

**A NEW SPECIES OF SNAIL-KILLING FLY OF THE GENUS *Dictya*
MEIGEN FROM THE DELMARVA STATES (DIPTERA: SCIOMYZIDAE)**

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Abstract.—A **new species** of snail-killing fly, *Dictya orthi* (Diptera: Sciomyzidae), is described from the Delmarva States (type locality: Virginia, Stafford; Aquia Harbour, Lions Park). Provided are detailed photographs, descriptions of structures of the male terminalia, a generic diagnosis, and a key to species of *Dictya* from the Delmarva and adjacent states.

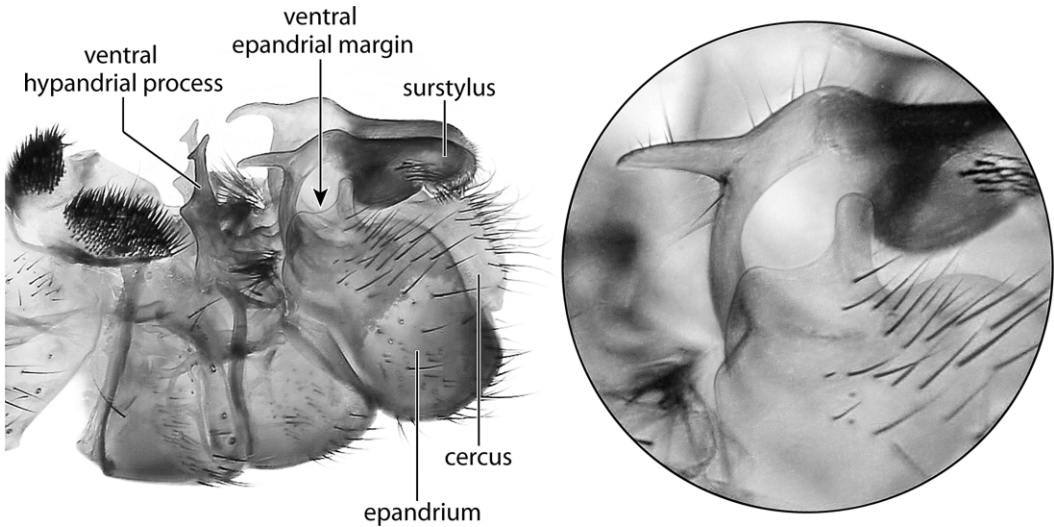
Key Words: *Dictya orthi*, new species, generic diagnosis, key to species

Described herein is a new species of snail-killing fly, *Dictya orthi*, discovered during a survey of snail-killing flies from the Delmarva States (defined in the following paragraph). The final report of this survey (in progress) will include extensive synonymies, diagnoses, locality maps and data, and specific observations for all included species. For perspective in this survey and to aid in making identifications, we also provide herein a revised diagnosis of the genus *Dictya* Meigen and a key to species of *Dictya* from the Delmarva and adjacent states.

Faunistic treatments by definition are of limited geographic scope. For this survey, the geographic scope comprises the Delmarva States in the antebellum sense: the District of Columbia plus the states of Delaware, Maryland, and Virginia, which at that time included

all of the current State of West Virginia. Since the American Civil War, the name Delmarva has evolved to refer most often to the Delmarva Peninsula, a much smaller subregion of the survey area. For our purposes, however, we are using the name to refer to the area encompassed in its classical meaning. To avoid confusion, we refer to the whole of the geographic area as the Delmarva States. The descriptor “Mid-Atlantic” is sometimes used synonymously for this area, but many governmental and nongovernmental entities (U.S. Geological Survey, U.S. Environmental Protection Agency, Wikipedia) have defined this area variously, and thus ambiguously, to include Pennsylvania and/or sometimes New Jersey or even New York. In other definitions, Virginia and West Virginia have been omitted. We thus include in our survey the Diptera fauna of the present-day states of Delaware, Maryland, Virginia,

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Figs. 1–2. *Dictya orthi* (Virginia. Stafford: Aquia Harbour, Lions Park). 1, Epandrium, surstylus, cercus, ventral hypandrial process, lateral view, inverted; 2, Close up of ventral epandrial margin.

and West Virginia and the District of Columbia.

