

Odonata collected in Napo province, Ecuador, in January of 2020

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Abstract

A ten-day collecting trip to Napo province was conducted between January 13 and 23, 2020, visiting localities where W. C. Macintyre originally collected *Argia schneideri* Garrison & von Ellenrieder, 2017 between 1935 and 1942, with the intention of documenting its life habits and obtaining photographs in life. A total of 65 odonate species in 36 genera were collected, including four new records for Napo province, but the target species was not found. A list of species recorded and color scans of species that have so far not been photographed are included. Color photographs and notes on the habitat of *Argia schneideri* are made available through the courtesy of colleagues who found it elsewhere, and its current known distribution is discussed.

Key words: Dragonflies and damselflies, new provincial records, *Argia schneideri*, Macintyre, color scans

Introduction

The odonate fauna of Ecuador is relatively well known compared to that of other Neotropical countries, and a comprehensive account of its knowledge was recently provided by Mauffray & Tennesen (2019). However, numerous new species are still being described from this country, in some cases based on specimens collected many decades ago. One such example is that of *Argia schneideri* Garrison & von Ellenrieder, 2017, described based on specimens collected by William Clarke Macintyre back in the years 1935 through 1942 (Garrison & von Ellenrieder 2017). This species was named in honor of the German odonatologist Dr. Wolfgang Schneider; his unfortunate recent passing (Dumont 2019) prompted the desire to further honor him by

rediscovering this species and documenting its habits and life colors, and a trip to Napo, the Ecuadorian province where its type locality and majority of its past records are concentrated, was planned.

Methods

Our visit took place January 13-23, 2020, with a total of seven days of collecting; two days were spent acquiring permits and travelling to and from the field and two days with no collecting due to rain. Photographing and sampling of odonates with entomological aerial nets was carried out in various localities along trails, streams, and ponds, under collecting permit DNB-CB-2018-0106. Specimens will be deposited at the entomological collection (ZSFQ) of the Universidad San Francisco de Quito (USFQ).

The localities visited (Figure 1), all located in Napo Province, Ecuador, included some of the localities where as far as we could pin-point *Argia schneideri* was originally collected by Macintyre, including its type locality.

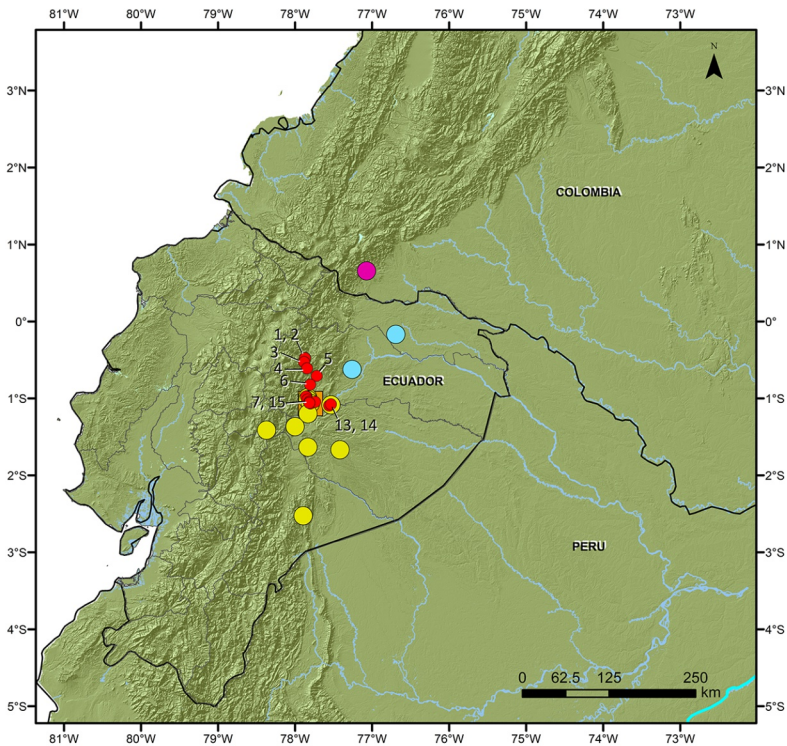


Figure 1: Map showing localities visited (numbered red circles) and known *Argia schneideri* Garrison & von Ellenrieder localities from: W. C. Macintyre 80 years ago = yellow circles, and type locality = partially hidden orange square; Bota Sierra et al. 2018 = purple circle; Mauffray & Tennesen 2019 = blue circles.

