Notes on the *Dicrotendipes* (Diptera: Chironomidae) of Mexico, with descriptions of two new species

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The species of *Dicrotendipes* known from or expected to occur in Mexico are listed. Two new species are described: *Dicrotendipes sinoposus* Epler from the male; and *D. obrienorum* Epler from the male and female. Comments are given on fluid preservation and color retention, and sexual dimorphism in the genus *Dicrotendipes*.

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The chironomid fauna of Mexico and Central America is poorly known (Reiss 1982). Less than 10 species have been described as new from Mexico (Reiss 1972; Roback 1964, 1965; Sæther 1983; Serra-Tosio 1977; Vargas 1946, 1952). Our poor present knowledge of the midges of Mexico is no doubt due to a scarcity of collectors and a dearth of specimens, rather than an impoverished fauna. I recently examined some chironomids from Mexico collected by C. W. and L. B. O'Brien. In this material were 2 new species of *Dicrotendipes* Kieffer.

The genus *Dicrotendipes* was recently revised for the Nearctic (Epler 1987). The present paper deals with the species of *Dicrotendipes* found or expected to occur in Mexico. Comments on sexual dimorphism in the genus are also included.

Methodology

Morphological and descriptive terminology follow Sæther (1980) and Epler (1987). All measurements are in micrometers unless otherwise stated. The female notum is measured from its anterior origin to its bifurcation point.

Abbreviations used are:

FSCA — Florida State Collection of Arthropods, Florida A & M University, Tallahassee, FL, U.S.A.
USNM — National Museum of Natural History, Washington, D.C., U.S.A.

The majority of chironomid workers today collect and preserve adult midges in alcohol. Preservation in alcohol has at least 2 drawbacks: delicate colors, such as greens, are lost; and, after a period of years (approximately 15-20), alcohol-preserved specimens are difficult to prepare for slide mounting. Tissues within the body are virtually impossible to macerate, and after spending a long period in KOH (in the attempt to macerate the inner tissues), the cuticle becomes very thin and difficult to observe.

Chironomids preserved in Kahle's solution (30 pt. 95% ethanol, 12 pt. formaldehyde, 4 pt. glacial acetic acid, 60 pt. water) or Pampel's fluid (15 pt. 95% ethanol, 6 pt. formaldehyde, 4 pt. glacial acetic acid, 30 pt. water) retain their colors for a longer period than alcohol preserved specimens. I first noticed this in specimens collected in Mexico and preserved in Pampel's by C. W. and L. B. O'Brien. After several weeks of storage in Pampel's, green midges were still green.

I have experimented with Kahle's solution; light green specimens collected and preserved in this solution still retain much of the same light green color they were over 2 years ago. Other specimens collected at the same time and preserved in alcohol have bleached to a light yellow color. However, Kahle's and Pampel's do have some drawbacks; both fluids contain formaldehyde, to which many workers are sensitive, and both fluids are malodorous. A more serious drawback is the effect of these fluids on specimens prepared for

slide mounting. The muscle tissue becomes very difficult or impossible to macerate following fixation in Kahle's after as short a period as 2 years. Because of this serious limitation, workers desiring to retain midge colors would acheive better results by pinning a series of fresh specimens in addition to those collected in alcohol.

Results and discussion

Vargas (1952) recorded 2 species of *Dicrotendipes* (as *Tendipes* (*Limnochironomus*)) from Mexico: *californicus* Johannsen and *figueroai* n. sp. Epler (1987) considered *figueroai* to be a junior synonym of *D. aethiops* (Townes). Following is a list of the species of *Dicrotendipes* known from or expected to occur in Mexico. Because so much of Mexico remains unsampled for chironomids, this list should be regarded as provisional.

Dicrotendipes adnilus Epler

This species is known only from the Chiricahua Mountains of SE Arizona. Although not yet recorded from Mexico, I would expect diligent collecting in the mountains of Chihuahua and Sonora would produce this species.