MATERIALS AND METHODS

The descriptive terminology for external structures and many internal structures follows that published in the *Manual of Nearctic Diptera* (McAlpine 1981). For structures of the male terminalia, however, we have adopted the terminology suggested by Cumming et al. (1995).

Because specimens of some species have body lengths as short as 3.8 mm, study and illustration required use of dissecting and compound microscopes. The terminology for structures of the male terminalia is provided in Fig. 1. Label data from each specimen were recorded and listed alphabetically according to country, state or province, county, and specific locality, such as city. If available, date of collection, collector, sex, and specimen location were listed. Label data from the holotype specimen were recorded exactly; in this paper we have placed clarifying information such as label color or script

type within brackets. The diagnosis of the new species is composite and not based solely on characters of the holotype.

Most specimens examined as part of this study are deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM). A paratype has been deposited in the collection of the George Washington Memorial Parkway (National Park Service), Turkey Run Park, McLean, Virginia (GWMP).

Male and female terminalia were prepared by use of the method of Clausen and Cook (1971) and Grimaldi (1987). Microforceps were used to remove abdomens, which were then macerated in a solution of potassium or sodium hydroxide. Cleared terminalia were rinsed in distilled water and acidified 70% ethanol and then transferred to glycerin for examination. To maintain proper orientation, some specimens were transferred to heated glycerin jelly, in which they were positioned as needed and then allowed to cool and become immobilized. For permanent

storage, each prepared abdomen was placed in a plastic microvial partially filled with glycerin, which was then pinned through the stopper and stored on the same pin as that supporting the remainder of the specimen.

For freshly caught specimens, it is recommended that the epandrium and associated structures of the male terminalia be teased open to allow future examination of these structures and identification of species to be made without need for dissection.

RESULTS AND DISCUSSION

Dictya Meigen

(33 Nearctic, 9 Neotropical,
1 Palearctic species; 13 from
the Delmarva States and
5 from adjacent states)

Dictya Meigen 1803: 277. Type species: *Musca umbrarum* Linnaeus 1758: 599, by subsequent designation (Cresson 1920: 70) [Traditional usage pending submission of proposal to I.C.Z.N. for fixation of type species].—Curran 1932: 1–7 [taxonomy].—Steyskal 1954: 511–539 [taxonomy]; 1960: 34–41 [taxonomy]; 1965: 689 [Nearctic catalog].—Fisher and Orth 1969: 222–228 [biology and taxonomy].—Valley and Berg 1977: 1–44 [biology and taxonomy].—Knutson et al. 1986: 18–21 [Nearctic catalog].—Orth 1991: 660–689 [taxonomy].

Diagnosis.—*Dictya* is distinguished from related genera in the tribe Teta-nocerini by the following combination of characters: medium-sized to large flies, body length 3.8–6.2 mm; body grayish brown, most setae and many setulae with dark somatic base, some of these confluent, giving mottled appearance; some large brownish spots are microtomentose, dull.

Head: Frons not strongly convex, occasionally subshiny, essentially parallel-sided in dorsal view; midfrontal vitta indistinct or very narrow; 1 fronto-orbital seta; ocellar, postocellar and vertical setae well developed; anterior half of frons with numerous setulae; lunule almost entirely concealed. Pedicel subquadrate, 2/3–3/4 length of basal flagellomere; basal flagellomere concave dorsally, truncate apically; arista with segments 1–2 whitish, remainder black, setae sparse, moderately long on basal third. Face white with central black spot; setulae along antennal groove reaching base of antenna.

