



International Dragonfly Fund - Report

Journal of the
International Dragonfly Fund

ISSN 1435-3393

Content

Garrison, Rosser & Natalia von Ellenrieder

A contribution to the study of the biodiversity of Odonata in Costa Rica
with an emphasis on the genus *Argia* (Insecta: Odonata: Coenagrionidae)

1-23

Volume 62 2013

The International Dragonfly Fund (IDF) is a scientific society founded in 1996 for the improvement of odonatological knowledge and the protection of species.

Internet: <http://www.dragonflyfund.org/>

This series intends to publish studies promoted by IDF and to facilitate cost-efficient and rapid dissemination of odonatological data.

Editorial Work: Martin Schorr

Layout: Martin Schorr

Indexed by Zoological Record, Thomson Reuters, UK

Home page of IDF: Holger Hunger

Printing: ikt Trier, Germany

Impressum: International Dragonfly Fund - Report - Volume 62

- Date of publication: 21.10.2013
- Publisher: International Dragonfly Fund e.V., Schulstr. 7B, 54314 Zerf, Germany. E-mail: oestlap@online.de
- Responsible editor: Martin Schorr

A contribution to the study of the biodiversity of Odonata in Costa Rica with an emphasis on the genus *Argia* (Insecta: Odonata: Coenagrionidae)

Rosser W. Garrison¹ & Natalia von Ellenrieder²

Plant Pest Diagnostics Branch, California Department of Food & Agriculture, 3294
Meadowview Road, Sacramento, CA 95832-1448, U.S.A.
rgarrison@cdfa.ca.gov¹, natalia.ellenrieder@gmail.com²



Pairs of *Argia cupraurea* in tandem perching along sunny river margins in Limón province.

Abstract

A two week trip to Costa Rica was conducted between 26 May and 8 June 2013, sampling odonates in several provinces along the center to the pacific southern portion of the country. A total of 86 species in 34 genera were found, including 16 species of the genus *Argia*. Lists of all species by locality, photographs of live specimens, and illustrations and notes of described species of *Argia* are presented to facilitate identification to other collectors.

Key words: Costa Rica, San José, Limón, Heredia, Puntarenas, checklist, *Argia*



Introduction

With a total of only 51,100 square kilometers and at least 270 species of odonates recorded for the country (Esquivel, 2006; Haber & Wagner, 2013), Costa Rica constitutes a biodiversity hot-spot. Numerous endemisms and species from both North and South America that reach their distribution limits are found within its diverse tropical rainforests, deciduous, cloud, and Mangrove forests (Abbell et al. 2008, Kohlmann 2011). Although the odonate fauna of Costa Rica is better known than that of any other Central American country, several undescribed species collected in the past are still awaiting description, and there is a high likelihood of even more new species being discovered.

The goal of our twelve days trip to Costa Rica was to inventory the Odonata from various localities within different biozones and habitats, with a particular emphasis on the most speciose genus of Odonata in the World: *Argia* Rambur. About 200 names have been applied to this genus, and the status of knowledge on its taxonomy, which is currently being revised by the senior author, is poor, due to numerous names based on type specimens that have been lost, incomplete original descriptions, lack of keys, and numerous still undescribed species. This genus is represented in Costa Rica by about 29 species (Haber & Wagner, 2013), whose identity needs to be confirmed or clarified.

Methodology

Costa Rica is located on the Central American isthmus between latitudes 8° and 12°N and longitudes 82° and 86°W, bordered by Nicaragua to the North, the Caribbean Sea to the east, the Pacific Ocean to the west, and Panama to the South (Fig. 1). Its climate is tropical, although there are many microclimates depending on elevation, rainfall, topography, and the geography of each particular region.

Our visit took place near the beginning of the rainy season, which normally extends from May through November. Photographing and sampling of odonates with entomological aerial nets was carried out in various localities along trails, streams and rivers, and around swamps and ponds.

We selected three areas to conduct our study (Fig. 1): one centered in Heredia (localities 1-8), another one in the South near San Vito and along the Pacific coast (localities 9-20), and the third one near Monteverde in Puntarenas province (localities 21-29).



