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International Dragonfly Fund - Report
A Journal of the International Dragonfly Fund

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published: 08.12.2025

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ISSN 1435-3393

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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, Milen Marinov, Rory A. Dow, Natalia von Ellenrieder, Rosser W. Garrison, Holger Hunger
Layout:	Martin Schorr
IDF-home page:	Holger Hunger
Printing:	Colour Connection GmbH, Frankfurt
Impressum:	Publisher: International Dragonfly Fund e.V., Schulstr. 7B, 54314 Zerf, Germany. E-mail: oestlap@online.de
Responsible editor:	Martin Schorr
Cover picture:	*Argia jujuya*
Photographer:	José S. Rodríguez

New insights into Odonata diversity of the Chaco ecoregion (Northern Argentina): A survey update

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Abstract

This study addresses significant knowledge gaps in the diversity and distribution of Odonata in Northern Argentina, particularly within the Chaco ecoregion. We conducted surveys across 38 sites in the Yungas-Chaco ecotone and Chaco ecoregion, spanning the provinces of Jujuy, Salta, and Tucumán. A total of 923 specimens from 62 species were collected, including adults, larvae, and 62 reared specimens (used to associate life stages). Key results include the successful rearing of 15 species from larva to adult, three of which yielded previously unknown larval descriptions: *Orthemis discolor, Nephepeltia leonardina,* and *Phyllocycla basidenta*. The survey also established five new provincial records for Jujuy and Tucumán. Most significantly, eight new species additions to the Argentinean Chaco ecoregion were recorded — including *Gynacantha bifida* and four *Telebasis* species — increasing the known Odonata fauna of this ecoregion from 112 to 120 species.

Keywords: Zygoptera, Anisoptera, dragonfly diversity, Chaco, Jujuy, Salta, Tucumán provinces, new provincial records.

Introduction

Odonata from Argentina are relatively well studied, yet significant knowledge gaps remain (Lozano et al. 2020), particularly in the northern regions of the country. These gaps include fragmentary information on species distributions and incomplete descriptions of certain life stages (most notably larvae, and in some cases, adult females). Furthermore, the conservation status has been assessed for only a few species (Lozano et al. 2020).

Our aim is to address these gaps through ongoing efforts in specimen collection and the rearing of individuals to associate different life stages. In this contribution, we provide numerous new locality records that complement those previously reported (Molineri et al. 2023a), including novel larva-adult associations and new provincial records.

Material and Methods

Identification

We identified adults with the generic keys of Garrison et al. (2006, 2010). Species-level identification was made with other works (e.g., Belle 1988; Borror 1942; Garrison 2009;

Lencioni 2005, 2017; Leonard 1977; von Ellenrieder & Garrison 2007; von Ellenrieder 2014; Molineri et al. 2023b, 2025).

The material is housed in the Odonate collection of the Instituto de Biodiversidad Neotropical (IBN, CONICET-UNT) (Tucumán, Argentina). Databases with material data are available upon request to the authors. All the photographs are from the authors of this contribution.

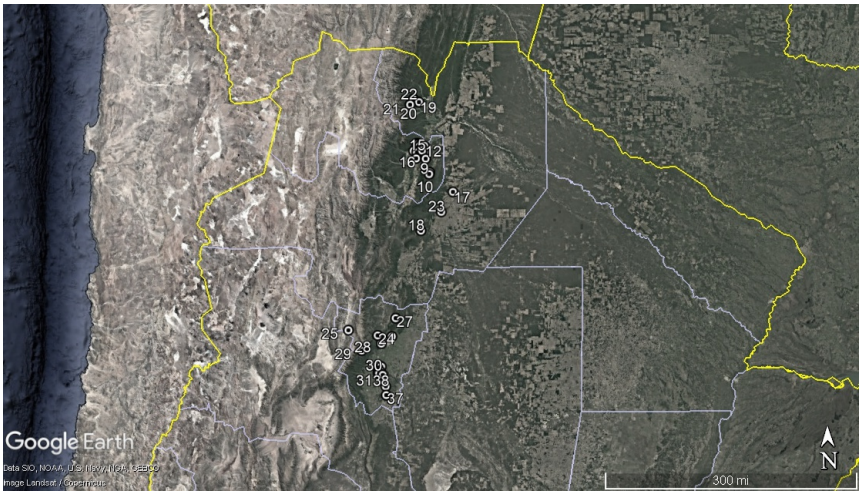
Study sites

We visited 38 sites in northwestern Argentina, within the provinces of Jujuy, Salta and Tucumán (Fig. 1). Almost all localities correspond to Yungas-Chaco ecoregion ecotone, and Chaco ecoregion

Geographic coordinates - given in decimal degree coordinates with latitude and longitude - are used to accurately describe the location of a site.

Jujuy province:

The province of Jujuy is located in the extreme northwest corner of the Argentina (Fig. 1). We have visited sixteen sites in the lower regions of this province, including rivers from two contiguous ecoregions, Yungas (a humid forest) and Chaco (a dry forest), and their ecotone. Yungas and ecotonal rivers are characterized by larger substrates (boulders, rocks, gravel, sand) than those of Chacoan rivers (sand and silt). Both contain logs and similar aquatic marginal vegetation, and there are no rooted vascular plants adapted to live in the bottom of these monsoonal rivers. Spates are common in summer (January to March), removing and washing all the sediments, restructuring riverbed and margins almost every year. Most of the sites sampled are located in protected river basins (National Park Calilegua), and those outside of this jurisdiction, represent well preserved riparian forests. All the sites mentioned below exhibit these characteristics, except otherwise stated.



Map 1. Please see locality codes in the textt. Image from Google Earth Pro.

Site 1: Río Los Berros (bridge at RN 34), 390 m asl, -23.74633, -64.667. The vegetation at the margins is characteristic of Yungas-Chaco ecotone. The river at the time of sampling showed evidence of a recent flooding (Fig. 2), larval density and diversity were low. This is a relatively wide (30 m wet) channel with an open canopy, the substrate is composed of large to small rocks, gravel and coarse sand. Median depth was around 0.4 m, and current velocity in riffles reached 1.4 m/seg. Dissolved oxygen was high (10.6 mg/l), pH 8.0, water temperature 20ºC, and conductivity 237µS/cm.