Thorax: Thoracic setae well developed: 2 postsutural dorsocentral setae; 1 prescutellar acrostichal seta; 1 postpronotal seta; 1 presutural supra-alar seta; 2 postalar setae; 2 notopleural setae; prosternum usually bare (setulae present in *D. fisheri* Orth, *D. hudsonica* Steyskal, *D. umbroides* Curran; present or absent in *D. laurentiana* Steyskal, *D. umbrarum* (L.), and *D. steyskali* Valley); anepisternum setulose, bearing 1 well-developed seta posterodorsally; anepimeron with several setulae and 1 well-developed seta anteroventrally and 1 or 2 moderately well-developed setae surrounded by several setulae below subalar ridge; subalar ridge without setae; katepisternum setulose but lacking setae. Wing with strong brownish infuscation and numerous pale spots; 1 well-developed seta dorsally at base of costal vein; crossvein dm-cu nearly straight to shallowly curved. Midfemur without seta at midlength of anterior surface; hind tibia with 1 large dorsal preapical seta and large, well developed, ventroapical, spurlike seta; fore- and hind tibiae with series of closely set, equal sized, minute setulae, forming comb on ventral surface at apex; mid-tibia with about 8 long and shorter setae surrounding apex, but without comb;

inner posterodorsal margin of hind coxa with sparse setulae.

Abdomen: Male terminalia: Cerci and epandrium large, well sclerotized; ventral epandrial margin variously shaped (useful in species recognition); posterior surstylus large, elongated posteriorly, 2–4× longer than wide, usually exposed, with basal, curved, pointed, anteriorly directed prong; surstylus more or less incised dorsopreapically, incision often appearing as gap or notch but sometimes closed, with apical brush of short setulae and, in *D. pictipes* (Loew) and *D. borealis* Curran, with apical tuft of long, stiff, posteriorly directed setae; hypandrium with elongate process on each side that extends ventrally (ventral hypandrial process = pregonite of Steyskal 1954; variously shaped), often with preterminal lobe (shape of processes and lobes of critical importance to species recognition); paired dorsolateral portion of hypandrium (= bases of ventral hypandrial processes) strongly explanate, but anterior margins of hypandrium usually weakly developed, consisting of pair of weak, C-shaped struts that barely approach each other on midline; heavily setose, thin, pale lobe interiorly at basal attachment of surstylus (= accessory lobe of Steyskal 1954, Orth 1991); slightly anteriorly, a separate, setose sclerite at posterior base of ventral hypandrial process (= postgonite of Steyskal 1954; not denoted by Orth 1991).

Comments on female terminalia.—Curran (1932) used the eighth sternum of the female in making determinations and figured that part for six species. Steyskal (1954) figured sterna seven to the end of the abdomen for females of many species that he considered to be correctly associated with males. Valley (1974) presented some additional notes on female sterna. Valley (pers. comm.)

analyzed Steyskal's manuscript key to female *Dictya* (based on characters of the sterna) and recently informed us that the distribution maps in Valley and Berg (1977) were based on collected females as well as males (based on his unpublished studies of females that were mostly definitely associated with males from his laboratory rearings). Orth (1991) noted, however, that "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." A definitive study of females for species of *Dictya*, probably based on the reared series at Cornell University, remains to be pursued.

KEY TO SPECIES OF *DICTYA* FROM THE
DELMARVA AND ADJACENT STATES
(BASED ON MALES ONLY; BRACKETS INDICATE
SPECIES FROM ADJACENT STATES)

1. Fifth sternite appearing as pair of strongly bilobed plates. Terminalia in retracted condition covered by elongate, scooplike fourth sternite. Ventral hypandrial process small, slender, curved forward to sharply pointed apex, preterminal lobe absent, interior and exterior extensions present. No vestige of anterior surstylus. Surstylus of aberrant shape, yellowish with tooth laterally at base of apical extension, medial lappet, and group of apically or laterally directed stiff setae near dorsoapical margin
. [*D. pyarion* Steyskal]
- Fifth sternite not strongly bilobed, consisting instead of pair of heavily setose plates. Terminalia in retracted condition with at least dorsoapical portion of surstylus exposed, fourth sternite not elongated, scooplike. Vestige of anterior surstylus large and setulose. Surstylus not of above aberrant shape 2

