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Brief Odonata survey in North Ethiopia during heavy rainy season of 2012

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Abstract

A survey of Odonata in North Ethiopia, on the route Debre Libanos – Bahir Dar – Woldia – Hayk – Mile – Awash – Debre Zeyit crossing the provinces of Oromia, Amhara and Afar, in July 29 - August 10, 2012 yielded 38 species, including two endemics of Ethiopia and five species not hitherto reliably reported for this country in the literature: *Pseudagrion commoniae* (Förster, 1902), *P. hamoni* Fraser, 1955, *P. salisburyense* Ris, 1921, *Bradinopyga strachani* (Kirby, 1900) and *Ictinogomphus ferox* (Rambur, 1842). The number of Odonata species recorded in Ethiopia thus reached 104. Seventeen main localities were visited, on average showing 4.9 species per locality. A small branch of Jara River, Amhara, was the richest one (15 species). Comments on specimens of *Pseudagrion spernatum* Selys, 1881 and *Nesciothemis farinosa* (Förster, 1898) and notes on the country in general and particular habitats of Odonata are provided.

Introduction

Ethiopia is a strange country. Situated close to the equator (3 to 15°N), most of its area enjoys moderate temperatures mostly ranging round the year within 15-25°C because of quite an elevation of 2,000-3,000 metres above sea level (the highest peak of Ras Dashen reaching 4,533 m). At the same time, Ethiopia embraces the Danakil Depression which falls to 125 m below sea level and is one of the hottest places in the world. The Ethiopian flora and fauna, although Afrotropical in general, has some Palaearctic connections and shows a high level of endemism and, in spite of its continental position, some features of an island flora/fauna as seemingly derived from ancient colonists of diverse origin, with scarce connections to mountains of East Africa (Clausnitzer & Dijkstra 2005). This is due to severe volcanism which ended



some 4-5 myr ago as well as the regular climate cooling and drying over last 1 myr, which had dramatic consequences for so elevated a landmass as the Ethiopian Upland (Ibid.). In recent times, a third disastrous factor has been added: humans. With the nature almost totally exterminated from uplands which support the lion's share of the country's population over 82 million people (14th place in the world), mostly involved in ineffective agriculture, there exist scattered shelters of vibrant wildlife, usually associated with magnificent gorges which cut through the volcanic plateaux. The Odonata fauna of Ethiopia was recently reviewed by Clausnitzer & Dijkstra (2005), their revised checklist includes 96 species. They pointed out its following peculiarities: rather a small number of species in total as well as, on average, in each given locality; relatively small proportion of localities occupied by each species within its range, high proportion of endemics and absence of many common African species, especially of forest ones.

That review by Clausnitzer & Dijkstra (2005) was undertaken after its authors' expedition to South-Western and Southern Ethiopia in the late dry season. Therefore I could not miss an opportunity to visit northern Ethiopia (only one locality, Debre Libanos, overlapping with the mentioned expedition) during the 'heavy rainy season' by accepting a generous invitation by my friend and colleague Nikita Vikhrev, a dipterologist, to join his team. The results of my brief survey of Odonata during this fortnight-long trip are presented here. Nearly all of my photos of damselflies and dragonflies taken during the trip will be soon available at <http://africa-dragonfly.net> and at my site at <http://pisum.bionet.nsc.ru/kosterin/odonata/ethiopia.htm>. Part of specimens will be deposited in Naturalis Biodiversity Center, Leiden (MRNH).

Materials and Methods

Odonata were captured with a net and either examined using a pocket lens and released or killed by ethylacetate and preserved dry on paper/cotton layers, or photographed in natural conditions using digital cameras. Figures 2-11, 13-26 and 28-44 show photos by the author, Figures 12 and 27 by I. Gomyranov. Illustrations of specimen details were obtained from serial photographs obtained via lens Zeiss Stemi 2000-C with digital camera Canon PowerShot A640 at the Institute of Molecular and Cellular Biology of Siberian Branch of Russian Academy of Sciences, Novosibirsk. Images with broad focus zones were obtained from serial photos with shifted focus using the software Helicon Focus 5.1 (<http://www.photo-soft.ru/heliconfocus.html>). Coordinates and elevation of localities were obtained from GPS by Nokia 6210 Navigator and then adjusted to precise localities using Google Earth; these data are given in the next section. Detailed descriptions of the habitats are provided in the last paper section 'Notes on the country and its Odonata'. Our route and situation of the localities studied are shown in Fig. 1.