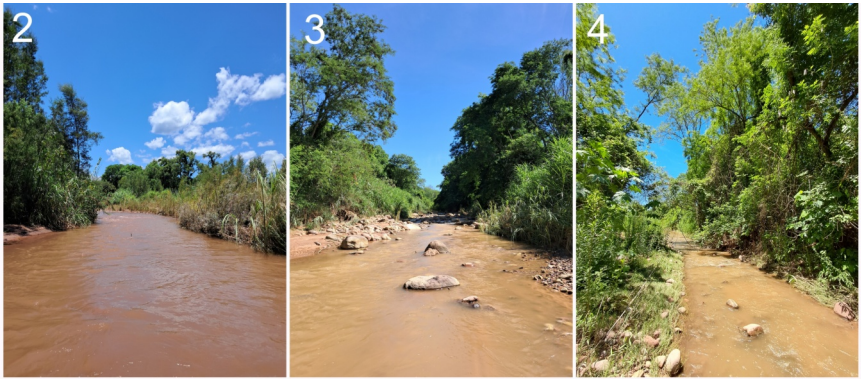
Site 2: Río Zora (bridge at RN 34), 353 m asl, -23.77333, -64.61139. Yungas-Chaco ecotone. This river exhibited similar characteristics to the previous one.

Site 3: Arroyo Sauzalito (bridge at RN 34), 427 m asl, -23.67146, -64.56182, Yungas-Chaco ecotone (Fig. 3). The width of the wet channel was about 10 m, median depth 0.4 m, and current speed in rapids reached 0.8 m/seg. Dissolved oxygen was fine (8.5 mg/l) and conductivity was somewhat high (649 µS/cm), probably due to saline ground water contribution produced by oil extraction in the basin. The rocks at the bottom are heavily compacted with fine sediment, leaving very few interstices.

Site 4 to 6. Site 4: PN Calilegua, Arroyo sin nombre (3up, Sauzalito affluent), 472 m asl, -23.64663, -64.59208. This small stream, as well as the following two, is located in the Yungas pedemontane forest, completely covered by tree canopy, and in an area with some impact due to oil extraction. The margins are heavily covered by cattail (*Typha*), the bottom is rocky and the current velocity above 1 m/seg, dissolved oxygen is over the saturation limit. Site 5: PN Calilegua, Arroyo sin nombre (1up), 548 m, -23.6258, -64.60365. Site 6: Arroyo sin nombre (1down), 530 m, -23.63055, -64.58933.

Site 7: PN Calilegua, Laguna, 520 m asl, -23.63849, -64.60558. A large circular pond of about 50 m of diameter and no more than 1.5 m depth, heavily covered by floating vegetation and surrounded by forest. It is located at the margin of site 5.

Site 8: Arroyo Yuto (bridge at RN34), 400 m asl, -23.6442, -64.5393. Yungas-Chaco ecotone (Fig. 4). This stream is impacted by salt ground water draining from an old oil well, conductivity values reached 2600 µS/cm. Nevertheless, the high amount of dissolved oxygen and preserved marginal and aquatic vegetation harbor a high aquatic biodiversity.



Figs. 2-4: 2, Locality 1, Los Berros stream; 3, Locality 3, Sauzalito stream; 4, Locality 8, Yuto stream (Jujuy province, Argentina).

Sites 9-10. Site 9: Villa Monte-RP6, Río Santa Rita, 1050 m asl, -24.12653, -64.40301. Site 10: Río Santa Rita at 1211 m asl, -24.0972, -64.39431. Both sites are located on the same stream flowing through Chaco Serrano ecoregion (Fig. 5). The bed channel was 6 m wide, with a median depth of 0.3 m and a current speed above 1.2 m/seg. Oxygen was above the saturation level, and the pH was slightly alkaline as is common in the region. The area is well preserved.

Sites 11 to 15. These sites are located along the main collector of the area (the Lavallén-San Francisco river), a relatively drier zone, with somewhat impacted ecosystems (cattle breeding, industrial organic effluents derived from sugar production). The substrate is mostly sandy, water depth around 1 m and current velocity around 1 m/seg. The insolation of the water is high due to an open canopy and wide river bed (100-200 m). Site 11: Toma de Agua dulce ("bypass"), 352 m asl, -23.708, -64.517. A small channelized part, deviated from the main river for irrigation, with almost no water current and covered with *Typha* and floating plants. Site 12: Yuto, Río San Francisco, 345 m, -23.6677, -64.47926. Site 13: Caimancito, Río San Francisco, 342 m asl, -23.71162, -64.53801. Site 14: Puente Don Chicho, Río Lavallén, 370 m asl, -23.86918, -64.6265. Site 15: Arroyo Termas de Caimancito, 400 m asl, -23.74397, -64.51883 (Fig. 6). This is a small stream draining to the large one from previous sites, it is a small thermal stream, relatively well preserved.

Site 16: Laguna La Brea/Laguna Hedionda, 590 m asl, -23.87674, -64.45888. Relatively large and shallow lagoons with floating vegetation.

Salta province:

Site 17: Apolinario Saravia, Río Dorado, -24.41868, -63.99043, 398 m asl. A medium sized river draining through Chaco Serrano vegetation, with sandy bottom, a wide wet channel (50 m) and less than 0.3 m depth. The site is impacted by sand extraction, cattle and the presence of a small town.

Site 18: Las Víboras, RP5, Río Castellanos, -25.0309, -64.56786, 684 m asl. Chaco Serrano ecoregion. The substrate is composed of small rocks, sand and gravel. The vegetation is well preserved and the water well oxygenated. Channel width was 6 m, depth 0.2 m and speed current 0.6 m/seg.

Sites 19 to 22. Small rivers, streams and ponds located in Isla de Cañas, a Yungas (Mountain forest) area, relatively well preserved. The substrate was mostly rocky, the canopy open to closed above the river bed, oxygen above saturation. Site 19: Río San Ignacio, -22.95877, -64.55548, 646m asl, this site is at Yungas-Chaco ecotone. Site 20: Río Blanquito, -22.91042, -64.65376, 798 m asl. Site 21: Río Cortaderas, -22.99958, -64.7132, 922 m asl. Site 22: Pond, -22.9185, -64.64583, 835 m asl, a small shallow pond in the margin of road below the tree cover, fine sediment and rooted aquatic vegetation on the bottom.

Site 23: Las Lajitas, pond, -24.73635, -64.20269, 455 m asl, Chaco Serrano ecoregion. A pond at the margin of the road, impacted by agrotoxin pulverization, thousands of adult dead odonates were on the ground. The pond is shallow and hot, without shade from trees, only some *Typha* on the margins**.**

Tucumán province:

Site 24: La Sala, swamp at margin of road (RP340), -26.69528, -65.38722, 1178 m asl, Chaco Serrano ecoregion. A small swamp covered with *Typha* and no open water.

