But I have not yet examined the type-species of both *Kiefferulus* and *Glyptotendipes*, so that I follow the system of PAGAST (1936), and treat *Kiefferulus* as a subgenus of *Chironomus* in this paper.

The immature stages of this subgenus are little known. PAGAST (1936) described the larva and pupa of *tendipediformis* collected from "Wasser Kalkablagerung" of mud in peatery near München. JOHANNSEN (1937), and BECK & BECK (1970) described the larva and pupa of the Nearctic *dux*. MARTIN (1963, 1964) gave brief descriptions and ecological notes on the larvae of three Australian species which live in ponds.

In Japan the genus *Chironomus* of the present sense is represented by 13 known species, but in my opinion none of them belong to the subgenus *Kiefferulus*. Thruough the recent investigation on the Chironomid fauna of Japan, I found a *Chironomus* species apparently belonging to the subgenus *Kiefferulus*. This species resembles the two Holarctic species, especially *dux*, in the male genitalia and some other characters, but it is distinct from them in the structures of the immature stages and the genitalia. Therefore I describe it as a new species, and also give a detailed description of its immature stages.

Before going further, I wish to express my cordial thanks to Professor Yoshihiro HIRASHIMA, Entomological Laboratory, Faculty of Agriculture, Kyushu University and Professor Toyohei SAIGUSA, College of General Education, Kyushu University for their continuous kind guidances. I am also indebted to Mr. Kenji ÔHARA, Kyushu University, for kindly offering valuable materials.

Chironomus* (*Kiefferulus*) *umbraticola sp. nov.

♂. Colouration: Head green in ground colour, clypeus and prefrons pale green, labrum and labella pale grayish brown, maxillary palpus yellowish brown; eye balck; antennal scape orange yellow, pedicel whitish, flagellum yellowish brown. Thorax with pronotum yellowish green; mesonotum pale yellowish green to light green; scutum with distinct orange yellow scutal vittae; median vitta with a dark brown median band or spot on its median portion, lateral vitta fused with median one at its anterior margin, prescutellar area thinly white pollinose; postnotum orange yellow, paler on its anterior part. In mesopleuron, anterior anepisternum pale organge yellow to light green, anepisternal furrow pale yellow, katepisternum orange yellow and its upper part pale green with white pollinosity; mesepimeron, meron, metepisternum and metepimeron pale yellow to light green. Foreleg with coxa pale yellow to green, trochanter yellowish green, femur yellowish green to pale orange yellow except dark apical part, tibia and tarsus uniformly shining dark brown. Middle and hind legs with coxa and trochanter pale yellow to green, femur pale orange yellow to pale green but dark at tip, tibia yellowish green except dark brown knee joint, tarsus yellowish brown darkened towards apex, tibial combs of middle and hind legs black. Wing hyaline, anterior veins yellowish and r-m crossvein slightly darkened without a dark spot. Abdomen predominantly green; 1st to 7th terga usually entirely green but 4th to 7th terga brown in some individuals, 8th tergum and genitalia always dark brown.

Head: Antennal ratio, range 2.82 to 3.13, mean 3.02. Palpar proportions, 16: 60: 41: 63, 1st to 4th segments of palpus with 5–7, 31–41, 20–26, 11–14 bristles respectively. Frontal tubercles almost obsolete. Prementum with 2 bristles on its lateral margin and tip of ligula with several minute bristles. Tentorium as in Fig. 1–B. Dorsal extention of eye long and parallel-sided, about five facets wide near apex. Clypeus with 16–23 bristles. Postocular bristles in a double row, longer in anterior row, and arranged in three rows near apex of eye.

Thorax: Pronotum with distinct collar but narrow, and with narrow notch at tip. Mesonotum with a relatively distinct median tubercles, and with 10–12 dorsocentral bristles in a row, 6 prealar bristles, and 1 supra-alar bristles. Scutellum with 12–19 bristles in a double row.