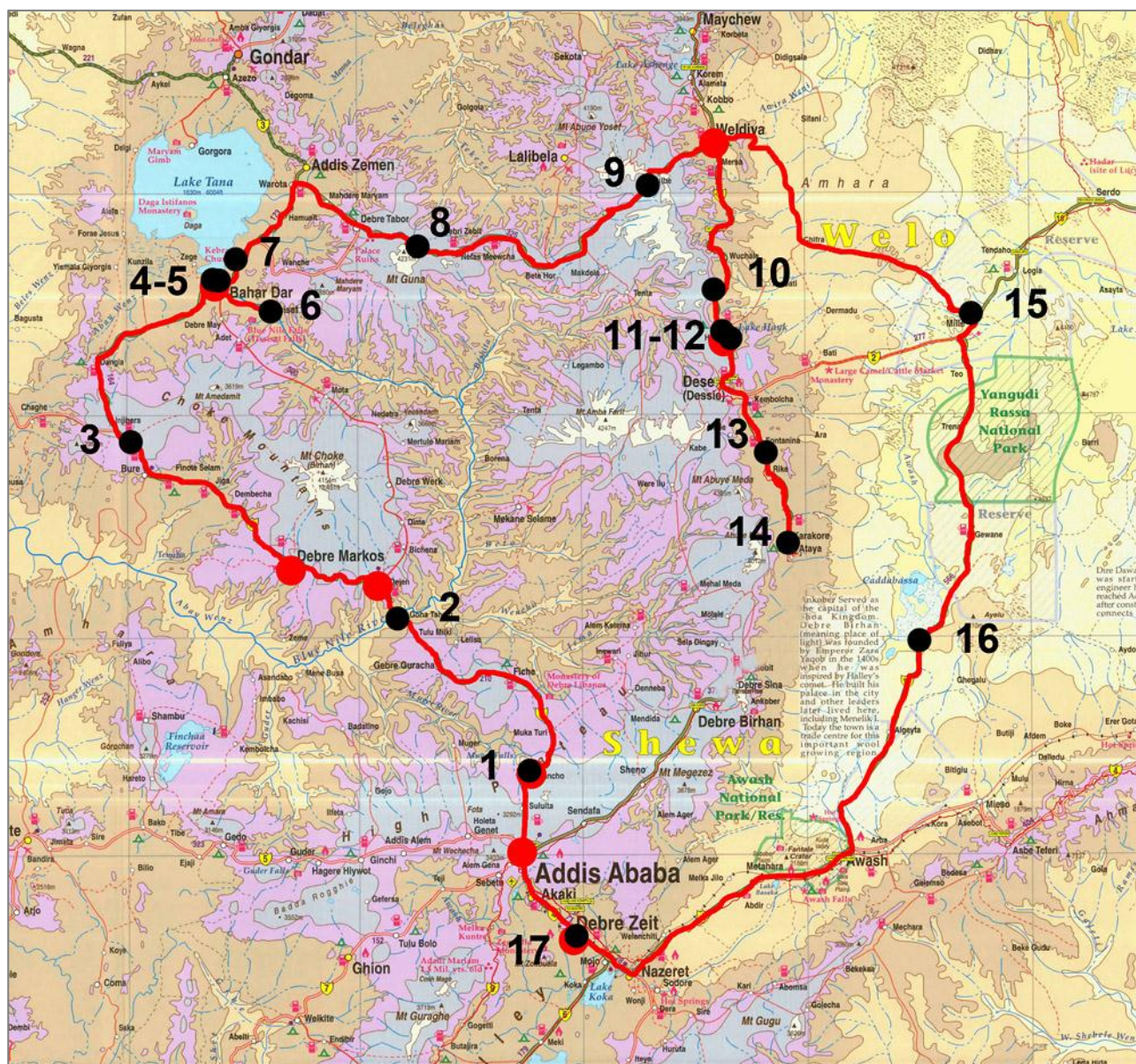


Figure 1. Our route (red, with places to overnight red-circled) and situation of the localities studied (black circles with numerals) shown on a tourist map of Ethiopia. The localities are numbered as in the section 'Localities and Odonata recorded', as follows: 1, Debre Libanos; 2, Blue Nile Gorge; 3, Lake Zengena, 4, Lake Tana in Bahir Dar; 5, Blue Nile outlet; 6, Blue Nile Waterfalls at Tiss Isat; 7, a rivulet 3 km SSE Zegye; 8, a wet grassland at Guna Mt.; 9, a brook 3 km W of K'uf Amba; 10, a gorge 1.5 km SW of Wergesa; 11, Jara River left branch 9 km NNW of Hayk; 12, Lake Hayk; 13, a muddy lake 4 km N of Weledil 14, a muddy river 4.5 km NW of Ataye; 15, a cattle pond 5 km SW Mile; 16, Awash River floods 24 km SW of Gewana; 17, Lake Hora at Debre Zeyit.