Site 25: Amaicha del Valle, Represa de Amaicha, -26.59704, -65.90801, 2000 m asl, Monte ecoregion. A small dam (50 m diameter, 2 m deep) for irrigation in an open environment with high insolation. The bottom is composed of fine sediments and rooted vascular plants, there is no floating vegetation.

Site 26: Timbó, Finca Alta Gracia, small rivulet, -26.71863, -65.13157, 518 m asl. Chaco Serrano. Fine sediments in a shallow and very small water course, vegetated with grasses in an open cultivated area.

Site 27: Altos de Medina, Arroyo El Tigre, -26.42602, -65.05566, 1490 m asl, Yungas-Chaco ecotone with well-preserved forest mainly composed of *Podocarpus* trees (Fig. 7). The bottom is rocky with some gravel, the stream is 1 m wide and 0.1 m deep, with marginal vegetation and shade from a closed canopy.

Figs. 5-7: 5, Locality 10, Santa Rita stream; 6, Locality 15, Termas de Caimancito stream (Jujuy province, Argentina). 7, Locality 27, El Tigre stream (Tucumán province, Argentina).

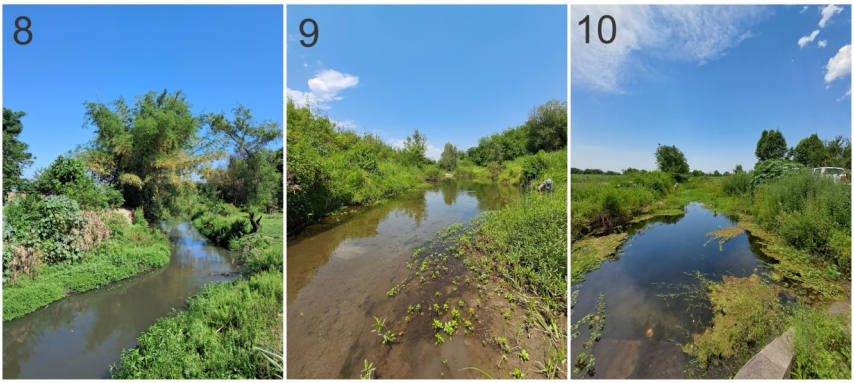
Site 28: Yerba Buena, Las Garzas, -26.83043, -65.32555, 509 m asl. Yungas, Mountain forest. A small spring crossing modified forest patches and lemon plantations. Bottom formed by small rocks and fine sediment.

Site 29: Tafí del Valle, Dique La Angostura, Zona del aliviadero, -26.93267, -65.68291, 2100m asl. Yungas, montane forest formed mainly by Alnus trees.

Site 30: CS3-1, -27.27077, -65.39064, 330 m asl, Chaco seco ecoregion, modified landscape (sugar cane plantations). A man made channel to drain pluvial waters, with cut banks and homogeneous soft sediment bottom, water speed less than 0.1 m /seg, 4 m wide, 1 m deep. Canopy covering the water, with marginal rooted semiaquatic vegetation.

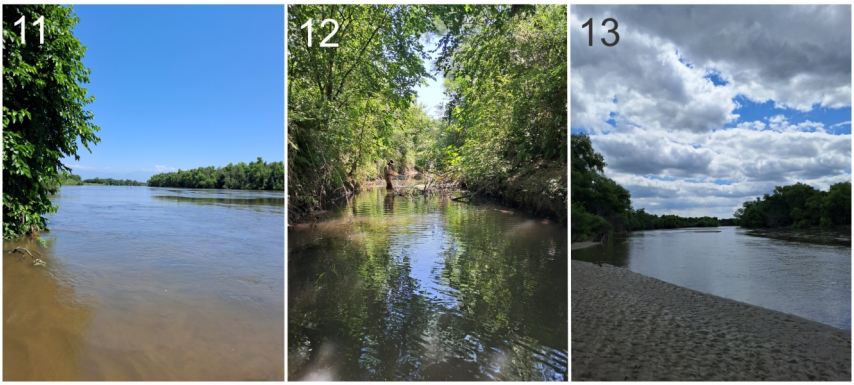
Site 31: Río Seco, -27.33645, -65.3174, 318 m asl, Chaco seco. A 20 m wide river, with a depth of about 0.3 m and a current speed of 0.5 m/seg. The bottom is rocky with sand patches, the area is entirely modified by sugar cane plantations, the water presents signs of organic enrichment. Open canopy.

Sites 32 to 36: artificial to heavily modified water courses, mostly man made channels for pluvial waters, soft sediments, immersed in a large sugarcane landscape. Riparian forest and marginal rooted semiaquatic vegetation present. Waters mostly oxygenated, not polluted. Site 32: Pampa Mayo, CP3-2, -27.28012, -65.36422, 324 m asl (Fig. 8). Site 33: Pampa Mayo, Casa Quemada, -27.31255, -65.38249, 328 m asl. (Fig. 9). Site 34: Pampa Mayo, CP1-2, -27.30126, -65.40004, 332 m asl (Fig. 10). Site 35: Manuela Pedraza, Arcor bosque, -27.20228, -65.33977, 329 m asl, (Fig. 11). Site 36: Manuela Pedraza, Canal Sidan, -27.18382, -65.38371, 332 m asl (Fig. 12).



Figs. 8-10: 8, Locality 32, CP3-2 stream; 9, Locality 33, Casa Quemada stream; 10, Locality 34, CP1-2 stream (Tucumán province, Argentina).

Sites 37- 38: large sand bottomed rivers, >50 m wide and 0.5 m deep, water speed less than 0.5 m/seg, open canopy, sugarcane landscape in Chaco seco ecoregion. Site 37: Lamadrid, -27.66614, -65.26546, 297 m asl, (Fig. 14). Site 38: Río Chico, -27.52246, -65.26848, 300 m asl (Fig. 13).



Figs. 11-13: 11, Locality 35, Balderrama river at Arcor Bosque; 12, Locality 36, Canal Sidán; 13, Locality 38, Río Chico (Tucumán province, Argentina).

Fig. 14. Locality 37, Lamadrid (Tucumán province, Argentina).

Results and Discussion

A total of 923 specimens from 62 species were collected. These include 556 adults preserved dry, 107 larvae (in alcohol), and 62 reared specimens (larval exuviae and adults in alcohol). A total of 15 species were reared from larva, three of which were previously unknown in this life stage: *Orthemis discolor, Nephepeltia leonardina* and *Phyllocycla basidenta*. The first two are in the process of being described, while the last was recently published (Molineri et al. 2025).