Locations

In the following list, localities visited that were likely in the vicinity of *Argia schneideri*'s Macintyre collecting sites are indicated with one asterisk; *Argia schneideri*'s type locality with two:

1. Small stream 4.9 km S of Baeza (0.47440 S, 77.87056 W, 1,836 m), 15.i.2020, R.W. Garrison & N. von Ellenrieder leg.
2. Small stream 5 km S of Baeza (0.47613 S, 77.87202 W, 1,856 m), 15.i.2020, R.W. Garrison & N. von Ellenrieder leg., permit DNB-CB-2018-0106 (Figure 2).
3. Stream S of Bermejo (0.52757 S, 77.88284 W, 1,870 m), 15.i.2020, R.W. Garrison & N. von Ellenrieder leg.
4. Rocky stream on dirt road to Reserva Antisana (0.60906 S, 77.84534 W, 2,090 m), 15.i.2020, R.W. Garrison & N. von Ellenrieder leg. (Figure 3).
5. Marshy area by route E20 E of Cascada de Hollín (0.70746 S, 77.71980 W, 1,128 m), 16.i.2020, R.W. Garrison & N. von Ellenrieder leg.
6. Rocky stream at Comunidad 9 de Junio near Cotundo on dirt road to Huasquila Amazon Lodge (0.82165 S, 77.80452 W, 837 m), 16.i.2020, 22.i.2020, R.W. Garrison & N. von Ellenrieder leg.
- 7*. Ishpinga-yacu, rocky stream and forest patch N of Muyuna (0.97391 S, 77.85323 W, 541 m), 17.i.2020, R.W. Garrison & N. von Ellenrieder leg. (Figure 4).
8. Pond and small vegetated tributary stream to Río Lupi at El Establo de Tomás Lodge (0.97629 S, 77.85888 W, 559 m), 17.i.2020, R.W. Garrison & N. von Ellenrieder leg. (Figure 5).
- 9*. Cushillo-yacu, gravel and sand bed stream W of road Tena to Pano (1.02068 S, 77.83684 W, 532 m), 18.i.2020, R.W. Garrison & N. von Ellenrieder leg. (Figure 6).
10. Small roadside pond near Cushi-yacu stream (1.01631 S, 77.83884 W, 535 m), 18.i.2020, R.W. Garrison & N. von Ellenrieder leg.
- 11**. Rushing deep stream amidst agricultural fields near Las Palmas, on Río Anzu (1.0667 S, 77.8 W, 448 m), 19.i.2020. Vicinity of type locality of *Argia schneideri*. No odonates seen.
- 12*. Small tributary to Jatun Yacu, volcanic rock and silt bottomed stream (1.04419 S, 77.81238 W, 452 m), with mining and muddy waters, 19.i.2020, 22.i.2020, R.W. Garrison & N. von Ellenrieder leg. (Figure 7).
- 13*. Pond and rocky stream at Parador Grand Selva (1.09301 S, 77.55695 W, 371 m), 21.i.2020, R.W. Garrison & N. von Ellenrieder leg. (Figure 8).
- 14*. Small gravel and sand stream tributary to Río Arajuno opposite Puerto Barantilla (1.07681 S, 77.53618 W, 349 m), 21.i.2020, R.W. Garrison & N. von Ellenrieder leg.
15. Río Sindy 2, small muddy stream (1.04668 S, 77.74225 W, 427 m), 21.i.2020, R.W. Garrison & N. von Ellenrieder leg.
16. Small rocky rivulet an associated pond 3.5 km SW of Puerto Napo (1.059167 S, 77.81583 W, 454 m), 22.i.2020, R.W. Garrison & N. von Ellenrieder leg.