Results

Localities and Odonata recorded.

1. Debre Libanos. env., Oromia, 29-31.08.2012 (5 Odonata species).

1.1 Small ponds carved in rock, 9.7314-7316°N, 38.8157-8159°E, 2,513 m: *Africal-lagma elongatum* (Martin, 1907) - 8 ♂♂ 4 ♀♀ collected, 1 ♂ photographed 29.07, quite a few ♂♂ ♀♀ seen both days; *Proischnura subfurcata* (Selys, 1876) - 1 ♂



collected by N. Vikhrev 30.07; Aeshnidae gen. sp. (small, greyish) – 1 ind. seen 29.07.

1.2. The Gur River from the bridge to waterfall, 9.7273-7361°N, 38.8095-8135°E, 2,480-2,502 m: *Anax* sp. – 1 headless exuvia collected 30.07; *Pantala flavescens* (Fabricius, 1798) – 1 ind. seen 29.07.

1.3. Stony grassland in place of an abandoned field in German Ethio Lodge, 9.7315-7330°N, 38.8140-8153°E, 2,498-2,510 m: *Orthetrum caffrum* (Burmeister, 1839) - 1 not fully coloured ♂ photographed and collected by I. Gomyranov (small open stony grassland at an abandoned field, 30.07).

2. Blue Nile Gorge left side, Amhara, 31.07-01.08.2012 (8 species).

2.1. An earth road through acacia coppice at the bridge, 10.0746-0770°N, 38.1886-1903°E, 1,062-1,080 m, 31.07.2012: *Bradinopyga strachani* (Kirby, 1900) – 1 ♀ collected (Fig. 2); *Orthetrum chrysostigma* (Burmeister, 1839) - 1 teneral ♀ collected; *Zygonyx* sp. (?*torridus*) – 2 ind. seen.



Figure 2. *Bradinopyga strachani*, a female collected in the Blue Nile Gorge at the new bridge, 13.07.2012.

2.2. A roadside pool 1 x 3 m, 10.0796°N, 38.1897°E, 1,121 m, 01.08.2012: *Orthetrum julia* Kirby, 1900 – 4 ♂♂ collected, 2 ♂♂ photographed; *O. chrysostigma* - 1 ♂ collected; *Orthetrum abbotti* Calvert, 1892 - 5 ♂♂ (1 teneral) collected, 1 ♂ photographed; *Palpopleura portia* (Drury, 1773) – 1 ♂ photographed and collected.



2.3. A larger Blue Nile right tributary upstream of the bridge, 10.0780-0807°N, 38.1908-1926°E, 1,037-1,072 m, 01.08.2012: *Trithemis dejouxi* Pinhey, 1978 - 3 ♂♂ collected, , 1 ♂ photographed, several ♂♂ seen; *Zygonyx* sp. (?*torridus*) - 1 ind. seen.

2.4. A smaller Blue Nile right tributary downstream of the bridge, 10.0705-0746°N, 38.1806-1855°E, 1,044-1,158 m, 31.07.2012: *Pseudagrion sublacteam* (Karsch, 1893) - 2 ♂♂ 1 ♀ collected, 1 more ♂ seen; *Zygonyx torridus* (Kirby, 1889) - 1 ♂ collected; *T. dejouxi* - ♂♂ collected, several ♂♂ 1 ♀ seen.

3. Lake Zengena, Amhara, 10.9112-9134°N, 36.9633-9647°E, 2,521 m. 02.08.2012 (3 species): *Anax imperator* Leach, 1815 – several ♂♂, 1 ovipositing f seen; *Pseudagrion spernatum* Selys, 1881 - 9 ♂♂ collected, several ♂♂ photographed, many ♂♂ seen; *Pseudagrion* sp. (see 'Comments on specimens' below) - 1 ♂ collected; Coenagrionidae Gen. sp. (see 'Comments on specimens' below) - 1 teneral ♀ collected.

