

A SYNOPSIS OF THE GENUS *Dictya* MEIGEN WITH TEN NEW SPECIES (DIPTERA: SCIOMYZIDAE)

R. E. ORTH

Department of Entomology, University of California Riverside, California 92521.

Abstract.—*Dictya caliente*, *D. chihuahua*, *D. disjuncta*, *D. fisheri*, *D. jamaica*, *D. knutsoni*, *D. orion*, *D. praecipua*, *D. valleyi*, and *D. veracruz* are described as new Nearctic and Neotropical species. A key to the *Dictya* species of the world is included. Illustrations of diagnostic genitalic structures, geographic distribution, and type locality for each species are given.

Key Words: Diptera, Sciomyzidae, *Dictya*, taxonomy, key, illustrations

Since Berg (1953) conclusively demonstrated that sciomyzid fly larvae kill and consume freshwater snails, considerable interest in these flies has continued. Used alone or with other control agents, sciomyzid flies, including *Dictya*, may limit or control the snails that serve as intermediate hosts of snail-borne diseases of man and animals, namely schistosomiasis and fascioliasis. Larvae of *Dictya* species attack both pulmonate and prosobranch snails in a wide variety of freshwater habitats as well as in coastal salt marshes. Within the broad diversity of the genus certain species may prove effective in the biological control of targeted snails. Recently, McLaughlin and Dame (1989) developed methods for continuous propagation of *Dictya floridensis* Steyskal, mass rearing larvae on living, freshly crushed, and frozen snails, and also embryonated snail egg masses. Colony size appeared limited primarily only by space, labor, and availability of snails for food.

Presently, 42 species of *Dictya* are known which include one new synonym and the ten new species described herein. All are Nearctic or Neotropical with the exception of *Dictya umbrarum* (Linnaeus), a Palearctic species.

The following combination of characters distinguishes *Dictya* from all other genera. Gross aspect dull grey with brownish spots, somewhat smaller than the housefly. **Head.**—Face white with central black spot, one orbital bristle present. Frons not strongly convex. Arista black. Pedicel usually approximately the same length as high. **Thorax.**—Proepisternum without strong bristle above base of forecoxa. Subalar sclerite without vellar bristles. Bristles present on a ridge immediately ventrad of the articulation of the wing. One or more thoracic pleurites with setae or bristles. Anepisternum and anepimeron each with a strong bristle; katepisternum with setae but without bristles. Two dorsocentral bristles present. Wing heavily patterned with black and whitish translucent spots or markings on a grayish background. Crossvein dm-cu slightly curved. Hind tibia with one dorsal preapical bristle. **Abdomen.**—The terminal segments and reproductive structures, as in other genera of Sciomyzidae, are uniquely shaped, which allows separation into species.

In the Americas *Dictya* is one of the most widely represented genera in the family Sciomyzidae. Where proper habitat and host mollusks are found, *Dictya* species usually

occur. The various species are known from the coastal salt marshes, to the valleys, mountains and deserts. In its northernmost distribution, *Dictya* occurs above the Arctic Circle. A distribution map by Valley and Berg (1977) shows *D. montana* Steyskal from Aklavik, Northwest Territories (68°15'N latitude). *Dictya* is widespread in Canada and the United States. It is further known from the islands of the Caribbean, Mexico, Central America, and South America, where, in Colombia, *D. bergi* Valley reaches the southernmost distribution for the genus.

In the future one would expect most of the presently undescribed species of *Dictya* to come from localities south of the United States. Within this tropical and subtropical area there is a rich diversity of insects, most of which have been poorly collected. One must hope that these areas will be collected more extensively in the near future by astute entomologists in order to have a permanent record of that rich fauna before habitat destruction by modern man causes its extinction.

The single most important taxonomic work on *Dictya* was by Steyskal (1954), who described eleven new species and recognized a total of twenty-six species. Earlier, Steyskal (1938) described four new species from the United States. Steyskal (1960) described four additional species in a paper on new North and Central American species. An in-depth study by Valley and Berg (1977) contributed to further understanding the biology and immature stages of many of the *Dictya* species; also included were maps of collecting sites and descriptions of four new species. Fisher and Orth (1983) illustrated six western North American species of *Dictya*. Further, they indicated and illustrated four forms of *D. montana*. These forms were not separated into discrete species, and crossing occurred in laboratory crossbreeding tests, the degree of success dependent upon the combinations attempted.

The external morphology of male and female *Dictya* adults is very similar, making

species associations very difficult, especially when a number of species are known to inhabit the same locality. The best characters for species separation are provided by the male terminalia. However, females of many species also have distinctive genitalic characters that permit species separation. A female *Dictya* has not been used as a holotype since Loew (1859) described *D. pictipes*. In his description, Loew did not use the terminalia diagnostically. He noted that external features were so similar to the European *D. umbrarum* that they might be conspecific. Cresson (1920) synonymized *D. pictipes* under *D. umbrarum*, but later it was resurrected by Curran (1932). In the following descriptions of new species, female characters have not been included. No attempt has been made to associate females with males due to lack of series depth. Associations have been made on occasion in the past, only later to be proven inaccurate, thus confusing the literature with misidentifications. An attempt has been made to pattern this manuscript after previous sciomyzid papers in order to give more continuity to the subject.

KEY AND DESCRIPTIONS

The key and descriptions that follow are based on the male terminalia. In most species, males can be readily separated by the ventral process of the hypandrium. Therefore, particular attention should be paid to that structure, which is shown inverted in the descriptions and illustrations.

Steyskal (1954) separated *Dictya* into three groups: (1) Abnormis Group, (2) Ptyarion Group, and (3) Typical Group. With the exception of the Typical Group, which is now becoming large and cumbersome, the others seem adequate. In time, as additional species become known, a further separation into two subgroups would seem desirable on the basis of the ventral process of the hypandrium being with or without a pre-terminal lobe.

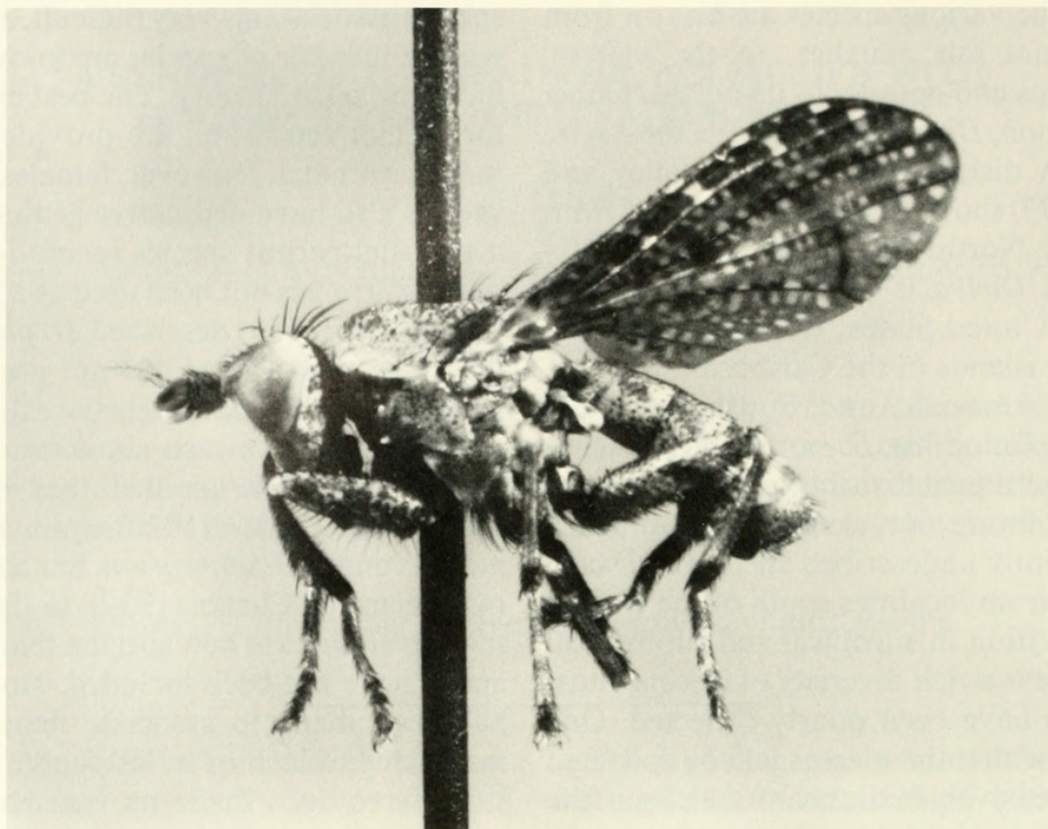


Fig. 1. *Dictya fontinalis*, paratype male. Boca Spring, Nevada Co., California. Photo by M. E. Badgley, University of California, Riverside.

CHECKLIST OF THE KNOWN
SPECIES OF *DICTYA*

a. **Abnormis Group**

1. *abnormis* Steyskal
2. *bergi* Valley
3. *guatemalana* Steyskal
4. *insularis* Steyskal
5. *matthewsi* Steyskal
6. *sinaloae* Orth
7. *veracruz* n. sp.

b. **Ptyarion Group**

8. *ptyarion* Steyskal

c. **Typical Group**

9. *adjuncta* Valley
10. *atlantica* Steyskal
11. *borealis* Curran
12. *brimleyi* Steyskal
13. *caliente* n. sp.
14. *chihuahua* n. sp.
15. *disjuncta* n. sp.
16. *expansa* Steyskal

17. *fisheri* n. sp.
18. *floridensis* Steyskal
19. *fontinalis* Fisher & Orth
20. *gaugei* Steyskal
21. *hudsonica* Steyskal
22. *incisa* Curran
23. *jamaica* n. sp.
24. *knutsoni* n. sp.
25. *laurentiana* Steyskal
26. *lobifera* Curran
27. *mexicana* Steyskal
28. *montana* Steyskal
29. *neffi* Steyskal
30. *orion* n. sp.
31. *oxybeles* Steyskal
n. syn. *iron* Steyskal
32. *pechumani* Valley
33. *pictipes* (Loew)
34. *praecipua* n. sp.
35. *sabroskyi* Steyskal
36. *steyskali* Valley
37. *stricta* Steyskal

38. *texensis* Curran

39. *umbrarum* (Linnaeus)*

40. *umbroides* Curran

41. *valleyi* n. sp.

42. *zacki* Orth & Fisher

KEY TO THE *DICTYA* SPECIES OF THE WORLD (BASED ON MALES)

1. Second antennal segment (= pedicel) shining on outer upper half or more, longer than high. Large to moderately large, deep black parafrontal spots present (**Abnormis Group**) 2

- Second antennal segment wholly pruinose, not longer than high. Parafrontal spots small or lacking 8

2. Surstylus with deep emargination in dorsal tip forming a ligulate lobe. Ventral process of hypandrium as in Figs. 34, 35 *D. guatemalana* Steyskal

- Surstylus without emargination in dorsal tip 3

3. Surstylus with dorsal tip strongly to moderately projecting 4

- Surstylus with dorsal tip weakly projecting 6

4. Ventral process of hypandrium flattened in cross section, apex truncate as in Figs. 40, 41 *D. sinaloae* Orth

- Ventral process of hypandrium not flattened in cross section, apex not truncate 5

5. Ventral process of hypandrium slender, gently curved forward, with apical point directed anteriorad. See Figs. 30, 31 . . . *D. abnormis* Steyskal

- Ventral process of hypandrium small, stout, strongly bent forward, with apical point directed anterolaterad. See Figs. 32, 33 *D. bergi* Valley

6. Surstylus with slender stem, apical extension sinuate and turned mesiad beyond middle, apical tip directed posteriad. Ventral process of hypandrium with small preterminal lobe as in Figs. 36, 37 *D. insularis* Steyskal

- Surstylus with broad stem, apical extension not sinuate nor turned mesiad beyond middle. Ventral process of hypandrium without preterminal lobe 7

7. Ventral process of hypandrium small, truncate, with slightly preterminal apical point directed anteriorad. See Figs. 38, 39 *D. matthewsi* Steyskal

- Ventral process of hypandrium with a broad, flat flange directed anteriorad, apex narrowed, directed slightly anterolaterad. See Figs. 20, 21 *D. veracruz* new species

8. Terminalia in retracted condition well covered by elongated, scoop-like sternite. Surstylus of aberrant shape (**Ptyarion Group**). Ventral process of hypandrium as in Figs. 42, 43 *D. ptyarion* Steyskal

- Terminalia when retracted with at least tip of surstylus well exposed. No elongated sternite (**Typical Group**) 9

9. Ventral process of hypandrium with preterminal lobe 10

- Ventral process of hypandrium simply tapering to tip, which may be somewhat recurved 23

10. Surstylus dorsal tip with long, stiff bristles directed posteriad. Ventral process of hypandrium as in Figs. 44, 45 *D. pictipes* (Loew)

- Surstylus dorsal tip with only short, stiff bristles directed posteriad or ventrad 11

11. Ventral process of hypandrium apical end trilobed as in Figs. 18, 19 . . *D. valleyi* new species

- Ventral process of hypandrium not trilobed 12

12. Surstylus with dorsal tip strongly to moderately projecting, usually angulate 13

- Surstylus with dorsal tip weakly or slightly projecting, usually rounded 18

13. Ventral process of hypandrium with large to moderately large preterminal lobe 14

- Ventral process of hypandrium with small preterminal lobe 16

14. Ventral process of epandrium with large to moderately large posterior lobe 15

- Ventral process of epandrium with small posterior lobe

cf. description and Figs. 24, 25

. *D. lobifera* Curran

cf. description and Figs. 14, 15

. *D. orion* new species

cf. description and Figs. 16, 17

. *D. praecipua* new species

15. Prosternum with a few setae. Ventral process of hypandrium as in Figs. 46, 47 *D. hudsonica* Steyskal

- Prosternum without setae. Ventral process of hypandrium as in Figs. 48, 49 *D. zacki* Orth & Fisher

16. Ventral process of hypandrium rather straight, erect in lateral view as in Figs. 2, 3 *D. caliente* new species

- Ventral process of hypandrium rather strongly bent anteriorad in lateral view 17