Five new provincial records are mentioned for Jujuy and Tucumán: *Nephepeltia flavifrons* (Fig. 28, Tucumán), *Nephepeltia leonardina* (Fig. 29, Jujuy), *Tramea abdominalis* (Fig. 32, Tucumán), *Telebasis inalata* (Fig. 41, Tucumán) and *Telebasis obsoleta* (Fig. 42, Tucumán).

Previous studies (von Ellenrieder 2010, Lozano et al. 2020 and Molineri et al. 2023a) have recorded 112 species in the Argentinean portion of the Chaco ecoregion. With the eight new additions presented here (*Gynacantha bifida, Remartinia luteipennis, Progomphus kimminsi, Nephepeltia flavifrons, Nephepeltia leonardina, Telebasis griffinii, Telebasis inalata,* and *Telebasis obsoleta*) this number reaches 120 species.

Species list

Aeshnidae

Anax amazili (Burmeister, 1839)

Salta. **Loc. 20**: 3 larvae and 1 reared adult ♀ (IBN-O-2403, IBN-O-2893, IBN-O-2420). **Loc. 22**: 1 reared ♀ adult (IBN-O-2678).

Coryphaeschna adnexa (Hagen, 1861) (Fig. 15)

Jujuy. **Loc. 11**: 1 adult ♂ (IBN-O-3606). Tucumán. **Loc. 28**: 1 ♂ adult (IBN-O-2991).

Gynacantha bifida Rambur, 1842 (Fig. 17)

Jujuy. **Loc. 9**: 1 adult ♂ (IBN-O-3096). New record for Chaco Serrano.

Figs. 15-17. Aeshnidae: 15, *Coryphaeschna adnexa*; 16, *Remartinia luteipennis*; 17, *Gynacantha bifida*.

Rhionaeschna absoluta (Calvert, 1952)

Tucumán. **Loc. 25**: 4 adult ♂♂ (IBN-O-2378, IBN-O-2379, IBN-O-2380, IBN-O-2381). **Loc. 27**: 1 ♂ adult, 1 adult ♀ (IBN-O-2683, IBN-O-2695).

Rhionaeschna bonariensis (Rambur, 1842)

Jujuy. **Loc. 11**: 1 adult ♂ (IBN-O-3619). **Loc. 13**: 2 adult ♀♀ (IBN-O-3086, IBN-O-3087). **Loc. 15**: 1 adult ♀ (IBN-O-3024). Tucumán. **Loc. 25**: 2 adult ♂♂ (IBN-O-2382, IBN-O-2383). **Loc. 38**: 1 adult ♀ (IBN-O-3298).

Rhionaeschna planaltica (Calvert, 1952)

Jujuy. **Loc. 9**: 1 adult ♂ (IBN-O-3097). **Loc. 14**: 1 adult ♂ (IBN-O-2720). Tucumán. **Loc. 28**: 1 adult♂ (IBN-O-2696). **Loc. 35**: 1 reared adult ♂ (IBN-O-3191).

Rhionaeschna vigintipunctata (Ris, 1918)

Tucumán. **Loc. 27**: 1 adult ♂ , 1 reared adult ♀ (IBN-O-3173, IBN-O-3318).

Remartinia luteipennis (Burmeister, 1839) (Fig. 16)

Jujuy. **Loc. 7**: 1 adult ♀ (IBN-O-3582). **Loc. 9**: 1 adult ♂ IBN-O-3154. New record for Chaco Serrano.

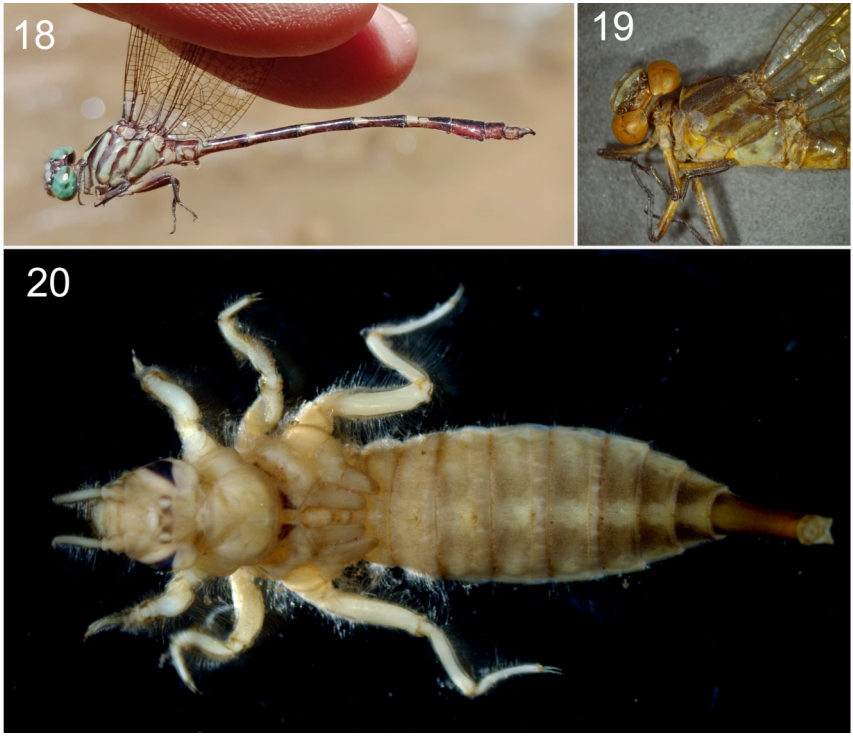
Gomphidae

Phyllocycla argentina (Hagen in Selys, 1878)

Jujuy. **Loc. 2**: 1 adult ♂, 3 reared adult ♂♂ (IBN-O-2814, IBN-O-2816, IBN-O-2817, IBN-O-2819). **Loc. 15**: 1 adult ♀ (IBN-O-3620).

Phyllocycla basidenta Dunkle, 1987 (Figs. 18-20)

Jujuy. **Loc. 2**: 2 adult ♂♂, 1 reared adult ♀ (IBN-O-2810, IBN-O-2818, IBN-O-2820, IBN-O-2821), 3 larvae (IBN-O-2810). **Loc. 13**: 2 adult ♂♂ (IBN-O-2812). **Loc. 8**: 4 adult ♂♂ (IBN-O-3531, IBN-O-3532, IBN-O-3533, IBN-O-3534). Tucumán. **Loc. 35**: 1 adult ♂ (IBN-O-3200).