Leg: Fore-, middle and hing coxae with 9–11, 7–8, 4–6 marginal bristles respectively. Fore-, middle and hind trochanters with 12–15, 6–8, 11–14 marginal bristles respectively. Foreleg ratio, range 1.56 to 1.71, mean 1.64. Middle leg ratio, range 0.63 to 0.66, mean 0.64. Hind leg ratio, range 0.73 to 0.77, mean 0.74. Foretibia with a low, rounded scale at tip. Tibial combs in middle and hind legs fused, fused combs with 2 spurs subequal in length. Foretarsus with short hairs only. Claws moderately curved; pulvilli well developed and pad-like; empodium long, slender, curved dorsally, and with more than ten branches.

Wing (Fig. 1–A): R_{2+3} parallel with R_1, and ending at basal 1/7 between

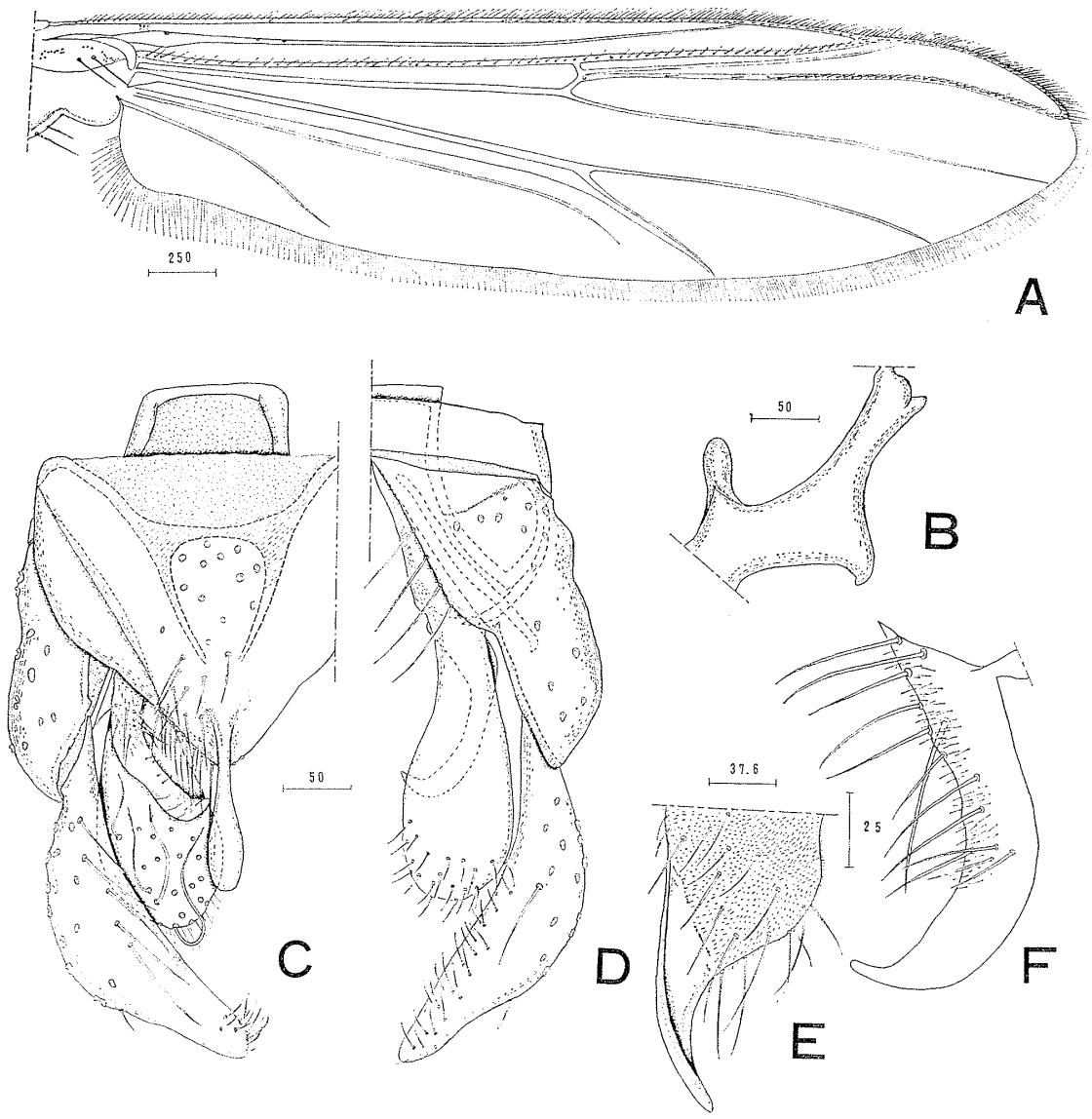

Fig. 1. Male of *Chironomus* (*Kiefferulus*) *umbraticola* sp. nov. A, right wing. B, left tentorium in lateral view. C, genitalia in dorsal view. D, ditto, in ventral view. E, anal point in lateral view. F, dorsal appendage in lateral view. (Scale in μ)

apices of R_1 and R_{4+5}. Fork of Cu somewhat beyond r-m crossvein. M ending almost under tip of R_{4+5}. Radialis with 11 annular organs on its basal part, 3 annular organs on middle anteriorly, 11–13 annualr organs on apical part, and with 2 bristles near middle. Base of R_{4+5} and subbasal portion of R_1 each with 1 annular organ. Anal lobe relatively well developed. Squama with 13–18 fringe hairs in a partial double row.

Genitalia (Figs. 1-C, -D, -E, -F): Epandrium with 7–15 bristles on disc. Anal point as in Fig. 1-E. Gonostylus long, wide, tapering at about apical 1/3, and with about 10 apical bristles, and fine bristles irregularly arranged in a double

row on its inner side. Dorsal appendage (Fig. 1-F) long, strongly sclerotized, and with more than 10 bristles on basal 1/2. Ventral appendage large, oval and flat in shape, with its apex extending middle of gonostylus, and clothed with many long curved bristles on its apical 1/3, some of which are forked near the tip.

Length: Body, 5.0–6.0 mm; wing, 3.0–3.8 mm.