17. Ventral process of hypandrium with apex and pre-terminal lobe broad and flattened as in Figs. 4, 5 *D. chihuahua* new species

- Ventral process of hypandrium with apex and preterminal lobe much narrower and not as flattened as in Figs. 50, 51 *D. incisa* Curran

18. Ventral process of hypandrium with large to moderately large preterminal lobe 19

- Ventral process of hypandrium with small preterminal lobe 22

* Palearctic

19. Ventral process of epandrium with moderate to large posterior lobe 20
 - Ventral process of epandrium with small posterior lobe 21
20. Ventral process of hypandrium bent forward in lateral view as in Figs. 52, 53 *D. expansa* Steyskal
 - Ventral process of hypandrium more or less vertical cf. description and Figs. 54–57 *D. mexicana* Steyskal
cf. description and Figs. 58, 59 *D. neffi* Steyskal
cf. description and Figs. 22, 23, 26–29 *D. oxybeles* Steyskal
cf. description and Figs. 60, 61 *D. pechumani* Valley
21. Preterminal lobe of ventral process of hypandrium directed anteriorly as in Figs. 62, 63 *D. stricta* Steyskal
 - Preterminal lobe of ventral process of hypandrium directed anterolaterad or laterad cf. description and Figs. 64–67 *D. atlantica* Steyskal
cf. description and Figs. 6, 7 *D. disjuncta* new species
22. Ventral process of epandrium with large posterior lobe. Preterminal lobe of ventral process of hypandrium directed anterolaterad as in Figs. 68, 69 *D. floridensis* Steyskal
 - Ventral process of epandrium with relatively small posterior lobe. Preterminal lobe of ventral process of hypandrium directed anterobasally as in Figs. 70, 71 *D. sabroskyi* Steyskal
23. Surstylus with dorsal tip forming a separate lobe bearing a tuft of long, stiff bristles directed posteriorly. Ventral process of hypandrium as in Figs. 72, 73 *D. borealis* Curran
 - Surstylus with dorsal tip not forming a separate lobe, usually with a few short, stiff bristles directed dorsally or posteriorly 24
24. Surstylus with dorsal tip strongly to moderately projecting, usually angulate 25
 - Surstylus with dorsal tip weakly or slightly projecting, usually rounded 31
25. Ventral process of hypandrium at least moderately long 26
 - Ventral process of hypandrium relatively short 28
26. Surstylus of aberrant shape, apical dorsal area rolled over upon itself laterad, main body of surstylus narrowed lengthwise in lateral view. Ventral process of hypandrium as in Figs. 12, 13 *D. knutsoni* new species
 - Surstylus of typical shape, apical dorsal area not rolled over upon itself laterad, main body of surstylus not narrowed lengthwise in lateral view 27
27. Ventral process of epandrium with large, somewhat sickle-shaped posterior lobe. Ventral process of hypandrium as in Figs. 8, 9 *D. fisheri* new species
 - Ventral process of epandrium with moderately large, rounded posterior lobe. Ventral process of hypandrium as in Figs. 74, 75 *D. laurentiana* Steyskal
28. Apex of ventral process of hypandrium somewhat blade-like as in Figs. 76, 77. Prosternum without setae. Robust species *D. fontinalis* Fisher & Orth
 - Apex of ventral process of hypandrium not blade-like. Prosternum with or without setae. Generally smaller species 29
29. Ventral process of hypandrium strongly curved well back from the apex as in Figs. 78, 79. Prosternum always with setae *D. umbroides* Curran
 - Ventral process of hypandrium curved forward at apex only. Prosternum with or without setae 30
30. Prosternum without setae. Ventral process of hypandrium as in Figs. 80, 81 (North American) *D. montana* Steyskal
 - Prosternum usually with setae; ventral process of hypandrium as in Figs. 82, 83 (European) *D. umbrarum* (Linnaeus)
31. Base of ventral process of hypandrium with emargination anteriorly as in Figs. 84, 85 *D. brimleyi* Steyskal
 - Base of ventral process of hypandrium without emargination anteriorly 32
32. Ventral process of hypandrium with a thin anterior flange cf. description and Figs. 86, 87 *D. adjuncta* Valley
cf. description and Figs. 88, 89 *D. steyskali* Valley
cf. description and Figs. 90, 91 *D. texensis* Curran
 - Ventral process of hypandrium without a thin anterior flange 33
33. Ventral process of hypandrium elongated, very narrow as in Figs. 10, 11 *D. jamaica* new species
 - Ventral process of hypandrium elongated, robust as in Figs. 92, 93 *D. gaigei* Steyskal

Dictya abnormis Steyskal, 1954

Figs. 30, 31

This species is a member of the *Abnormis* Group and is known only from Mexico. It was introduced into Hawaii against *Lymnaea ollula* Gould, a vector of liver fluke, but did not become established (Davis 1961, 1974).

Male.—Wing length 4.3–4.5 mm. Prosternum bare.

Terminalia: Surstylus similar to more typical species, but stem slender and apical extension expanded laterally; dorsal tip rounded, moderately projecting. Ventral process of hypandrium slender, gently curved forward, apex with anteriorly directed tip. Ventral process of epandrium with a slender digitiform posterior lobe; anterior lobe lacking.

Type locality.—*MEXICO*, CHIHUAHUA: Sierra Madre, Hd. R. Piedras Verdes.

Dictya adjuncta Valley, 1977
Figs. 86, 87

This species is known only from Florida, where it is relatively widespread.

Male.—Wing length 4.4–5.0 mm. Prosternum bare.

Terminalia: Surstylus with dorsal tip scarcely projecting, broadly angulate, somewhat rounded. Ventral process of hypandrium without preterminal lobe, apical area with thin flange, most noticeable in anterolateral view; ventral processes angled medially in anterior view. Ventral process of epandrium with large, relatively narrow posterior lobe, directed slightly posteroventrally; anterior lobe much smaller.

Type locality.—*USA*, FLORIDA: Highlands Co., Highlands Hammock State Park.

Dictya atlantica Steyskal, 1954
Figs. 64–67

This species is known from Nova Scotia, south to North Carolina, east to Missouri, north to Michigan and Quebec, but common only in New England and Middle Atlantic states.

Male.—Wing length 4.6–5.5 mm. Prosternum bare.

Terminalia: Surstylus with dorsal tip rounded, only slightly projecting. Ventral process of hypandrium with preterminal lobe broadly flared, angulate and turned anterolaterally (Figs. 64–67 illustrate variation

in the ventral process). Ventral process of epandrium with a relatively small posterior lobe; anterior lobe broad but short.

Type locality.—*USA*, VIRGINIA: Fairfax Co., Dead Run.

Dictya bergi Valley, 1977
Figs. 32, 33

This species is a member of the Abnormis Group and is known from Costa Rica and Colombia.

Male.—Wing length 4.6–5.2 mm. Prosternum bare.

Terminalia: Surstylus with dorsal tip angulate, well-projecting. Ventral process of hypandrium small, with apical point directed anterolaterally, no preterminal lobe. Ventral process of epandrium with moderately large posterior lobe directed posteroventrally; anterior lobe scarcely projecting.

Type locality.—*COSTA RICA*, SAN JOSE PROV.: San Antonio—Desamparados.

Dictya borealis Curran, 1932
Figs. 72, 73

This species is known from Alberta east to Ontario and New York, south to Georgia, west to Texas, north to North Dakota.

Male.—Wing length 4.6–5.5 mm. Prosternum bare.

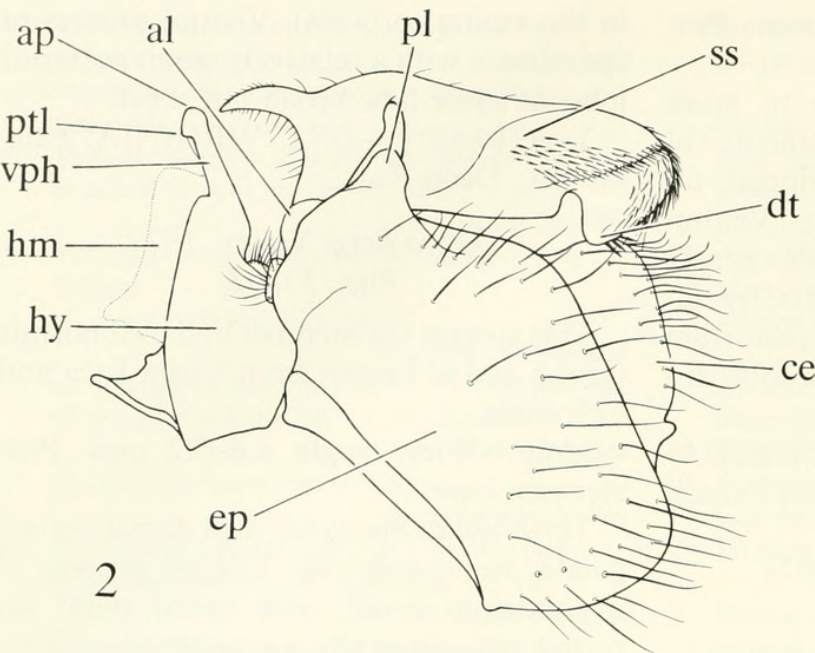
Terminalia: Surstylus with dorsal tip forming a separate lobe bearing a tuft of long, stiff bristles directed posteriad. Ventral process of hypandrium slender, elongate, with antero-apical point, no preterminal lobe. Ventral process of epandrium with a large, somewhat acute posterior lobe; anterior lobe smaller.

Type locality.—*CANADA*, MANITOBA: Birtle.

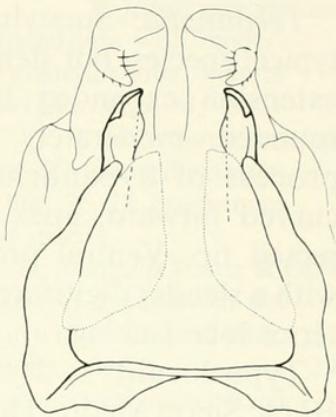
Dictya brimleyi Steyskal, 1954
Figs. 84, 85

This species is known from Maine to Florida, west to Louisiana.

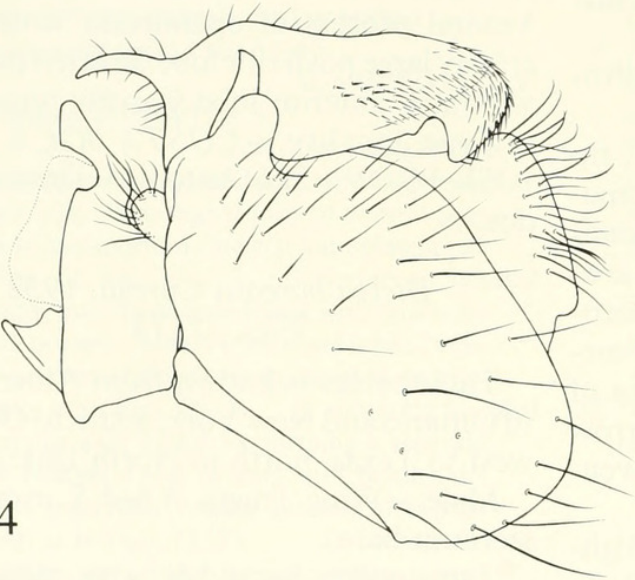
Male.—Wing length 4.1–4.6 mm. Prosternum bare.



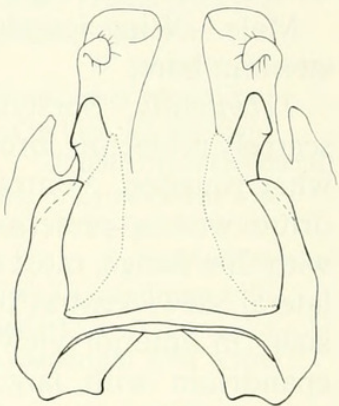
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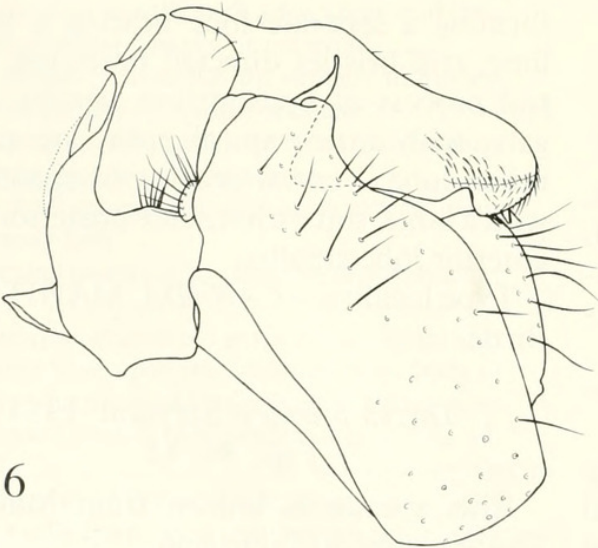
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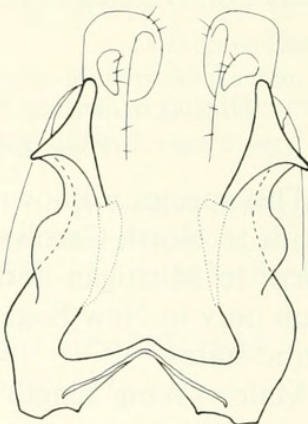
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5



6



7

0.4 mm

Terminalia: Surstylus with dorsal tip only slightly projecting. Ventral process of hypandrium with deep emargination at base anteriorly, slender and straight with strongly curved, very sharp tip. Ventral process of epandrium with narrow, rounded posterior lobe; anterior lobe not projecting.

Type locality.—USA, NORTH CAROLINA: Raleigh.

***Dictya caliente* Orth,**

NEW SPECIES

Figs. 2, 3

Holotype male.—*Head*: Face white, with a black central ovoid spot; parafrontal spot distinct, blackish, but not overly prominent; orbito-antennal wedge-shaped spot brown. Pedicel entirely matte, in lateral profile as high as long; arista with long, sparse black hairs.