Figure 2: Rosser Garrison at small stream 5 km S of Baeza, habitat of *Ormenophlebia imperatrix* McLachlan and *Teinopodagrion croizati* De Marmels.



Figure 3: Rocky stream on dirt road to Reserva Antisana, where *Mesamphiagrion dunklei* von Ellenrieder & Garrison and *M. ecuatoriale* von Ellenrieder & Garrison coexist.



Figure 4: Forest patch by Ishpinga-yacu stream, prime habitat for *Metaleptobasis* spp. and *Pa-laemnema clementia* Selys.



Figure 5: Pond near Río Lupi at El Establo de Tomás Lodge.



Figure 6: Cushillo-yacu, gravel and sand bed stream W of road Tena to Pano.



Figure 7: Small tributary to Jatun Yacu, volcanic rock and silt bot-tomed stream.



Classification follows Dijkstra et al. (2013). Within each sub-order, families and species are listed alphabetically. Numbers immediately following a species name (e. g.: **1**, **2**) refer to numbered localities listed above.

Figure 8: Rocky stream at Parador Grand Selva.

Results

Unfortunately, we did not find *Argia schneideri* at any locality visited presenting what appeared to be appropriate habitats for it. Kenneth Tennessen and Jim Johnson (pers.



comm.) collected this species in Loreto and Shushufindi Provinces, Ecuador, at small slow streams in the forest, with limited sun exposure but with some openings in the tree canopy so that sunlight was partial along the stream. Photographs of a live specimen (Figure 9) kindly made available by Jim

Figure 9: *Argia schneideri* Garrison & von Ellenrieder. Live male photographed in hand by Jim Johnson in Loreto Province, Ecuador.

Johnson show its live color pattern as well as the very characteristic long forcipate cerci of the male.

A total of 65 odonate species in 36 genera were found, including four new records for Napo Province:

Zygoptera

Calopterygidae

Hetaerina occisa Hagen in Selys, 1853

12. A single male was seen at a rocky stream.

Hetaerina sanguinea Selys, 1853

6-9, 12-16. This was the most widespread and abundant species during the trip, encountered at all streams visited at elevations under 1,000 m a.s.l.

Mnesarete devillei (Selys, 1880)

9, 12, 14. Males were frequent along gravel and sandy streams.

Mnesarete hauxwelli (Selys, 1869)

6 (Figure 10). A single male was found at a rocky stream.

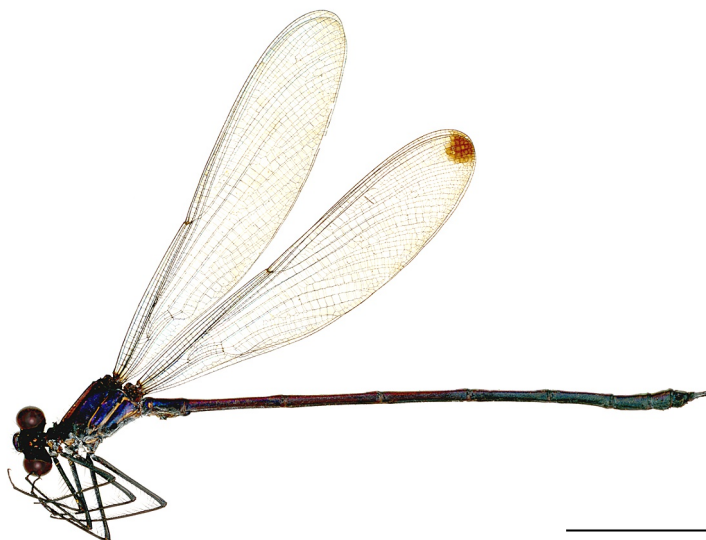


Figure 10: *Mnesarete hauxwelli* (Selys). Color scan of male from rocky stream at Comunidad 9 de Junio near Cotundo. Scale bar 10 mm.

Ormenophlebia imperatrix (McLachlan, 1878)

2. Both males and females were perching along vegetation overhanging secluded and steep portions of the banks of a narrow mountain creek.