Figs. 18-20. Gomphidae, *Phyllocycla basidenta*: 18, male; 19, female; 20, larva.

Progomphus complicatus Selys, 1854

Jujuy. **Loc. 6**: 1 adult ♀ (IBN-O-3568) Salta. **Loc. 18** (Salta): 1 adult ♀ (IBN-O-2411), 20 larvae (IBN-O-2407).

Progomphus kimminsi Belle, 1973

Jujuy. **Loc. 13**: 1 larva (IBN-O-2909). **Loc. 14**: 4 larvae (IBN-O-2896). Tucumán. **Loc. 35**: 2 adult ♂♂ (IBN-O-3202, IBN-O-3204). **Loc. 37**: 1 adult ♂ (IBN-O-3317). New record for Chaco Seco and Serrano.

Progomphus phyllochromus Ris, 1918

Jujuy. **Loc. 9**: 1 ♂ adult (IBN-O-3095). **Loc. 5**: 1 adult ♀ (IBN-O-3561). Salta. **Loc. 19**: 7 larvae (IBN-O-2406). Tucumán. **Loc. 27**: 1 adult ♂ (IBN-O-2690). **Loc. 24**: 1 adult ♂ (IBN-O-2691). **Loc. 31**: 1 adult ♀ (IBN-O-2957).

Libellulidae

Brachymesia furcata (Hagen, 1861) (Fig. 21)

Jujuy. **Loc. 8**: 1 adult ♂ (IBN-O-3548). **Loc. 11**: 4 adult ♂♂ (IBN-O-3607, IBN-O-3615, IBN-O-3616, IBN-O-3638).

Brechmorhoga nubecula (Rambur, 1842)

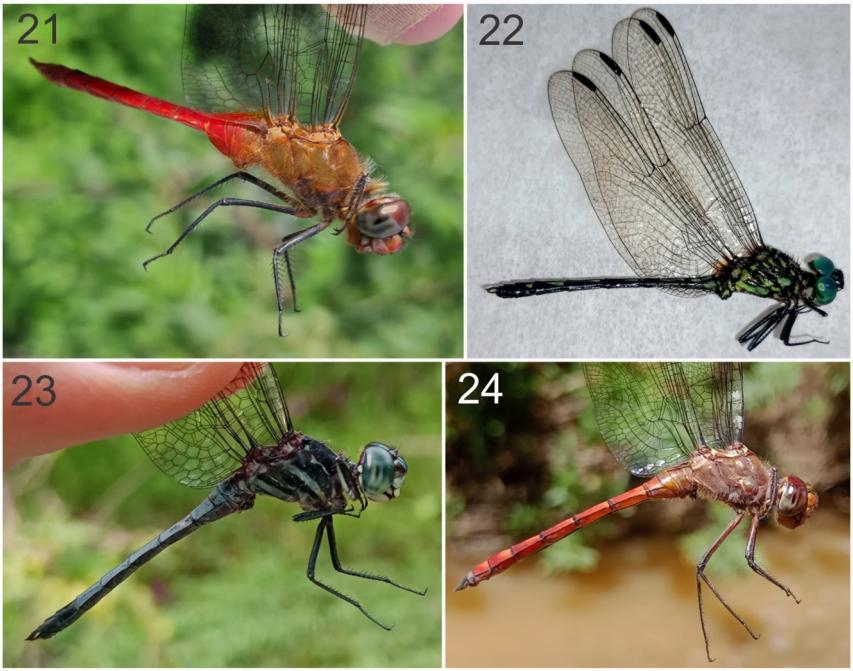
Jujuy. **Loc. 5**: 1 adult ♀ (IBN-O-3560).

Brechmorhoga vivax Calvert, 1906 (Fig. 22)

Jujuy. **Loc. 4**: 1 larva (IBN-O-2911). **Loc. 16**: 2 adult ♂♂ (IBN-O-3122, IBN-O-3123). Tucumán. **Loc. 27**: 1 adult ♀ (IBN-O-2682).

Cannaphila vibex (Hagen, 1861) (Fig. 23)

Jujuy. **Loc. 9**: 5 adult ♂♂, 1 adult ♀ (IBN-O-3098, IBN-O-3099, IBN-O-3100, IBN-O-3101, IBN-O-3102). **Loc. 15**: 1 adult ♂ (IBN-O-3020).



Figs. 21-24. Libellulidae, males: 21, *Brachymesia furcata*; 22, *Brechmorhoga vivax*; 23, *Cannaphila vibex*; 24, *Elasmothemis cannacrioides*.

Dythemis nigra Martin, 1897

Jujuy. **Loc. 3**: 3 adult ♂♂ (IBN-O-2743, IBN-O-2733, IBN-O-2734). **Loc. 15**: 1 adult ♂, 1 adult ♀ (IBN-O-3033, IBN-O-3039). **Loc. 8**: 3 adult ♂♂ (IBN-O-3545, IBN-O-3546, IBN-O-3547).

Elasmothemis cannacrioides (Calvert, 1906) (Fig. 24)

Jujuy. **Loc. 1**: 1 adult ♂ (IBN-O-3550). **Loc. 13**: 1 adult ♂ (IBN-O-2741). **Loc. 15**: 2 adult ♂♂ (IBN-O-3575, IBN-O-3576).

Erythemis attala (Selys in Sagra, 1857)

Tucumán. **Loc. 36**: 1 adult ♂ (IBN-O-3223).

Erythemis peruviana (Rambur, 1842)

Jujuy. **Loc. 13**: 1 adult ♂ (IBN-O-2717).

Erythemis plebeja (Burmeister, 1839)

Jujuy. **Loc. 12**: 1 adult ♀ (IBN-O-2745). **Loc. 13**: 3 adult ♂♂ (IBN-O-2700, 2024, IBN-O-2712, IBN-O-3063).

Erythemis vesiculosa (Fabricius, 1775)

Jujuy. **Loc. 16**: 2 adult ♂♂ (IBN-O-3125, IBN-O-3126).

Erythrodiplax atroterminata Ris, 1911

Tucumán. **Loc. 28**: 1 adult ♂ (IBN-O-2742).

Erythrodiplax corallina (Brauer, 1865)

Tucumán. **Loc. 27**: 1 adult ♂ (IBN-O-2689).