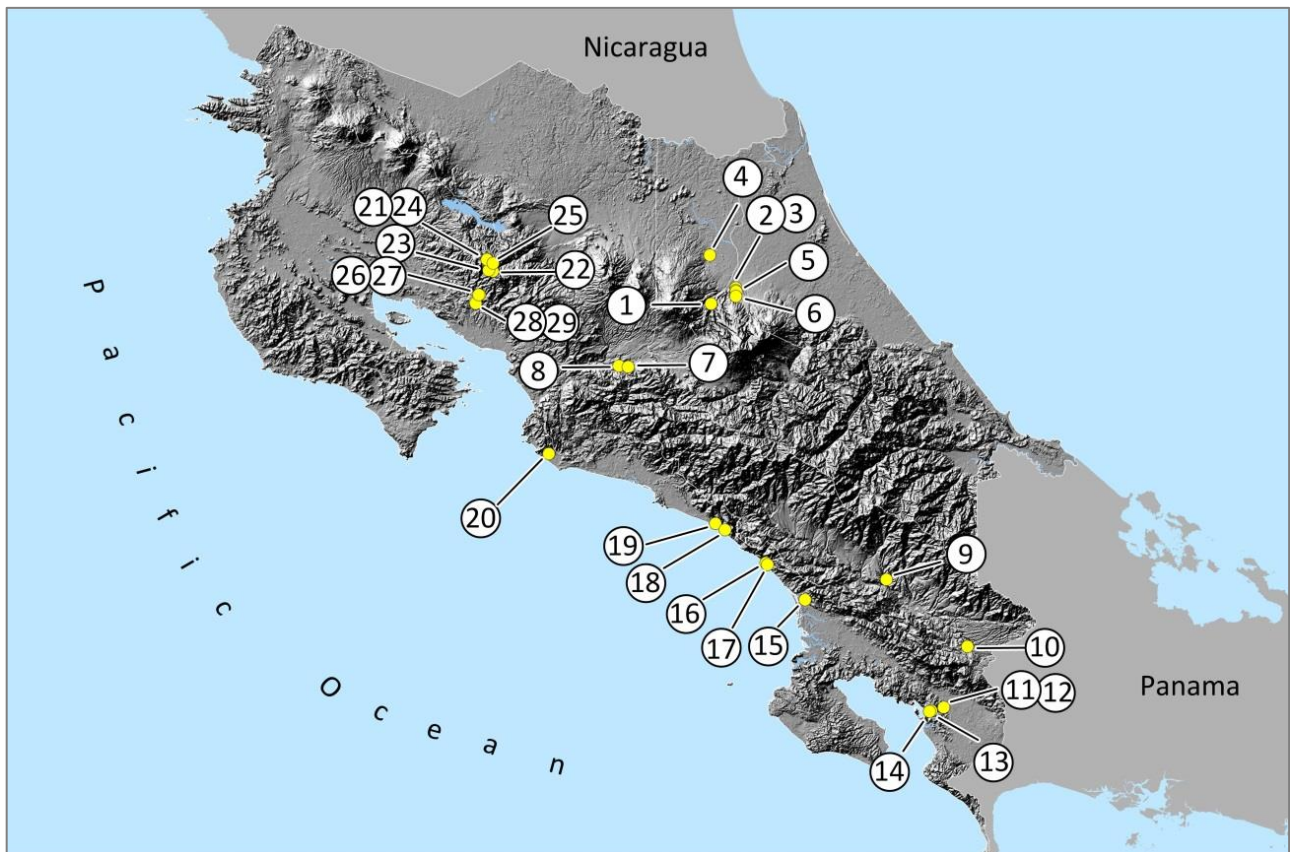


Fig. 1. Map of Costa Rica showing localities visited.

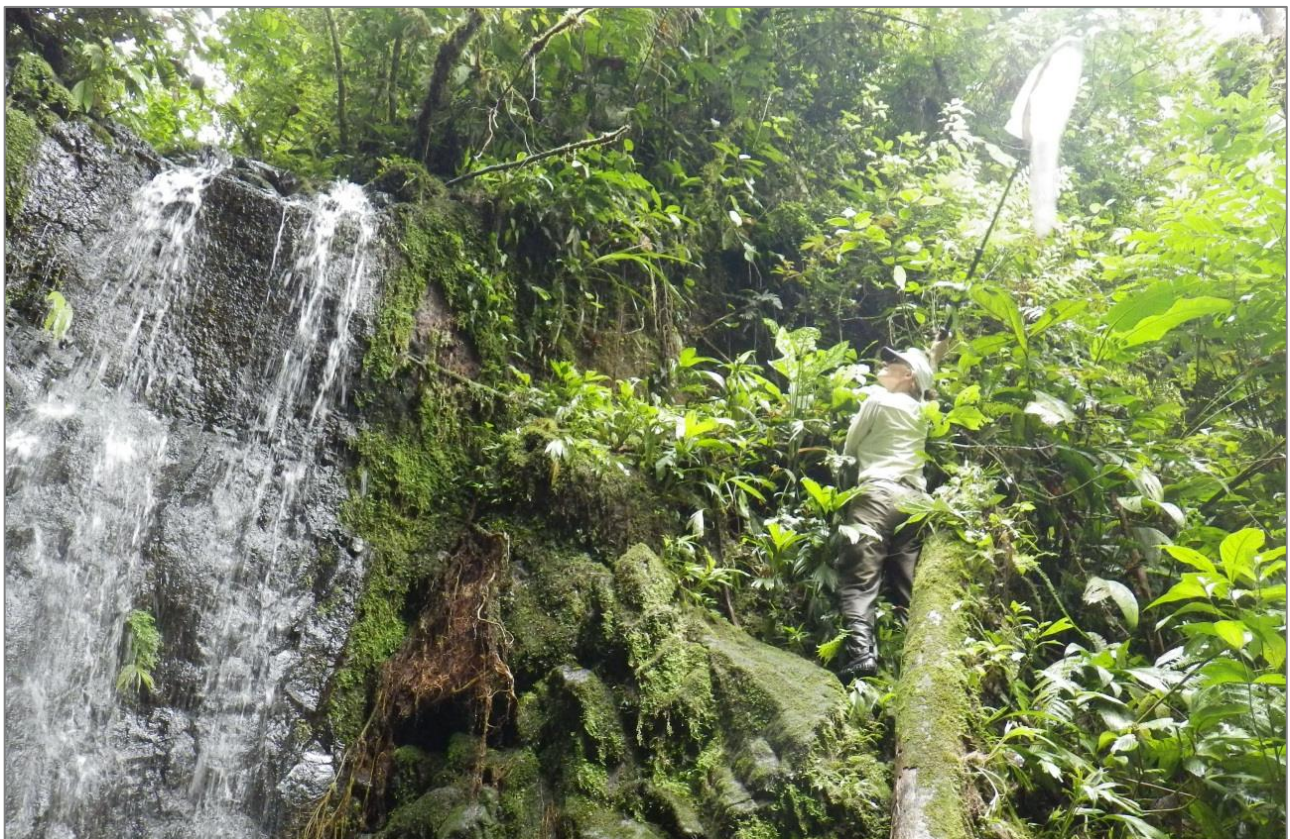


Fig. 2. *Thaumatonereura innopinata* habitat at Braulio Carrillo N.P. For photographs of this monotypic damselfly and information about its life cycle please consult Esquivel (2006) and Haber & Wagner (2013).





Fig. 3. Río Costa Rica in Limón Province – home to four species of *Palaemnema*.