♀. Colouration almost as in male but median vitta almost shining black; antenna with scape yellowish brown to brown, flagellum brown, 6-segmented. Proportional lengths of 2nd to ultimate antennal segments, 42: 32: 32: 29: 46. Palpus brown, 4-segmented (15: 58: 46: 75). Foreleg ratio, range 1.65 to 1.85, mean 1.73. Middle leg ratio, range 0.61 to 0.63, mean 0.62. Hind leg ratio, range 0.71 to 0.74, mean 0.73. Wing wider than in male. Cercus yellowish brown, crescent-shaped; spermathecae two in number, equal in size to each other and hyaline.

Length: Body, 3.3–4.3 mm; wing, 3.2–3.8 mm.

Larva: Body blood red. Head capsule orange yellow, eye spots black and clearly separated from each other. The 11th segment with a pair of ventral tubules, anal papillae long and with a definite constriction at middle (Fig. 2-D); 10th segment without lateral projections on posterolateral margins; 12th segment with a pair of small papillae bearing several long bristles. Claws of posterior pseudopod as in Fig. 2–E. Chaetotaxy and structure of head capsule as in Figs. 2–A, –B, –C.

Antenna (Fig. 2–F) with 5 segments, relative lengths of the segments, 40: 12: 8: 9: 2. First antennal segment with a very minute seta at base and a ring organ at basal 1/3. Antennal blade reaching base of 5th antennal segment.

Labral setation as in Fig. 3–A. S I comparatively broad (ca. 6 μ), and more or less parallel-sided, and with about 13 feather-like branches on each side. S II long (ca. 60–80 μ) and simple. S III slender and short (ca. 7 μ). S IV represented by a long scole with a small conical segment and finger-like rod. Four pairs of distinct spinulae which are modified to small triangular plates. Five pairs of labral chaetae which are pecten-like structure; anteriormost pair conglutinate distally (probably *Sm* in STRENZKE, 1960). Labral rod setiform and slender. Seta praemandibularis distinct and comparatively long (ca. 18 μ). Praemandibular brush simple. Epipharyngeal comb with 15–17 uneven small teeth; four pairs of chaetulae laterales and two pairs of chaetulae basales, each chaetulae with many branches on its inner side.