Thorax: Presutural bristle approximately $\frac{3}{4}$ as long as notopleurals. Prosternum without setae. Mid femur posteroventrally with a row of approximately 16 bristles, longer medially, shorter and closer together toward the apex. Wing length 5.0 mm.

Terminalia: As in Figs. 2, 3. Surstylus with apical dorsal tip moderately angulate and well-projecting. Ventral process of hypandrium relatively erect with rounded apex and small preterminal lobe directed anterolaterally. Ventral process of epandrium with posterior lobe well-developed; anterior lobe small.

Female.—Not recognized.

Holotype.—♂, USA, NEVADA: Lincoln Co., 1 mi S Caliente, 13 June 1970, A. L. Antonelli and D. E. Foster. This specimen

was provided by W. F. Barr, University of Idaho. Deposited in United States National Museum of Natural History.

Paratypes.—USA, NEVADA: Clark Co., Juanita Springs, 17 April 1985, R. E. Bechtel and T. E. Smigel (2 ♂): Lincoln Co., Delmues Ranch, 13 August 1985, R. E. Bechtel and T. E. Smigel (1 ♂). NEW MEXICO: Catron Co., 32 mi E Glenwood, 30 June 1973, Wayne N. Mathis (2 ♂).

Diagnosis.—This species has been collected with *D. incisa*, *D. montana*, and *D. texensis*. The terminalia are similar to *D. incisa*. However, differences can readily be seen in the shape of the ventral process of the hypandrium.

Etymology.—The species name *caliente* is a noun in apposition. This species is named after the town of Caliente, which is the type locality and where this species was first collected. Caliente is a Spanish word meaning “hot,” which is descriptive of the summer temperature of this small town in southeastern Nevada.

***Dictya chihuahua* Orth,**

NEW SPECIES

Figs. 4, 5

Holotype male.—*Head*: Face white, with a small, black central elliptical spot; parafrontal spot distinct, blackish, but not overly prominent; orbito-antennal wedge-shaped spot pale brown. Pedicel entirely matte, in lateral profile slightly higher than long; arista with long, sparse black hairs.

Thorax: Presutural bristle approximately $\frac{7}{8}$ as long as notopleurals. Prosternum without setae. Mid femur posteroventrally with

Figs. 2–7. 2, 3, *Dictya caliente*, holotype male. 2, Postabdomen, lateral view, inverted; ap = apex of ventral process of hypandrium, al = anterior lobe of ventral process of epandrium, ce = cerci, dt = dorsal tip of surstylus, ep = epandrium, hm = hyaline membrane, hy = hypandrium, pl = posterior lobe of ventral process of epandrium, ptl = preterminal lobe of ventral process of hypandrium, ss = surstylus, vph = ventral process of hypandrium. 3, Hypandrium, anterior view, inverted. 4, 5, *Dictya chihuahua*, holotype male. 4, Postabdomen, lateral view, inverted. 5, Hypandrium, anterior view, inverted. 6, 7, *Dictya disjuncta*, holotype male. 6, Postabdomen, lateral view, inverted. 7, Hypandrium, anterior view, inverted.

a row of approximately 17 bristles, longer medially, shorter and closer together toward the apex. Wing length 4.6 mm.

Terminalia: As in Figs. 4, 5. Surstylus with apical dorsal tip strongly angulate and well-projecting. Ventral process of hypandrium with preterminal lobe forming a flattened wedge-shaped blade rounded at the apex. Ventral process of epandrium with a large, rounded posterior lobe directed ventral posteriad; anterior lobe scarcely discernible.

Female.—Not recognized.

Holotype.—♂, *MEXICO*, CHIHUAHUA: 5 mi N of Meoqui, Hwy. 45, elev. 3800 ft., 30 September 1967, AS-655, T. W. Fisher. Deposited in United States National Museum of Natural History.

Diagnosis.—Externally, this species closely resembles most other members in the Typical Group. The terminalia appear closest to *D. incisa* and *D. expansa*; however, examination of the ventral process of the hypandrium separates this species.

Etymology.—The species name *chihuahua* is a noun in apposition. Chihuahua is a large state in central northern Mexico adjacent to New Mexico and Texas.

Dictya disjuncta Orth,

NEW SPECIES

Figs. 6, 7

Holotype male.—*Head*: Face white, with a small, brown, central dewdrop-shaped spot; distinct black parafrontal spot; orbito-antennal wedge-shaped spot brown. Pedicel entirely matte, in lateral profile as high as long; arista with long, sparse, brownish black hairs.

Thorax: Presutural bristle approximately $\frac{1}{10}$ as long as notopleurals. Prosternum without setae. Mid femur posteroventrally with a row of approximately 16 stout bristles, those in apical half much shorter and heavier. Wing length 4.3 mm.

Terminalia: As in Figs. 6, 7. Surstylus with apical dorsal tip broadly wedge-shaped, only slightly projecting. Ventral process of

hypandrium bowed ventrad, apex wedge-like, with rounded tip. Preterminal lobe well-developed, sharply pointed, directed almost totally laterad. Ventral process of epandrium with a small posterior lobe; anterior lobe not projecting.

Female.—Not recognized.

Holotype.—♂, *USA*, MISSISSIPPI: Agr. Col. Miss., 4 May 1921, H. W. Allen. On permanent loan to United States National Museum of Natural History from Mississippi State Entomological Museum.

According to T. L. Schiefer, curator, Mississippi State, in regard to the type locality, "The names Agr. Col. Miss., A. & M. C. Miss., and State College are all old names for Mississippi State, Oktibbeha Co., Mississippi. Mississippi State is immediately adjacent (east) of Starkville."

Diagnosis.—This species can only be identified by examination of the terminalia. In Mississippi at least 10 other species of *Dictya* are known to occur. *Dictya expansa*, *D. oxybeles*, and *D. stricta*, which occur in Mississippi, show some similarities as all have a well-developed preterminal lobe on the ventral process of the hypandrium. However, *D. disjuncta* is distinguished by the preterminal lobe being directed almost entirely laterad as well as the ventral process being bowed ventrad. Further, in *D. disjuncta* the apical dorsal tip of the surstylus is considerably less projecting than in the above species.

Etymology.—The species name *disjuncta* is an adjective of Latin derivation and means separate, distinct, or different.

Dictya expansa Steyskal, 1938

Figs. 52, 53

This species is known from British Columbia east to Quebec, and all states in continuous USA except California, Maine, Tennessee, and Wyoming.

Male.—Wing length 4.9–5.4 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip somewhat rounded, weakly projecting.

Ventral process of hypandrium with preterminal lobe formed at considerable length from the apex, angulate and turned anterolaterally. Ventral process of epandrium with large posterior lobe directed posteroventrally; anterior lobe not elevated above ventral margin.

Type locality.—*USA*, MICHIGAN: Detroit.

***Dictya fisheri* Orth,**

NEW SPECIES

Figs. 8, 9

Holotype male.—*Head*: Face white, with distinct black central ovoid spot; small, distinct, blackish parafrontal spot; orbito-antennal wedge-shaped spot brown. Pedicel entirely matte, in lateral profile slightly longer than high; arista with long, sparse black hairs.

Thorax: Presutural bristle nearly as long as notopleurals. Prosternum with a few bristly setae. Mid femur posteroventrally with a row of approximately 18 stout bristles, row poorly defined proximally, bristles shorter and closer together toward the apex. Wing length 5.5 mm.

Terminalia: As in Figs. 8, 9. Surstylus with apical dorsal tip moderately angulate and well-projecting. Dorsal tip without stout, stiff bristles, all bristles more or less uniform. Ventral process of hypandrium elongated, bent forward with apex directed anteriorly, no preterminal lobe. Ventral process of epandrium large, narrowed (to a point) posterior lobe, directed posteriorly; anterior lobe not present. Epandrium with a central, ventral, bilaterally-divided, blade-like projection that extends beyond the ventral surface of the surstyli. Medially an inner shorter lobe with long setae separating the blade-like projections.

Female.—Not recognized.

Holotype.—♂, *MEXICO*, *MEXICO*: La Marquesa, Las Cruces N.P., 5–9 July 1965, Flint and Ortiz. Deposited in United States National Museum of Natural History.

Paratypes.—Wing length 5.4–5.8 mm.

MEXICO, *MEXICO*: La Marquesa, Las Cruces N.P., 5–9 July 1965, Flint and Ortiz (3 ♂). *HIDALGO*: Lagunilla, Rt. 85, km 132, 4 July 1965, Flint and Ortiz (1 ♂).

Diagnosis.—This is the only *Dictya* species found south of the United States that is known to have setae on the prosternum with the exception of *D. knutsoni*, which may or may not have setae. The blade-like projection on the ventral surface of the epandrium extending beyond the ventral surface of the surstyli and the uniform bristles over the entire apex of the surstylus further separate it from all other species of *Dictya*.

Etymology.—It is my pleasure to name this species in honor of Dr. Theodore W. Fisher, University of California, Riverside, whose friendship and shared research over many years are hereby gratefully acknowledged.

Dictya floridensis Steyskal, 1954

Figs. 68, 69

This species is known from North Carolina, Georgia, Florida, Alabama, Mississippi and Louisiana.

Male.—Wing length 4.1–4.7 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip rounded, only slightly projecting, bristles relatively short. Ventral process of hypandrium with very short preterminal lobe, apex acute, directed anterolaterally. Ventral process of epandrium with large, rounded, posterior lobe; anterior lobe projecting, narrow and pointed.

Type locality.—*USA*, *FLORIDA*: Indian River County.

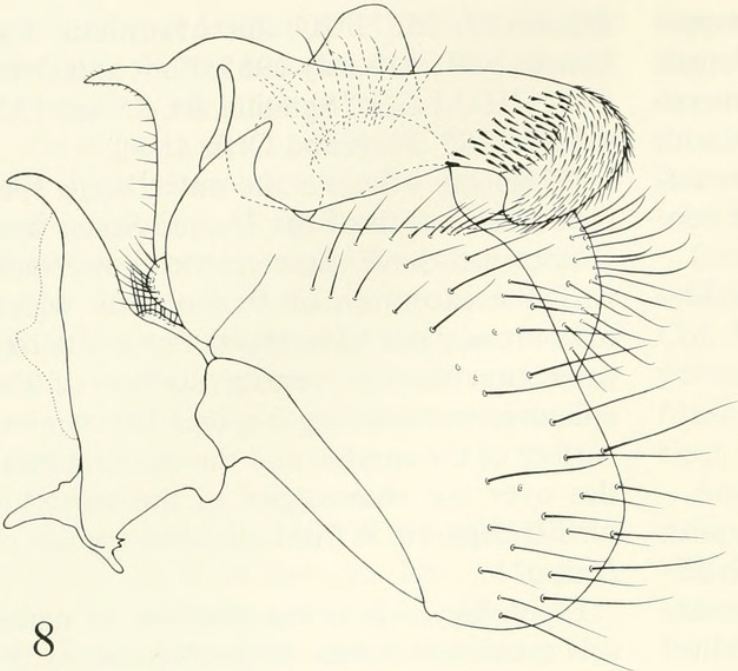
Dictya fontinalis Fisher and Orth, 1969

Figs. 1, 76, 77

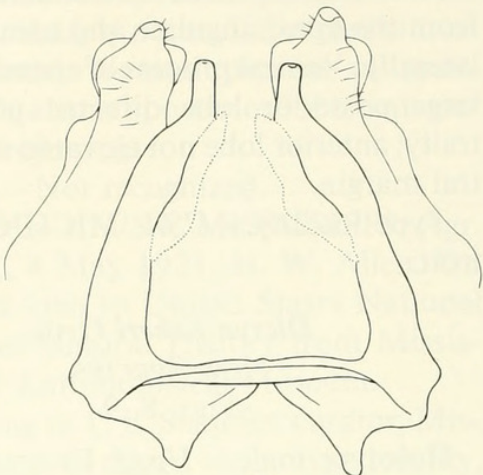
This species is known from Washington, Oregon, California, and Nevada.

Male.—Wing length 4.8–5.6 mm. Prosternum without setae.

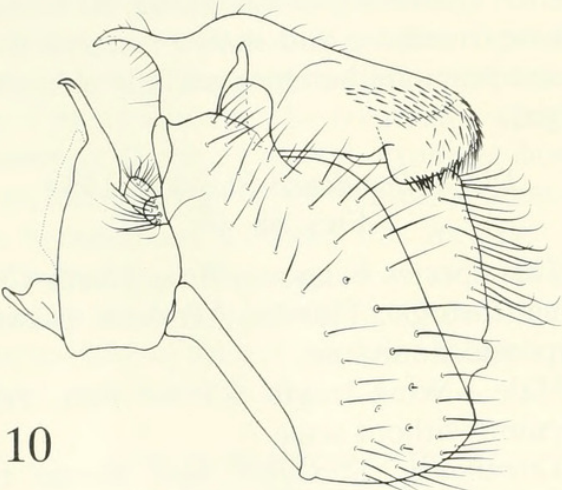
Terminalia: Surstylus with dorsal tip well-projecting, not sharply angulate, but blunt-



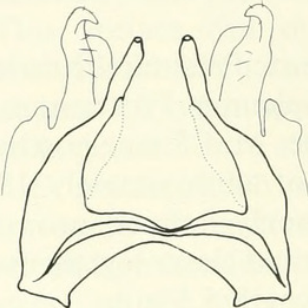
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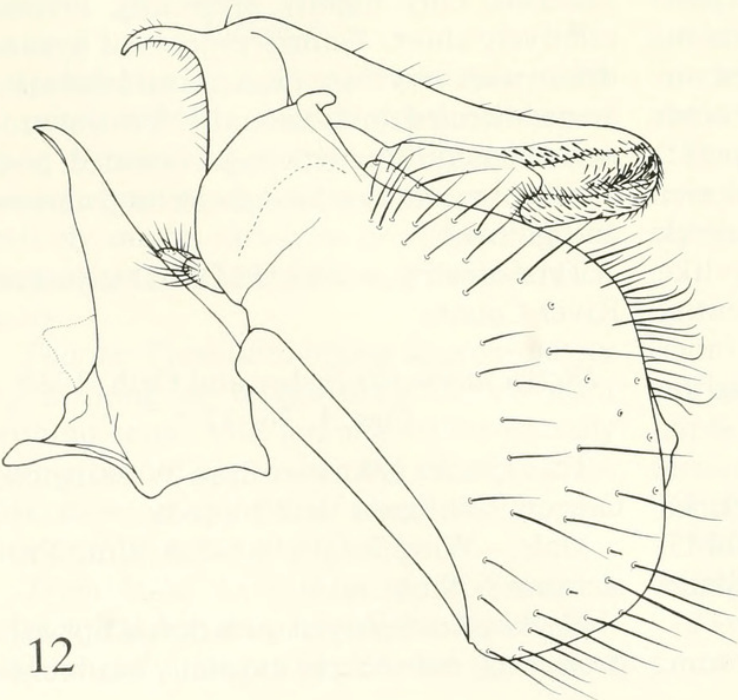
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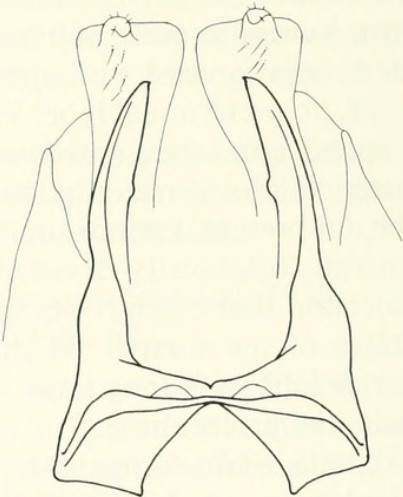
10



11



12



13

0.4 mm

ed or somewhat rounded. Ventral process of hypandrium without preterminal lobe, apex with anteriorly directed tip, subapical portion flattened. Ventral process of epandrium with small, short posterior lobe; anterior lobe broad, slightly projecting.

