

INSECTA MUNDI

A Journal of World Insect Systematics

0303

Rediscovery of the Florida Scorpionfly, *Panorpa floridana* Byers
(Mecoptera: Panorpidae)

Louis A. Somma

McGuire Center for Lepidoptera and Biodiversity
Florida Museum of Natural History
University of Florida
Gainesville, FL 32611-2710
somma@ufl.edu

Stephen Cresswell

Buckhannon, WV 26201
www.americaninsects.com
cresswell@wvwc.edu

James C. Dunford

McGuire Center for Lepidoptera and Biodiversity
Florida Museum of Natural History
University of Florida
Gainesville, FL 32611-2710
dunford@ufl.edu

Date of Issue: June 10, 2013

Louis A. Somma, Stephen Creswell and James C. Dunford
Rediscovery of the Florida Scorpionfly, *Panorpa floridana* Byers (Mecoptera: Panorpidae)
Insecta Mundi 00303: 1–5

ZooBank Registered urn:lsid:zoobank.org:pub:4DE5C210-D917-43F1-B61B-38729DEBED22

Published in 2013 by

Center for Systematic Entomology, Inc.
P. O. Box 141874
Gainesville, FL 32614-1874 USA
<http://www.centerforsystematicentomology.org/>

Insecta Mundi is a journal primarily devoted to insect systematics, but articles can be published on any non-marine arthropod. Topics considered for publication include systematics, taxonomy, nomenclature, checklists, faunal works, and natural history. **Insecta Mundi** will not consider works in the applied sciences (i.e. medical entomology, pest control research, etc.), and no longer publishes book reviews or editorials. **Insecta Mundi** publishes original research or discoveries in an inexpensive and timely manner, distributing them free via open access on the internet on the date of publication.

Insecta Mundi is referenced or abstracted by several sources including the Zoological Record, CAB Abstracts, etc. **Insecta Mundi** is published irregularly throughout the year, with completed manuscripts assigned an individual number. Manuscripts must be peer reviewed prior to submission, after which they are reviewed by the editorial board to ensure quality. One author of each submitted manuscript must be a current member of the Center for Systematic Entomology.

Managing editor: Paul E. Skelley, e-mail: insectamundi@gmail.com

Production editors: Michael C. Thomas, Brian Armitage, Ian Stocks

Editorial board: J. H. Frank, M. J. Paulsen

Subject editors: G.B. Edwards, J. Eger, A. Rasmussen, F. Shockley, G. Steck, Ian Stocks, A. Van Pelt, J. Zaspel

Spanish editors: Julieta Brambila, Angélico Asenjo

Printed copies (ISSN 0749-6737) annually deposited in libraries of:

CSIRO, Canberra, ACT, Australia
Museu de Zoologia, São Paulo, Brazil
Agriculture and Agrifood Canada, Ottawa, ON, Canada
The Natural History Museum, London, Great Britain
Muzeum i Instytut Zoologiczny PAN, Warsaw, Poland
National Taiwan University, Taipei, Taiwan
California Academy of Sciences, San Francisco, CA, USA
Florida Department of Agriculture and Consumer Services, Gainesville, FL, USA
Field Museum of Natural History, Chicago, IL, USA
National Museum of Natural History, Smithsonian Institution, Washington, DC, USA
Zoological Institute of Russian Academy of Sciences, Saint-Petersburg, Russia

Electronic copies (On-Line ISSN 1942-1354, CDROM ISSN 1942-1362) in PDF format:

Printed CD mailed to all members at end of year. Archived digitally by Portico. Openly accessible at:
Florida Virtual Campus: <http://purl.fcla.edu/fcla/insectamundi>
University of Nebraska-Lincoln, Digital Commons: <http://digitalcommons.unl.edu/insectamundi/>
Goethe-Universität, Frankfurt am Main: <http://edocs.ub.uni-frankfurt.de/volltexte/2010/14363/>

Author instructions available on the *Insecta Mundi* page at:

<http://www.centerforsystematicentomology.org/insectamundi/>

Copyright held by the author(s). This is an open access article distributed under the terms of the Creative Commons, Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited. <http://creativecommons.org/licenses/by-nc/3.0/>

Rediscovery of the Florida Scorpionfly, *Panorpa floridana* Byers
(Mecoptera: Panorpidae)

Louis A. Somma
McGuire Center for Lepidoptera and Biodiversity
Florida Museum of Natural History
University of Florida
Gainesville, FL 32611-2710
somma@ufl.edu