Dicrotendipes aethiops (Townes)

Vargas (1952) recorded this species (as *Tendipes (Limnochironomus) figueroai*) from Lagunas de Zempoala, Morelos. Epler (1987) recorded a single specimen from Arroyo de Calamajue in Baja California. In addition, I have also seen 4 specimens from Querétaro, Cadereyta, Wagner Farm, 29-X-1962, leg. E. J. Fittkau. These 4 specimens are in the Zoologische Staatssammlung, Munich, Federal Republic of Germany.

Dicrotendipes californicus (Johannsen)

Vargas (1952) recorded this species from Lagunas de Zempoala, Morelos. Epler (1987) also recorded specimens from Xochitepec in Morelos, Tehuantepec in Oaxaca, and Piaxtla in Sinaloa. This species is part of a complex of species which ranges from California and South Dakota in the U.S. to Colombia in South America.

Dicrotendipes lucifer (Johannsen) complex

Males of the *D. lucifer* complex are not safely separable to species (Epler 1987). Although I have not seen specimens of this complex from Mexico, I have examined specimens collected in Brownsville, Texas and other areas near the Texas — Mexico border. I believe it would be safe to assume that this species will eventually be collected in Mexico.

Dicrotendipes neomodestus (Malloch)

This species has not yet been recorded from Mexico, but its presence along the Rio Grande in Texas should lead to its eventual collection in Mexico.

Dicrotendipes obrienorum sp. nov.

Type locality: Mexico, Michoacan, Patzcuaro.
Type material: Holotype, male, Mexico, Michoacan, Patzcuaro, el. 2164 m, at light,14-VIII-1982, leg. L. B. O'Brien (FSCA). — *Paratypes* (13), same data as holotype, 3♂♂, 10♀♀ (FSCA, JHE). The male holotype is mounted in Euparal and is deposited in the Florida State Collection of Arthropods chironomid collection housed at Florida A & M University, Tallahassee, FL, U.S.A. 2 male paratypes are mounted in Hoyer's (ringed with Euparal); the remainder of the paratypes are in alcohol or mounted in Euparal.
Diagnosis: Distinguished from *D. californicus* (Johannsen) and *D. crypticus* Epler by the dark red-brown coloration and the solid coloration of the fore femora.
Etymology: I take pleasure in naming this species after C. W. and L. B. O'Brien, who have taken the time to collect chironomids on their field trips to Mexico, and have made their specimens available to me.

Description

MALE IMAGO (n=3; holotype, 2 paratypes)

Color (alcohol preserved specimens). Head and abdomen red-brown, distal 1/3 of T VII and VIII lighter, thorax dark red-brown. Fore legs completely dark brown; mid and hind legs with femora dark brown, tibiae light brown with dark brown apices, tarsi light brown, tarsomere 1 sometimes with light proximal apex; tibial apices of hind legs with more extensive dark coloration than mid legs. Wings mostly clear, with faint spots at base of r_{4+5}, at FCu and along M_{3+4} and Cu_1 slightly darker long vannal fold; veins light red-brown.

Length. Total 4.20-4.61 mm; thorax 1.18-1.28 mm; abdomen 3.03-3.34 mm.

Head. Temporals 50-51. Clypeus with 24-28 setae; 10-11 (2) cibarial setae. Palpomere lengths: 43-55; 50-63; 188-193; 173-183; 195-230. Frontal tubercles 20-28 long, 8-10 wide. AR 2.61-2.89.

Thorax. Scutal tubercle moderately to well developed. Acrostichals 4-6(2); dorsocentrals 26-33(2); scutellars 11(2); prealars 10-11(2). Humeral pit well developed, with 3-7 large tubercles.

Wing. Length 2.40-2.51 mm, width 685-690. FCu below or distal to RM. VR 0.90-0.92. Brachiolum with 2-3 setae; R_1 with 16-22 setae; R_{4+5} with 3-5 setae; squama with 17-18 setae.