4. Lake Tana S bank at Tana Hotel, Bahir Dar, Amhara, 02-04.08.2012 (13 species).

4.1 Lake Tana bank, 11.6028-6091°N, 37.3928-3942°E, 1,790 m: *Platycypha caligata* (Selys, 1853) – 2 ♂♂ collected 03 and 04.08, 1 ♂ photographed 02.08, several ♂♂ seen 04.08; *Pseudagrion kaffinum* Consiglio, 1978 – 2 ♂♂ 4 ♀♀ collected, several ind. seen 04.08; *Pseudagrion massaicum* Sjöstedt, 1909 – 4 ♂♂ collected, 1 ♂ photographed, many seen 04.08.

4.2. Shallow bay of Lake Tana, 11.6097°N, 37.3949°E, 1,790 m, 04.08.2012: banks of a shallow bay overgrown with *Persicaria* sp.: *Agriocnemis inversa* Karsch, 1899 – 2 ♂♂ 1 ♀ collected, many ind. seen.

4.3. A small pond at Tana Hotel, 11.6043°N, 37.3947°E, 1,798 m: *A. inversa* – 5 ♂♂ 2 ♀♀ collected 02.08, many seen; 1 immature ♂ photographed 03.08; *Ischnura senegalensis* (Rambur, 1842) – 7 ♂♂ 3 ♀♀ collected 02.08, very many seen; *P. massaicum* – 1 ♀ collected 02.08; *Acisoma* sp. cf. *panorpoides* Rambur, 1842 (African representatives of this group to be soon revised, pers. comm. by K.-D.B. Dijkstra) – 2 ind. seen 02.08; *Brachythemis lacustris* (Kirby, 1889) – 1 immature ♂ collected 04.08; *Nesciothemis farinosa* (Förster, 1898) – 2 ♂♂ 1 ♀ collected, 1 ♂ photographed 02.08, 2 ♂♂ (1 teneral) collected 04.08.

4.4. Large grassy swamps at Tana Hotel, 11.6028-6049°N, 37.3957-3973°E, 1,794 m, 04.08: *P. caligata* – 3 ♀♀ collected, 1 ♀ photographed; *A. inversa* – 2 ♀♀ collected, 1 tandem photographed, several ind. seen; *Ceriagrion glabrum* (Burmeister, 1839) – 5 ♂♂ 8 ♀♀ collected, 1 ♂, 1 ♀ photographed, several ♂♂ ♀♀ seen; *I. senegalensis* – 3 ♂♂ 10 ♀♀ collected, many seen; *P. massaicum* – 2 teneral ♂♂ collected, 1 of them photographed, 1 more seen; Aeshnidae gen sp. – 1 ind. seen; *Acisoma* sp. – 2 ♂♂ 1 ♀ collected, 3 more ind. seen; *Diplacodes lefebvrei* (Rambur, 1842) (not the smaller species: hw 24 mm, pt 3 mm) – 1 ♂ collected; *Crocothemis erythraea*



(Brullé, 1832) – 1 ♂ 3 ♀♀ collected; *Trithemis stictica* (Bureister, 1839) – 1 immature ♂ collected.

5. The Blue Nile outlet, Amhara. 04.08.2012 (8 species).

5.1. A small cape 11.6109°N, 37.4037°E, 1,790 m: *I. senegalensis* – several ind. seen; *Brachythemis* sp. (cf. *leucosticta*) – 2 ♂♂ seen; *C. erythraea* – 2 teneral ♀♀ collected; *Trithemis annulata* (Palisot de Belauvois, 1832) – 1 ♂ seen.

5.2. A deep bay 11.6091°N, 37.4092°E, 1,790 m: *A. inversa* – many ind. seen; *I. senegalensis* – many ind. seen; *P. kaffinum* – 6 ♂♂ 2 ♀♀ collected, many ♂♂ seen; *N. farinosa* – 1 ♂ collected; *T. stictica* – 2 ♂♂ collected, several seen; *T. annulata* – 2 ♂♂ collected, several seen.

6. The Blue Nile Waterfalls at Tiss Isat village, Amhara. 03.08.2012 (5 species).

6.1. The steep valley slope at the first waterfall. 11.4901°N, 37.5889°E, 1,636 m: *A. imperator* – 1 ♂ seen; *Zygonyx natalensis* (Martin, 1900) – 1 ♂ collected, several ind. seen.