- 2. Ventral hypandrial process without preterminal lobe, apex slightly curved anteromedially, minute anteroapical notch; narrow, thin flange on anteroapical half of shaft; dorsal portion of posterior margin slightly curved anteriorly. Ventral epandrial process with moderately large posterior lobe directed posteroventrally, anterior lobe not produced. Surstylus with dorsoapical notch nearly closed (Note: Orth (1991) referred to the lobe-like posterior apex of the surstylus as “projected” or not. We find it useful to refer also to the shape or condition of the dorsoapical notch anterior to the lobe-like apex.) *D. texensis* Curran
 - Ventral hypandrial process recurved apically, hooklike, or with minute to large preterminal lobe, or simply tapered but without narrow, thin flange on anteroapical half of shaft. Ventral epandrial process with posterior and anterior lobes produced or not. Surstylus with dorsoapical notch open or closed 3
- 3. Ventral hypandrial process anteriorly with deep, rounded notch at base, strongly directed anteriorly, anterior margin straight, with anteriorly directed, strongly recurved, very sharp apex. Ventral epandrial process with subacute, ventrally directed posterior lobe, anterior lobe scarcely produced. Surstylus with dorsal apex strongly projected, dorsoapical notch open *D. brimleyi* Steyskal
 - Ventral hypandrial process anteriorly without notch at base, more or less broadly excavated near midlength of anterior margin or sloping. Ventral epandrial process with posterior and anterior lobes produced or not. Surstylus with dorsoapical notch open or closed 4
- 4. Ventral hypandrial process with preterminal lobe explanate in ventral view 5
 - Ventral hypandrial process with preterminal lobe, if present, not explanate in ventral view 6
- 5. Ventral hypandrial process with preterminal lobe broadly explanate and platelike, in ventral view almost hemispherical, in lateral view directed strongly anteriorly. Ventral epandrial process with posterior lobe large, height and width nearly equal, directed ventrally. Surstylus with dorsoapical notch broadly open
 - *D. expansa* Steyskal
 - Ventral hypandrial process with preterminal lobe broadly flared, angulate in ventral view, in lateral view directed anterolaterally. Ventral epandrial process with posterior lobe small, nipplelike. Surstylus with dorsoapical notch at widest only partially open, often a narrow slit or closed *D. atlantica* Steyskal
- 6. Surstylus with dorsoapical tip bearing long, stiff, posteriorly directed setae. 7
 - Surstylus with dorsoapical tip with normal patch of setae 8
- 7. Surstylus with posterior margin strongly notched, forming separate, posteriorly directed posterodorsal lobe bearing tuft of long, mostly posteriorly directed setae. Ventral hypandrial process slender, elongate, with minute anteroapical point. Ventral epandrial process with large, bluntly pyramidal posterior lobe
 - [*D. borealis* Curran]
 - Surstylus with posterior margin not strongly notched, more or less rounded, posterodorsal apex bearing tuft of long, mostly posteriorly directed setae. Ventral hypandrial process with pronounced, sharply acute, medially directed preterminal lobe, anterior margin with broad shoulder on basal half. Ventral epandrial process with small, thumblike posterior lobe *D. pictipes* (Loew)
- 8. Ventral hypandrial process with preterminal lobe on anterior margin minute or lacking 9
 - Ventral hypandrial process with preterminal lobe on anterior margin distinct (variable in *D. orthi*, may be indistinct) 11
- 9. Ventral hypandrial process with preterminal lobe very short, apex acute, directed anterolaterally; shaft relatively straight, basal half of anterior margin with broad, lightly pigmented shoulder directed slightly laterally, posterior margin angulate at base. Ventral epandrial process with posterior lobe broad, directed posteriorly; anterior lobe minute, toothlike. Surstylus with dorsal apex scarcely projected, dorsoapical notch open [*D. floridensis* Steyskal]
 - Ventral hypandrial process without preterminal lobe, with or without triangular