Type locality.—*USA, CALIFORNIA*: Nevada Co., Boca Spring.

Dictya gagei Steyskal, 1938

Figs. 92, 93

This species is known from Ontario and Michigan.

Male.—Wing length 4.5–5.0 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip but slightly projecting. Ventral process of hypandrium straight with tip directed anteriorly, inclined mesad toward opposite side in anterior view, without preterminal lobe. Ventral process of epandrium with moderate sized posterior lobe directed postero-ventrally; anterior lobe not projecting.

Type locality.—*USA, MICHIGAN*: Huron Co., Sand Point.

Dictya guatemalana Steyskal, 1954

Figs. 34, 35

This species is a member of the Abnormis Group and is known only from Guatemala.

Male.—Wing length 4.7 mm. Prosternum without setae. Pedicel 1.7 times as long as high.

Terminalia: Surstylus with wide stem, apical extension with a long lateral lobe and deep emargination in dorsal tip forming a ligulate lobe fringed with small bristles. Ventral process of hypandrium short, stout, strongly tapering, and curved forward. Ventral process of epandrium without lobes but

with a small mammiform projection on inner side posteriad to middle of the ventral margin.

Type locality.—*GUATEMALA*: “Guatemalan forest.”

Dictya hudsonica Steyskal, 1954

Figs. 46, 47

This species is known from British Columbia, Ontario, Quebec, New Brunswick south to New Jersey, west to Idaho.

Male.—Wing length 4.1–4.4 mm. Prosternum with a few setae.

Terminalia: Surstylus with dorsal tip moderately produced, angulate. Ventral process of hypandrium slender, narrow, long, with preterminal lobe at considerable distance from apex, acute in lateral view, directed anteromesiad. Ventral process of epandrium with posterior lobe of moderate size; anterior lobe not projecting.

Type locality.—*CANADA, QUEBEC*: Great Whale River.

Dictya incisa Curran, 1932

Figs. 50, 51

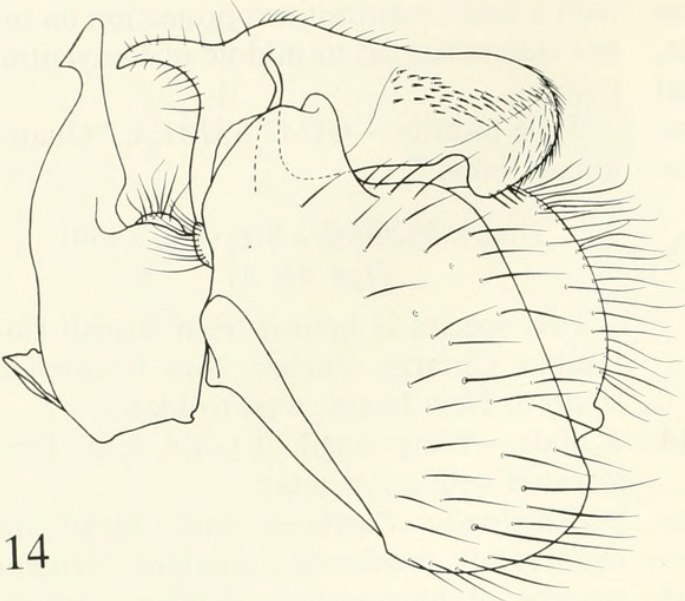
This species is known from Washington, Nevada, Utah, Kansas, New Mexico, Arizona, California and north central Mexico.

Male.—Wing length 4.0–4.7 mm. Prosternum without setae.

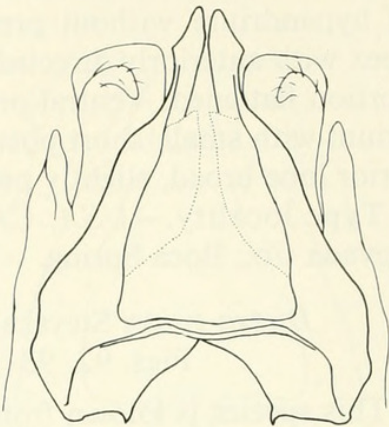
Terminalia: Surstylus with dorsal tip angulate, strongly projecting. Ventral process of hypandrium short, strongly bent, with small, broadly pointed preterminal projection. Ventral process of epandrium with large posterior lobe; anterior lobe scarcely projecting.

Type locality.—*USA, ARIZONA*: G. Zuni River.

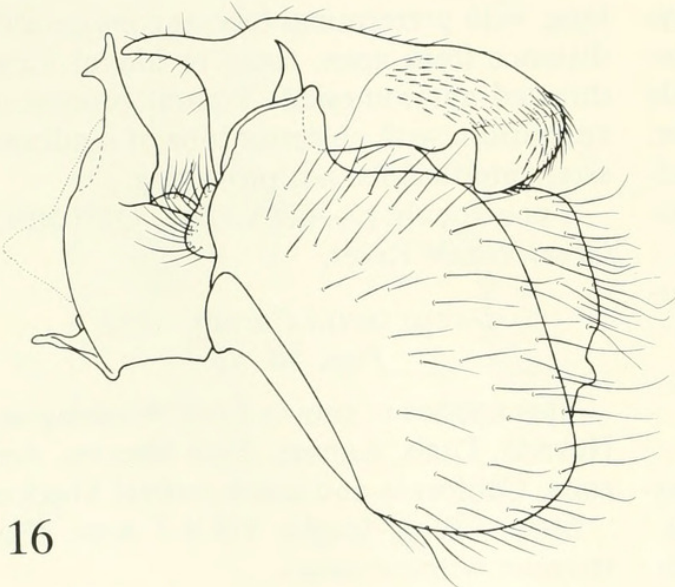
Figs. 8–13. 8, 9, *Dictya fisheri*, holotype male. 8, Postabdomen, lateral view, inverted. 9, Hypandrium, anterior view, inverted. 10, 11, *Dictya jamaica*, holotype male. 10, Postabdomen, lateral view, inverted. 11, Hypandrium, anterior view, inverted. 12, 13, *Dictya knutsoni*, holotype male. 12, Postabdomen, lateral view, inverted. 13, Hypandrium, anterior view, inverted.



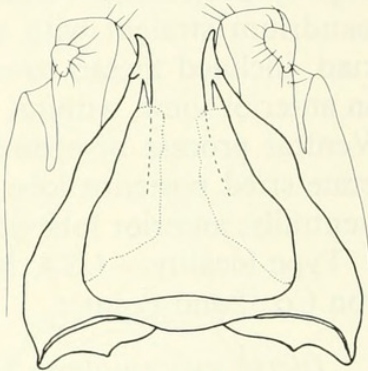
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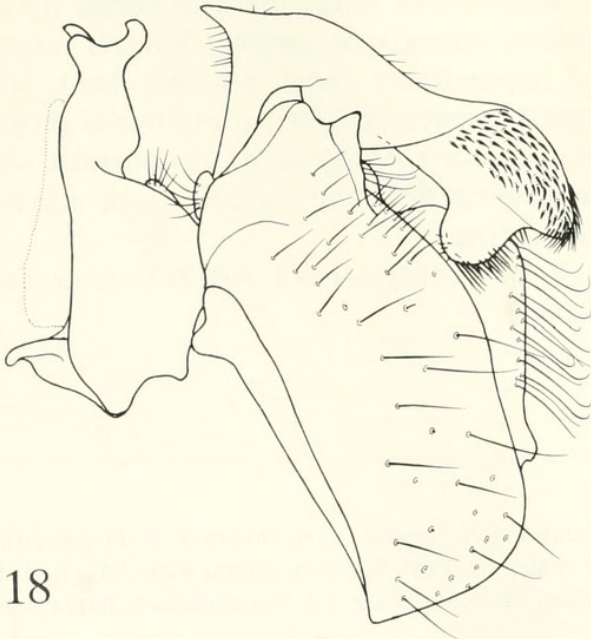
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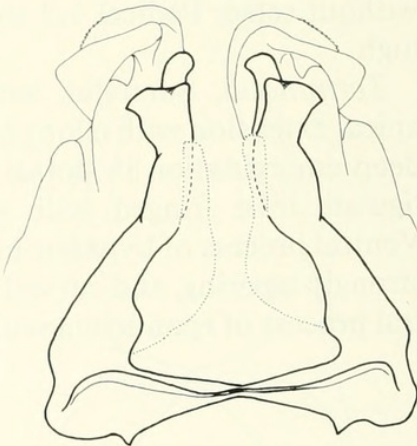
16



17



18



19

0.4 mm

Dictya insularis Steyskal, 1954

Figs. 36, 37

This species is a member of the Abnormis Group and is known only from Puerto Rico. I have examined a female from Cuba which appears to be the same species.

Male.—Wing length 4.2 mm. Prosternum without setae. Thoracic dorsum with roundish deep black spot centered in each depression mesiad of humeral calli.

Terminalia: Surstylus with slender stem, apical extension sinuate and turned mesiad beyond middle. Ventral process of hypandrium thick at base, then suddenly constricted anteriorly and curved forward, preterminal lobe appears as a small shark-tooth-like projection along the anterior margin. Ventral process of epandrium with two lobes, anterior lobe longer and more pointed, posterior lobe low with finely serrated margin. The lobes have transposed, i.e. the anterior lobe is actually the posterior lobe of other species.

Type locality.—*PUERTO RICO*: San-turce.

Dictya iron Steyskal, 1960,

synonymized with

Dictya oxybeles Steyskal, 1960

Figs. 22, 23

The male holotypes of *Dictya iron* and *D. oxybeles* were kindly forwarded to me by Dr. Karl Valley and Dr. Wayne Mathis, respectively. Examination of the terminalia of both types as well as additional specimens reveals them to be conspecific (see Figs. 22, 23, 26–29). The two species were described in the same publication. *Dictya iron* is known only by the holotype, allotype, and one paratype, all from Horn Island, Mississippi. These specimens are in ex-

tremely poor condition. In fact, only the terminalia remain for the allotype. The terminalia of the three above specimens are in micro-vials attached to the insect pins. *Dictya oxybeles* is known to be widely distributed along the eastern coastal salt marshes from Nova Scotia south to Florida and west to Mississippi. The holotype is from Isle of Palms, South Carolina, and is in excellent condition. I now consider *Dictya iron* to be a new synonym of *Dictya oxybeles*.

Dictya jamaica Orth,

NEW SPECIES

Figs. 10, 11

Holotype male.—*Head*: Face white, with a large, black, central ovoid spot; distinct large, black parafrontal spot; orbito-antennal wedge-shaped spot brown. Pedicel entirely matte, in lateral profile as high as long; arista with long, sparse, black hairs.

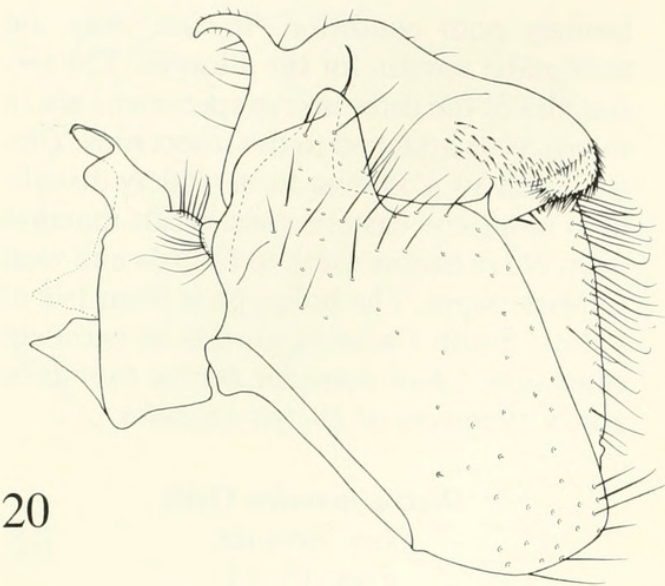
Thorax: Presutural bristle approximately $\frac{5}{8}$ as long as notopleurals. Prosternum without setae. Mid femur posteroventrally with a row of approximately 14 stout bristles nearly the same length, but somewhat closer together toward the apex. Wing length 4.1 mm.

Terminalia: As in Figs. 10, 11. Surstylus with apical dorsal tip broadly angulate, weakly projecting. Ventral process of hypandrium nearly straight, directed forward near base, apex with small point directed anteriorly, no preterminal lobe. Ventral process of epandrium with large, broad posterior lobe; anterior lobe small.