Legs. Foretarsal beard absent. Metatarsus of middle leg with 9(2) palmate sensilla chaetica. Lengths and proportions of legs:

	p_1	p_2	p_3
fe	970—980	920—950	1040—1060
ti	840—880	915—940	1210—1240
ta_1	1220(2)	460—465	780—805
ta_2	575—605(2)	290—300	410
ta_3	520—545(2)	220—235	330—340
ta_4	380—400(2)	130—140	190—205
ta_5	155—170	100—110	115—125
LR	1.39—1.45(2)	0.49—0.51	0.64—0.65
BV	1.79—1.86(2)	2.99—3.09	2.89—2.91
SV	1.48—1.52(2)	3.96—4.11	2.88—2.91

Abdomen. Flattened setae on S VI not apparent.

Hypopygium (Fig. 1). Gonostylus broad, not as inflated or apically attenuate as *D. californicus*, curved medially, with 8-10 large setae on inner apex. Superior volsella (Figs. 2-3) length 75-83, width 40-46; pediform, with apex reflexed in all specimens examined, ventrally setose except for distal margin and apex, with 5-7 sensilla chaetica arranged in 2-3 irregular rows. Inferior volsella with tip of club moderately expanded, apex shallowly notched, with 2-3 dorsal rows of 1-5 sensilla chaetica each; with 1-3 ventral apical setae, these setae slightly smaller than those present in most other *Dicrotendipes*. Anal point bare dorsally, pyriform, with short narrow peduncle, strongly deflexed; with 2-4 dorsal basal setae and 9-11 lateral basal setae.

FEMALE IMAGO (n=3 paratypes)

Color. Similar to male. The dark markings along the veins of the wing are slightly more extensive in the female.

Length. Total 3.70-3.71(2) mm; thorax 1.08 (2) mm; abdomen 2.63-2.68 mm.

Head. Temporals 23-32. Clypeus with 31-36 setae; 8-13 cibarial setae. Palpomere lengths: 25-42; 43-50; 143-175; 143-150; 172-203. Frontal tubercles 10-15 long, 5-10 wide. AR 0.46-0.52.

Thorax. Scutal tubercle well developed. Acrostichals 10-11(2); dorsocentrals 40-48; scutellars 13-15; prealars 8-13. Humeral pit well developed, with 8-9 large tubercles.

Wing. Length 2.28-2.45 mm; width 770-800. FCu distal to RM. VR 0.89-0.92. Brachiolum with 2 setae; R_1 with 31-35 setae; R_{4+5} with 30-35 setae; squama with 13-14 setae.

Legs. Metatarsus of middle leg with 42-43 palmate sensilla chaetica in partially double row. Lengths and proportions of legs:

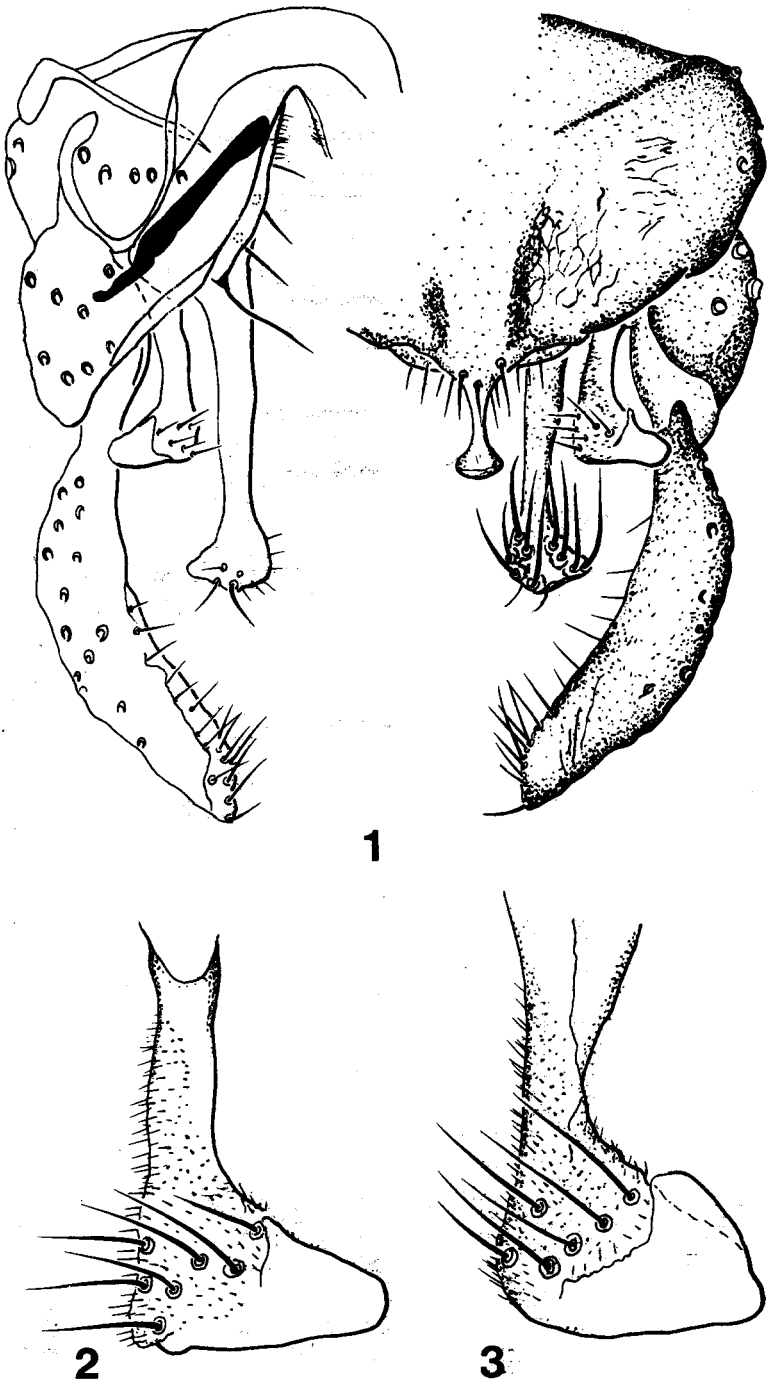
	p_1	p_2	p_3
fe	880—910	840—860	910—950
ti	720—780	805—860	1050—1140
ta_1	1110(1)	400—440	640—740
ta_2	480(1)	235—260	325—360
ta_3	415(1)	175—180	265—300
ta_4	310(1)	110	140—155
ta_5	150(1)	95	110
LR	1.54(1)	0.50—0.52	0.61—0.65
BV	2.01(1)	3.30—3.35	3.06—3.07
SV	1.45(1)	3.91—4.11	2.82—3.06

Abdomen. Flattened setae on S VI not apparent. S VIII with 20-29 setae per side; T VIII with 22-37 setae. T IX with about 36-50 setae. T X with 5-7 setae per side. Gc IX with 2-3 setae. Notum 190-198 (2) long. Cerci 126-134 long. Genitalia as in Figs. 4-6.