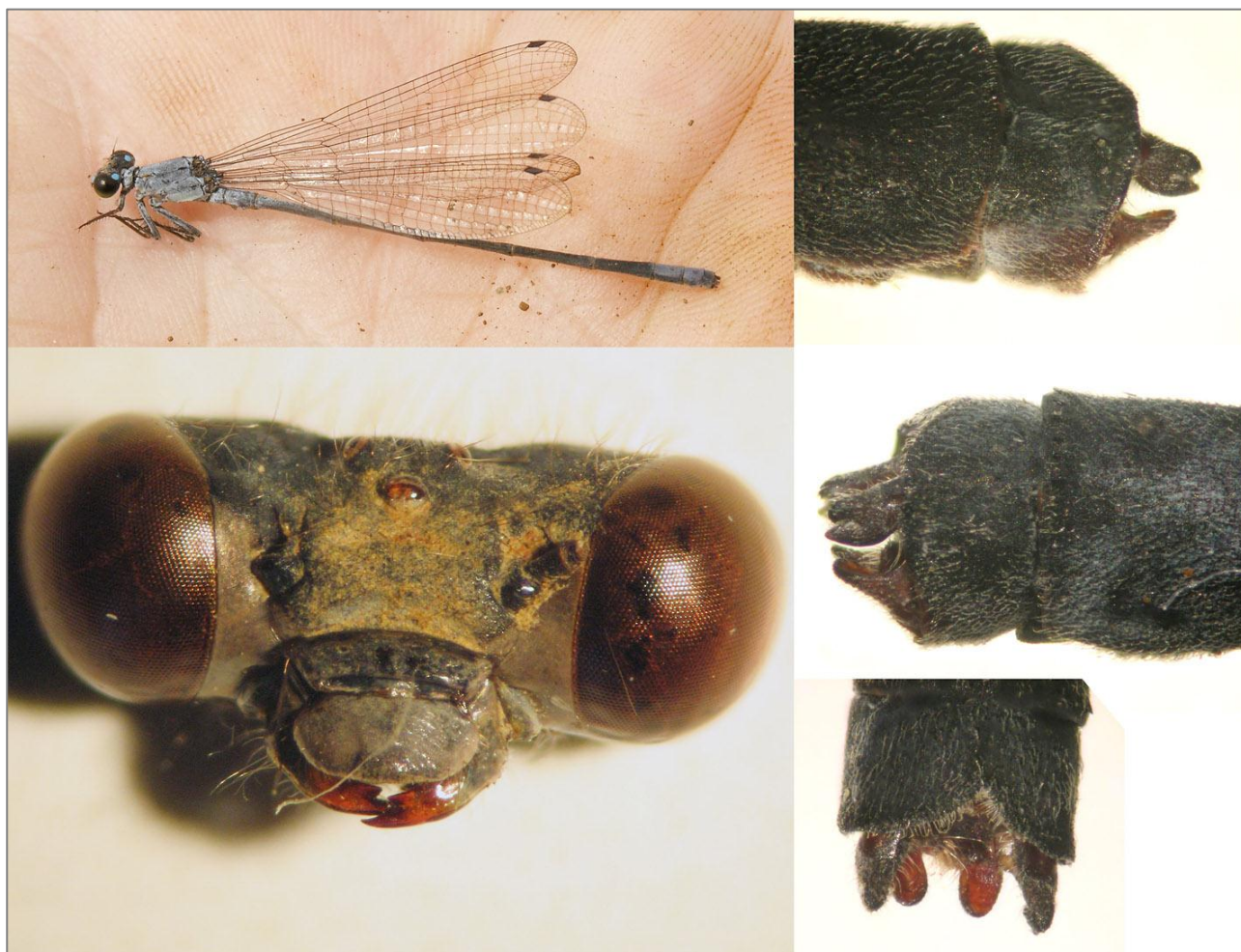


Figure 3. *Pseudagrion salisburyense*, a male collected at a rivulet 3 km SEE of Zegye on 05.08.2012 and its details (not to scale).



6.2. Pools at a terrace grassland downstream the Portuguese bridge, 11.4876°N, 37.5942°E, 1,614 m: *P. subfurcata* – 1 ♂ 1 ♀ in tandem collected; *Pseudagrion commoniae* (Förster, 1902) – 2 ♂♂ 1 ♀ collected; *O. chrysostigma* – 1 ♂ collected, 2 more ♂♂ seen, 1 ♂ photographed.