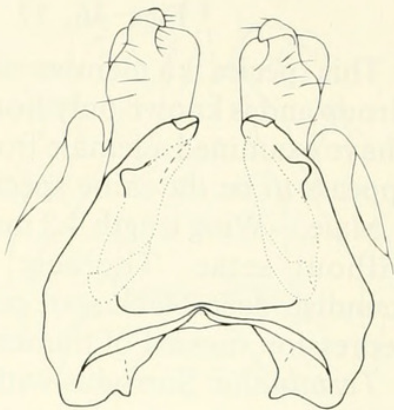
Female.—Not recognized.

Holotype.—♂, *JAMAICA*: Wag Water River, 25 February 1969, W. W. Wirth. Deposited in United States National Museum of Natural History.

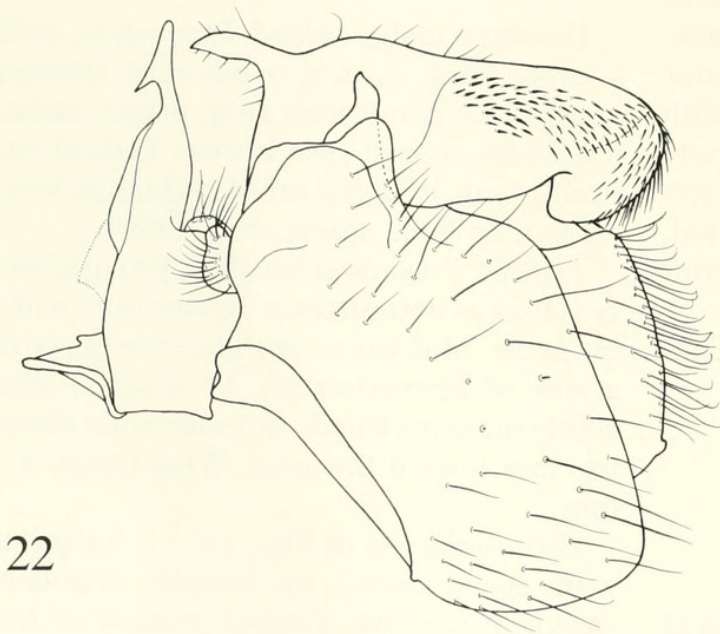
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Figs. 14–19. 14, 15, *Dictya orion*, holotype male. 14, Postabdomen, lateral view, inverted. 15, Hypandrium, anterior view, inverted. 16, 17, *Dictya praecipua*, holotype male. 16, Postabdomen, lateral view, inverted. 17, Hypandrium, anterior view, inverted. 18, 19, *Dictya valleyi*, holotype male. 18, Postabdomen, lateral view, inverted. 19, Hypandrium, anterior view, inverted.



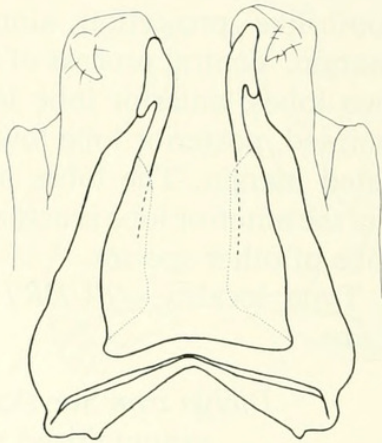
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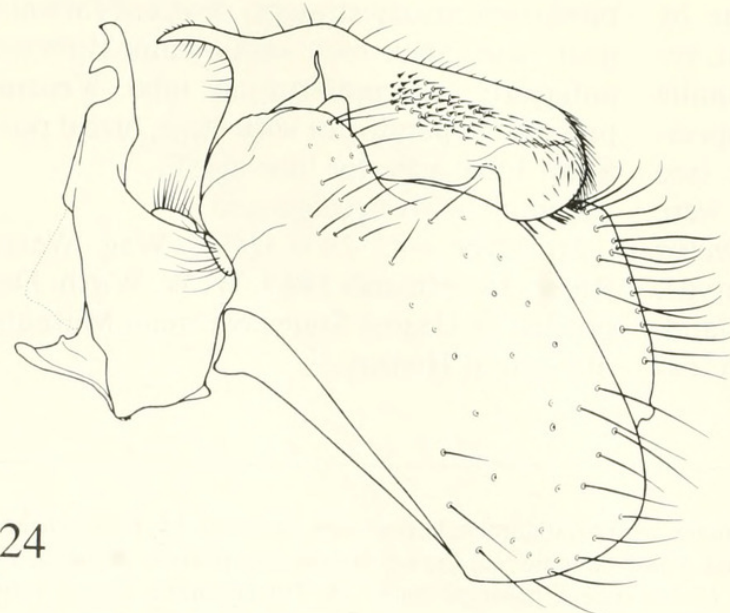
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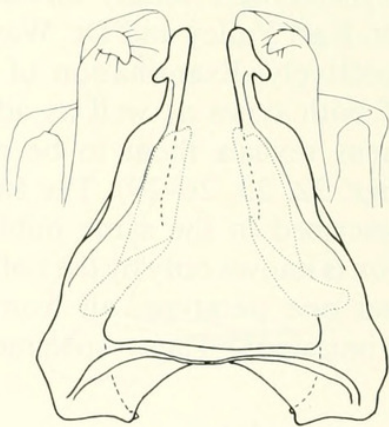
22



23



24



25

0.4 mm

Paratypes.—Wing length 4.1–4.2 mm. CUBA, SOLEDAD: Cienfuegos, Jan.–Feb. 1927, C. T. & B. B. Brues, A. L. Melander collection (2 ♂).

Diagnosis.—This is the only *Dictya* known to occur in Jamaica and Cuba. It is one of the smallest species and should not be confused with any other species. Identification is made simple by the large, black parafrontal spot and the combination of genital characters as seen in the figures.

Etymology.—This species is named after the Caribbean island of Jamaica in the West Indies at 18°N latitude.

***Dictya knutsoni* Orth,**
NEW SPECIES
Figs. 12, 13

Holotype male.—*Head*: Face white, with a small, central, roughly ovoid, brown spot; parafrontal spot not overly prominent, brown; orbito-antennal wedge-shaped spot brown. Pedicel entirely matte, in lateral profile approximately as high as long; arista with long, sparse, blackish hairs.

Thorax: Presutural bristle approximately as long as notopleurals. Prosternum without setae. Mid femur posteroventrally with a row of approximately 20 bristles, row poorly defined toward the proximal end of the femur, bristles comparatively small, 4 short, stout bristles close together near the apex. Wing length 5.1 mm.

Terminalia: As in Figs. 12, 13. Surstylus of aberrant form, apical dorsal area rolled over upon itself laterad, main body of surstylus narrowed lengthwise in lateral view. Ventral process of hypandrium relatively long, gradually tapering, bending and directed anteriad. Ventral process of epandrium with a small posterior lobe directed posteriad; no anterior lobe.

Female.—Not recognized.

Holotype.—♂, MEXICO, CHIHUAHUA: Sierra Madre, Hd. R. Piedras Verdes, abt. 7300 ft., 3 July (no year), Townsend, Pres. by E. Brunetti, B.M. 1927-184. Deposited in United States National Museum of Natural History.

Paratype.—Wing length 5.2 mm. MEXICO, DURANGO: Navios [= Navios Viejos], 26 mi E of El Salto, elev. 8000 ft., 27 July 1964, J. F. McAlpine (1 ♂). The paratype has a few setae on the prosternum.

Diagnosis.—The only other *Dictya* records I know of from the states of Chihuahua and Durango are *D. chihuahua* n. sp., and three “*Abnormis* Group” females. In viewing a map of these states there appear to be numerous freshwater aquatic habitats that could support *Dictya*. The terminalia of this species do not resemble any other species I’ve seen. The aberrant shape of the surstylus is unique to *D. knutsoni*. Other *Dictya* species found in adjoining states in Mexico and USA are *D. incisa*, *D. matthewsi*, *D. sabroskyi*, *D. sinaloae*, and *D. texensis*.

Etymology.—It is my pleasure to name this species in honor of Dr. Lloyd Knutson, United States Department of Agriculture, Rome, Italy. I have known him both as a friend and co-worker of sciomyzid flies for many years.

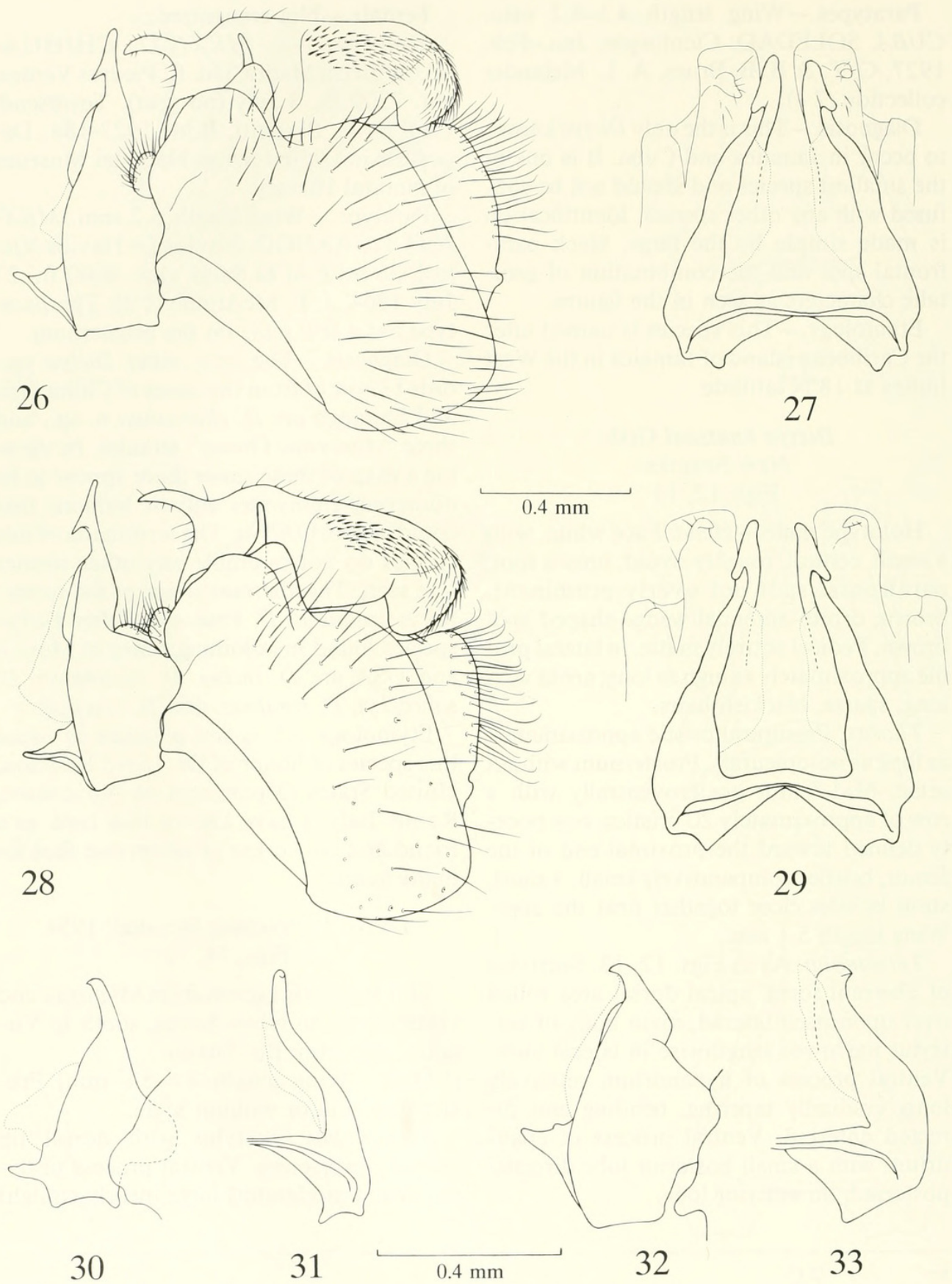
***Dictya laurentiana* Steyskal, 1954**
Figs. 74, 75

This species is known from Michigan and Ontario east to Nova Scotia, south to Virginia, also from the Yukon.

Male.—Wing length 4.6–5.6 mm. Prosternum with or without setae.

Terminalia: Surstylus with dorsal tip strongly projecting. Ventral process of hypandrium moderately large, nearly straight

←
Figs. 20–25. 20, 21, *Dictya veracruz*, holotype male. 20, Postabdomen, lateral view, inverted. 21, Hypandrium, anterior view, inverted. 22, 23, *Dictya iron*, holotype male. 22, Postabdomen, lateral view, inverted. 23, Hypandrium, anterior view, inverted. 24, 25, *Dictya lobifera*, holotype male. 24, Postabdomen, lateral view, inverted. 25, Hypandrium, anterior view, inverted.



Figs. 26-33. 26, 27, *Dictya oxybeles*, holotype male. 26, Mirror image. Postabdomen, lateral view, inverted. 27, Hypandrium, anterior view, inverted. 28, 29, *Dictya oxybeles*, 5 mi S Tuckerton, Ocean Co., New Jersey. 28, Postabdomen, lateral view, inverted. 29, Hypandrium, anterior view, inverted. 30, 31, *Dictya abnormis*,

with a hooked tip directed anteriad, well inclined mesad toward opposite side in anterior view, no preterminal lobe. Ventral process of epandrium with large posterior lobe directed posteroventrally; anterior lobe not projecting.

Type locality.—*CANADA*, QUEBEC: Ste. Anne de Beaupré.

Dictya lobifera Curran, 1932

A redescription of the terminalia
Figs. 24, 25

Curran (1932) described *Dictya lobifera* in a short one-sentence description of the anterior clasper (ventral process of the hypandrium) along with a small sketch of the same. The only other illustration of *D. lobifera* was by Steyskal (1954), which was a misidentification. It therefore seems justified at this time to briefly redescribe and illustrate the terminalia of *D. lobifera*.

This species is known from coastal salt marshes, Connecticut south to Florida, west to Louisiana. Not Cuba.

Male.—Wing length 4.7–5.1 mm. Prosternum without setae.