Mandible (Fig. 3–B) with four teeth, of which the apical one is longer and inner three subequal in shape. Preapical comb of mandible consists of 10 setae; subdental seta spatulate and about 20 μ in length; seta interna consists of four branches, each of which has many twigs.

Maxilla as in Fig. 3–D. Lacinial chaetae being of five hyaline thin blades. Antiaxial seta about 20 μ in length, paraxial seta slender and short. Maxillary palpus with one ring organ and with eight sensillae on its distal membranous area,

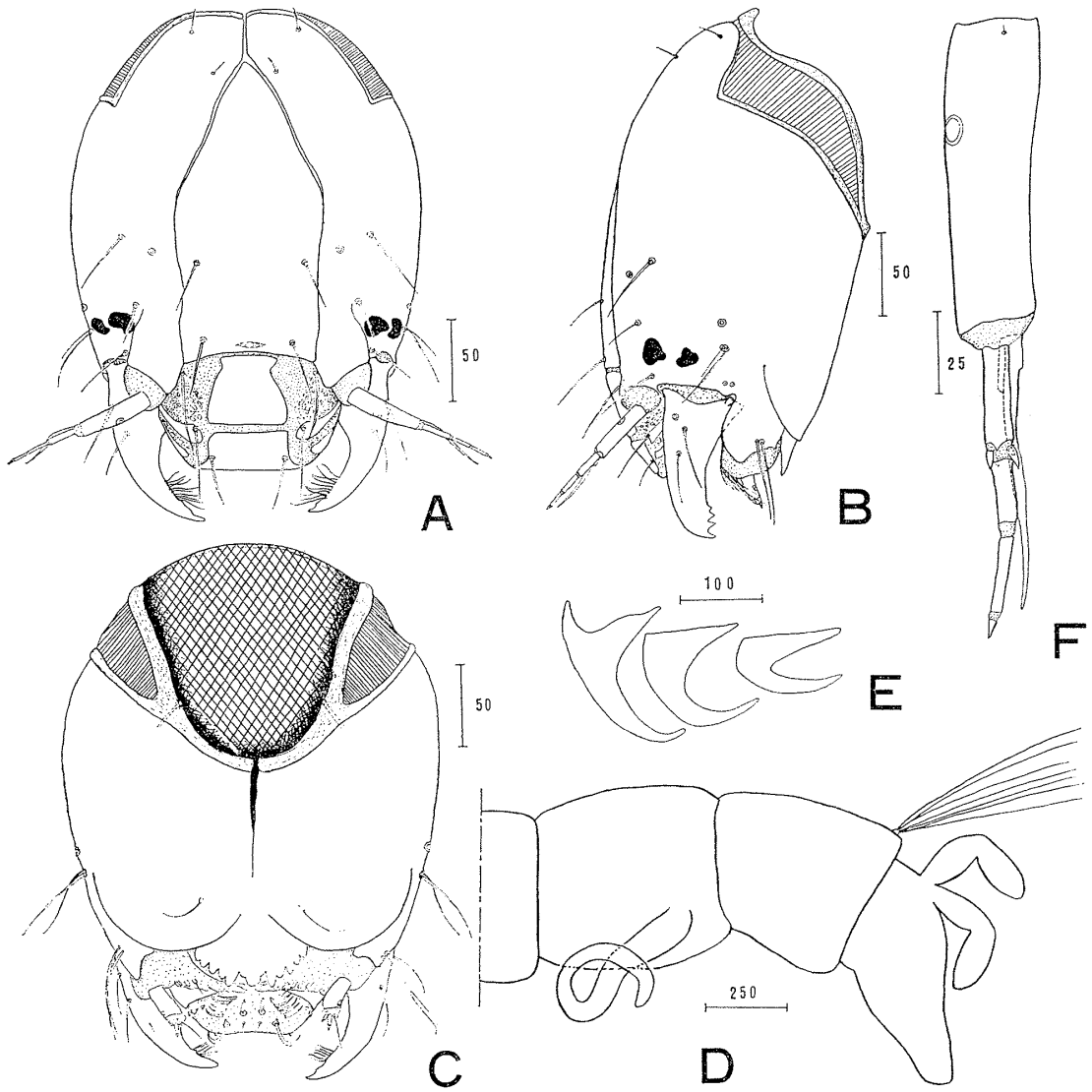

Fig. 2. Larva of *Chironomus* (*Kiefferulus*) *umbraticola* sp. nov. A, head capsule in dorsal view. B, ditto, in lateral view. C, ditto, in ventral view. D, posterior region of body in lateral view. E, claws of posterior pseudopod. F, antenna. (Scale in μ)