7. A rivulet near Lake Tana, 3 km SEE of Zegye, Amhara. 05.08.2012 (3 species).

7.1. The rivulet 11,6759-6766°N 37,4604-4633°E, 1850-1856 m: *Pseudagrion salisburyense* Ris, 1921 – 1 ♂ collected (Fig. 3); *Trithemis furva* Karsch, 1899 – 1 teneral ♂ collected.

7.2. A small brook, the rivulet tributary, 11,6752-6757°N 37,4601-4602°E, 1850-1852 m: *P. subfurcata* – 1 ♂ collected by N. Vikhrev; *T. furva* – 2 ♂♂ collected, 1 more ♂ seen.

8. A wet grassland at Guna Mt., 5 km NWW of Sali, Amhara, 11,7430-7459°N 38,2994-3033°E, 3162-3177 m, 05.08.2012 (1 species): *Ischnura abyssinica* Martin, 1907 – 3 ♂♂ 1 ♀ collected.

9. A highland brook 3 km W of K'uf Amba, Amhara, 11, 8846-8854°N 39,3175-3190°E, 3,450-3,455 m a.s.l., 05.08.2012. No Odonata.

10. A river gorge 1.5 km SW of Wergesa, Amhara, 11,5392-5395°N 39,6071-6091°E, 1,984-2,021 m a.s.l., 06.08.2012 (1 species): *Orthetrum kollmannspergeri* Buchholz, 1995 – 3 ♂♂ (1 teneral), 1 ♀ collected, 1 more ♂ seen.

11. Jara River left branch, 9 km NNW of Hayk, Amhara, 11.3793-3813°N 39.6418-6422°E, 1,654-1,657 m, 06-07.08.2012. (15 species): *C. glabrum* – 1 ♂ collected 06.08 by I. Gomyranov, 1 ♂ seen 07.08; *P. subfurcata* – 6 ♂♂ 2 ♀♀ collected 06.08, 1 ♂♂ 2 ♀♀ collected 07.08; *P. commoniae* – 8 ♂♂ 3 ♀♀ collected 06.08, 3 ♂♂ 2 ♀♀ collected, 1 ♂ 1 tandem photographed 07.08, numerous males and tandems seen both days; *Pseudagrion kersteni* (Gerstäcker, 1869) – 19 ♂♂ 2 ♀♀ collected 06.08, 3 ♂♂ 2 ♀♀ collected, 1 ♂ several tandems photographed 07.08, numerous males and tandems seen both days; *P. spernatum* – 1 ♂ seen 06.08, photographed and collected 07.08; *P. sublacteum* – 1 ♂ collected, 1 more ♂ seen 06.08, 5 ♂♂ collected, 1 ♂ 1 tandem photographed 07.08; *P. massaicum* – 5 ♂♂ collected, 1 ♂ photographed 07.08; *Pseudagrion nubicum* Selys, 1876 – 2 ♂♂ photographed 07.08; *A. imperator* – 1 ♂ seen 06.08, 1 ♂ collected 07.08; *Anax speratus* Hagen, 1867 – 1 ♂ seen both days; *C. erythraea* – 1 ♂ seen both days; *N. farinosa* – several ♂♂ seen both days, *O. chrysostigma* – 10 ♂♂ collected, 2 ♂♂ photographed 06.08, 1 ♂ 1 ♀ photographed and collected in copula, 1 ♂ photographed 07.08, several seen both days; ?*O. kollmannspergeri* – uncertain visual sightings not confirmed by collections; *P. portia* – 2 ♂♂ 1 ♀ collected 06.08, 1 ♂ photographed 07.08, several ♂♂ ♀♀ seen both days;



Trithemis arteriosa (Burmeister, 1839) – 6 ♂♂ collected 06.08, 2 ♂♂ photographed 07.08, many ♂♂ seen both days; numerous teneral coenagrionids and many teneral *Orthetrum* seen both days.