The localities visited included:

- 1 San José Prov., **Braulio Carrillo National Park**, waterfall at unnamed creek on road 32, 2.5 km west of bridge on Río Sucio ($10^{\circ}9'13''\text{N}$, $83^{\circ}57'11''\text{W}$, 20 m), 26 v 2013.
- 2 Limón Prov., **Río Costa Rica**, Ruta 32 between La Unión and Flores, on dirt road 0.3 km north; rocky river, along vegetated shore in shade ($10^{\circ}12'52''\text{N}$, $83^{\circ}51'30''\text{W}$, 249 m), 26 v 2013.
- 3 Limón Prov., Ruta 32 between La Unión and Flores, on dirt road 1 km south; **unnamed rocky stream** through secondary forest and open marshy cow pasture ($10^{\circ}12'17''\text{N}$, $83^{\circ}51'31''\text{W}$, 287 m), 26 v 2013.
- 4 Heredia Prov., **La Horqueta**, ditch at road ($10^{\circ}20'22''\text{N}$, $83^{\circ}57'27''\text{W}$, 78 m), 27 v 2013.
- 5 Limón Prov., Ruta 32 between La Unión and Flores, on dirt road 1.5 km south; **rocky river** through secondary forest ($10^{\circ}12'3''\text{N}$, $83^{\circ}51'26''\text{W}$, 279 m), 27 v 2013.
- 6 Limón Prov., Ruta 32 between La Unión and Flores, on dirt road 4 km south; **rocky river** through secondary forest and shady affluent creek ($10^{\circ}10'57''\text{N}$, $83^{\circ}51'30''\text{W}$, 351 m), 27 v 2013.





Fig. 4. Shaded creek in secondary forest, habitat of *Perissolestes magdalenae*.

7 San José Prov., Hacienda El Rodeo, 7 km west of Villa Colón (9°54'49"N,
84°16'10"W, 859 m), 28 v 2013.



8 San José Prov., **Finca ca 5.5 km W of Villa Colón**, Bajo Limón, stony river through secondary forest (9°55'3"N, 84°18'16"W, 559 m), 28 v 2013.



Fig. 5. Overview of the Cartago from the Cerro del Muerto, where in sunny days *Sympetrum illotum* can be seen flying at high altitude ponds.

- 9** Puntarenas Prov., **unnamed stream** 2 km north of Río Terraba on Hwy 2; small shaded rocky stream (9°6'14"N, 83°16'59"W, 197 m), 29 v 2013.
- 10** Puntarenas Prov., **Hotel Cuenca de Oro**, 5 km north of San Vito on ruta 612; forested stream and pond near forest edge (8°50'54"N, 82°58'26"W, 844 m), 30 v 2013.
- 11** Puntarenas Prov., **Río km 20**, 12 km east of Golfito on ruta 14; sandy stream (8°37'2"N, 83°3'52"W, 25 m), 31 v 2013.
- 12** Puntarenas Prov., **Quebrada Diecinueve**, 11 km east of Golfito on ruta 14; sandy stream (8°36'56"N, 83°3'56"W, 25 m), 31 v 2013.
- 13** Puntarenas Prov., **Río Purrujas**, 5 km east of Golfito on ruta 14; rocky stream (8°36'56"N, 83°3'56"W, 38 m), 31 v 2013.
- 14** Puntarenas Prov., **wide sandy stream**, 3 km east of Golfito on ruta 14 (8°36'5"N, 83°7'7"W, 23 m), 31 v 2013.
- 15** Puntarenas Prov., **stony/sandy river**, 22 km south of Uvita de Osa on ruta 34 (9°1'37"N, 83°35'37"W, 48 m), 31 v 2013.





Fig. 6. Artificial pond at Hotel Cuenca de Oro near San Vito.



Fig. 7. Settlement near San Vito.



- 16** Puntarenas Prov., **Río Uvita**, 0.8 km west of ruta 34; wide stony river (9°10'2"N, 83°44'36"W, 37 m), 1 vi 2013.
- 17** Puntarenas Prov., **stagnant rain pool and ditches**, 0.3 km west of ruta 34, near Uvita de Osa (9°9'38"N, 83°44'14"W, 37 m), 1 vi 2013.



Fig. 8. View of the Pacific Ocean from the coastal cordillera near Uvita de Osa.

- 18** Puntarenas Prov., **wide stony river**, 1.3 km south of Hatillo on ruta 34 (9°17'34"N, 83°53'58"W, 30 m), 1 vi 2013.
- 19** Puntarenas Prov., **narrow sandy gravel stream** between Hatillo and Matapalo on ruta 34 (9°19'3"N, 83°56'8"W, 23 m), 1 vi 2013.
- 20** Puntarenas Prov., **wide sandy gravel stream** between Playa Hermosa and Quebrada Amarilla on ruta 34 (9°34'58"N, 84°34'20"W, 35 m), 1 vi 2013.
- 21** Puntarenas Prov., Monteverde, **Quebrada Sucia**, 1 km northeast of Santa Elena; small tributary of Río Guacimal, Finca de Fernín Argueda (10°19'31"N, 84°48'30"W, 1640 m), 4 vi 2013.
- 22** Puntarenas Prov., Monteverde, **Río San Luis**, stony river through forest (10°16'41"N, 84°47'10"W, 1176 m), 5 vi 2013.
- 23** Puntarenas Prov., **San Luis Valley** below Monteverde, Finca Mauricio Ramírez, pond in open pasture and shaded trickle in secondary forest (10°16'54"N, 84°48'8"W, 1187m), 5 vi 2013.



24 Puntarenas Prov., **Monteverde, Estación Biológica Canadiense**, streams in primary cloud forest (10°19'21"N, 84°48'31"W, 1534 m), 6 vi 2013.



Fig. 9. Approaching Monteverde's Cloud Forest.



Fig. 10. Pantanos trail at the Estación Biológica Bosque Nuboso in Monteverde, showing a small lateral pool frequented by *Libellula mariae*.