one of whicn is long and setiform (ca. 50 μ). Palpiger with two groups of chaetae.

Labial part as in Fig. 3–C. Labial plate with trilobed, wide median tooth and six pairs of lateral teeth; first lateral tooth is slightly longer than median one.

Length of body: 7.5–8.0 mm.

Pupa. Body dark brown. Cephalic tubercles acutely pointed and with a bifid subterminal spine (Fig. 4–C). Thorax with a small median tubercle on dorsal side. Thoracic respiratory organ white, and composed of four main branches, each of which has numerous filaments.

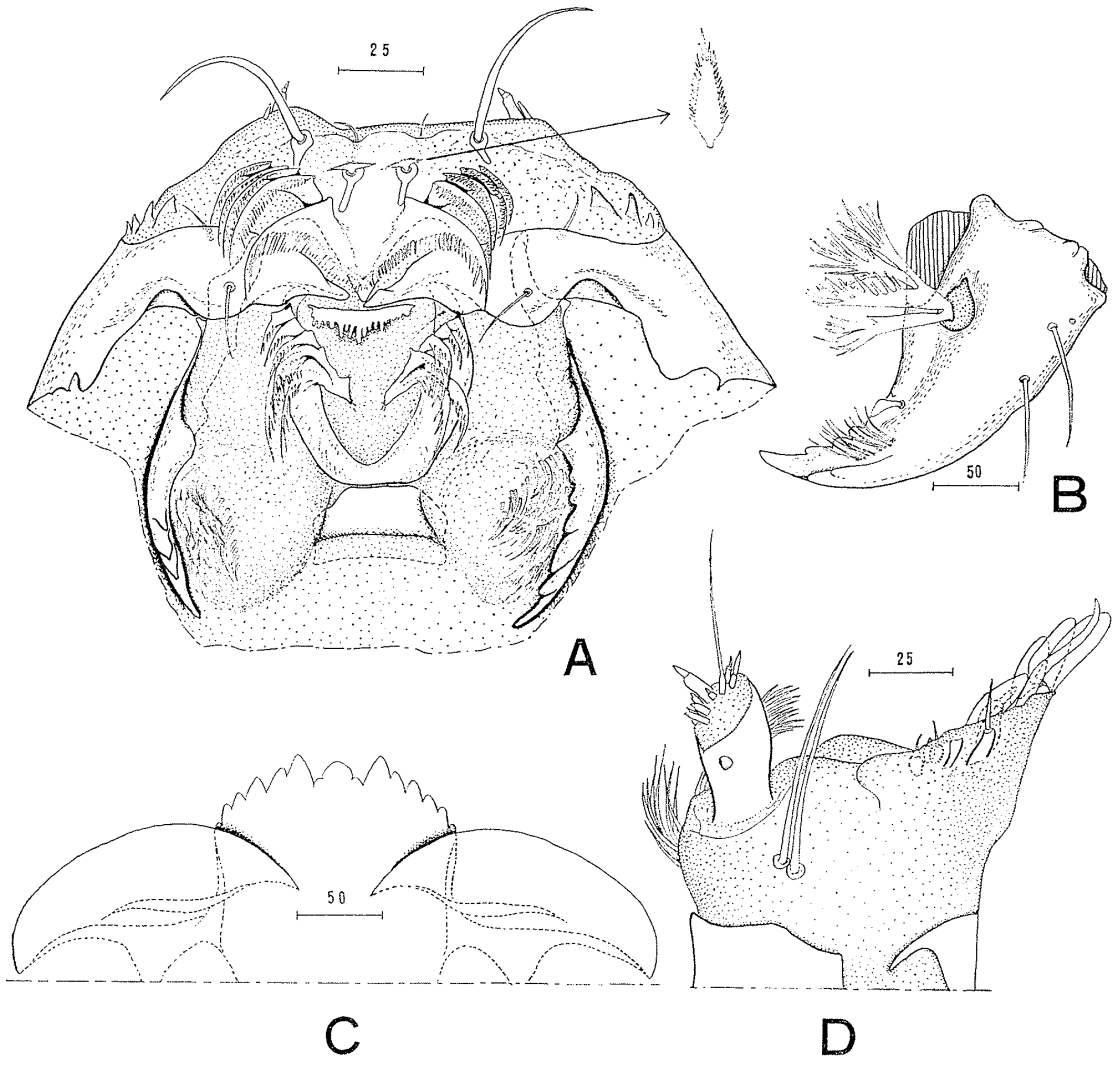

Fig. 3. Larval mouth part of *Chironomus* (*Kiefferulus*) *umbraticola* sp. nov. A, epipharynx. B, mandible in lateral view. C, hypostomium. D, maxilla in dorsal view. (Scale in μ)

Chaetotaxy and shagrination of abdominal terga as in Figs. 4–A, –B. The 1st tergum with two pairs of dorsal setae, a pair of minute dorsal oral setae and a pair of lateral setae; 2nd to 4th terga each with five pairs of dorsal setae, a pair of minute dorsal oral setae and three pairs of lateral setae; 5th to 7th terga with five pairs of dorsal setae, a pair of minute dorsal oral setae and four pairs of lateral filaments; 8th tergum with a pair of dorsal setae, a pair of minute dorsal oral setae and five to six (mostly five) pairs of lateral filaments; 9th segment with a pair of minute setae, a pair of filaments on its dorsal side and with numerous lateral filaments. Caudal margins of 2nd and 8th abdominal segments each with a pair of papillae. The 6th to 9th terga each with a pair of annular organs between 1st and 2nd lateral filaments; 9th tergum with a pair of small projections near the annular