Coenagrionidae

Acanthagrion cuyabae Calvert, 1909

13, 16. This species was relatively abundant when present, and as other species in this genus, found at lentic habitats.

Acanthagrion floridense Fraser, 1946

8, 10, 13, 16. Most commonly encountered species from this genus at the ponds visited.

Acanthagrion obsoletum (Förster, 1914)

8, 15, 16. Relatively abundant when present.

Acanthagrion yungarum Ris, 1918

10. Found only at one small marshy pond.

Argia adamsi Calvert, 1902

12, 16. Found at two small rocky streams.

Argia infrequentula Fraser, 1946

8, 9, 14. Present at three small gravel and sand bottomed streams.

Argia limitata Navás, 1924

7, 12. Encountered at two rocky streams.

Argia medullaris Hagen in Selys, 1865

1-4. Found at two rocky streams in the higher elevation areas visited.

Argia pulla Hagen in Selys, 1865

7. Found only at a medium size open rocky stream.

Argia selysi Garrison & von Ellenrieder, 2018

8, 15. Found at two very small vegetated streams.

Drepanoneura tenneseni von Ellenrieder & Garrison, 2008

13. Only present at the shaded margin of a medium sized rocky stream.

Enallagma novaehispaniae Calvert, 1907

15. Found perching on marginal vegetation of a small stream.

Mesamphiagrion dunklei von Ellenrieder & Garrison, 2008

4. Encountered at a medium size rocky stream above 1000 m. a.s.l., perching and flying along sunny banks on rocks and vegetation.

Mesamphiagrion ecuatoriale von Ellenrieder & Garrison, 2008

2, 4 (Figures 11, 12). Slightly larger species coexisting with *M. dunklei* and found also at a smaller higher elevation stream.

Metaleptobasis knopfi Tennesen, 2012

7. A single male was collected together with *M. mauffrayi*.

Metaleptobasis mauffrayi Daigle, 2000

7. Several specimens were found at a forest patch flying amidst the forest undergrowth.

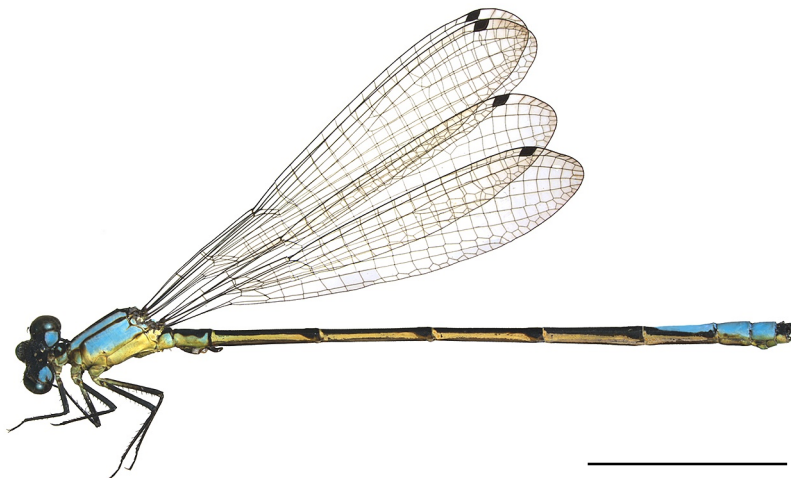


Figure 11: *Mesamphiagrion ecuatoriale* von Ellenrieder & Garrison. Color scan of male from rocky stream on dirt road to Reserva Antisana. Scale bar 10 mm.