Stephen Cresswell
Buckhannon, WV 26201
www.americaninsects.com
cresswell@wwvc.edu

James C. Dunford
McGuire Center for Lepidoptera and Biodiversity
Florida Museum of Natural History
University of Florida
Gainesville, FL 32611-2710
dunford@ufl.edu

Abstract. We describe the rediscovery of the Florida scorpionfly, *Panorpa floridana* Byers (Mecoptera: Panorpidae), at Gold Head Branch State Park, Clay County, Florida, based upon a single, living, adult specimen photographed on 4 November 2010. The hardcopy photographic prints and electronic digital images of this panorpid are the first vouchers for *P. floridana* in 28 years, the only observation of a living specimen, and the sixth individual known of this seemingly rare Florida endemic.

Introduction

The Florida scorpionfly, *Panorpa floridana* Byers, 1993, was described 20 years ago on the basis of only five known adult specimens (Byers 1993; Somma and Dunford 2009a). This endemic Floridian panorpid has only been collected in Alachua and Clay counties, northern peninsular Florida (Byers 1993; Somma and Dunford 2008, 2009a). Known *P. floridana* specimens are a male, the holotype, collected in Gainesville at a horticultural unit near the San Felasco Hammock, Alachua County, 1970; one female paratype collected from an unspecified locality in Alachua County, 1974; a female allotype and female paratype, both collected in Gold Head Branch State Park, Clay County, 1982; and one male paratype collected in Orange Park, Clay County, 1936 (Byers 1993; Somma and Dunford 2009a). Four of the five specimens were collected in November, and the Orange Park male in December (Byers 1993; Somma and Dunford 2009a). Almost no other data help elucidate the biology of *P. floridana* except the female Alachua County specimen was found “on saw palmetto” (Byers 1993). *Panorpa floridana* currently has a NatureServe Global Conservation Status Rank of G1 (=critically imperiled because of extreme rarity, NatureServe Explorer 2012) and the Florida Natural Areas Inventory (FNAI) has State-listed it as GIS1 (= critically imperiled because of extreme rarity, Florida Natural Areas Inventory 2012). Herein we present information on the sixth known voucher and only observation of a living individual of *P. floridana*. Additionally, we provide data regarding its habitat and make suggestions for future study.

Methods and Materials

One of us (SC) surveyed the steephead ravine of Gold Head Branch, in the Mike Roess Gold Head Branch State Park, Clay County, Florida, on 4 November 2010. The camera used to photograph the



Figures 1–4. 1) Male *Panorpa floridana* in situ on low growing *Ilex* sp. in Gold Head Branch Ravine, Clay County, Florida, 4 November 2010 (photographic voucher FNAI Reference Code: N13CRE01FLUS, Reference ID: 189911; MorphoBank M152668). Photograph by Stephen Cresswell. 2) Lateral view of male *Panorpa floridana* in situ in Gold Head Branch Ravine, Clay County, Florida, 4 November 2010 (photographic voucher FNAI Reference Code: N13CRE01FLUS, Reference ID: 189911; MorphoBank M152669). Photograph by Stephen Cresswell. 3) Dorsal view of male *Panorpa floridana* in situ in Gold Head Branch Ravine, Clay County, Florida, 4 November 2010 (photographic voucher FNAI Reference Code: N13CRE01FLUS, Reference ID: 189911; MorphoBank M152670). Photograph by Stephen Cresswell. 4) Anterior view of head of male *Panorpa floridana* in situ in Gold Head Branch Ravine, Clay County, Florida, 4 November 2010 (photographic voucher FNAI Reference Code: N13CRE01FLUS, Reference ID: 189911; MorphoBank M152671). Photograph by Stephen Cresswell.

scorpionfly was a Cannon 5D Mark II with a 180 mm macro lens and MT-24 macro twin flash; exposure 1/200 s at f18 and f16. Two of these images were originally posted on BugGuide (Cresswell 2011), where these initial online postings were used to make a species determination by Wesley J. Bicha (in Cresswell 2011, pers. comm. 2012). These and one other photographic image were used by two of us (LAS, JCD) to verify the species identity based upon visible morphology, especially the forewings, by comparing with published descriptions (Byers 1993; Somma and Dunford 2009a) and the two specimens (the holotype and the Orange Park paratype) maintained in the Mecoptera Collection of the Florida State Collection of Arthropods (FSCA), Division of Plant Industry (DPI), Florida Department of Agriculture and Consumer Services (FDACS) (Dunford and Somma 2008, 2009a; Dunford et al. 2013). These three images, along with a fourth photograph better illustrating the plant on which the panorpids was found (Fig. 1–4), were made into duplicate hardcopy photographic prints and vouchered in the McGuire Center for Lepidoptera