- 25** Puntarenas Prov., **Monteverde, Estación Biológica Bosque Nuboso**, rain pool & swampy stream in forest ca 2 km from Station along Sendero Pantanoso (10°18'31"N, 84°47'5"W, 1586 m), 7 vi 2013.
- 26** Puntarenas Prov., **stony & sandy river** ca 12 km N of Sardinal (10°11'19"N, 84°50'23"W, 318 m), 8 vi 2013.
- 27** Puntarenas Prov., **stony & muddy creek** ca 11 km N of Sardinal (10°11'15"N, 84°50'8"W, 352 m), 8 vi 2013.
- 28** Puntarenas Prov., **stony & muddy creek** ca 11 km N of Sardinal (10°9'38"N, 84°51'12"W, 246 m), 8 vi 2013.
- 29** Puntarenas Prov., **stony & muddy creek** ca 11 km N of Sardinal (10°9'20"N, 84°51'5"W, 214 m), 8 vi 2013.

Field work was complemented with visits to the odonate collections hosted at the Instituto Nacional de Biodiversidad (INBIO), Carlos Esquivel's collection at the Escuela de Biología de la Universidad Nacional in Heredia, and Bill Haber's collection in Monteverde.

Results

We collected a total of 86 odonate species (Tables 1-2), representing about 30% of the recorded species from Costa Rica, and 16 species of *Argia*, accounting for about half the number of species of this genus known from the country.



Fig. 11. Male of *Hetaerina miniata*, on vegetation overhanging a shady creek at locality 6.





Fig. 12. Male of *Hetaerina capitalis*, perching on vegetation along creek of Hacienda El Rodeo.



Fig. 13. Male of *Palaemnema dentata*, perching along shore of Río Costa Rica.





Fig. 14. Male of *Palaemnema paulirica*, perching along shore of Río Costa Rica.



Fig. 15. Female of *Palaemnema paulirica*, at the same locality.





Fig. 16. Male of *Cora chirripa donnellyi*, at the Estación Biológica Canadiense near Monteverde.



Fig. 17. Male of *Megaloprepus caerulatus* at Hacienda El Rodeo – the famous ‘helicopter’ damselfly – one of the largest living damselflies.





Fig. 18. Male of *Heteragrion erythrogastrum* perching along creek at Hacienda El Rodeo – the most widespread and common species of *Heteragrion* in Costa Rica.



Fig. 19. Male of *Heteragrion mitratum atrolineatum* at the Río Costa Rica.





Fig. 20. Male of *Heteragrion majus* at the Río San Luis near Monteverde.

The species of *Argia* from Costa Rica

About 29 species of *Argia* are recorded from Costa Rica, of which six are undescribed. Our collections augmented series of some species of which limited material was available before, gave us insight to what geographic variation might exist in color and pattern differences among the various species, and allowed us to gain a more detailed knowledge of their distribution, for which we have thus far over 350 georeferenced records for the country.

The species thus far known from Costa Rica include:

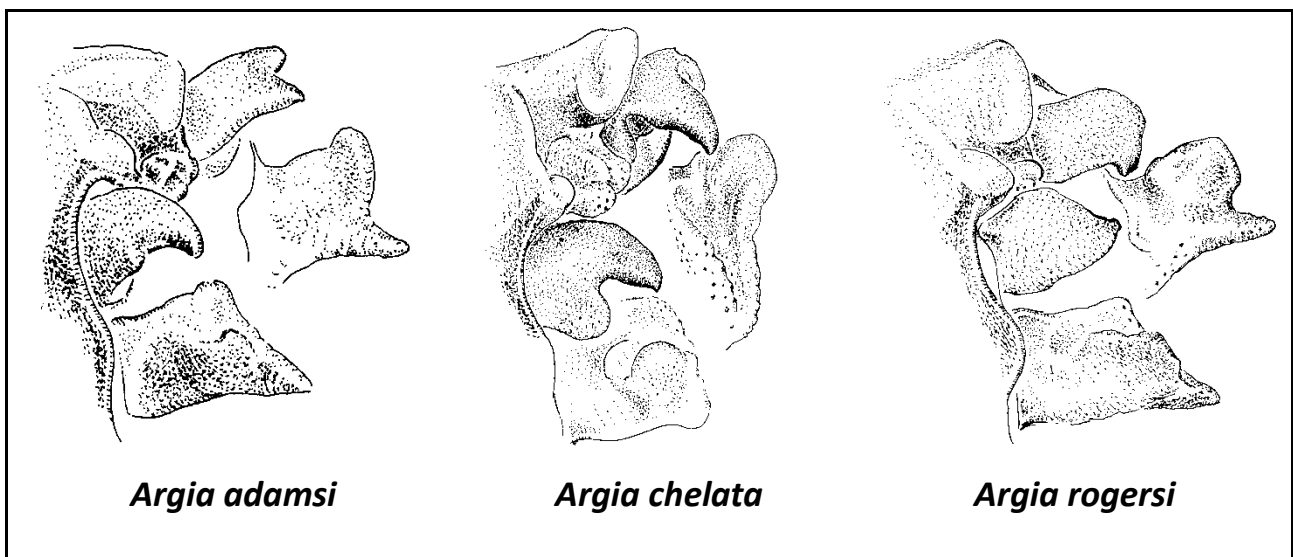
- *Argia adamsi* Calvert, 1902
- *Argia anceps* Garrison, 1996
- *Argia chelata* Calvert, 1902
- *Argia cupraurea* Calvert, 1902
- *Argia eliptica* Selys, 1865
- *Argia fissa* Selys, 1865
- *Argia frequentula* Calvert, 1907
- *Argia indicatrix* Calvert, 1902
- *Argia insipida* Hagen in Selys, 1865
- *Argia johannella* Calvert, 1907