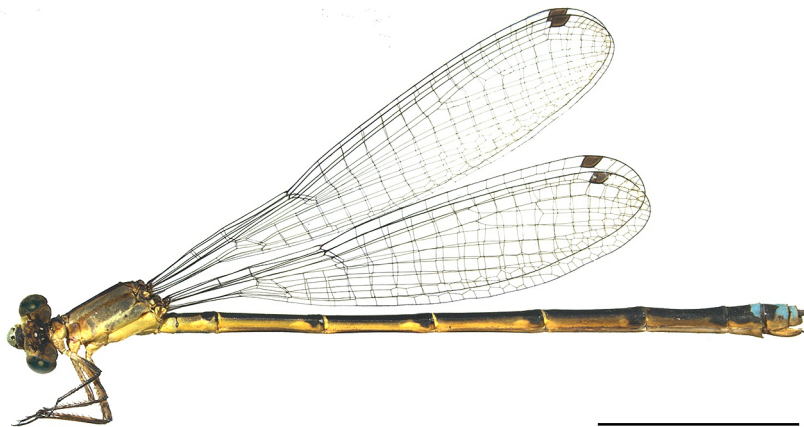


Figure 12: *Mesamphiagrion ecuatoriale* von Ellenrieder & Garrison. Color scan of female from rocky stream on dirt road to Reserva Antisana. Scale bar 10 mm.

Oxyagrion tennesse Mauffray, 1999

2, 4. Frequent along higher elevation streams.

Protoneura woytkowskii Gloyd, 1939

16. Encountered at a single small vegetated stream.

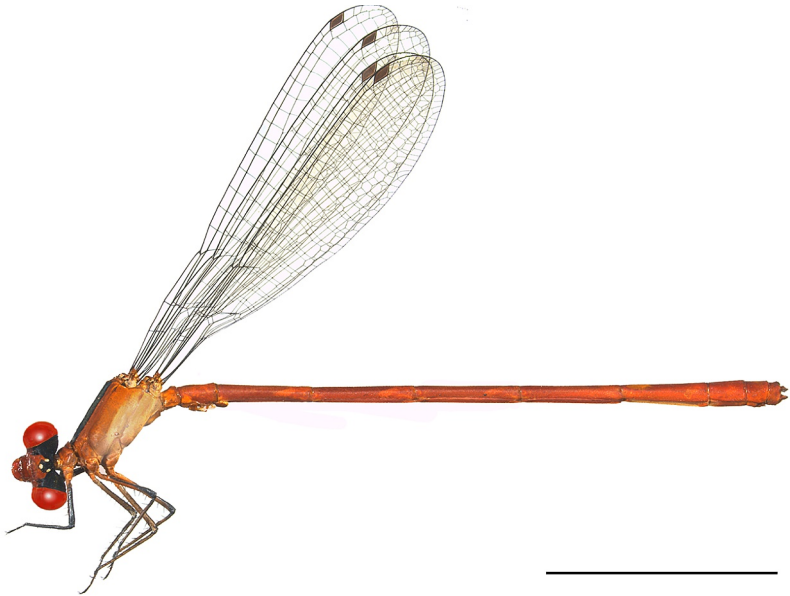


Figure 13: *Telebasis carota* Kennedy. Color scan of male from pond near Río Lupi at El Establo de Tomás Lodge. Scale bar 10 mm.

Telebasis carota Kennedy, 1936

8, 16 (Figure 13). Pond dweller found at two of the four ponds visited.

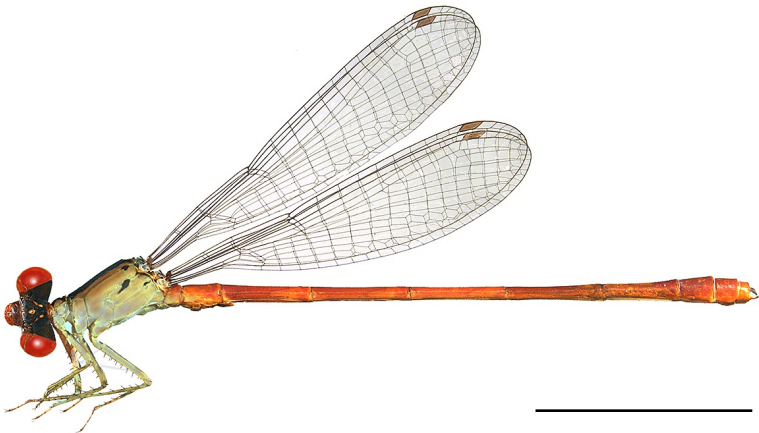


Figure 14: *Telebasis griffinii* (Martin). Color scan of male from pond near Río Lupi at El Establo de Tomás Lodge. Scale bar 10 mm.