Erythrodiplax fusca (Rambur, 1842)

Jujuy. **Loc. 11**: 1 adult ♂ (IBN-O-3652). **Loc. 16**: 4 adult ♂♂ (IBN-O-3127, IBN-O-3128, IBN-O-3129, IBN-O-3130). Tucumán. **Loc. 28**: 1 adult ♂ (IBN-O-2757). **Loc. 34**: 2 adult ♂♂ (IBN-O-3292, IBN-O-3295).

Erythrodiplax media Borror, 1942

Jujuy. **Loc. 13**: 2 adult ♂♂ (IBN-O-3062, IBN-O-3083). Salta. **Loc. 18**: 1 adult ♂ (IBN-O-2405).

Erythrodiplax melanorubra Borror, 1942

Jujuy. **Loc. 6**: 1 adult ♂ (IBN-O-3567). **Loc. 11**: 1 adult ♂ (IBN-O-3653). **Loc. 15**: 1 adult ♂ (IBN-O-3038). **Loc. 16**: 3 adult ♂♂ (IBN-O-3131, IBN-O-3132, IBN-O-3133).

Erythrodiplax umbrata (Linnaeus, 1758)

Jujuy. **Loc. 14**: 2 adult ♀♀ (IBN-O-2718, IBN-O-2719).

Macrothemis imitans Karsch, 1890 (Fig. 25)

Jujuy. **Loc. 3**: 1 adult ♂ (IBN-O-2731). **Loc. 14**: 1 adult ♀ (IBN-O-2721). **Loc. 15**: 1 adult ♂ (IBN-O-3016). Tucumán. **Loc. 31**: 1 adult ♂ (IBN-O-2949). **Loc. 35**: 1 adult ♂ (IBN-O-3201).

Macrothemis inacuta Calvert, 1898

Jujuy. **Loc. 9**: 2 adult ♂♂ (IBN-O-3103, IBN-O-3104)

Miathyria marcella (Selys in Sagra, 1857) (Fig. 26)

Jujuy. **Loc. 13**: 1 adult ♀ (IBN-O-3085). Tucumán. **Loc. 36**: 4 adult ♂♂ (IBN-O-3220, IBN-O-3221, IBN-O-3224, IBN-O-3225). **Loc. 33**: 2 adult ♂♂, 1 adult ♀ (IBN-O-3234, IBN-O-3235, IBN-O-3236).

Micrathyria hesperis Ris, 1911 (Fig. 27)

Jujuy. **Loc. 1**: 1 adult ♂ (IBN-O-3549). **Loc. 13**: 7 adult ♂♂ 1 adult ♀ (IBN-O-2697, IBN-O-3041, IBN-O-3042, IBN-O-3067, IBN-O-3068, IBN-O-3069, IBN-O-3072, IBN-O-3084). Tucumán. **Loc. 36**: 1 adult ♂ (IBN-O-3214). **Loc. 33**: 2 adult ♂♂ (IBN-O-3242, IBN-O-3243). Salta. **Loc. 17**: 1 adult♂ (IBN-O-2413).

Figs. 25-27. Libellulidae, males: 25, *Macrothemis imitans*; 26, *Miathyria marcella*; 27, *Micrathyria hesperis*.

Micrathyria ocellata Martin, 1897

Jujuy. **Loc. 7**: 1 adult ♂, 3 adult ♀♀ (IBN-O-3583, IBN-O-3584, IBN-O-3585, IBN-O-3586). **Loc. 11**: 26 adult ♂♂, 1 adult ♀ (IBN-O-3591, IBN-O-3592, IBN-O-3593, IBN-O-3594, IBN-O-3595, IBN-O-3611, IBN-O-3612, IBN-O-3613, IBN-O-3617, IBN-O-3618, IBN-O-3621, IBN-O-3622, IBN-O-3623, IBN-O-3624, IBN-O-3625, IBN-O-3626, IBN-O-3633, IBN-O-3635, IBN-O-3636, IBN-O-3637, IBN-O-3640, IBN-

O-3641, IBN-O-3643, IBN-O-3644, IBN-O-3646, IBN-O-3649). **Loc. 13**: 4 adult ♂♂ (IBN-O-2699, IBN-O-2713, IBN-O-2714, IBN-O-2715).

Micrathyria ungulata Förster, 1907

Tucumán. **Loc. 34**: 1 adult ♂ (IBN-O-3293).

Micrathyria venezuelae De Marmels, 1989

Tucumán. **Loc. 28**: 2 adult ♂♂ (IBN-O-2692, IBN-O-2693).

Micrathyria sp.

Jujuy. **Loc. 13**: 4 adult ♂♂ (IBN-O-2698, IBN-O-3596, IBN-O-3597, IBN-O-3598).

Nephepeltia flavifrons (Karsch, 1889) (Fig. 28)

Tucumán. **Loc. 33**: 3 adult ♂♂ (IBN-O-3240, IBN-O-3244, IBN-O-3245). New province record. New record for Chaco Seco.

Nephepeltia leonardina Rácenis, 1953 (Fig. 29)

Jujuy. **Loc. 11**: 2 adult ♂♂ (IBN-O-2705, IBN-O-3599), 2 adult and exuviae ♂♂ (reared) (IBN-O-3608, IBN-O-3609). New province record, larva previously unknown. New record for Chaco Serrano.

Figs. 28-29. Libellulidae, males: 28, *Nephepeltia flavifrons*; 29, *Nephepeltia leonardina*.

Orthemis discolor (Burmeister, 1839) (Fig. 30)

Jujuy. **Loc. 5**: 2 adult ♂♂ (IBN-O-3564, IBN-O-3565). **Loc. 11**: 2 adult ♂♂, 1 adult ♀ (IBN-O-2740, IBN-O-2702, IBN-O-2711). **Loc. 16**: 1 adult ♂ (IBN-O-3134).

Perithemis tenera (Say, 1840) (Fig. 31)

Jujuy. **Loc. 13**: 1 adult ♂ (IBN-O-3079). **Loc. 14**: 2 adult ♂♂, 2 adult ♀♀ (IBN-O-2720, IBN-O-2722, IBN-O-2723, IBN-O-2724). **Loc. 15**: 3 adult ♂♂ (IBN-O-3005, IBN-O-3006, IBN-O-3032). Tucumán. **Loc. 33**: 3 adult ♂♂ (IBN-O-3246, IBN-O-3266, IBN-O-3267). **Loc. 34**: 1 adult ♂ (IBN-O-3271). **Loc. 36**: 2 adult ♂♂ (IBN-O-3219, IBN-O-3222).

Figs. 30-32. Libellulidae, males: 30, *Orthemis discolor*; 31, *Perithemis tenera*; 32, *Tramea abdominalis*.