- *Argia medullaris* Hagen in Selys, 1865
- *Argia oculata* Hagen in Selys, 1865
- *Argia oenea* Hagen in Selys, 1865
- *Argia pocomana* Calvert, 1907
- *Argia popoluca* Calvert, 1902
- *Argia pulla* Hagen in Selys, 1865
- *Argia rogersi* Calvert, 1902
- *Argia talamanca* Calvert, 1907
- *Argia terira* Calvert, 1907
- *Argia tezpi* Calvert, 1902
- *Argia translata* Hagen in Selys, 1865
- *Argia ulmeca* Calvert, 1902
- *Argia underwoodi* Calvert, 1907
- *Argia* n. sp. 1 (*cuprea* group)
- *Argia* n. sp. 2 (*oenea* group)
- *Argia* n. sp. 3 (*extranea* group)
- *Argia* n. sp. 4
- *Argia* n. sp. 5
- *Argia* n. sp. 6

Species specific characters include the morphology of the caudal appendages (cerci and paraprocts) of the males and the mesostigmal laminae of the females. The male genital ligula also offers good diagnostic characters.

Below (Fig. 21), we include some examples of illustrations of the male caudal appendages of species occurring in Costa Rica which had not been illustrated before in this view, in order to allow other odonatologists to confirm identifications that cannot necessarily be achieved by comparing color patterns.



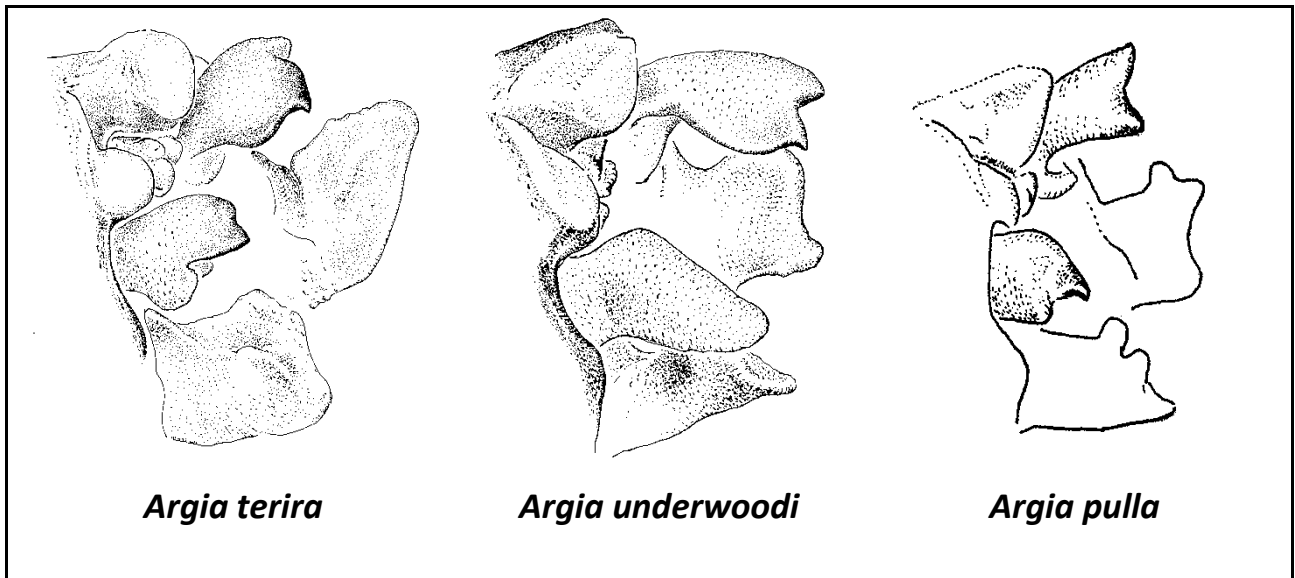


Fig. 21. Caudal appendages of *Argia adamsi*, *A. chelata*, *A. rogersi*, *A. terira*, *A. underwoodi* and *A. pulla*.



Fig. 22. Pair of *Argia chelata* in tandem, ovipositing in cloud forest creek near Monteverde.



Fig. 23. Male of *Argia cupraurea* perching on sunny rocks of river at locality 6.





Fig. 24. Male of *Argia medullaris* on vegetation at Río San Luis.



Fig. 25. Male of *Argia oenea* perching on a sunny patch along creek of Hacienda El Rodeo.





Fig. 26. Male of *Argia pulla* at River km 20 in near Golfito.



Fig. 27. Male of *Argia terira* at Monteverde's Estación Biológica Bosque Nuboso.





Fig. 28. Male of *Argia underwoodi* at cloud forest reserve Estación Canadiense.

Acknowledgments

We thank the IDF for generously providing funds to aid in travel costs. Our gratitude goes also to Carlos Esquivel and Bill Haber, who graciously accompanied us to the best collecting localities they know, shared their extraordinary expertise on the local fauna, and provided us with their enjoyable company. Eladio Cruz kindly helped us in the field while we were in Monteverde, and Bill Haber gave us invaluable information that facilitated the process of obtaining collecting and exporting permits.

References

- Abell, R., M.L. Thieme, C. Revenga, M. Bryer, M. Kottelat, N. Bogutskaya, B. Coad, N. Mandrak, S. Contreras Balderas, W. Bussing, M.L.J. Stiassny, P. Skelton, G.R. Allen, P. Unmack, A. Naseka, R. Ng, N. Sindorf, J. Robertson, E. Armijo, J.V. Higgins, T.J. Heibel, E. Wikramanayake, D. Olson, H.L. López, R.E. Reis, J.G. Lundberg, M.H. Sabaj Pérez, M.H. & P. Petry. 2008. Freshwater Ecoregions of the World: A new map of biogeographic units for freshwater biodiversity conservation. *BioScience* 58(5): 403-414.