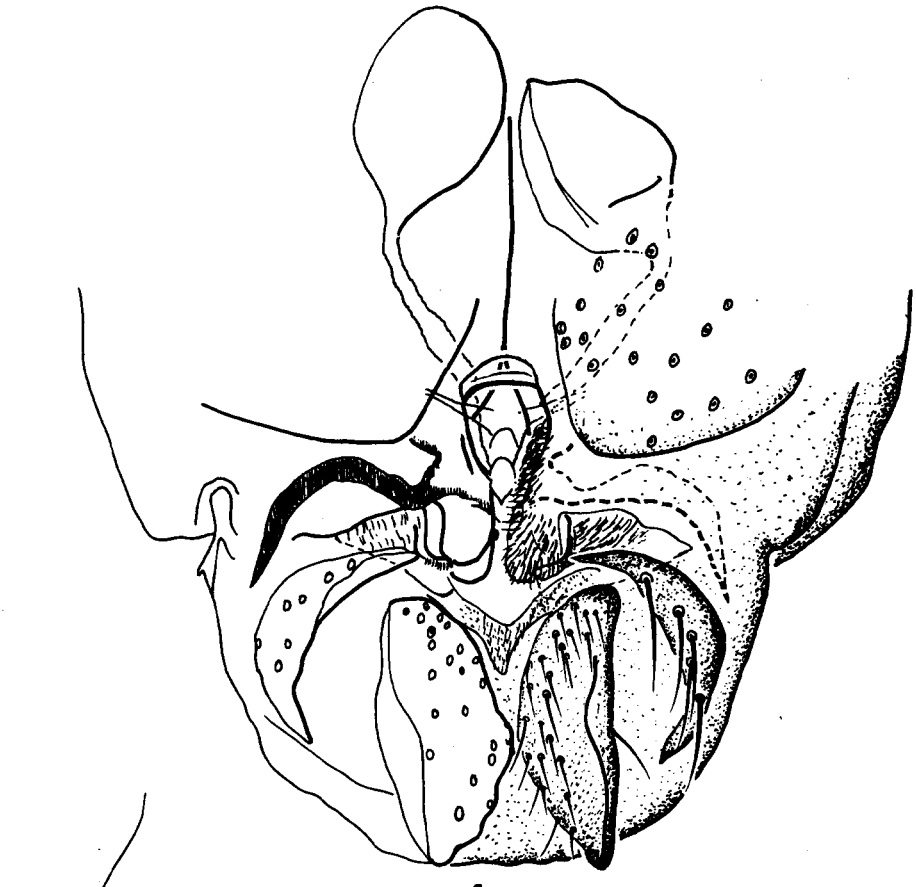
PUPA AND LARVA: Unknown

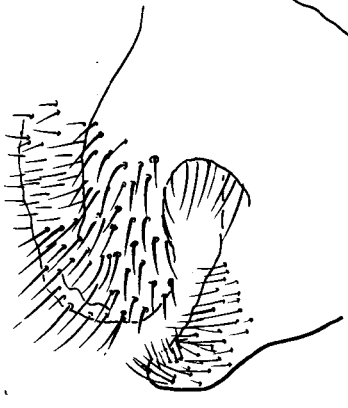
Remarks

This species is a member of the *D. californicus* group; other species in this group include *D. californicus* and *D. crypticus* Epler. This group is distributed from the western United States southward to Colombia. It is possible that *D. obrienorum* may be a color phase or subspecies of *D. californicus*; more rearings of the members of the *D.*



Figs. 1-3. *Dicrotendipes obrienorum*, adult male. — 1. Hypopygium. — 2, 3. Superior volsellae.





Figs. 4-6. *Dicrotendipes obrienorum*, adult female. — 4. Ventral view, female genitalia. — 5. DmL & VlL. — 6. ApL.

californicus group are needed from Central and South America.

Dicrotendipes sinoposus sp. nov.

Type locality: Mexico, Hidalgo, Otongo.
Type material: Holotype , male, Mexico, Hidalgo, Otongo, at light, 8-I-1982, leg. C. W. & L. B. O'Brien (FSCA). — *Paratypes* (2): Mexico, Veracruz, Catemaco, 9 Aug. 1964, light trap, leg. P. J. Spangler, 2♂♂ (USNM). The holotype specimen is slide mounted in Hoyer's mountant (ringed with Euparal), and is deposited in the FSCA.
Diagnosis: This species is similar to *D. modestus* (Say) and *D. adnilus* Epler. The raised truncate base of the anal point, with more than 15 dorsal basal setae, will separate this species from *D. modestus*. The base of the anal point is wider and more setose in *D. sinoposus* than *D. adnilus*; the apex of the superior volsella is setose in *sinoposus*, bare in *adnilus*; and the abdomen of *sinoposus* is green, while *adnilus* is a dark brown species.
Etymology: Sinoposus is an anagram for Soponis; I take pleasure in naming this species in honor of A. R. Soponis.

MALE IMAGO (n=3; 1 holotype and 2 paratypes)

Color (based on holotype which was preserved in Pampel's fluid before slide mounting). Head and abdomen green, thorax yellow-orange. Fore legs with femora green, with brown distal apices; tibiae light brown-green, distal apices brown, tarsi brown. Mid and hind legs greenish stramineous, with tarsomeres darker. Wings clear, veins light yellow-brown.