Terminalia: As in Figs. 24, 25. Surstylus with apical dorsal tip broadly angulate and moderately projecting. Ventral process of hypandrium relatively erect, leaning anteriad, apex rounded, terminating anteriad in a blunt point. Preterminal lobe well-developed, beak-like, and directed anterolaterally. Ventral process of epandrium with relatively small posterior lobe; anterior lobe rounded, slightly raised.

Holotype male.—Wing length 4.7 mm. *USA*, FLORIDA: Ormond, collection of Mrs. A. T. Slosson, Ac. 26226. Deposited in American Museum of Natural History.

Dictya matthewsi Steyskal, 1960

Figs. 38, 39

This species is a member of the Abnormis Group and is known from Arizona, and in Mexico from Sonora and Nuevo Leon south to Chiapas.

Male.—Wing length 4.1–4.8 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip scarcely projecting, extending a considerable distance back from apex with relatively small bristles projecting posterodorsally. Ventral process of hypandrium small with apical point slightly preterminal, directed anteriorly. Ventral process of epandrium with a short, broad posterior lobe; anterior lobe scarcely projecting.

Type locality.—*MEXICO*, CHIAPAS: Las Cruces.

Dictyma mexicana Steyskal, 1954

Figs. 54–57

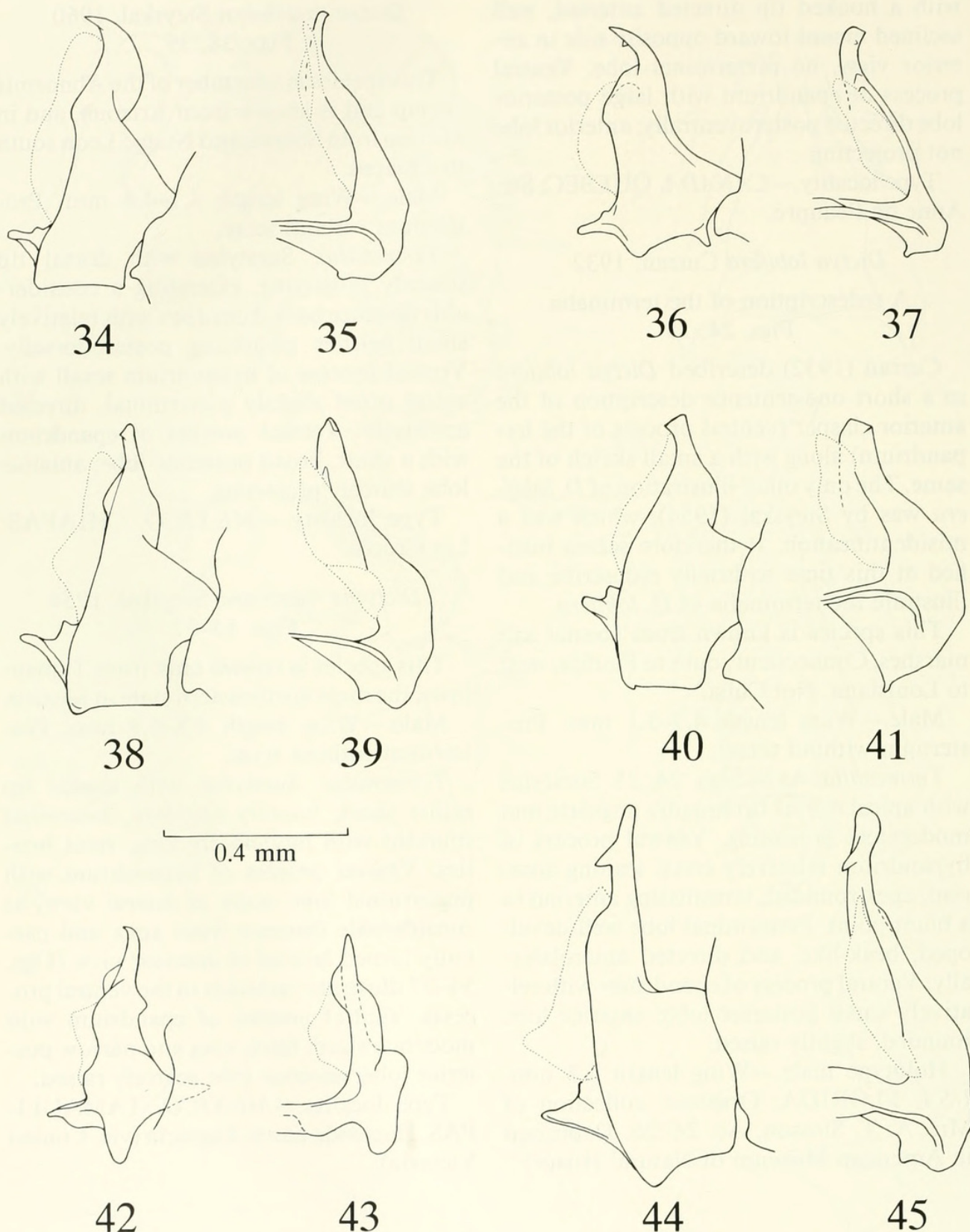
This species is known only from Tamaulipas, the most northeastern state in Mexico.

Male.—Wing length 4.8–4.9 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip rather short, broadly angulate, somewhat rounded with moderately long, erect bristles. Ventral process of hypandrium with preterminal lobe acute in lateral view, at considerable distance from apex and partially turned laterad in anterior view (Figs. 54–57 illustrate variation in the ventral process). Ventral process of epandrium with moderate sized, fairly long and narrow posterior lobe; anterior lobe scarcely raised.

Type locality.—*MEXICO*, TAMAULIPAS: Hacienda Santa Engracia (vic. Ciudad Victoria).

←
SW Cruz des Piedras, Durango, Mexico. 30, Hypandrium, lateral view, inverted. 31, Hypandrium, anterior view, inverted. 32, 33, *Dictya bergi*, Nariño, Santiago, Colombia. 32, Hypandrium, lateral view, inverted. 33, Hypandrium, anterior view, inverted.



Figs. 34-45. 34, 35, *Dictya guatemalana*, holotype male, mirror image. 34, Hypandrium, lateral view, inverted. 35, Hypandrium, anterior view, inverted. 36, 37, *Dictya insularis*, holotype male. 36, Hypandrium, lateral view, inverted. 37, Hypandrium, anterior view, inverted. 38, 39, *Dictya matthewsi*, Hermosillo, Sonora, Mexico. 38, Hypandrium, lateral view, inverted. 39, Hypandrium, anterior view, inverted. 40, 41, *Dictya sinaloae*, paratype, Hwy. 15, Cortinez, Sinaloa, Mexico. 40, Hypandrium, lateral view, inverted. 41, Hypandrium, anterior view, inverted. 42, 43, *Dictya ptyarion*, holotype male. 42, Hypandrium, lateral view, inverted. 43,

Dictya montana Steyskal, 1954

Figs. 80, 81

This species is known from British Columbia east to Saskatchewan, south to Arizona, west to California, north to Washington, also Baja California Norte and Sonora. Fisher and Orth (1983) consider *D. montana* a polytypic species which can be separated into four forms by differences in size, male and female terminalia, and, often, by patterns of distribution.

From "southern California." Male.—Wing length 4.5–5.2 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip strongly projecting, acutely angulate with relatively short, stiff bristles directed posteriad. Ventral process of hypandrium relatively small, apex slightly hooked and directed anterolaterally, no preterminal lobe. Ventral process of epandrium with posterior lobe small, barely projecting; anterior lobe broader but scarcely raised.

Type locality.—USA, CALIFORNIA: Marin Co., Paradise Cove.

Dictya neffi Steyskal, 1960

Figs. 58, 59

This species is known from southern Mexico and Guatemala.

Male.—Wing length 4.3–5.0 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip rounded, slightly projecting with a group of moderate sized, stiff bristles directed posteriad. Ventral process of hypandrium long, rounded at apex: preterminal lobe acute in lateral view, directed forward and slightly laterad. Ventral process of epandrium with posterior lobe moderately developed; anterior lobe not projecting.

Type locality.—GUATEMALA: Patzún, Chimaltenango, Ruta Nac. 1, km 90.

Dictya orion Orth,

NEW SPECIES

Figs. 14, 15

Holotype.—*Head*: Face white with a distinct black, central, ovoid spot; parafrontal spot small, brownish black; orbito-antennal wedge-shaped spot brown. Pedicel entirely matte; in lateral profile higher than long; arista with long, sparse, black hairs.

Thorax: Presutural bristle $\frac{2}{3}$ as long as notopleurals. Prosternum without setae. Mid femur posteroventrally with a row of approximately 16 bristles, longer medially, shorter and closer together toward the apex. Wing length 5.2 mm.

Terminalia: As in Figs. 14, 15. Surstylus with apical dorsal tip moderately angulate and well-projecting. Ventral process of hypandrium with preterminal lobe forming a flattened wedge-shaped blade rounded off at the apex. Ventral process of epandrium with a small posterior lobe; anterior lobe not elevated above ventral margin.

Female.—Not recognized.

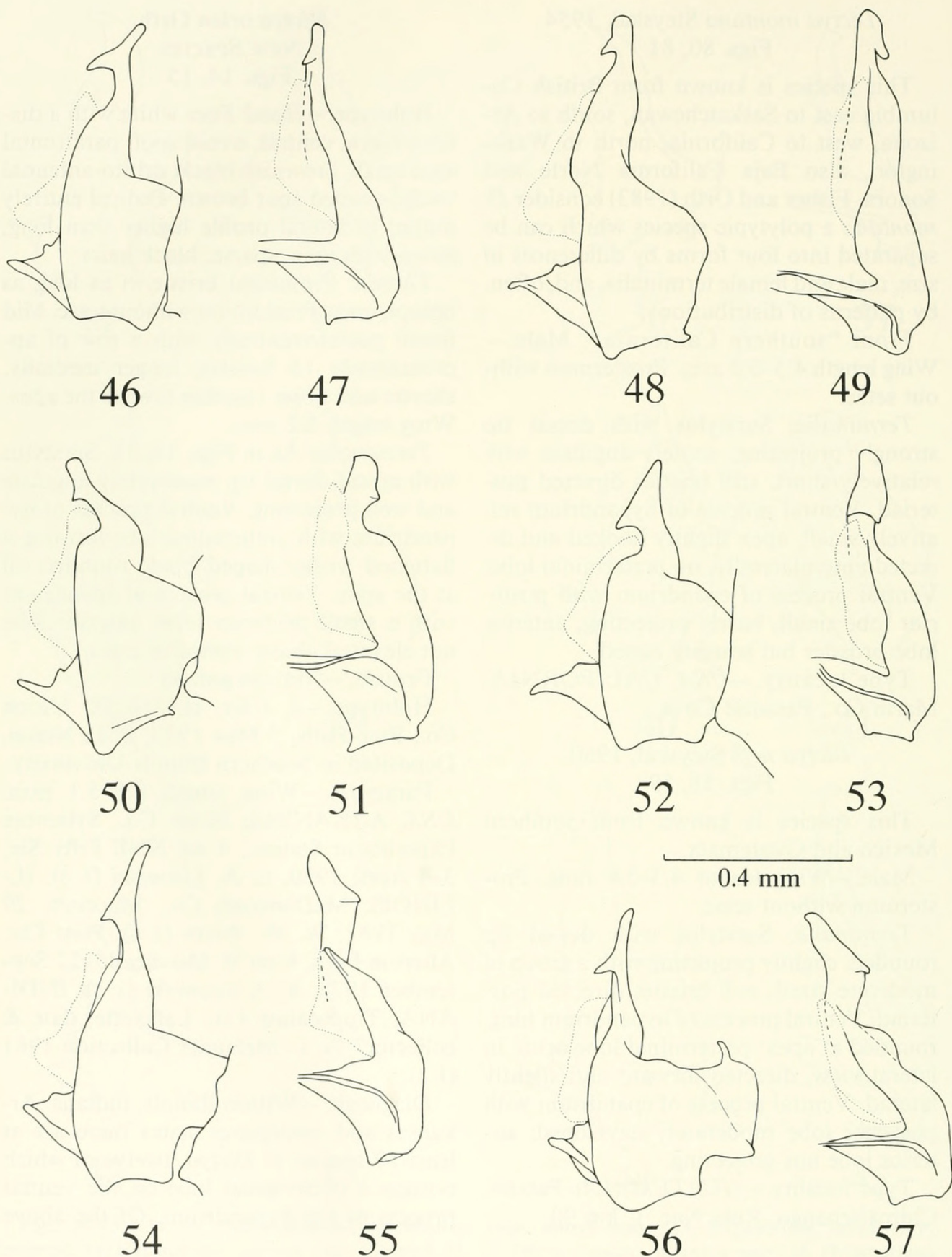
Holotype.—♂, USA, ILLINOIS: Union Co., Pine Hills, 3 May 1973, P. L. Nixon. Deposited in Southern Illinois University.

Paratypes.—Wing length 4.8–5.1 mm. USA, ARKANSAS: Stone Co., Sylamore Experiment Station, 4 mi NNE Fifty Six, 3–4 April 1980, E. A. Lisowski (1 ♂). ILLINOIS: McDonough Co., Macomb, 29 May 1962, W. W. Wirth (1 ♂); Piatt Co., Allerton Park, 4 mi W Monticello, 22 September 1978, E. A. Lisowski (1 ♂). INDIANA: Tippecanoe Co., Lafayette, date & collector?, A. L. Melander Collection 1961 (1 ♂).

Diagnosis.—Within Illinois, Indiana, Arkansas and contiguous states there are at least 19 species of *Dictya*, twelve of which possess a preterminal lobe on the ventral process of the hypandrium. Of the above

←

Hypandrium, anterior view, inverted. 44, 45, *Dictya pictipes*, Saugatuck Reservoir, Fairfield Co., Connecticut. 44, Hypandrium, lateral view, inverted. 45, Hypandrium, anterior view, inverted.