Figure 5. Flowing water of Gold Head Branch, 2–3 m from the vouchered *P. floridana*, Clay County, Florida, 4 November 2010. Photograph by Stephen Cresswell.

a characteristic of the *Panorpa lugubris* Swederus, 1787, species group, detailed features of the genitalia which distinguish it from other species in this group (Byers 1993) are not visible. However, the unique forewing morphology (Fig. 2–3) which separates it from all other Florida panorpid include lightly tinted yellowish brown membranes, a diagonal unbranched pterostigmal band, and a basal band strongly constricted at vein M (Byers 1993; Somma and Dunford 2009a). Although the humeral area of the forewings of *P. floridana* are immaculate (Byers 1993), herein we note that the subcostal veins are blackened or edged in black along the basal third of their length in this specimen (Fig. 2–3), and both the holotype and paratype housed in FSCA. The overall color of the body is yellowish to yellowish brown, the head is reddish, and the ocelli are encircled by dark blackish rings (Fig. 2–4), further verifying that this individual is *P. floridana*, the Florida scorpionfly (Byers 1993; Somma and Dunford 2009a). This living *P. floridana* has black antennae, mostly black tarsi, and reddish abdominal segments 6–9 (Fig. 2–4); characteristics which are less clear in pinned, darkened specimens.

Gold Head Branch forms a steephead, or sapping valley, created by the outflow of clear-water springs within Gold Head Branch State Park, located approximately 7.4 km northeast of Keystone Heights and 37 km east-northeast of Gainesville in northern peninsular Florida (Rosenau et al. 1978; Scott et al. 2004; Hermansen 2009). This fire-protected steephead ravine is approximately 14 m deep and cuts through principally flat, upland xeric high pine and scrub ecosystems within the park; but the habitat within the ravine proper is lush, humid, dominated by a southern hardwood ecosystem, has greater thermal stability than the surrounding uplands, and is known for its remarkable diversity of flora and salamanders (Watts and Stuiver 1980; Platt and Schwartz 1990; Hermansen 2009). These features are shared by other steepheads located westward in the Florida Panhandle (Neill 1957; Means 1981, 2000; Dunford et al. 2007). The physical environment and formation of this ravine may be related to geomorphological features of the southernmost extent of the Trail Ridge and northernmost expression of the Lakes Wales Ridge dur-

and Biodiversity (MGCL), Florida Museum of Natural History, University of Florida; the Howard V. Weems, Jr., Reprint Collection in FSCA; and FNAI (Reference Code: N13CRE01FLUS, Reference ID: 189911). Additionally, the electronic versions of the digital images were vouchered with FNAI (Reference Code: N13CRE01FLUS, Reference ID: 189911) and MorphoBank (project number p879; www.morphobank.org/permalink/?P879) under the codes: M152668-M152671). The MorphoBank vouchers are open access.

The length of the scorpionfly was measured to the nearest 0.1 mm by SC photographing a plastic metric ruler immediately after the initial images were taken, at the same distance from the lens, using the identical camera settings, afterwards comparing this photograph against the photograph illustrating the insect's lateral aspect (Fig. 2).

Results and Discussion

The scorpionfly was observed and photographed in situ on a low growing, undetermined species of holly, *Ilex* sp. (Fig. 1–4) under conditions of low ambient lighting between 1214–1217 h. This specimen was on the Fern Loop Trail approximately 15 m from the bottom of the ravine stairway (29.8409°N, 81.9544°W), 2–3 m from the flowing water of Gold Head Branch (Fig. 5). The panorpid was a male 15.1 mm long from apex of anteriormost ocellus to forewing apex. Although an elongate genital bulb is barely visible through the folded wings (Fig. 2),

ing various Pleistocene marine depositions and resortings (Hermansen 2009). Steephead ravines in other parts of northern Florida have proven productive for a variety of unique biota including another elusive mecopteran, the North American earwigfly, *Merope tuber* Newman, 1838 (Dunford et al. 2007; Somma 2011).