- Dijkstra, K-D. B., V. J. Kalkman, R. A. Dow, F. R. Stoks & J. van Tol. 2013a. Redefining the damselfly families: a comprehensive molecular phylogeny of Zygoptera (Odonata). *Systematic Entomology* DOI:10.1111/syen.12035.
- Dijkstra, K.-D. B., G. Bechly, S.M. Bybee, R.A. Dow, H.J. Dumont, G. Fleck, R.W. Garrison, M. Hämäläinen, V.J. Kalkman, H. Karube, M. L. May, A.G. Orr, D.R. Paulson, A.C. Rehn, G. Theischinger, J.W.H. Trueman, J. van Tol, N. von Ellenrieder & J. Ware. 2013b. The classification and diversity of dragonflies and damselflies (Odonata), pp. 36-45. In: Zhang, Z.-Q. (Ed.) *Animal Biodiversity: An Outline of Higher-level Classification and Survey of Taxonomic Richness (Addenda 2013)*. *Zootaxa* 3703(1): 1-82.
- Esquivel, C. 2006. *Libélulas de Mesoamérica y el Caribe. Dragonflies and Damselflies of Middle America and the Caribbean*. Editorial INBio, Santo Domingo de Heredia, Costa Rica. 319 pp.
- Haber, W.A. and D. Wagner. 2013. *Dragonflies and Damselflies: Odonata of Monteverde, Costa Rica*. <http://efg.cs.umb.edu/monteverde/Ode/OdeIntro.html> [accessed 15 October 2013]
- Kohlmann, B. 2011. Chapter 10. Biodiversity conservation in Costa Rica - An animal and plant biodiversity atlas. In: Pavlinov, I.Ya. (ed.): "Research in Biodiversity - Models and Applications", InTech. ISBN 978-953-307-794-9. 364 pp.



Appendix

Table 1. Damselfly species collected by locality. Families (as per Dijkstra *et al.* 2013a, b) and genera are ordered alphabetically. Locality codes are found under Methodology.

Family	Genus	Species	Locality CR #
Calopterygidae			
(8 spp.)	<i>Hetaerina</i>	<i>caja</i> Drury, 1773	11, 12, 19, 20
	<i>Hetaerina</i>	<i>capitalis</i> Selys, 1873	3, 7
	<i>Hetaerina</i>	<i>cruentata</i> Rambur, 1842	1, 22, 24
	<i>Hetaerina</i>	<i>fuscoguttata</i> Selys, 1878	12, 13
	<i>Hetaerina</i>	<i>majuscula</i> Selys, 1853	22, 24, 25
	<i>Hetaerina</i>	<i>miniata</i> Selys, 1879	3, 6
	<i>Hetaerina</i>	<i>occisa</i> Hagen in Selys, 1853	3, 4, 5, 6, 8, 9, 11, 12, 13, 14, 15, 18, 26, 28, 29
	<i>Hetaerina</i>	<i>titia</i> Drury, 1773	11, 12, 14, 15, 16, 18, 19, 20
Coenagrionidae			
(29 spp.)	<i>Acanthagrion</i>	<i>trilobatum</i> Leonard, 1977	6, 10, 11, 12, 14, 17, 23
	<i>Anisagrion</i>	<i>allopterum</i> Selys, 1876	23
	<i>Argia</i>	<i>adamsi</i> Calvert, 1902	3, 5
	<i>Argia</i>	<i>sp. 1</i>	7
	<i>Argia</i>	<i>anceps</i> Garrison, 1996	7
	<i>Argia</i>	<i>chelata</i> Calvert, 1902	22, 24, 25
	<i>Argia</i>	<i>cupraurea</i> Calvert, 1902	3, 5, 6
	<i>Argia</i>	<i>sp. 2</i>	23
	<i>Argia</i>	<i>frequentula</i> Calvert, 1907	3, 4, 7, 11, 12, 20, 28, 29
	<i>Argia</i>	<i>medullaris</i> Hagen in Selys, 1865	22, 24
	<i>Argia</i>	<i>oculata</i> Hagen in Selys, 1865	7, 15, 28
	<i>Argia</i>	<i>oenea</i> Hagen in Selys, 1865	3, 7, 8, 11, 12, 13, 14, 19, 20, 28, 29
	<i>Argia</i>	<i>pulla</i> Hagen in Selys, 1865	3, 4, 5, 12, 14, 17, 19, 26, 28, 29
	<i>Argia</i>	<i>rogersi</i> Calvert, 1902	7, 22, 23
	<i>Argia</i>	<i>terira</i> Calvert, 1907	25
	<i>Argia</i>	<i>tezpi</i> Calvert, 1902	29
	<i>Argia</i>	<i>translata</i> Hagen in Selys, 1865	3, 9, 11, 12, 14, 18, 19, 20, 28, 29
	<i>Argia</i>	<i>underwoodi</i> Calvert, 1907	22, 24
	<i>Enallagma</i>	<i>civile</i> Hagen, 1861	23
	<i>Enallagma</i>	<i>novaehispaniae</i> Calvert, 1907	3, 4, 7, 11, 19, 20
	<i>Ischnura</i>	<i>ramburii</i> Selys, 1850	10, 17, 23
	<i>Megaloprepus</i>	<i>caerulatus</i> Drury, 1782	7, 25
	<i>Neoneura</i>	<i>amelia</i> Calvert, 1903	4
	<i>Neoneura</i>	<i>esthera</i> Williamson, 1917	11, 12, 20
	<i>Protoneura</i>	<i>amatoria</i> Calvert, 1907	12, 28
	<i>Protoneura</i>	<i>aurantiaca</i> Selys, 1886	4
	<i>Psaironeura</i>	<i>remissa</i> Calvert, 1903	8
	<i>Telebasis</i>	<i>digiticollis</i> Calvert, 1902	25
	<i>Telebasis</i>	<i>garleppi</i> Ris, 1918	25
Lestidae			
(1 sp.)	<i>Archilestes</i>	<i>neblina</i> Garrison, 1982	24
Perilestidae			
(1 sp.)	<i>Perissolestes</i>	<i>magdalenae</i> Williamson, 1924	6, 10
Philogenidae			
(2 spp.)	<i>Philogenia</i>	<i>carrillica</i> Calvert, 1907	6, 21, 22, 23
	<i>Philogenia</i>	<i>peacocki</i> Brooks, 1989	21, 22, 24, 25
Platystictidae			
(5 spp.)	<i>Palaemnema</i>	<i>baltodanoi</i> Brooks, 1989	21, 22, 24, 27