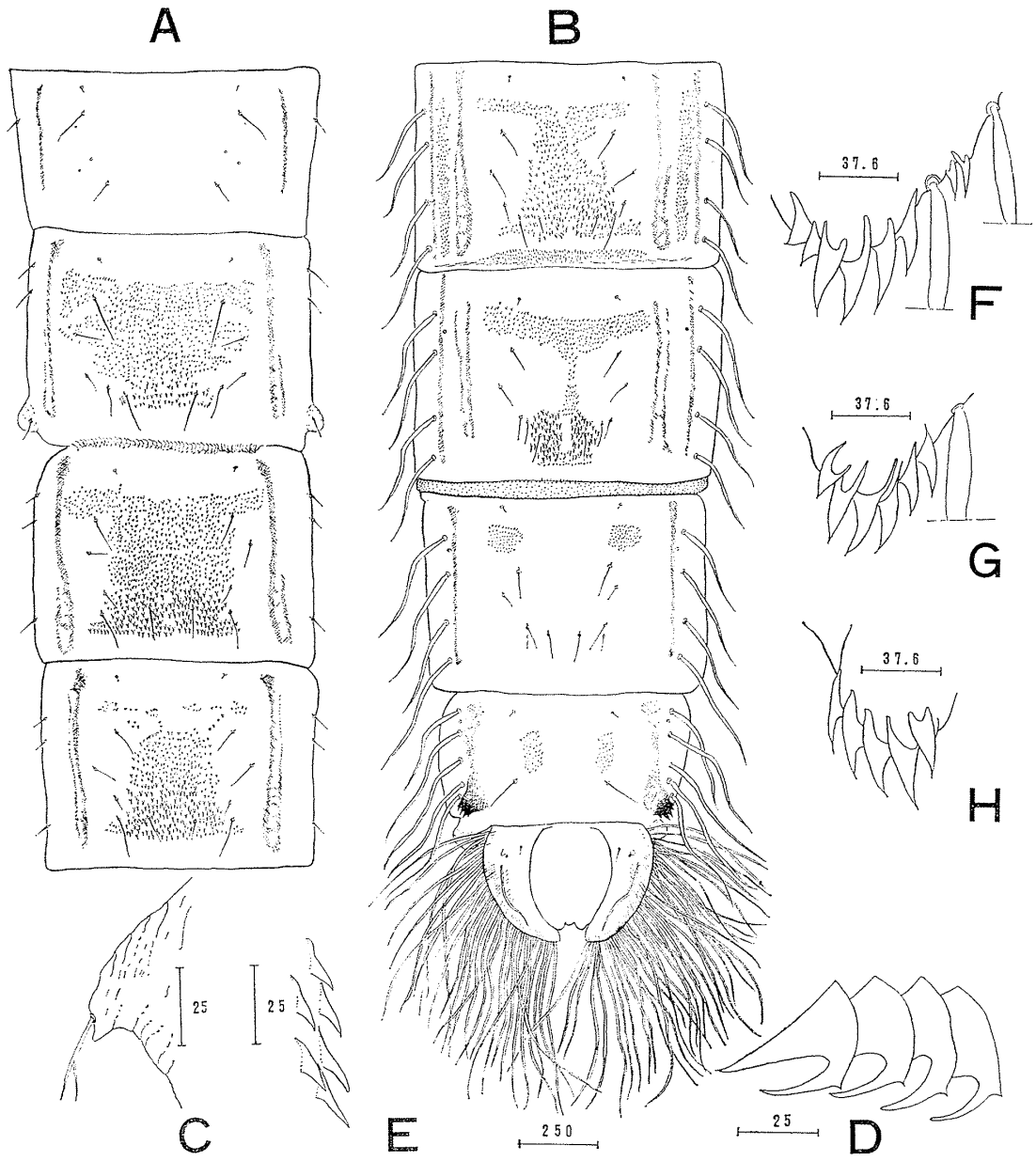

Fig. 4. Pupa of *Chironomus* (*Kiefferulus*) *umbraticola* sp. nov. A–B, dorsum of abdomen. C, cepharic tubercle. D, hooks of 2nd abdominal tergum. E, denticles on the shagreened surface, much enlarged. F–H, posterolateral spurs of segment VIII, showing variation, much enlarged. (Scale in μ)

organ. The 2nd to 6th terga with shagrination as figured; 7th and 8th terga with a pair of shagrinations, which are absent in *Kiefferulus dux* (BECK & BECK, 1970); denticles on a part of abdominal shagrination as in Fig. 4–E. Caudal margin of 2nd tergum with a row of about 50 stout hooks (Figs. 4–A, –D). The 8th tergum with posterolateral spurs, which are provided with 5–8 spines (Figs. 4–F, –G, –H).

Length of body: 5.4–6.0 mm.

Distribution: Japan (Honshu, Kyushu).

Holotype: ♂, Mt. Wakasugiyama, Fukuoka Pref., Kyushu, 4. vii. 1974., M. YAMAMOTO leg. (Type No. 2094, Kyushu Univ.)