Somma and Dunford (2009a, variously reprinted as Somma and Dunford 2012a, 2012b, 2012c) predicted *P. floridana* would be rediscovered in the moist, shaded steephead ravine rather than the surrounding xeric ecosystems in this park; thus, conforming to habitats preferred by most species of Mecoptera (Byers and Thornhill 1983; Dunford and Somma 2008). Other members of the *lugubris* species group are unusual in their preference to open, more xeric environments (Byers 1963, 1993; Evans and Flint 2009; Somma 2011).

No detailed habitat information exists for the other five specimens of *P. floridana* previously collected in Alachua and Clay counties. However, we suggest searching spring seepages, including wet or inundated sinkholes roughly approximating a steephead environment such as Devil's Millhopper in Alachua County (Arnold 1936), during the months of November and December, in these and other nearby counties in northern peninsular Florida. Shady, lush microhabitats with low growing, leafy vegetation may prove particularly productive. To date there is not enough knowledge covering the biology and abundance of *P. floridana* to adequately determine the status of this Florida endemic. In many respects, this is in keeping with the overall knowledge of the Mecoptera of Florida, which remain poorly collected and severely understudied (Somma and Dunford 2008, 2009b; Somma 2010, 2011). Clearly, new discoveries in mecopteran biology await young naturalists and intrepid students of the Florida biota.

Acknowledgments

We thank Andrew Warren (Senior Collections Manager, MGCL) and David T. Almquist (Invertebrate Zoologist, FNAI, Tallahassee) for accessioning our photographic vouchers in their respective institutions. We are grateful to Patti Anderson (Botany Section, DPI) for verifying our plant identification. We are pleased that Scott Burton (Technical Assistance Office, DPI) took the time to produce superior photographic prints for our vouchers. Other technical support was provided by the facilities of DPI. We are thankful to Wes Bicha for determining the initial identity of this species. We are gratified that Jimmie Griffiths used his expertise to carefully review our paper. Gary J. Steck (Curator of Diptera and Minor Orders, FSCA, DPI) graciously took the time to go over our manuscript and encourage our submission for publication. Lastly, we are completely indebted to James R. Wiley (Assistant Curator [Ret.], FSCA) for enthusiastically assisting us in providing critical literature, and continually educating us with his tireless, prescient insights.

Literature Cited

- Arnold, L. E. 1936. A field trip to the Devil's Millhopper. *Journal of the Elisha Mitchell Scientific Society* 52: 77–90, pl. 7–10.
- Byers, G. W. 1963. The life history of *Panorpa nuptialis* (Mecoptera: Panorpidae). *Annals of the Entomological Society of America* 56: 142–144.
- Byers, G. W. 1993. Autumnal Mecoptera of southeastern United States. *University of Kansas Science Bulletin* 55: 57–96.
- Byers, G. W., and R. Thornhill. 1983. Biology of the Mecoptera. *Annual Review of Entomology* 28: 203–228.
- Cresswell, S. 2011. Florida scorpionfly—*Panorpa floridana*. In: J. VanDyk and V. Belov (editors). *Bug-Guide*. Department of Entomology, Iowa State University; Ames. <http://bugguide.net/node/view/515897>. (Accessed 19 March 2013).
- Dunford, J. C., P. W. Kovarik, L. A. Somma, and D. Serrano. 2007. First state records for *Merope tuber* (Mecoptera: Meropeidae) in Florida and biogeographical implications. *Florida Entomologist* 90: 581–584.
- Dunford, J. C., and L. A. Somma. 2008. Scorpionflies (Mecoptera). p. 3304–3310, pl. 97. In: J. L. Capinera (editor). *Encyclopedia of entomology*. Second edition. Vol. 4. S-Z. Springer; [Dordrecht].