- extension at midlength. Ventral epandrial process with posterior lobe moderately large and directed posteroventrally 10
10. Ventral hypandrial process with apical area bent abruptly 45° anteromedially in lateral view, forming broad point; anterior margin with conspicuous broad, short flange below apical area, posterior margin nearly straight. Ventral epandrial process with posterior lobe moderately large, directed posteroventrally; anterior lobe barely produced. Surstylus with dorsal apex roundly angulate, slightly projected, dorsoapical notch nearly closed. [D. *steyskali* Valley]
- Ventral hypandrial process with posterior surface of shaft straight from base to acute, anteriorly directed apex, anterior margin broadly sloping, anteroventral half well inclined medially in anteroventral view. Ventral epandrial process with moderately large, rounded posterior lobe directed posteroventrally, anterior lobe not produced. Surstylus with dorsal apex rounded, strongly projected, dorsoapical notch broadly open D. *laurentiana* Steyskal
11. Ventral hypandrial process with anterior margin emarginate immediately distad to preterminal lobe. 12
- Ventral hypandrial process with anterior margin smoothly curved or straight on apical half. 14
12. Ventral hypandrial process with preterminal lobe long, acute, directed anteroventrally, thin mesolaterally. Ventral epandrial process with small posterior lobe, anterior lobe not produced. Surstylus with dorsal apex not distinctly angulate, more or less rounded, slightly projected. D. *stricta* Steyskal
- Ventral hypandrial process with preterminal lobe long or short, rounded at apex, directed anteriorly or anterolaterally. Ventral epandrial process with large or small, rounded, bluntly pointed, subpyramidal posterior lobe and slightly produced anterior lobe. Surstylus with dorsal apex more or less angulate, scarcely to moderately projected. Salt marshes . . . 13
13. Ventral hypandrial process with blunt apex directed laterally, anterior margin in lateral view very broad with nearly horizontal shoulder and short, curved emargination, posterior margin straight in basal 1/4 and curved in distal 3/4; preterminal lobe cone-shaped, sharply pointed, projected at about 75° and directed slightly anterolaterally, about half as long as width of anterior shoulder. Ventral epandrial process with large, bluntly pointed, subpyramidal posterior lobe and rounded, slightly produced anterior lobe. Surstylus with dorsal apex small, somewhat angulate, scarcely projected, with a few posterodorsally directed setae at apex longer than others, dorsoapical notch open shallowly. D. *pechumani* Valley
- Ventral hypandrial process with blunt apex directed ventrally, anterior margin in lateral view somewhat broad with gently inclined shoulder and short, smooth emargination; posterior margin with curved emargination in basal 1/4, straight in distal 3/4; preterminal lobe beaklike, bluntly pointed, projected at right angle, strongly directed anterolaterally and about as long as width of shoulder of anterior margin. Ventral epandrial process with small, rounded posterior lobe and rounded, slightly produced anterior lobe. Surstylus with dorsal apex large, broadly angulate, moderately projected, with all posterodorsally directed setae at apex approximately equal in length to other setae along posterior margin, dorsoapical notch open deeply and widely D. *lobifera* Curran
14. Ventral hypandrial process with prominent, well-sclerotized triangular extension at base directed anterolaterally; anterior margin sloping very gently and evenly between triangular extension and preterminal lobe, apex directed posteroventrally, posterior margin slightly expanded at base; preterminal lobe small, triangular, directed anterolaterally. Ventral epandrial process with elongate, digitiform, narrow, ventrally directed posterior lobe; anterior lobe rounded, barely produced. Surstylus with dorsal apex large, rounded, moderately projected, with tuft of posterodorsally directed setae at apex twice length of others on posterior margin, dorsoapical notch broadly open D. *orthi*, new species
- Ventral hypandrial process without prominent triangular extension at base and