Paratypes: 11 ♂♂, 1 ♀, Hirakawa, Yamaguchi City, Yamaguchi Pref., Honshu, 14. ix. 1974., M. YAMAMOTO leg.; 1 ♂, same locality and same collector, 21. ix. 1974.; 20 ♂♂, 3 ♀♀, same locality and same collector, 28. v. 1975.; 3 ♂♂, same locality and same collector, 30. v. 1975.; 4 ♂♂, 1 ♀, same locality and same collector, 18. vi. 1975.; 1 ♂, same locality and same collector, 8. vi. 1976.; 38 ♂♂, 4 ♀♀, Mt. Wakasugiyama, Fukuoka Pref., Kyushu, 4. vii. 1974., M. YAMAMOTO leg.; 6 ♂♂, 3 ♀♀, same locality and same collector, 2. viii. 1974.; 1 ♂, same locality and same collector, 7. viii. 1974.; 4 ♂♂, same locality and same collector, 8. viii. 1974.; 1 ♂, 1 ♀, same locality and same collector, 31. viii. 1974.; 2 ♀♀, same locality and same collector, 26. x. 1974.; 10 ♂♂, same locality and same collector, 21. v. 1975.; 13 ♂♂, same locality and same collector, 15. v. 1976.; 8 ♂♂, 9 ♀♀, same locality and same collector, 27. x. 1976.; 4 ♂♂, 5 ♀♀, Takeda Jinja, Kaseda City, Kagoshima Pref., Kyushu, 23. vii. 1976., K. ÔHARA leg.; 7 ♂♂, 3 ♀♀, same locality and same date, M. YAMAMOTO leg.