Length. Total 5.12 mm (1); thorax 1.15-1.23 mm; abdomen 3.90mm (1).

Head. Temporals 41 (1). Clypeus with 13-20 setae; 7 (1) cibarial setae. Palpomere lengths: 53-62; 53; 160-225; 168-203; 245-308. Frontal tubercles 5-8 long, 7-8 wide. AR 2.45-2.70.

Thorax. Scutal tubercle moderately to well developed. Acrostichals 11-14; dorsocentrals 14-22; scutellars 9-12 (2); prealars 10. Humeral pit not clearly discernable.

Wing. Length 1.83-2.55 mm, width 560-730. FCu distal to RM. VR 0.86-0.88. Brachiolum with 2 setae; R_1 with 34-42 setae; R_{4+5} with 16-21 setae; squama with 8-14 setae.

Legs. Foretarsal beard absent. Metatarsus of middle leg with 5-6 palmate sensilla chaetica. Lengths and proportions of legs:

	p_1	p_2	p_3
fe	890—1310	805—1100	900—1300
ti	730—1030	710—1060	1000—1470
ta_1	1070—1650	435—605	710—980
ta_2	560—860	260—350	350—480
ta_3	480—725	165—215	265—350
ta_4	420—600	80—120	140—210
ta_5	185—190(2)	60—85	90—120
LR	1.44—1.60	0.57—0.61	0.67—0.71
BV	1.61—1.64(2)	3.45—3.59	3.10—3.23
SV	1.42—1.52	3.48—3.57	2.61—2.82

Abdomen. Flattened setae on S VI not apparent.

Hypopygium (Fig. 7). Gonostylus narrow, curved medially, with 8 large setae on inner apex. Superior volsella (Fig. 8) length 65-83, width 45-65; pediform, ventrally covered with small setae to distal margin, with 6-10 sensilla chaetica arranged in 2-3 irregular rows. Inferior volsella with tip of club moderately expanded, apex shallowly bifid, with 2-3 dorsal rows of 1-5 sensilla chaetica each; with 1 large ventral apical setae. Anal point bare dorsally, pyriform; base of point truncate, raised; with 16-20 large dorsal basal setae, some running forward almost to median portion of hypopygium; 7-9 lateral basal setae.

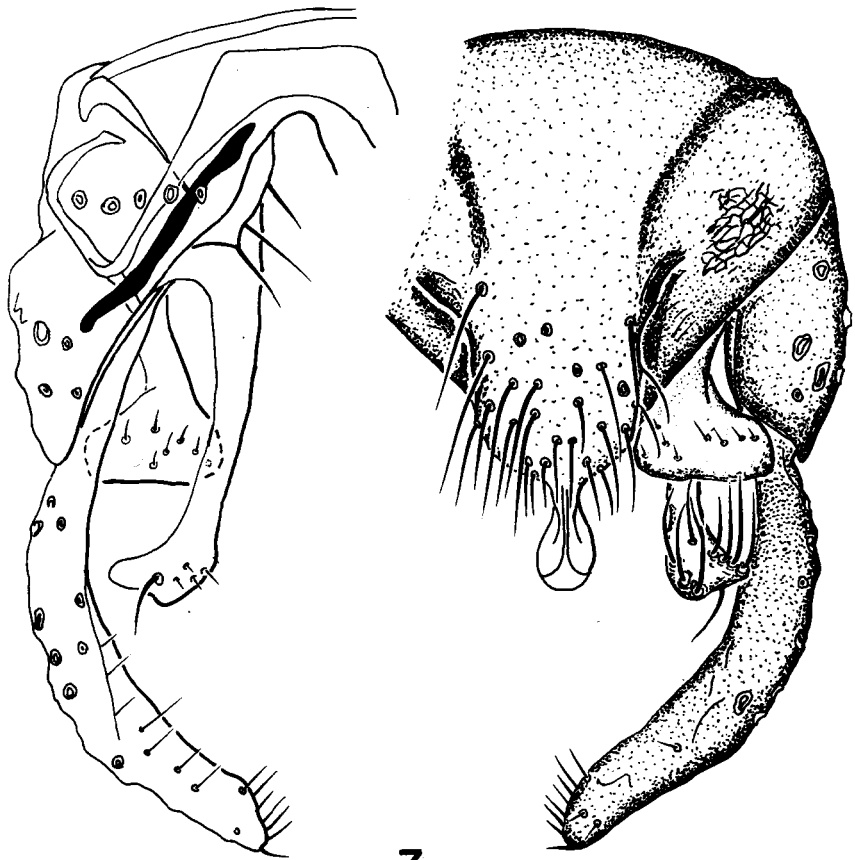
FEMALE IMAGO, PUPA, AND LARVA: unknown.