- without above combination of other characters 15
15. Ventral hypandrial process with apex truncate and with small, acute, anterobasally directed preterminal lobe. Ventral epandrial process with relatively small digitiform posterior lobe; anterior lobe not produced. Surstylus with dorsal tip broadly angulate, slightly projected, dorsoapical notch broadly open [D. sabroskyi Steyskal]
- Ventral hypandrial process with apex acute and with large, blunt-tipped, cone-shaped, anteriorly directed preterminal lobe. Ventral epandrial process with small to large posterior lobe. Surstylus with dorsal tip broadly angulate, strongly projected, dorsoapical notch broadly or deeply open. 16
16. Prosternal setae present. Ventral hypandrial process with long, slender neck, apex directed posteroventrally, posterior margin nearly straight, preterminal lobe large, cone-shaped, directed anteromedially. Ventral epandrial process with digitiform posterior lobe moderately produced. D. hudsonica Steyskal
- Prosternal setae absent. Ventral hypandrial process long and slender or forming blunt point, directed posteroventrally or ventrally; preterminal lobe acutely reflexed and sharp-tipped or blunt and beaklike; anterior margin nearly straight or emarginate, posterior margin basally straight and posteroventrally directed, distally straight and anteroventrally directed or with pronounced extension just distal to midpoint. Ventral epandrial process with posterior lobe moderately large, rounded, ventrally directed or with small and nipplelike, anterior lobe not produced. 17
17. Ventral hypandrial process at apex bluntly pointed, long and slender, posteroventrally directed, preterminal lobe acutely reflexed, sharp-tipped; anterior margin with broad emargination basad of preterminal lobe, basal portion straight, directed slightly posteriorly, posterior margin basally straight and posteroventrally directed, distally straight and anteroventrally directed. Ventral epandrial process with moderately large, rounded, ventrally directed posterior lobe, anterior lobe

- short, sharply pointed, lateral surface concave between lobes. Surstylus with dorsal tip broadly angulate, strongly projected, dorsoapical notch open wide. Salt marshes D. oxybeles Steyskal
- Ventral hypandrial process at apex acuminate; preterminal lobe sharply pointed, beaklike, directed anteriorly, anterior margin gently sloping, posterior margin angulate just basal of midpoint. Ventral epandrial process with small, nipplelike posterior lobe, anterior lobe not produced. Surstylus with dorsal apex strongly angulate, strongly projected, notch more open than in any other species. Salt marshes D. praecipua Orth

Dictya orthi Mathis, Knutson, and Murphy, new species
(Figs. 1–2)

Diagnosis.—This species can be distinguished readily from its congeners by the prominent triangular, anteromedially directed projection at midpoint on the anterior margin of the hypandrial process; by the shape and angle of the apex and the usually larger preterminal lobe; and by the shape of the ventral process of the epandrium, which has a posteroventrally directed digitiform posterior lobe that is twice as long as wide.

Description.—*Head*: Pedicel microtomentose, as high or higher than long. Parafrontal spots conspicuous, brownish, lighter colored than smaller, black, fronto-orbital spot.

Thorax: Wing length 4.0–5.2 mm. Prosternum without setae.

Abdomen: Male terminalia (Figs. 1–2): When retracted, at least apex of surstylus well exposed; surstylus with dorsal apex angulate, strongly projected, dorsoapical notch shallow, with cluster of 8–10 posterodorsally directed setulae near apex stouter and slightly longer than rest of setulae on posterior margin. Ventral process of epandrium (Fig. 2) with posteroventrally directed

digitiform posterior lobe twice as long as wide, separated by suture parallel to posterior margin; anterior lobe rounded, barely projected with short, faint suture separating it from main portion of process. Ventral margin of surstylus with gentle but pronounced hump immediately ventrad of anterior prong; outer, midlateral surface with patch of about 12 minute setulae. Ventral hypandrial process nearly erect with long, bluntly tipped preterminal lobe, in ventral view slipper-shaped with blunt posterior apex and sharply pointed anterior apex; face of preterminal lobe directed anteriorly at 45° angle in relation to hypandrial shaft. Hypandrial process directed ventromesally in basal 3/4 and ventrally in apical 1/4. Hypandrial process at midpoint with prominent, well-sclerotized, triangular, slightly anterolaterally to anteromedially directed projection, outer dorsal margin of triangular projection more strongly sclerotized than outer ventral margin; posterior margin nearly straight, with very slight posteriorly directed rounded projection almost directly opposite anterior projection.