12. Lake Hayk S bank, 2 km NE of Hayk, Amhara, 06-07.08.2012 (10 species).

12.1. Lake Hayk at Hayk Lodge. 11.3244-3257°N 39.6877-6887°E, 1,911 m: *I. senegalensis* – 4 ♂♂ 10 ♀♀ collected, several ♂♂ photographed 06.08, many ♂♂ ♀♀ seen both days; *P. massaicum* – 1 ♂ collected, several seen 06.08; *P. nubicum* – 14 ♂♂ collected, several ♂♂ photographed 06.08, many seen both days; *A. imperator* – 1 ♂ collected, 2 ♂♂ released, 1 ♂ photographed 06.08, several ♂♂ seen both days; *Ictinogomphus ferox* (Rambur, 1842) – 1 ♂ photographed and collected 06.08; *Brachythemis impartita* (Karsch, 1890) – 4 ♂♂ 10 ♀♀ collected 06.08, very many ♂♂ ♀♀ seen, some photographed both days; *C. erythraea* – 1 ♂ photographed and collected 06.08; *N. farinosa* – 2 ♂♂ collected, 2 ♂♂ photographed 06.08, numerous ♂♂ seen both days; *T. annulata* – 1 ♂ photographed 06.07.

12.2. A hill above the lake, 11.3238-3252°N 39.6852-6878°E, 1,917-1,951 m, 07.08: *O. chrysostigma* – 1 ♀ collected (mature but thoracic pattern indicative, identical to that collected in copula with male at Jara); *T. annulata* – 1 ♂, 1 ♀ collected, 1 ♂ 1 ♀ seen; *I. senegalensis* – 1 ♀ collected.

13. Muddy lake 4 km N of Weledi, Amhara, 10.8710°N 39.8096°E, 1,460 m, 08.09.2012 (2 species): *Acisoma* sp. – 1 ♀ collected; *P. flavescens* – 1 ♀ collected, several ind. seen.

14. Muddy river 4.5 km NW of Ataye, Amhara, 10.3750°N 39.9323°E, 1,504 m, 08.09.2012 (2 species): *C. glabrum* – 1 ♂ photographed and collected; *P. commoniae* – 1 ♂ seen.

15. Cattle pond 5 km SW Mile, Afar 11.3804°N 40.7400°E, 531 m. 09.08.2012. No Odonata.

16. Awash River floods 24 km SW of Gewana, Afar, 9.971°N 40.540°E, 572 m, 09.08.2012 (3 species): *Agriocnemis sania* Nielsen, 1959 – 1 ♂ 2 ♀♀ collected by O.K. and N. Vikhrev; *Pseudagrion niloticum* Dumont, 1978 – 1 ♂ collected, several ♂♂ 1 tandem seen; *Orthetrum* sp. 1 ♂ (large with narrow abdomen, dark, very slightly pruinose, perhaps *O. trinacria* (Selys, 1841)) 1 ♀ (large, with narrow abdomen) seen.

17. Lake Hora in Debre Zeyit, Oromia, 9.7573-7589°N 38.9933-9965°E, 1,875 m, 10.08.2012 (4 species): *I. senegalensis* – 5 ♂♂ 2 ♀♀ collected, numerous seen; *Pseudagrion hamoni* Fraser, 1955 – 6 ♂♂ 6 ♀♀ collected, several ♂♂ ♀♀ seen; *A. imperator* – 1 ♂ captured and released; *Brachythemis leucosticta* (Burmeister, 1839) – 3 ♂♂ 1 ♀ collected, 1 ♂ 1 ♀ photographed, many ♂♂ ♀♀ seen.



Addenda: specimens collected in Ethiopia in March 2012 by Nikita Vikhrev:

Lake Awasa, Oromia, 7.079°N 38.478°E, 1690 m, 15-16.03.2012: *A. inversa* - 3 ♂♂ 1 ♀.

Lake Ziway, Oromia, 7.91°N 38.73°E, 1640 m, 11-13.03.2012: *A. inversa* - 2 ♂♂ 1 ♀.

Goba, Oromia, 7.025°N 39.980°E, 2660 m, 18-20.03.2012: *P. subfurcata* - 1 ♂.

List of identified species

In the list below, including in total 38 identified species, the family subtotals are given in parentheses after the family names; the ordinal numbers of main (numbered above) localities where each species was found are given in parentheses after species. Asterisks stand for species new for the country.

Chlorocyphidae (1 species):

Platycypha caligata (4).

Coenagrionidae (14 species):

Africallagma elongatum (1); *Agriocnemis inversa* (4); *A. sania* (16); *Ischnura abyssinica* (8); *I. senegalensis* (5, 12, 17); **Pseudagrion commoniae* (6, 11, 14); *P. hamoni* (17); *P. kaffinum* (4, 5); *P. massaicum* (4, 11, 12); *P. niloticum* (16); *P. nubicum* (11, 12); **P. salisburyense* (7); *P. spernatum* (3, 11); *P. sublacteum* (2, 11).