	<i>Palaemnema</i>	<i>cyclohamulata</i> Donnelly, 1992	2, 3, 6, 9
	<i>Palaemnema</i>	<i>dentata</i> Donnelly, 1992	2, 3
	<i>Palaemnema</i>	<i>nathalia</i> Selys, 1886	2, 9, 19, 26, 27, 29
	<i>Palaemnema</i>	<i>paulirica</i> Calvert, 1931	2, 3, 6, 26
Polythoridae			
(3 spp.)	<i>Cora</i>	<i>chirripa donnellyi</i> Bick & Bick, 1990	21, 22, 24
	<i>Cora</i>	<i>semiopaca</i> Selys, 1878	7
	<i>Cora</i>	<i>skinneri</i> Calvert, 1907	22, 24
Thaumatoneuridae			
(1 sp.)	<i>Thaumatoneura</i>	<i>innopinata</i> McLachlan, 1897	1
Incertae Sedis			
(ex Megapod- agrionidae)	<i>Heteragrion</i>	<i>erythrogastrum</i> Selys, 1886	2, 3, 5, 6, 7, 9, 11, 12, 13, 26, 27, 28
(6 spp.)	<i>Heteragrion</i>	<i>majus</i> Selys, 1886	22
	<i>Heteragrion</i>	<i>mitratum atroterminatum</i> Donnelly, 1992	2, 3, 6

Table 2. Dragonfly species collected by locality. Families (as per Dijkstra *et al.* 2013a, b) and genera are ordered alphabetically. Locality codes are found under Methodology.

Family	Genus	Species	Locality CR #
Aeshnidae			
(1 sp.)	<i>Aeshna</i>	<i>williamsoniana</i> Calvert, 1905	25
Gomphidae			
(5 spp.)	<i>Epigomphus</i>	<i>echeverrii</i> Brooks, 1989	7
	<i>Epigomphus</i>	<i>subobtusus</i> Selys, 1878	4
	<i>Epigomphus</i>	<i>subsimilis</i> Selys, 1878	1
	<i>Epigomphus</i>	<i>tumefactus</i> Calvert, 1903	26
	<i>Progomphus</i>	<i>longistigma</i> Selys, 1878	7
Libellulidae			
(22 spp.)	<i>Anatya</i>	<i>guttata</i> Erichson, 1848	12, 17
	<i>Brechmorhoga</i>	<i>pertinax</i> Hagen, 1861	22, 24
	<i>Brechmorhoga</i>	<i>praecox</i> Hagen, 1861	29
	<i>Brechmorhoga</i>	<i>rapax rapax</i> Calvert, 1898	24
	<i>Brechmorhoga</i>	<i>rapax croosema</i> Ris, 1913	7, 21, 22
	<i>Brechmorhoga</i>	<i>vivax</i> Calvert, 1906	7
	<i>Cannaphila</i>	<i>insularis funerea</i> Carpenter, 1897	3, 17
	<i>Cannaphila</i>	<i>vibex</i> Carpenter, 1897	22
	<i>Dythemis</i>	<i>nigra</i> Martin, 1897	3, 11, 28
	<i>Dythemis</i>	<i>sterilis</i> Hagen, 1861	10, 11, 14, 15, 29
	<i>Elasmothemis</i>	<i>sp.</i>	3
	<i>Erythrodiplax</i>	<i>fusca</i> Rambur, 1842	3, 5, 28, 29
	<i>Erythrodiplax</i>	<i>kimminsi</i> Borror, 1942	5, 15
	<i>Libellula</i>	<i>herculea</i> Karsch, 1889	13
	<i>Libellula</i>	<i>mariae</i> Garrison, 1992	25
	<i>Macrothemis</i>	<i>pseudimitans</i> Calvert, 1889	4, 7, 28
	<i>Macrothemis</i>	<i>tessellata</i> Burmeister, 1839	12
	<i>Orthemis</i>	<i>discolor</i> Burmeister, 1839	28
	<i>Orthemis</i>	<i>levis</i> Calvert, 1906	29
	<i>Paltothemis</i>	<i>lineatipes</i> Karsch, 1890	7
	<i>Pantala</i>	<i>flavescens</i> Fabricius, 1798	18
	<i>Perithemis</i>	<i>mooma</i> Kirby, 1889	28
	<i>Uracis</i>	<i>imbuta</i> Burmeister, 1839	5, 15, 17, 29



INSTRUCTION TO AUTHORS

International Dragonfly Fund - Report is a journal of the International Dragonfly Fund (IDF). It is referred to as *the journal* in the remainder of these instructions. Transfer of copyright to IDF is considered to have taken place implicitly once a paper has been published in the journal.

The journal publishes original papers only. By *original* is meant papers that: a) have not been published elsewhere before, and b) the scientific results of the paper have not been published in their entirety under a different title and/or with different wording elsewhere. The republishing of any part of a paper published in the journal must be negotiated with the Editorial Board and can only proceed after mutual agreement.

Papers reporting studies financially supported by the IDF will be reviewed with priority, however, authors working in general with Odonata are encouraged to submit their manuscripts even if they have not received any funds from IDF.