Type material.—The holotype male is labeled “**USA. VA.** [boldface] Stafford: Aquia Harbour, Lion’s [sic] Park (38°27’N, 77°23.3’W), 15 Jun 2004, Dianne Mathis/USNM ENT 00118098 [plastic bar code label]/HOLOTYPE ♂ *Dictya orthi* Mathis, Knutson, & Murphy USNM [red].” The holotype is directly pinned, is in good condition (abdomen removed, dissected, and stored in a microvial on same pin), and is deposited in the USNM. Paratypes are as follows: VIRGINIA. Fairfax: Turkey Run (mouth; 38°57.9’N, 77°09.4’W), 24 Apr–25 May 2006, 2007, D. and W. N. Mathis (2♂; GWMP, USNM). Isle of Wight: Zuni Pine Barrens (36°49.6’N, 76°51.3’W; Blackwater River; 39 m), 16 Sep 2008, W. N. Mathis (1♂; USNM).

Stafford: Aquia Harbour (38°27.7’N, 77°23.3’W), 15 May 2000, D. and W. N. Mathis (1♂; USNM); Aquia Harbour, Aquia Creek (38°27.8’N, 77°23.1’W), 30 Jan 2006, D. and W. N. Mathis (1♂; USNM); Aquia Harbour, Lions Park (38°27’N, 77°23.3’W), 3 Jan–18 Dec 2004, 2005, 2006, D. and W. N. Mathis (8♂; USNM); Aquia Landing (38°23.2’N, 77°19’W), 14 Apr–7 May 2005, 2006, D. and W. N. Mathis (2♂; USNM).

Type locality.—Nearctic: United States. Virginia. Stafford: Aquia Harbour, Lions Park (38°27’N, 77°23.3’W). Lions Park is located at the western margin of the coastal plain (at the fall line) and is within the drainage system of Aquia Creek, a tributary of the Potomac River. The site is essentially flat, has not been developed because it is an easement for electrical power lines, and is very near Government Island, one of the newest sites on the Department of Interior’s *Register of Historic Places*. To the west of the Park are horse stables and paddocks; to the north is a small dike that was built to hold tailings from dredging Aquia Creek; to the south is Austin Run, a small creek that flows into Aquia Creek; and to the east is a deciduous thicket and woods, typical of coastal plains. An extensive cattail marsh behind the dike has been destroyed (a small cattail marsh elsewhere in the sampling area remains intact), and some of the area between the dike and Austin Run has been fenced off as a dog park.

Distribution.—Nearctic: United States (Virginia).

Etymology.—The specific epithet, *orthi*, is a genitive patronym to honor our friend and colleague, Robert E. Orth, who has contributed significantly to the study of Nearctic Sciomyzidae. Orth’s (1991) summary of the Nearctic

species of *Dictya*, which included 10 new species, has been an invaluable tool and guide to our own research on the *Dictya* fauna of the Delmarva States.

Natural history.—This species, although not rare, is collected uncommonly and is usually associated with other snail-killing flies, species of the genus *Dictya* in particular. In the Delmarva States, this species is known thus far only from sites in the upper coastal plain, usually at or near the fall line. Other species of *Dictya* collected at the type locality are as follows (listed in order of abundance; females neither determined nor counted): *D. texensis* Curran (131 ♂; abundant), *D. pictipes* Loew (84 ♂; abundant), *D. expansa* Steyskal (26 ♂; common), *D. brimleyi* Steyskal (15 ♂; common), *D. laurentiana* Steyskal (9 ♂; uncommon), *D. atlantica* Steyskal (6 ♂; uncommon), *D. oxybeles* Steyskal (4 ♂; uncommon), and a second apparently undescribed species represented by a single male.