Telebasis flammeola Kennedy, 1936

10, 13. Found at the other two visited ponds.

Telebasis griffinii (Martin, 1896)

8 (Figure 14). A single male was seen.

Telebasis rubricauda Bick & Bick, 1995

13. This colorful species was found flying rapidly along the sunny vegetated margins of an artificial pond near the forest. **New record for Napo Province.**

Dictyriidae

Heliocharis amazona Selys, 1853

13. A pair in copula was seen at a medium rocky stream, perching on sunbathed vegetation.

Lestidae

Lestes apollinaris Navás, 1934

4. A single female was found at a marshy side pool on a higher elevation stream.

Lestes jerrilli Tennessen, 1997

10. Recorded at a lower elevation marshy pond.

Megapodagrionidae

Heteragrion aequatoriale Selys, 1886

6. Only one male found at a shaded small rocky stream.

Heteragrion bariai De Marmels, 1989

13. A single specimen encountered at a shaded medium rocky stream.

Heteragrion bickorum Daigle, 2005

7, 9, 12, 13, 16 (Figure 15). A very common species along lower elevation forest streams.

Teinopodagrion croizati De Marmels, 2002

2, 4. Found perching on marginal vegetation and rocks at higher elevation streams.

Platystictidae

Palaemnema clementia Selys, 1886

7 (Figure 16). Several males and females perching and flying on the undergrowth of a forest patch near a rocky stream.

Polythoridae

Cora inca Selys, 1873

2 (Figure 16). One female perching on vegetation at a small rocky stream.



Figure 15: Male of *Heteragrion bickorum* Daigle, the most ubiquitous species of this genus in Ecuadorian forests.



Figure 16: Male of *Palaemnema clementia* Selys at a forest patch by Ishpinga-yacu stream.

Anisoptera

Aeshnidae

Coryphaeshna amazonica De Marmels, 1989

10. Males of this species were patrolling a small roadside pond. **New record for Napo Province.**

Gomphidae

Aphylla dentata Selys, 1859

13 (Figure 17). A single male was collected patrolling an artificial pond near the forest. **New record for Napo Province.**



Figure 17: *Aphylla dentata* Selys. Color scan of male from pond at Parador Grand Selva. Scale bar 10 mm.

Libellulidae

Brechmorhoga praecox (Hagen, 1861)

7, 14. Flying swiftly close to the water surface at two streams.

Cannaphila vibex (Hagen, 1861)

3. A single specimen perching by a small forest stream.

Dasythemis esmeralda Ris, 1910

6, 13. Found in the vegetation nearby two streams.

Dythemis nigra Martin, 1897

6, 8, 14, 16. Perching in the sun at ponds and stream pools.

Erythrodiplax basalis (Kirby, 1897)

4, 7, 8, 13. Only species found at both higher and lower elevation habitats during this trip, at ponds and marshy areas near streams.

Erythrodiplax castanea (Burmeister, 1839)

6, 12, 14. Found perching on sunny areas by stream pools.

Erythrodiplax fusca (Rambur, 1842)

8, 10, 13. Flying around ponds marginal marshy vegetation.

Erythrodiplax ines Ris, 1911

2-4. Seen only at marshy areas of higher elevation streams.

Erythrodiplax melanorubra Borror, 1942

5. A single specimen found at a marshy roadside area.

Erythrodiplax tenuis Borror, 1942

8, 10. Several specimens flying and perching on vegetation along ponds margins.