Pantala flavescens (Fabricius, 1798)

Loc. 6: 1 adult ♂ (IBN-O-3569). Salta. **Loc. 23**: 1 adult ♀ (IBN-O-3160).

Tramea abdominalis (Rambur, 1842) (Fig. 32)

Tucumán. **Loc. 27**: 2 adult ♂♂ (IBN-O-2685, IBN-O-2684). New provincial record.

Tramea cophysa Hagen, 1867

Tucumán. **Loc. 27**: 1 adult ♀ (IBN-O-2681).

Calopterygidae

Hetaerina rosea Selys, 1853

Jujuy. **Loc. 3**: 2 adult ♂♂ (IBN-O-2735, IBN-O-2736). **Loc. 10**: 2 adult ♂♂ (IBN-O-3089, IBN-O-3540). **Loc. 13**: 7 adult ♂♂ (IBN-O-3043, IBN-O-3044, IBN-O-3045, IBN-O-3073, IBN-O-3074, IBN-O-3075, IBN-O-3076). **Loc. 14**: 4 larvae (IBN-O-2896). **Loc. 15**: 7 adult ♂♂, 3 adult ♀♀ (IBN-O-2993, IBN-O-2994, IBN-O-2995, IBN-O-2996, IBN-O-2997, IBN-O-2998, IBN-O-3008, IBN-O-3015, IBN-O-3025, IBN-O-3026).

Mnesarete grisea (Ris, 1918) (Fig. 33)

Jujuy. Loc. 1: 1 adult ♂ (IBN-O-3538). **Loc. 10**: 2 adult ♂♂ (IBN-O-3091, IBN-O-3092). Salta. **Loc. 18**: 1 larva (IBN-O-2411). **Loc. 21**: 9 larvae (IBN-O-2410).

Figs. 33. Calopterygidae, *Mnesarete grisea*, male.

Coenagrionidae

Acanthagrion aepiolum Tennessen, 2004

Jujuy **Loc. 15**: 1 adult ♂, IBN-O-3029.

Acanthagrion floridense Fraser, 1946

Jujuy. **Loc. 13**: 3 adult ♂♂ (IBN-O-3048, IBN-O-3064, IBN-O-3081). **Loc. 8**: 7 adult ♂♂ (IBN-O-3524, IBN-O-3525, IBN-O-3526, IBN-O-3527, IBN-O-3528, IBN-O-3529, IBN-O-3530). **Loc. 15**: 5 adult ♂♂ (IBN-O-3007, IBN-O-3021, IBN-O-3027, IBN-O-3030, IBN-O-3040). **Loc. 16**: 8 adult ♂♂ (IBN-O-3137, IBN-O-3138, IBN-O-3139, IBN-O-3140, IBN-O-3141, IBN-O-3142, IBN-O-3143, IBN-O-3144). Tucumán. **Loc. 32**: 18 adult ♂♂ (IBN-O-3176, IBN-O-3177, IBN-O-3180, IBN-O-3181, IBN-O-3182, IBN-O-3187, IBN-O-3188, IBN-O-3189, IBN-O-3190). **Loc. 33**: 14 adult ♂♂ (IBN-O-3226, IBN-O-3251, IBN-O-3260, IBN-O-3261, IBN-O-3263, IBN-O-3264). **Loc. 35**: 14 adult ♂♂ (IBN-O-3193, IBN-O-3195, IBN-O-3196, IBN-O-3199, IBN-O-3205, IBN-

O-3207, IBN-O-3208). **Loc. 36**: 2 adult ♂♂ (IBN-O-3211, IBN-O-3212). **Loc. 37**: 5 adult ♂♂ (IBN-O-3315, IBN-O-3316). **Loc. 38**: 9 adult ♂♂ (IBN-O-3300, IBN-O-3304, IBN-O-3311).

Acanthagrion lancea Selys, 1876

Jujuy: **Loc. 1**: 1 tandem (IBN-O-3537). **Loc. 13**: 11 adult ♂♂, 1 adult ♀ (IBN-O-3051, IBN-O-3052, IBN-O-3053, IBN-O-3054, IBN-O-3055, IBN-O-3056, IBN-O-3057, IBN-O-3070, IBN-O-3071, IBN-O-3077, IBN-O-3078). **Loc. 15**: 1 adult ♂ (IBN-O-2992). **Loc. 11**: 7 adult ♂♂, 2 adult ♀♀ (IBN-O-2706, IBN-O-2707, IBN-O-2708, IBN-O-2709, IBN-O-2710, IBN-O-2726, IBN-O-2727, IBN-O-3645). Salta. **Loc. 17**: 5 adult ♂♂, 1 adult ♀ (IBN-O-2416). **Loc. 18**: 7 adult ♂♂ (IBN-O-2402, IBN-O-2412), 20 larvae (IBN-O-2407). Tucumán. **Loc. 32**: 1 adult ♂, 1 adult ♀ (IBN-O-3178, IBN-O-3179). **Loc. 33**: 9 m 2 adult ♀♀ (IBN-O-3241, IBN-O-3248, IBN-O-3252, IBN-O-3256, IBN-O-3262, IBN-O-3265). **Loc. 34**: 3 adult ♂♂ (IBN-O-3272, IBN-O-3284). **Loc. 35**: 6 adult ♂♂, 3 adult ♀♀ (IBN-O-3192, IBN-O-3194, IBN-O-3197, IBN-O-3203, IBN-O-3206). **Loc. 36**: 1 reared adult ♀ (IBN-O-3213), 4 adult ♂♂ (IBN-O-3215, IBN-O-3216). **Loc. 38**: 2 adult ♂♂, 2 reared adult ♀♀ (IBN-O-3299, IBN-O-3301, IBN-O-3302, IBN-O-3303).

*Argia joergensen*i Ris, 1913

Jujuy. **Loc. 9**: 1 adult ♂ (IBN-O-3112). **Loc. 11**: 1 adult ♂ (IBN-O-2716). **Loc. 15**: 1 adult ♂ (IBN-O-3145).

Argia jujuya Ris, 1913

Jujuy. **Loc. 10**: 1 adult ♂ (IBN-O-3113). Tucuman. **Loc. 24**: 3 adult ♂♂ (IBN-O-2425), 1 tandem (IBN-O-2428).