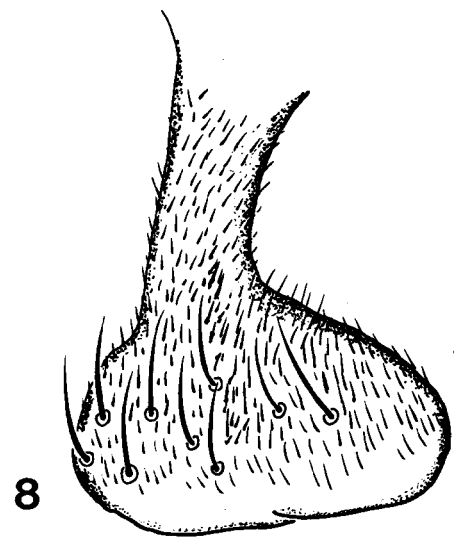
Remarks

The pediform superior volsella and general morphology of the hypopygium place this species near *D. adnilus* Epler and *D. modestus* (Say).

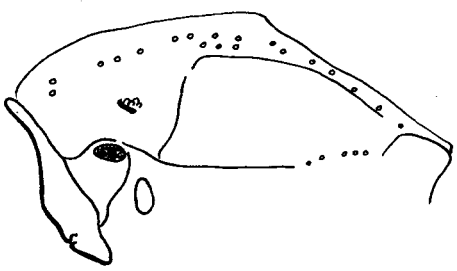
Notes on sexual dimorphism

In addition to the usual sexual dimorphism, such as genitalia, antennae, and the stouter female body and wing form, several other differences are apparent. The dorsocentral setae in the female (Fig. 9) originate much farther forward on the thorax than in the male (Fig. 10), and are more numerous, as are the acrostichal setae. Wing veins R_1 and R_{4+5} are more setose in the female. The leg ratio BV is higher in the female. The palmate sensilla chaetica of the metatarsus of the middle leg are more numerous in the female and may run almost the entire length of the tarsomere. The row of sensilla chaetica is partially double. Although I





Figs. 7-8. *Dicrotendipes sinoposus*, adult male. — 7. Hypopygium. — 8. Superior volsella.



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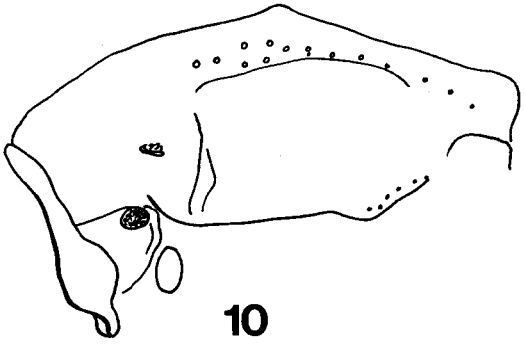

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Figs. 9-10. *Dicrotendipes obrienorum*, scutum, showing distribution of dorsocentral setae. — 9. Female. — 10. Male.

have not critically examind females of all *Dicrotendipes* species, the numbers of dorsocentral setae and palmate sensilla chaetica are higher in the female than the male in all species examined, and these setae and sensilla chaetica are generally distributed in a similar manner in the females of all species examined.

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