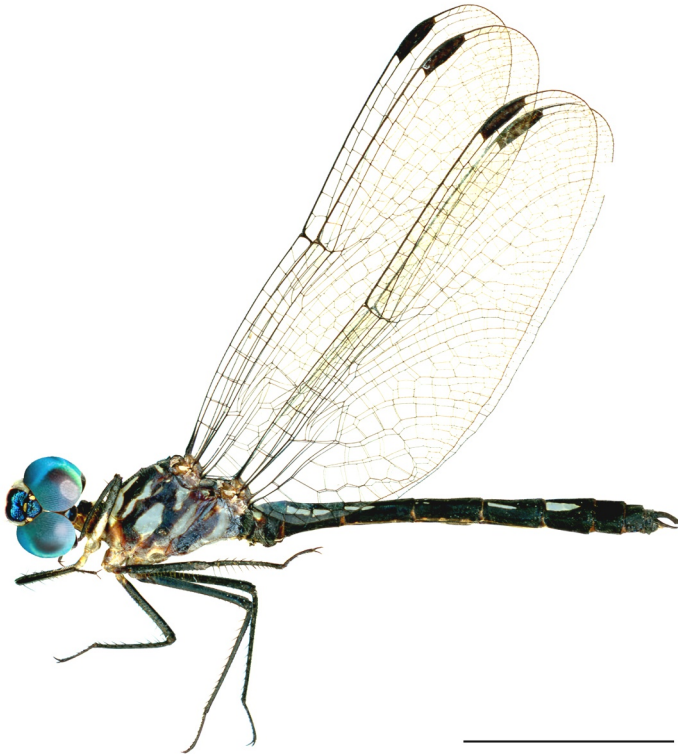


Figure 18: *Micrathyria occipita* Westfall. Color scan of male from pond at Parador Grand Selva. Scale bar 10 mm.

Macrothemis hahneli Ris, 1913

3. A single male seen at a small exposed creek.

Macrothemis hemichlora (Burmeister, 1839)

12, 14-16. Found flying along several small forest streams.

Micrathyria atra (Martin, 1897)

10, 16. Some males seen perching near small ponds.

Micrathyria catenata Calvert, 1909

8, 10, 13. Recorded flying and perching on marginal vegetation at ponds.

Micrathyria occipita Westfall, 1992

8, 13, 16 (Figure 18). Recorded together with *M. catenata* flying and perching on marginal vegetation at ponds.

Micrathyria pseudeximia Westfall, 1992

16. Only seen at one of the ponds visited.

Nephepeltia leonardina Rácenis, 1953

8, 13, 16. Flying and perching together with the species of *Micrathyria* recorded at ponds.

Oligoclada pachystigma Karsch, 1890

13. Common perching on marginal vegetation of an artificial pond. **New record for Napo Province.**

Orthemis cultriformis Calvert, 1899

13, 14. Perching near a pond and marshy area of a stream.

Perithemis mooma Kirby, 1889

13, 16. Found at two ponds perching on emergent vegetation.

Perithemis parzefalli Hoffmann, 1991

8, 16. Found at two ponds perching on emergent vegetation.

Sympetrum gilvum (Selys, 1884)

4. Only seen at a marshy area near a higher elevation stream.

Tauriphila argo (Hagen, 1869)

13. A single specimen collected at a pond.

Tramea binotata (Rambur, 1842)

10, 13. Found flying near and over ponds.

Uracis fastigiata (Burmeister, 1839)

7, 10. Perching on the forest undergrowth.

Uracis imbuta (Burmeister, 1839)

6-9. The more ubiquitous of the two *Uracis* species found; perching on the forest undergrowth.

Zenithoptera lanei Santos, 1941

8. 10. Encountered at two of the ponds visited, perching on vegetation along its margins.

Discussion

We believe that the extension of habitats suitable for *Argia schneideri* in Napo Province has been reduced since its original findings due to habitat alternation for human expansion and agriculture (Kalamandeen et al. 2018). Other odonate species that Macintyre collected in Napo about 80 years ago have also not been found ever since in this province. These include *Argia fraudatricula* Förster, 1914, *Argia kokama* Calvert, 1909, *Argia nigrior* Calvert, 1909, *Teinopodagrion curtum* (Selys, 1886), *Stenocora percornuta* Kennedy, 1940, *Anomisma abnorme* McLachlan, 1877, *Triacanthagyna ditzleri* Williamson, 1923 and *Progomphus pijpersi* Belle, 1966, as far as we are aware based on the subset of Macintyre's specimens that we identified in the past or which was included in publications. With the exemption of *Anomisma abnorme* and *Triacanthagyna ditzleri*, both of which are phytothelmatic, all these species are also inhabitants of forest streams, and it is well known that pristine streams house an array of more vulnerable, often localized odonate species, which show strong responses to habitat change such as thinning of forest and increased erosion (Corbet 1999; Kalkman et al. 2008; Paulson 2004).