Remarks.—This species is a member of Steyskal's (1954) "Typical Group." It is similar, and apparently closely related, to *D. floridensis* based on the similarly shaped structures of the male terminalia, especially the shape of the ventral hypandrial process and the posteroventrally directed, digitiform posterior lobe of the ventral process of the epandrium.

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LITERATURE CITED

- Clausen, P. J. and E. F. Cook. 1971. A revision of the Nearctic species of the tribe Parydrini (Diptera: Ephydriidae). *Memoirs of the American Entomological Society* 27: 1–150.
- Cresson, E. T., Jr. 1920. A revision of Nearctic Sciomyzidae (Diptera, Acalypratae). *Transactions of the American Entomological Society* 46(799): 27–89.
- Cumming, J. M., B. J. Sinclair, and D. M. Wood. 1995. Homology and phylogenetic implications of male genitalia in Diptera-Eremoneura. *Entomologica Scandinavica* 26: 121–149.
- Curran, C. H. 1932. The genus *Dictya* Meigen (Tetanoceridae, Diptera). *American Museum Novitates* 517: 1–7.
- Fisher, T. W. and R. E. Orth. 1969. A new *Dictya* in California, with biological notes (Diptera: Sciomyzidae). *Pan-Pacific Entomologist* 45(3): 222–228.
- Grimaldi, D. A. 1987. Phylogenetics and taxon-

- omy of *Zygothrica*. Bulletin of the American Museum of Natural History 186: 103–268.
- Knutson, L., R. E. Orth, T. W. Fisher, and W. L. Murphy. 1986. Catalog of Sciomyzidae (Diptera) of America North of Mexico. Entomography 4: 1–53.
- Linnaeus, C. 1758. Systema Naturae per Regna Tria Naturae. Edition 10, Vol. 1, 824 pp. Holmiae [= Stockholm].
- McAlpine, J. F. 1981. Morphology and terminology-adults, pp. 9–63. In J. F. McAlpine, B. V. Peterson, G. E. Shewell, H. J. Teskey, J. R. Vockeroth and D. M. Wood, eds. Annual of Nearctic Diptera. Volume 1: 9–63, Research Branch Agriculture Canada, Monograph no. 27, vi+ 674 pp.
- Meigen, J. W. 1803. Versuch einer neuen Gattungs Eintheilung der europäischen zeiflügligen Insecten. Magazin für Insektenkunde (Illiger) 2: 259–281.
- Orth, R. E. 1991. A synopsis of the genus *Dictya* Meigen with ten new species (Diptera: Sciomyzidae). Proceedings of the Entomological Society of Washington 93(3): 660–689.
- Steyskal, G. C. 1954. The American species of the genus *Dictya* Meigen (Diptera, Sciomyzidae). Annals of the Entomological Society of America 47(3): 511–539.
- . 1960. New North and Central American species of Sciomyzidae (Diptera: Acalyptratae). Proceedings of the Entomological Society of Washington 62(1): 33–43.
- . 1965. Family Sciomyzidae, pp. 686–695. In A. Stone, C. W. Sabrosky, W. W. Wirth, R. H. Foote and J. R. Coulson, eds. A Catalog of the Diptera of America North of Mexico. U.S. Department of Agriculture, Handbook 276, 1,696 pp.
- Valley, K. R. 1974. Biology and Immature Stages of Snail-killing Diptera of the Genus *Dictya* (Sciomyzidae), Ph.D. Dissertation, Cornell University, Ithaca, New York, 174 pp. Order No. 75-1630, Univ. Microfilms, Ann Arbor, Michigan. (Dissertation Abstracts 35 (7): 3372-B).
- Valley, K. and C. O. Berg. 1977. Biology, immature stages, and new species of snail-killing Diptera of the genus *Dictya* (Sciomyzidae). Search Agriculture, Entomology 18 (Ithaca) 7(2): 1–44.