Figs. 46-57. 46, 47, *Dictya hudsonica*, Jackson Lake Dam, Teton Co., Wyoming. 46, Hypandrium, lateral view, inverted. 47, Hypandrium, anterior view, inverted. 48, 49, *Dictya zacki*, holotype male. 48, Hypandrium,

species with a preterminal lobe, those that most closely resemble *D. orion* are: *D. atlantica*, *D. expansa*, *D. hudsonica* and *D. praecipua*. Viewing the illustrations of the ventral process of the hypandrium reveals each to be distinct.

Variation.—The preterminal lobe of the ventral process of the hypandrium of the four paratypes is slightly smaller and more slender than that of the holotype. I consider this to be acceptable variation within the species.

Etymology.—The species name *orion* is a noun in apposition. The origin of Orion is Latin and pertains to the fabled hunter transformed into a constellation.

Dictya oxybeles Steyskal, 1960

Figs. 22, 23, 26–29

This species is known from coastal salt marshes from Nova Scotia south to Florida, west to Mississippi.

Male.—Wing length 4.9–5.8 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip somewhat angulate, only weakly projecting. Ventral process of hypandrium with long, slender process sharply pointed apically, with acutely reflexed preterminal lobe (Figs. 26–29 illustrate variation in the ventral process). Ventral process of epandrium with moderately well-developed posterior lobe; anterior lobe approximately level with epandrial margin.

Type locality.—USA, SOUTH CAROLINA: Charleston Co., Isle of Palms.

Dictya pechumani Valley, 1977

Figs. 60, 61

This species is known from coastal salt marshes of Massachusetts south to Florida, west to Texas; also Bermuda and Bahamas.

Male.—Wing length 4.0–4.6 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip small, roundly angulate, scarcely projecting, with a few medium-sized bristles projecting posteriad. Ventral process of hypandrium with apical area directed laterally; preterminal lobe sharply pointed, directed slightly anterolaterally. Ventral process of epandrium with large posterior lobe; anterior lobe scarcely raised.

Type locality.—USA, MASSACHUSETTS: Ipswich.

Dictya pictipes (Loew), 1859

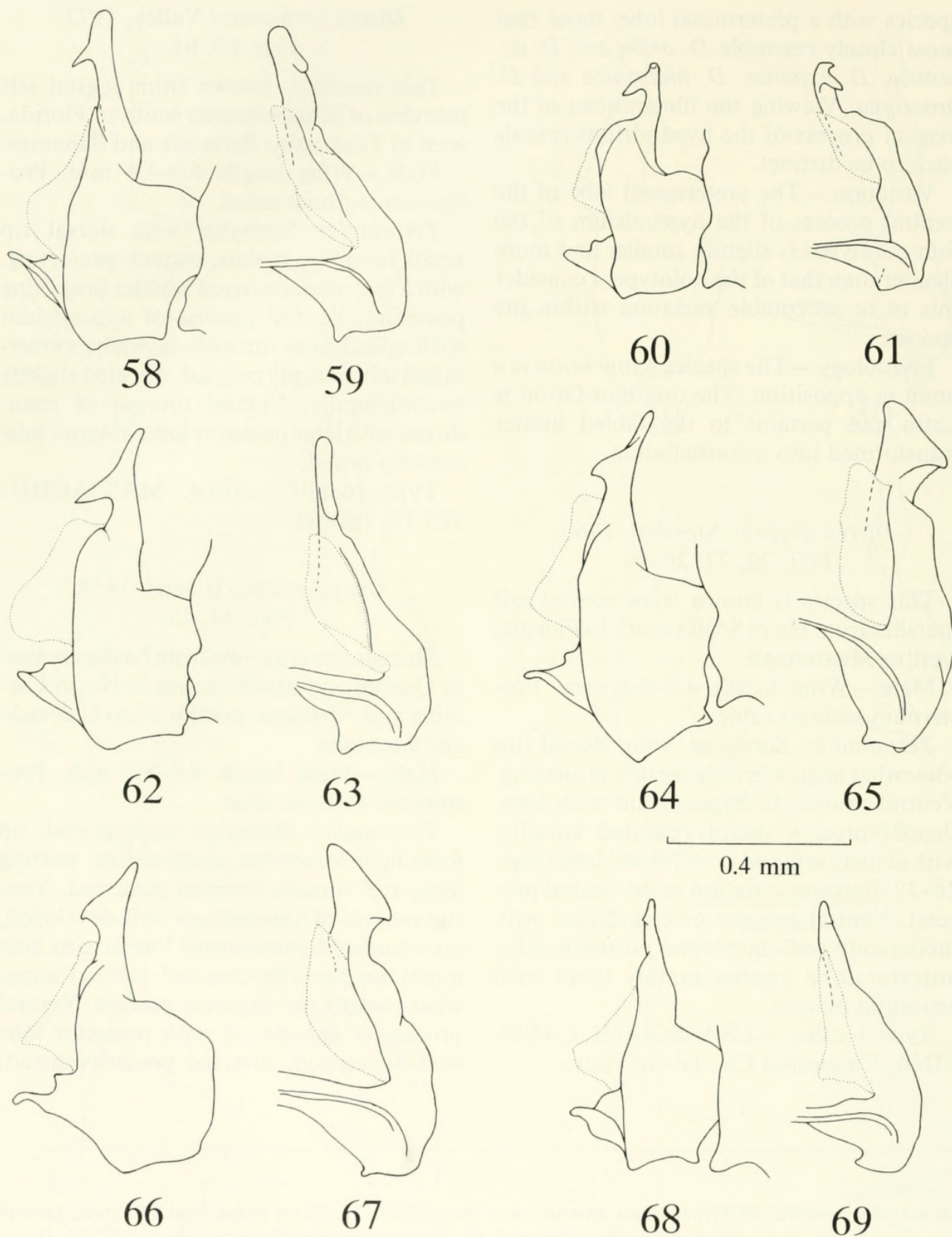
Figs. 44, 45

This species is known from Saskatchewan to Quebec and Maine, south to North Carolina and Alabama, northwest to Colorado and Montana.

Male.—Wing length 4.8–5.7 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip forming a somewhat separate lobe bearing long, stiff bristles directed posteriad. Ventral process of hypandrium well-developed, apex rounded, preterminal lobe arising near mesal margin of process and directed somewhat toward the opposite process. Ventral process of epandrium with posterior lobe well-developed, directed posteroventrad;

← lateral view, inverted. 49, Hypandrium, anterior view, inverted. 50, 51, *Dictya incisa*, 2 mi S Caliente, Lincoln Co., Nevada. 50, Hypandrium, lateral view, inverted. 51, Hypandrium, anterior view, inverted. 52, 53, *Dictya expansa*, East Fork Jemez River, Sandoval Co., New Mexico. 52, Hypandrium, lateral view, inverted. 53, Hypandrium, anterior view, inverted. 54, 55, *Dictya mexicana*, paratype male, Hacienda Santa Engracia, Tamaulipas, Mexico. 54, Hypandrium, lateral view, inverted. 55, Hypandrium, anterior view, inverted. 56, 57, *Dictya mexicana*, holotype male. 56, Hypandrium, lateral view, inverted. 57, Hypandrium, anterior view, inverted.



Figs. 58–69. 58, 59, *Dictya neffi*, Comitán, 3 mi E Chiapas, Mexico. 58, Hypandrium, lateral view, inverted. 59, Hypandrium, anterior view, inverted. 60, 61, *Dictya pechumani*, paratype male, Bonita Beach, Lee Co., Florida. 60, Hypandrium, lateral view, inverted. 61, Hypandrium, anterior view, inverted. 62, 63, *Dictya stricta*, Stoneville, Mississippi. 62, Hypandrium, lateral view. 63, Hypandrium, anterior view, inverted. 64, 65, *Dictya atlantica*, holotype male. 64, Hypandrium, lateral view, inverted. 65, Hypandrium, anterior view, inverted. 66,

anterior lobe projecting and of moderate size.

Type locality.—USA: "NORTH AMERICA."

***Dictya praecipua* Orth,**

NEW SPECIES

Figs. 16, 17

Holotype male.—*Head*: Face white, with a black, central, roundish spot; parafrontal spot and orbito-antennal wedge-shaped spot indistinct, light brown. Pedicel entirely matte, in lateral profile as high as long; arista with moderately long, sparse, black hairs.

Thorax: Presutural bristle approximately $\frac{7}{8}$ as long as notopleurals. Prosternum without setae. Mid femur posteroventrally with a row of approximately 16 somewhat unevenly placed bristles, slightly longer medially and closer together toward the apex. Wing length 4.5 mm.

Terminalia: As in Figs. 16, 17. Surstylus with apical dorsal tip moderately angulate and well-projecting. Ventral process of hypandrium narrowed at the apex forming a rounded-off point, preterminal lobe beak-like and directed nearly anteriorly and slightly laterad. Ventral process of epandrium with a small posterior lobe; anterior lobe not projecting.

Female.—Not recognized.

Holotype.—♂, USA, VIRGINIA: Bath Co., Blowing Spring Campground, 8 mi W Warm Springs, 28 June 1982, Mathis and Flint. Deposited in United States National Museum of Natural History.

Diagnosis.—The ventral process of the hypandrium of this species resembles that of *Dictya expansa* and *D. orion*. However, it may be separated from these species by the beak-like projection of the preterminal lobe of the hypandrium and the greater and

more angulate projection of the apical dorsal tip of the surstylus. The illustration of Steyskal (1954) of *Dictya lobifera* from Difficult Run, Virginia, is not *D. lobifera* but undoubtedly is this new species.

Etymology.—The species name *praecipua* is an adjective of Latin derivation and means special or extraordinary.

***Dictya pyarion* Steyskal, 1954**

Figs. 42, 43

This species is the only member of the Ptyarion Group and is known from North Carolina, South Carolina, Georgia, Florida, and Alabama.

Male.—Wing length 3.8–4.2 mm. Prosternum without setae.

Terminalia: Surstylus of peculiar shape, pale yellowish, with tooth laterally at base of apical extension, medial lappet, and group of apically directed stiff bristles near apex of dorsal margin. Ventral process of hypandrium rather small, slender and curved forward to sharply pointed tip, preterminal lobe lacking but with an interior and exterior flange. Ventral process of epandrium with long, obliquely truncate anterior lobe well divided from shorter, rounded posterior lobe.

Type locality.—USA, NORTH CAROLINA: Wendell.

***Dictya sabroskyi* Steyskal, 1938**

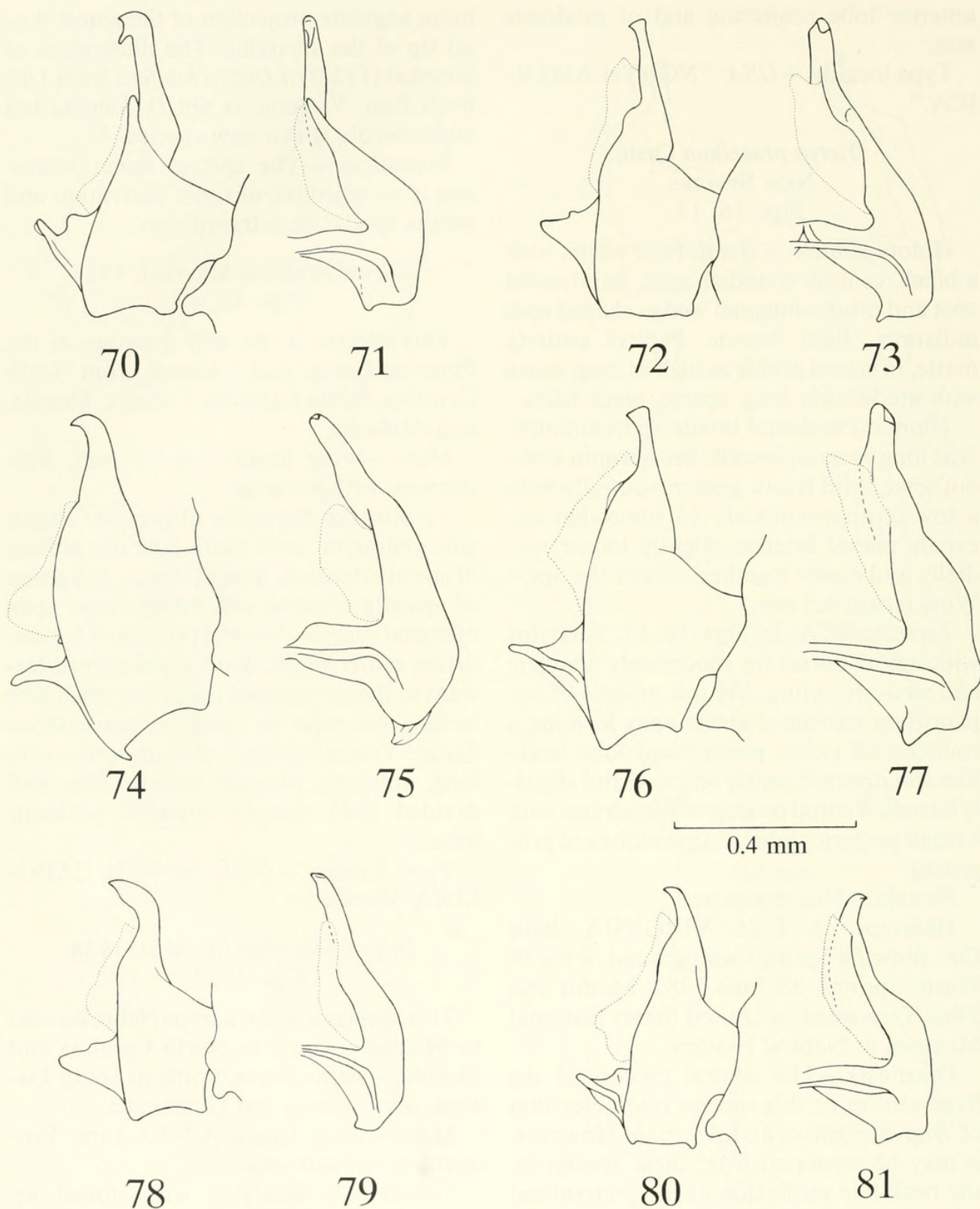
Figs. 70, 71

This species is known from Nebraska east to Michigan, south to North Carolina and Florida, west to Texas, north to South Dakota; also Mexico and Guatemala.