- Dunford, J. C., L. A. Somma, and D. Serrano. 2013.** FSCA Mecoptera resources: Mecoptera (scorpionflies, hangingflies, earwigflies, and allies) at the Florida State Collection of Arthropods. *In*: M. C. Thomas (editor). Museum of Entomology FSCA (Gainesville). Florida State Collection of Arthropods, Division of Plant Industry, Florida Department of Agriculture and Consumer Services; Gainesville. <http://www.fsc-dpi.org/MecopteraPage.htm>. (Accessed 19 March 2013).
- Evans, A. V., and O. S. Flint, Jr. 2009.** The mourning scorpionfly, *Panorpa lugubris*, in Virginia (Mecoptera: Panorpidae). *Banisteria* 33: 58–60.
- Florida Natural Areas Inventory. 2012.** FNAI Tracking List: Alachua County. Florida Natural Areas Inventory; Tallahassee. <http://www.fnai.org/bioticssearch.cfm>. (Accessed 19 March 2013).
- Hermansen, G. 2009.** A geohydrological investigation of Gold Head Branch State Park, Clay County, Florida. Unpublished MS Thesis, University of Florida; [Gainesville]. 113 p.
- Means, D. B. 1981.** Steepheads: Florida's little-known canyonlands. ENFO (Tallahassee) 1981(Dec.): 1–4.
- Means, D. B. 2000.** Southeastern U.S. Coastal Plain habitats of the Plethodontidae: The importance of relief, ravines, and seepage. p. 287–302. *In*: R. C. Bruce, R. G. Jaeger, and L. D. Houck (editors). The biology of the plethodontid salamanders. Kluwer Academic/Plenum Publishers; New York. 485 p.
- NatureServe Explorer. 2012.** *Panorpa floridana*. NatureServe; Arlington. <http://www.natureserve.org/explorer/servlet/NatureServe?searchSciOrCommonName=Pantorpa+floridana&x=9&y=10>. (Accessed 19 March 2013).
- Neill, W. T. 1957.** Historical biogeography of present-day Florida. *Bulletin of the Florida State Museum, Biological Sciences* 2: 175–220.
- Platt, W. J., and M. W. Schwartz. 1990.** Temperate hardwood forests. p. 194–229. *In*: R. L. Myers and J. J. Ewel (editors). *Ecosystems of Florida*. University of Central Florida Press; Orlando. 765 p.
- Rosenau, J. C., G. L. Faulkner, C. W. Hendry, Jr., and R. W. Hull. 1978.** Springs of Florida. State of Florida Department of Natural Resources, Bureau of Geology Bulletin 1977 31(Revised): i–xxvii, 1–461.
- Scott, T. M., G. H. Means, R. P. Meegan, R. C. Means, S. B. Upchurch, R. E. Copeland, J. Jones, T. Roberts, and A. Willet. 2004.** Springs of Florida. *Florida Geological Survey Bulletin* 66(version 1.1): i–xviii, 1–658.
- Somma, L. A. 2010.** A state record for the Oconee scorpionfly, *Panorpa oconee* Byers (Mecoptera: Panorpidae), in Florida. *Insecta Mundi* 0135: 1–4.
- Somma, L. A. 2011.** New collections and records for earwigflies and scorpionflies (Mecoptera: Meropidae and Panorpidae) in Florida. *Insecta Mundi* 0165: 1–4.
- Somma, L. A., and J. C. Dunford. 2008.** Preliminary checklist of the Mecoptera of Florida: Earwigflies, hangingflies, and scorpionflies. *Insecta Mundi* 0042: 1–9.
- Somma, L. A., and J. C. Dunford. 2009a.** The Florida scorpionfly, *Panorpa floridana* Byers (Mecoptera: Panorpidae). *Entomology Circular* (Division of Plant Industry, Florida Department of Agriculture & Consumer Services) 420: 1–3.
- Somma, L. A., and J. C. Dunford. 2009b.** Records for *Bittacus* hangingflies and *Panorpa* scorpionflies (Mecoptera: Bittacidae and Panorpidae) in Florida. *Insecta Mundi* 0084: 1–5.
- Somma, L. A., and J. C. Dunford. 2012a.** Florida scorpionfly, *Panorpa floridana* Byers (Insecta: Mecoptera: Panorpidae). Publication # EENY-538. Institute of Food and Agricultural Sciences Extension, University of Florida; Gainesville. 4 p.
- Somma, L. A., and J. C. Dunford. 2012b.** Florida scorpionfly *Panorpa floridana* Byers. EENY-538. *In*: D. Hagen and S. Gildersleve (editors). *Featured Creatures EDIS*. Institute of Food and Agricultural Sciences Extension, University of Florida; Gainesville. <http://edis.ifas.ufl.edu/in949>. (Accessed 19 March 2013).
- Somma, L. A., and J. C. Dunford. 2012c.** Florida scorpionfly - *Panorpa floridana* Byers. EENY-538. *In*: J. L. Gillett-Kaufman (editor). *Featured Creatures*. Department of Entomology and Nematology, IFAS, University of Florida, and Florida Department of Agriculture and Consumer Services, Division of Plant Industry; Gainesville. <http://entnemdept.ufl.edu/creatures/MISC/scorpionfly.htm>. (Accessed 19 March 2013).
- Watts, W. A., and M. Stuver. 1980.** Late Wisconsin climate of northern Florida and the origin of species-rich deciduous forest. *Science* 210: 325–327.