Even though *A. schneideri* was not found in recent years in Napo Province, it is possible that this species still occurs along small forested creeks of difficult access or located in protected areas along the Ecuadorian eastern Andean foothills which are yet to be explored. After its description was published (Garrison & von Ellenrieder 2017) *A. schneideri* was found in Putumayo Department, Colombia (Bota-Sierra et al. 2018) and in Loreto Province, Ecuador (Mauffray & Tennesen 2019), its currently known geographic distribution being therefore more extensive than thought at the time of its description (Fig. 1). Its coloration and habitat are reminiscent of those of *Argia yungensis* Garrison & von Ellenrieder, 2007, which is also a mostly dark species with black eyes inhabiting small shaded creeks in the forest, where males can be found perching at isolated sunlit patches on the vegetation (Garrison & von Ellenrieder 2007). We consider that *A. schneideri* represents the ecological equivalent of *A. yungensis*, which extends farther south along the eastern slopes of the Andean cloud forest, from Peru to northwestern Argentina.

Acknowledgements

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References

- Bota-Sierra, C., A. Corso, O. Janni, J. Sandoval-H. and M. Vigano, 2018. Seventeen new dragonfly records from Colombia and the confirmation of the synonymy of *Philogenia monotis* and *P. tinalandia* (Insecta: Odonata). *International Journal of Odonatology* 18(2): 115-127. DOI: 10.1080/13887890.2018.1462262
- Corbet, P. S., 1999. *Dragonflies - Behavior and ecology of Odonata*. Comstock Publishing Associates, Cornell University Press xxxii + 829 pp.
- 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. 2013. 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. <http://dx.doi.org/10.11646/zootaxa.3703.1.9>
- Dumont, H. J., 2019. In memoriam Wolfgang Schneider (1953-2019). *Odonatologica* 48(3/4): 167-174.
- Garrison, R. W. & N. von Ellenrieder, 2007 The true *Argia difficilis* Selys, 1865, with the description of *Argia yungensis* sp. nov. (Odonata: Coenagrionidae). *Transactions of the American Entomological Society* 133(1+2): 189-204.
- Garrison, R. W. & N. von Ellenrieder, 2017. New species of the damselfly genus *Argia* from Mexico, Central America and Ecuador with an emphasis on Costa Rica (Insecta: Odonata: Coenagrionidae). *Zootaxa* 4235 (1): 1-93. <http://dx.doi.org/10.11646/zootaxa.4235.1.1>
- Kalamandeen, M., E. Gloor, E. Mitchard, D. Quincey, G. Ziv, D. Spracklen, B. Spracklen, M. Adami, L. E. O. C. Aragão and D. Galbraith, 2018. Pervasive Rise of Small-scale Deforestation in Amazonia. *Scientific Reports* 8: 1600. <https://doi.org/10.1038/s41598-018-19358-2>
- Kalkman, V. J., V. Clausnitzer, K.-D. Dijkstra, A. G. Orr, D. R. Paulson and J. van Tol, 2008. Global diversity of dragonflies (Odonata) in freshwater. *Hydrobiologia* 595: 351-363. <https://doi.org/10.1007/s10750-007-9029-x>.
- Mauffray, W. F. & K. J. Tennessen, 2019. A Catalogue and Historical Study of the Odonata of Ecuador. *Zootaxa* 4628 (1): 1-265. <https://doi.org/10.11646/zootaxa.4628.1.1>
- Paulson, D. R., 2004. Critical species of Odonata in the Neotropics. In: Clausnitzer & Jödicke (eds.), *Guardians of the watershed. Global status of dragonflies: critical species, threat and conservation*. Special issue: IUCN Regional Reports. *International Journal of Odonatology* 7(2): 163-188.