Male.—Wing length 4.7–5.4 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip broadly angulate, slightly projecting. Ven-

67, *Dictya atlantica*, Aspetuck Reservoir, Easton, Fairfield Co., Connecticut. 66, Hypandrium, lateral view, inverted. 67, Hypandrium, anterior view, inverted. 68, 69, *Dictya floridensis*, Aster, Lake Co., Florida. 68, Hypandrium, lateral view, inverted. 69, Hypandrium, anterior view, inverted.



Figs. 70–81. 70, 71, *Dictya sabroskyi*, Hunt Co., Texas. 70, Hypandrium, lateral view, inverted. 71, Hypandrium, anterior view, inverted. 72, 73, *Dictya borealis*, 25 mi N Wyndmere, Richland Co., North Dakota. 72, Hypandrium, lateral view, inverted. 73, Hypandrium, anterior view, inverted. 74, 75, *Dictya laurentiana*, Rosslyn, Virginia. 74, Hypandrium, lateral view, inverted. 75, Hypandrium, anterior view, inverted. 76, 77, *Dictya fontinalis*, paratype male. Boca Spring, Nevada Co., California. 76, Hypandrium, lateral view, inverted. 77, Hypandrium, anterior view, inverted. 78, 79, *Dictya umbroides*, Rivera Cow Camp, E Fork Brazos River,

tral process of hypandrium thin mesolaterally, with small, acute, anterobasally directed preterminal lobe. Ventral process of epandrium with relatively small posterior lobe; anterior lobe not projecting.

Type locality.—*USA*, KANSAS: Manhattan.

Dictya sinaloae Orth, 1984
Figs. 40, 41

This species is a member of the Abnormis Group and is known only from the type locality in the state of Sinaloa.

Male.—Wing length 4.1–4.3 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip angulate, moderately projecting, with bristles projecting dorsal ventrad. Ventral process of hypandrium flattened in cross section, apex truncate, no preterminal lobe. Ventral process of epandrium with moderate sized posterior lobe directed posteroventrally; anterior lobe smaller, less pronounced, ventral margin minutely serrated.

Type locality.—*MEXICO*, SINALOA: Cortinez, Hwy. 15.

Dictya steyskali Valley, 1977
Figs. 88, 89

This species is known from Ontario east to Nova Scotia, south to Pennsylvania, west to Ohio and Michigan.

Male.—Wing length 4.2–4.8 mm. Prosternum with or without setae.

Terminalia: Surstylus with dorsal tip roundly angulate, slightly produced. Ventral process of hypandrium with posterior margin nearly straight, angling forward near tip, preterminal lobe lacking, apical area directed anteromesially, with conspicuous flange. Ventral process of epandrium with

posterior lobe moderately large, angled posteroventrally; anterior lobe not raised.

Type locality.—*USA*, NEW YORK: Tompkins Co., White Church Marsh, Ridgeway Rd., 2.6 mi due S Brooktondale.

Dictya stricta Steyskal, 1938
Figs. 62, 63

This species is known from Nebraska to North Carolina, south to Florida, west to Texas.

Male.—Wing length 4.5–5.1 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip not distinctly angulate, more rounded, only slightly projecting. Ventral process of hypandrium thin mesolaterally, with long, acute preterminal lobe. Ventral process of epandrium with small posterior lobe; anterior lobe not apparent.

Type locality.—*USA*, LOUISIANA: Winn Co., Winnfield.

Dictya texensis Curran, 1932
Figs. 90, 91

This species is known from Idaho east to New York, south to Georgia, west to southern California; also Tamaulipas.

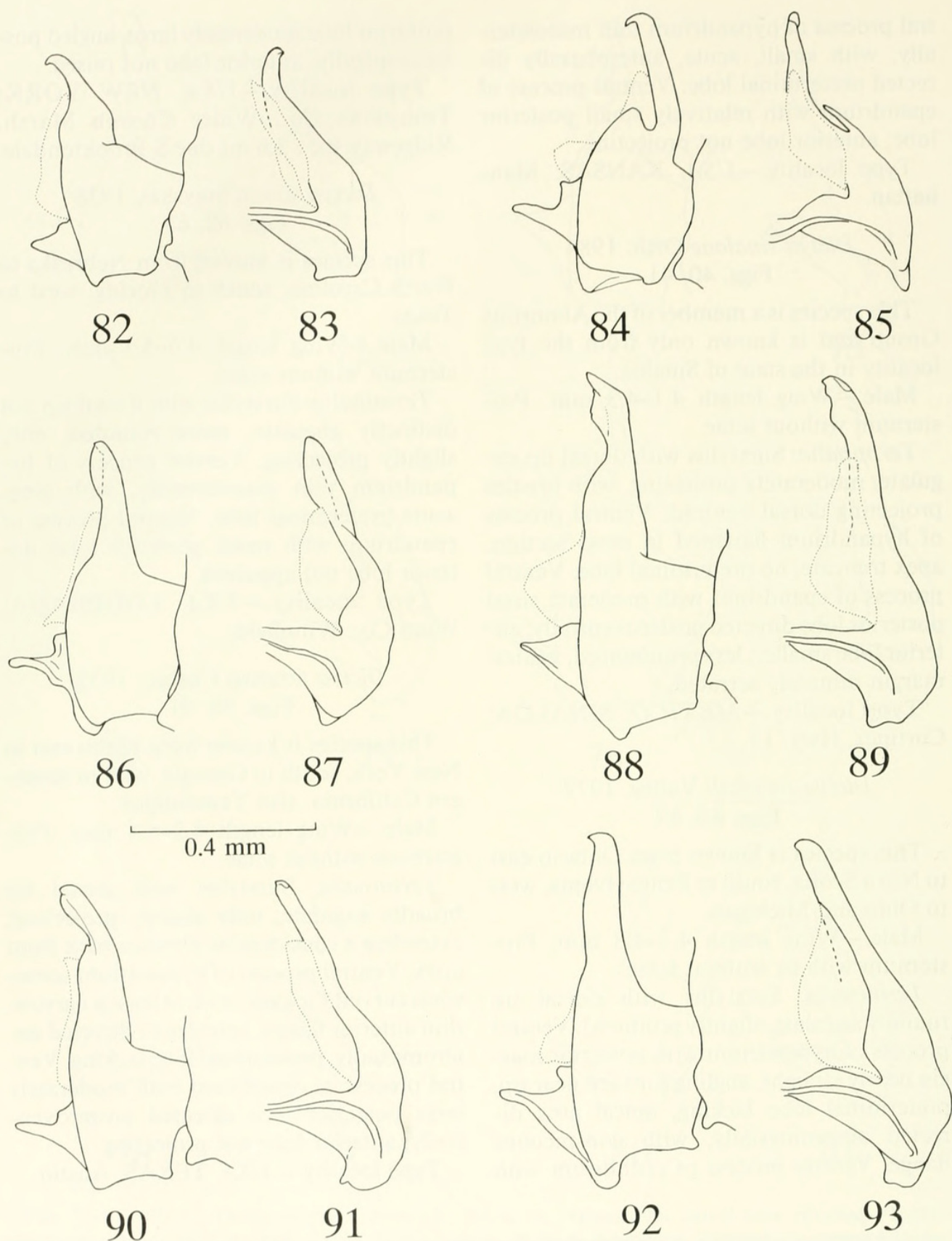
Male.—Wing length 4.2–5.4 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip broadly angulate, only slightly projecting, extending a considerable distance back from apex. Ventral process of hypandrium somewhat curved forward, with at least a narrow, thin anterior flange, apical area directed anteromesially, preterminal lobe lacking. Ventral process of epandrium with moderately large posterior lobe directed posteroventrally; anterior lobe not projecting.

Type locality.—*USA*, TEXAS: Austin.

←

Rio Arriba Co., New Mexico. 78, Hypandrium, lateral view, inverted. 79, Hypandrium, anterior view, inverted. 80, 81, *Dictya montana*, 2 mi S Alpine, San Diego Co., California. 80, Hypandrium, lateral view, inverted. 81, Hypandrium, anterior view inverted.



Figs. 82-93. 82, 83, *Dictya umbrarum*, S. Sunderbyn, Norrbotten, Sweden. 82, Hypandrium, lateral view, inverted. 83, Hypandrium, anterior view, inverted. 84, 85, *Dictya brimleyi*, NE 15th St., Gainesville, Florida. 84, Hypandrium, lateral view, inverted. 85, Hypandrium, anterior view, inverted. 86, 87, *Dictya adjuncta*, 2 mi W Intercession City, Osceola Co., Florida. 86, Hypandrium, lateral view, inverted. 87, Hypandrium, anterior view, inverted. 88, 89, *Dictya steyskali*, 8 mi S Richmond, Carlton Co., Ontario. 88, Hypandrium, lateral view, inverted. 89, Hypandrium, anterior view, inverted.

Dictya umbrarum (Linnaeus), 1758

Figs. 82, 83

This species is known only from Europe. It closely resembles *D. montana* in diagnostic characters, both externally and internally, except it usually has setae on the prosternum.

Male.—Wing length 3.8–4.1 mm. Prosternum with or without setae.

Terminalia: Surstylus with dorsal tip acutely angulate, moderately to strongly projecting. Ventral process of hypandrium relatively small, directed forward, apex slightly hooked and directed anterolaterally, no preterminal lobe. Ventral process of epandrium with moderately small posterior lobe; anterior lobe not projecting.

Type locality.—EUROPE.

Dictya umbroides Curran, 1932

Figs. 78, 79

This species is known from Alaska east to Northwest Territories, south to British Columbia, east to Newfoundland; also Michigan, Colorado, and New Mexico.

Male.—Wing length 3.9–4.7 mm. Prosternum with setae.

Terminalia: Surstylus with dorsal tip angulate, strongly projecting. Ventral process of hypandrium strongly bent forward. Ventral process of epandrium with a moderately small, narrow posterior lobe; anterior lobe slightly projecting.

Type locality.—CANADA, ALBERTA: Banff.

Dictya valleyi Orth, NEW SPECIES

Figs. 18, 19

Holotype male.—*Head*: Face white, with a prominent black, central, ovoid spot; dis-

ting black parafrontal spot; orbito-antennal wedge-shaped spot brown. Pedicel matte, at most slightly subshining on dorsal outer surface, in lateral profile as high as long; arista with long, sparse, black hairs.

Thorax: Presutural bristle approximately $\frac{3}{4}$ as long as notopleurals. Prosternum without setae. Mid femur posteroventrally with a row of approximately 16 stout bristles, most of which are concentrated in the apical $\frac{1}{3}$ and are proportionately shorter and thicker. Wing length 5.0 mm.

Terminalia: As in Figs. 18, 19. Surstylus with dorsal tip forming a separate rounded, well-projecting lobe; proximal anterior projection relatively short and broad. Ventral process of hypandrium with posterior lobe trilobate, posterior lobe much longer and somewhat hook-shaped. Ventral process of epandrium with posterior lobe angulate, anterior lobe rounded and larger.

Female.—Not recognized.

Holotype.—♂, MEXICO, MICHOACAN: San Lorenzo, Rt. 15, km 206, 14–15 July 1966, Flint and Ortiz. Deposited in United States National Museum of Natural History.

Paratype.—Wing length 4.8 mm. MEXICO, MICHOACAN: Patzcuaro Lk. on road to Erongaricuaru, elev. 1200 m, 17 August 1969, Karl R. Valley (1 ♂).

Diagnosis.—Positive determination of this species should be made by examination of the terminalia. The terminalia cannot be confused with any other species. It is the only species with a trilobate ventral process of the hypandrium.

Etymology.—This species is named in honor of Dr. Karl Valley, Pennsylvania Department of Agriculture, who has contributed greatly toward a better understanding of the biology and taxonomy of *Dictya*.

←
inverted. 89, Hypandrium, anterior view, inverted. 90, 91, *Dictya texensis*, Overton, Hwy. 169, Clark Co., Nevada. 90, Hypandrium, lateral view, inverted. 91, Hypandrium, anterior view, inverted. 92, 93, *Dictya gaigei*, Tuscola Co., Michigan. 92, Hypandrium, lateral view, inverted. 93, Hypandrium, anterior view, inverted.

Dictya veracruz Orth,

NEW SPECIES

Figs. 20, 21

Holotype male.—*Head*: Face white, with moderately large, black central ovoid spot; distinct, black parafrontal spot; orbito-antennal wedge-shaped spot brown. Pedicel shining on upper outer half or more, in lateral profile longer than high; arista with long, sparse, black hairs.

Thorax: Presutural bristle approximately $\frac{2}{3}$ as long as notopleurals. Prosternum without setae. Mid femur posteroventrally with a row of approximately 14 stout bristles, longer medially, shorter and closer together toward the apex. Wing length 4.8 mm.

Terminalia: As in Figs. 20, 21. Surstylus with apical dorsal tip rounded, only slightly projecting. Ventral process of hypandrium with a broad, flat flange directed anteriorly, apex narrowed forming a small point directed anterolaterad. Ventral process of epandrium with a large posterior lobe directed ventrally; anterior lobe not apparent.

Female.—Not recognized.

Holotype.—♂, MEXICO, VERACRUZ: Cascomatopac, 11-7-1957, R. & K. Dreisbach. Deposited in United States National Museum of Natural History.

Diagnosis.—This species is a member of the Abnormis Group but should not be confused with other members of that group. The terminalia appear closest to *D. matthewsi*. However, the broad flange on the ventral process of the hypandrium readily separates it from *D. matthewsi*, which has no flange.

Etymology.—The species name *veracruz* is a noun in apposition. Veracruz is a long, narrow, central eastern state bordering on the Gulf of Mexico.

Dictya zacki Orth and Fisher, 1983

Figs. 48, 49

This species is known only from the type locality in Idaho.

Male.—Wing length 4.85 mm. Prosternum without setae.

Terminalia: Surstylus with dorsal tip strongly projecting. Ventral process of hypandrium with broadly rounded apex; preterminal lobe sharply pointed, directed anterolaterally. Ventral process of epandrium with large, rounded posterior lobe, directed posteroventrally; anterior lobe small, flattened.

Type locality.—USA, IDAHO: Latah Co., Laird Park, 4 mi NE of Harvard.

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