Manuscripts submitted to the journal should preferably be in English; alternatively German or French will also be accepted. Every manuscript should be checked by a native speaker of the language in which it is written; if it is not possible for the authors to arrange this, they must inform the Editorial Board on submission of the paper. Authors are encouraged, if possible, to include a version of the abstract in the primary language of the country in which their study was made.

Authors can choose the best way for them to submit their manuscripts between these options: a) via e-mail to the publisher, or b) on a CD, DVD or any other IBM-compatible device. Manuscripts should be prepared in Microsoft Word for Windows.

While preparing the manuscript authors should consider that, although the journal gives some freedom in the style and arrangements of the sections, the editors would like to see the following clearly defined sections: Title (with authors names, physical and e-mail addresses), Abstract, Introduction, Material & Methods, Results, Discussion, Acknowledgments and References. This is a widely used scheme by scientists that everyone should be familiar with. No further instructions are given here, but every author should check the style of the journal.

Authors are advised to avoid any formatting of the text. The manuscripts will be stylised according to the font type and size adopted by the journal. However, check for: a) all species names must be given in *italic*, b) the authority and year of publication are required on the first appearance of a species name in the text, but not thereafter, and c) citations and reference list must be arranged following the format below.

Reference cited in the text should read as follows: Tillyard (1924), (Tillyard 1924), Swezey & Williams (1942). The reference list should be prepared according to the following standard:

Swezey, O. & F. Williams, 1942. Dragonflies of Guam. Bernice P. Bishop Museum Bulletin 172: 3-6.

Rebora, M., Piersanti, S. & E. Gaino. 2004. Visual and mechanical cues used for prey detection by the larva of *Libellula depressa* (Odonata Libellulidae). *Ethology, Ecology & Evolution* 16(2): 133-144.

Citations of internet sources should include the date of access.

The manuscript should end with a list of captions to the figures and tables. The later should be submitted separately from the text preferably as graphics made using one of the Microsoft Office products or as a high resolution picture saved as a .jpg or .tif file. Hand-made drawings should be scanned and submitted electronically. Printed figures sent by the post could be damaged, in which case authors will be asked to resubmit them.

Manuscripts not arranged according to these instructions may also be accepted, but in that case their publication will be delayed until the journal's standards are achieved.

Nr.	Jahr	geförderte Person bzw. Körperschaft	Fördergegenstand
68	2010	Graham Reels, Hong-Kong	African Odonata (Dijkstra & Clausnitzer, Eds) text edit
69	2011	Rory Dow, Niederlande	Expedition to the Odonata of the Hose Mts., Sarawak, Malaysia
70	2011	Dejan Kulijer, Bosia & Herzegovina	Odonata of the Livanjsko polje karst wetland area, with special emphasis on Coenagrion ornatum
71	2011	Do Manh, Cuong, Hanoi, Vietnam	Study of Odonata in north central Vietnam
72	2011	Kosterin, O.E., Russia	The Odonata of the Cardamon mountains in Cambodia – progress study August 2011
73	2011	Villanueva, Reagan, Philippinen	Odonata of Tawi-Tawi-Island, The Philippines
74	2011	Elena Dyatlova, Ukraine	Odonata of Moldavia – progress study
75	2011	Zhang, Haomiao, Guangzhou, China	The Superfamily Calopterygoidea in South China: taxonomy and distribution III – Travelling grant to the Guizhou and Yunnan Provinces, Summer 2011
76	2011	Marinov, Milen, Christchurch, New Zealand	Odonata at artificial light sources – review paper
77	2011	Do Manh, Cuong, Hanoi, Vietnam	Providing the Odonatological literature database
78	2010	Villanueva, Reagan, Philippinen	Stereomikroskop
79	2010	Villanueva, Reagan, Philippinen	Odonata of the Diomabok-Lake region south of Davao, The Philippines Follow-up
80	2011	Villanueva, Reagan, Philippinen	Odonata of the Catanduanes-Island, The Philippines
81	2012	Villanueva, Reagan, Philippinen	Odonata of Dinapigue, The Philippines
82	2012	Dow, Rory, UK/The Netherlands	Odonata of Kalimantan, Borneo, Malaysia
83	2012	Marinov, Milen, Christchurch, New Zealand	Odonata species diversity of the "Eua Island, Kingdom of Tonga"
84	2012	Marinov, Milen, Christchurch, New Zealand	Odonata of Solomon-Islands
85	2012	Villanueva, Reagan, Philippinen	Palawan-Odonata, The Philippines
86	2012	Do Manh, Cuong, Hanoi, Vietnam	Mau Son Mountain Odonata, Vietnam
87	2012	Dow, Rory, UK/The Netherlands	Odonata of Gunung Pueh, Borneo, Malaysia
88	2013	Anna Rychla, Ukraine	Vorkommen der Arktischen Smaragdlibelle Somatochlora arctica (Zetterstedt, 1840) in Planregenmooren der polnischen Ostseeküste (S. arctica in bogs along the coast of the Polish Baltic Sea)
89	2013	Vincent Kalkman/A.B. Orr, The Netherlands/Australia	Field guide New Guinea Zygoptera
90	2013	Oleg Kosterin, Russia	Progress study Cambodia 2013
91	2013	Dejan Kulijer, Bosnia & Herzegovina	Odonata fauna of karst streams and rivers of South Herzegovina (Bosnia and Herzegovina, West Balkan)
92	2013	Villanueva, Reagan, Philippinen	Odonata from Balabac Islands, Palawan, Philippines
93	2013	Villanueva, Reagan, Philippinen	Odonata from Balut Island, Philippines
94	2013	Rory Dow, UK	Malaysian Odonata – Regional progress projects
95	2013	Rory Dow, UK	Sarawak Odonata – documenting the status quo Odonata diversity prior logging
96	2013	Garrison / Ellenrieder, Sacramento, USA	Argia in Costa Rica
97	2013	Villanueva, Reagan, Davao, Philippinen	Odonata of Mt. Lomot and Mt. Sumagaya, The Philippines