Argia translata Hagen in Selys, 1865 (Fig. 34)

Jujuy. **Loc. 1**: 3 adult ♂♂, 1 tandem (IBN-O-3520, IBN-O-3521, IBN-O-3522, IBN-O-3523). **Loc 13**: 1 adult ♀ (IBN-O-2701). **Loc. 3**: 5 adult ♂♂ (IBN-O-2732, IBN-O-2737, IBN-O-2738, IBN-O-2739, IBN-O-2744). **Loc. 11**: 1 adult♀ (IBN-O-2701). **Loc. 6**: 1 adult♀ (IBN-O-3574). **Loc. 15**: 1 reared adult ♂, 1 reared adult ♀ (IBN-O-2912); 12 adult ♂♂, 7 adult ♀♀ (IBN-O-2912, IBN-O-2999, IBN-O-3000, IBN-O-3001, IBN-O-3002, IBN-O-3003, IBN-O-3004, IBN-O-3009, IBN-O-3010, IBN-O-3011, IBN-O-3012, IBN-O-3013, IBN-O-3014, IBN-O-3022, IBN-O-3023, IBN-O-3031, IBN-O-3035, IBN-O-3036). **Loc. 16**: 1 adult ♂ (IBN-O-3146). **Loc. 8**: 5 adult ♂♂, 1 adult ♀ (IBN-O-3515, IBN-O-3516, IBN-O-3517, IBN-O-3518, IBN-O-3519).

Enallagma novaehispaniae Calvert, 1907 (Fig. 35)

Jujuy. **Loc. 8**: 8 adult ♂♂, 2 adult ♀♀ (IBN-O-3551, IBN-O-3552, IBN-O-3553, IBN-O-3554, IBN-O-3555, IBN-O-3556, IBN-O-3557, IBN-O-3558). **Loc. 13**: 4 adult ♂♂ (IBN-O-3049, IBN-O-3058, IBN-O-3059, IBN-O-3082). Tucumán. **Loc. 31**: 2 adult ♂♂ (IBN-O-2952, IBN-O-2958). **Loc. 34**: 3 adult ♂♂ (IBN-O-3276).

Homeoura chelifera (Selys, 1876) (Fig. 36)

Tucumán. **Loc. 33**: 16 adult ♂♂ (2 reared) (IBN-O-3227, IBN-O-3228, IBN-O-

Figs. 34-36. Coenagrionidae: 34, *Argia translata*, male; 35, *Enallagma novaehispaniae*, oviposition in tandem; 36, *Homeoura chelifera*, male.

3229, IBN-O-3247, IBN-O-3253, IBN-O-3254). **Loc. 34**: 14 adult ♂♂, 2 adult ♀♀, 2 reared adult ♂♂ IBN-O-3268, IBN-O-3270, IBN-O-3273, IBN-O-3279, IBN-O-3281, IBN-O-3285, IBN-O-3290, IBN-O-3291, IBN-O-3297).

Ischnura capreolus (Hagen, 1861) (Fig. 37)

Jujuy. **Loc. 13**: 9 adult ♂♂ ((BN-O-2897, IBN-O-2728, IBN-O-2729, IBN-O-2730). Salta. **Loc. 18**: 6 adult ♂♂ (IBN-O-2401, IBN-O-2415). Tucumán. **Loc. 26**: 2 adult ♂♂, 1 adult ♀ (IBN-O-2422).

Ischnura fluviatilis Selys, 1876

Jujuy. **Loc. 14**: 1 adult ♀ (IBN-O-2703). Tucumán. **Loc. 26**: 3 adult ♀♀ (IBN-O-2423, IBN-O-2424). **Loc. 27**: 5 adult ♂♂ (IBN-O-2421, IBN-O-2686). **Loc. 29**: 11 adult ♂♂ (IBN-O-2903, IBN-O-2908).

Ischnura ultima Ris, 1908

Tucumán. **Loc. 29**: 14 adult♂♂, 4 adult ♀♀ (IBN-O-2895, IBN-O-2902).

Neoneura confundens Wasscher & van't Bosch, 2013 (Fig. 38)

Jujuy. Loc. 1: 1 adult ♂ (IBN-O-3548). **Loc. 13**: 3 adult ♂♂ (IBN-O-3065, IBN-O-3066, IBN-O-3080). **Loc. 15**: 2 adult ♂♂ (IBN-O-3017, IBN-O-3018). Tucumán. **Loc. 38**: 5 adult ♂♂, 2 adult ♀♀ (IBN-O-3307, IBN-O-3308, IBN-O-3310, IBN-O-3312).

Oxyagrion ablutum (Calvert, 1909) (Fig. 39)

Salta. **Loc. 18**: 4 adult ♂♂, 1 adult ♀. **Loc. 27**: 11 adult ♂♂ (IBN-O-2426, IBN-O-2687, IBN-O-2688). **Loc. 24**: 11 adult ♂♂ (IBN-O-2427, IBN-O-2429).

Figs. 37-38. Coenagrionidae, males: 37, *Ischnura capreolus*; 38, *Neoneura confundens*.

Fig. 39. Coenagrionidae, *Oxyagrion ablutum*, male.

Telebasis griffinii (Martin, 1896) (Fig. 40)

Jujuy. **Loc. 11**: 1 adult ♂ (IBN-O-3654). New record for Chaco Serrano.

Telebasis inalata (Calvert, 1961) (Fig. 41)

Tucumán. **Loc. 34**: 1 adult ♂ (IBN-O-3287). New provincial record. New record for Chaco Seco.

Telebasis obsoleta (Selys, 1876) (Fig. 42)

Jujuy. **Loc. 13**: 1 adult ♂ (IBN-O-2899). New provincial record. New record for Chaco Serrano.

Telebasis willinki Fraser, 1948 (Fig. 43)

Tucumán. **Loc. 33**: 3 adult ♂♂ (IBN-O-3231, IBN-O-3249, IBN-O-3258). **Loc. 34**: 2 adult ♂♂, 1 adult ♀ (IBN-O-3274, IBN-O-3275). **Loc. 36**: 2 adult ♂♂ (IBN-O-3217).

Figs. 40-43. Coenagrionidae, *Telebasis*, males: 40, *T. griffinii*; 41, *T. inalata*; 42, *T. obsoleta*; 43, *T. willinki*.

Acknowledgements

The field work reported here was funded by the International Dragonfly Fund. We thank Gabriela Fontanarrosa for invaluable help during field trips, IBN (CONICET-UNT) lab and field trips facilities. We also thank the departments of Fauna & Flora from Tucumán, Jujuy and Salta provinces and APN (Argentine National Parks administration) for the collecting permits (DRNOA 248/23). Special thanks to Natalia von Ellenrieder and Rosser Garrison for the suggestions for improving the manuscript.

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