The holotype is deposited in the collection of the Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka.

Remarks: The present species is somewhat related to *Chironomus* (*Kiefferulus*) *dux* JOHANNSEN and *Chironomus* (*Kiefferulus*) *paratinctus* MARTIN, as stated elsewhere in this paper. In *C. dux*, however, the gonostylus of male genitalia is slender. In *C. paratinctus* the foreleg ratio of male is more than 1.8, being much larger than that of *umbraticola*.

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支部活動状況 (I)

中国支部 昭和53年10月25日，広島市せとうち苑において，昭和53年度例会を，日本応用動物昆虫学会中国支部と合同で開催し次の講演があった．

1) 高温処理ヒメトビウンカの発育におよぼすコレステロールの影響—野田博明（島根農試）・斎藤哲夫（名大農）；2) タイ国におけるウンカ・ヨコバイ類の卵寄生バチについて—三浦　正（島根大農）；3) 最近のニカメイガについて—積木久明（岡大農生研）・坪井昭正（岡山農試）；4) 温度処理によるコガタルリハムシの休眠覚醒—芦田栄徳（岡大農生研）；5) 電池式吸虫管—矢野宏二・浜崎詔三郎（山口大農）；6) 水田雑草の昆虫相（予報）—山田昆良・矢野宏二（山口大農）；7) 水田におけるハナアブ相—矢野宏二・大村克己（山口大農）・奥野孝夫（大阪農セ）；8) ホソハリカメムシの産卵による斑点米の発生におよぼす環境温度の影響—安部　浩・田中重義・石井卓爾（島根農試）；9) クサギカメムシの産卵に及ぼす日長の影響—山下優勝・河野　哲（兵庫農セ）；10) カメムシ類の悪臭成分であるアルデヒドについて—山下俊和・兼久勝夫（岡大農生研）；11) ゴミムシの防禦分泌の方向性—兼久勝夫（岡大農生研）；12) ニセダイコンアブラムシの有性虫出現と日長との関係—河田和雄（岡大農生研）；13) カンキツ園アブラムシのアリとの共生が食蝥性天敵の活動におよぼす影響—加藤　勉（山口大島柑橘）；14) サクラに虫瘤を形成するアブラムシ類に関する研究—冬寄主上での *Myzus sasakii* の1形態について—浜崎詔三郎（山口大農）；15) ミカンハダニのベンゾメート抵抗性系統と感受性系統間の生態上の比較—井上晃一（果樹試安芸津）；16) ブドウ（マスカット・オブ・アレキサンドリア）の生育に及ぼすカンザワハダニの影響—芦原　亘（果樹試安芸津）；17) クワシロカイガラムシとウメシロカイガラムシについて—小原隆三・河合　孝・前田　進・久保信夫（鳥取大農）；18) モモハモグリガ秋季成虫の越冬条件—藤原昭雄（広島果樹）・田村悠治（広島県庁）・松本　要（広島果試）；19) 黄色水盤でとらえたオンシツコナジラミ雌成虫の卵巣成熟状態—林　英明（広島農試）；20) 広島県におけるアメリカシロヒトリの初発生—山口泰治・常清政光（広島県福山防除所）；21) クリ園における空中散布が昆虫相に及ぼす影響—ナミテントウの薬剤感受性—藤本　清（兵庫農セ）；特別講演　昆虫不妊化に関する諸問題と展望—清久正夫（岡山大学名誉教授）．