Aeshnidae (2 species):

Anax imperator (3, 6, 11, 12, 17); *A. speratus* (11).

Gomphidae (1 species):

**Ictinogomphus ferox* (12).

Libellulidae (20 species):

Brachythemis impartita (12); *B. lacustris* (4); *B. leucosticta* (17); **Bradinopyga strachani* (2); *Crocothemis erythraea* (4, 5, 11, 12); *Diplacodes lefebvrei* (4); *Nesciothemis farinosa* (4, 5, 11, 12); *Orthetrum abbotti* (2); *O. kollmannspergeri* (10); *O. caffrum* (1); *O. chrysostigma* (2, 6, 11, 12); *O. julia* (2); *Palpopleura portia* (2, 11); *Trithemis annulata* (5, 12); *T. arteriosa* (11); *T. dejouxi* (2); *T. furva* (7); *T. stictica* (4, 5); *Zygonyx natalensis* (6); *Z. torridus* (2).

Faunal discussion

Herewith we make the first published exact records in Ethiopia for five species either never reported for this country or for various reasons excluded from the checklist of



its fauna by Clausnitzer & Dijkstra (2005) which counted 96 species. *P. hamoni* was not reported for Ethiopia before. The above cited authors excluded from their Ethiopian checklist *P. commoniae* as actually reported from Eritrea, *P. salisburyense* and *I. ferox* as uncertainly identified old records and *B. strachani* as too imprecise a record for “Abyssinia”. Now we have found them in Ethiopia. Actually, *I. ferox* had already been recorded in Ethiopia by Phil Benstead who uploaded a photo of a male of this species from Bogol Manyo, Ethiopia, dated 02.02.2007, to www.africa-dragonfly.net but this finding has not been so far published in literature. Besides, the same author uploaded also male photos of *Orthetrum sabina* (Drury, 1770) from Lake Biseka, Awash National Park, Ethiopia 17.02.2007, and *Urothemis edwardsii* (Selys, 1849) for the same National Park, 15.02.2007, with acknowledgement to K.-D. Dijkstra for the help with identification. Taking into account the recent separation of *B. leucosticta* auct. into the true *B. leucosticta* and *B. impartita*, both reported for Ethiopia (Dijkstra & Matushkina 2009), the number of species with published records from Ethiopia has now been increased to 104.

Our 38 identified species were found in total in 17 main localities (numbered above). Accounting for all species, including the few remained unidentified, the localities showed the following distribution as to the number of species found: 15 species – 1 locality (Jara River); 13 species – 1 locality (Bahir Dar); 10 species – 1 locality (Lake Hayk); 8 species – 2 localities (Blue Nile Gorge and Blue Nile outlet); 5 species – 2 localities (Debre Libanos and Tis Issat); 4 species – 1 locality (Lake Hora); 3 species – 3 localities (Lake Zengena, a rivulet at Zegye, Awash River); 2 species – 2 localities (near Weledi and near Ataye); 1 species – 2 localities (near Guna Mt. and near Wergesa); 0 species – 2 localities (near K’uf Amba and near Mile). This gives 4.9 species per locality on average. Of course, the time spent at different localities was incomparable, so this figure should not be taken too seriously. However, it is in line with one of the conclusions by Clausnitzer & Dijkstra (2005): smaller number of species per locality than expected for the observed diversity of the fauna. Three localities situating above 2,000 m a.s.l. provided 8 species in total, 5, 3, 1, 0 and 0 species each; at the same time, the richest locality of Jara River (15 species) was not at much lower level (ca 1,650 m). We encountered only two Ethiopian endemics, *Ischnura abyssinica* (at 1 locality) and *P. kaffinum* (at 2 localities, both at Lake Tana). Of species for the first time reliably reported for Ethiopia, 3 species *P. hamoni*, *P. salisburyense* and *B. strachani* were found in 1 locality only (with only 3 species found there in total) and 1 species (*P. commoniae*) - in 3 localities.

It was interesting to observe that two lakes, Hayk and Hora, were occupied by different species of the sibling pair *B. impartita* and *B. leucosticta*, confirming a tendency of these species to exclude each other from lakes even in the same region, so that only one is usually present at a given lake (Dijkstra & Matushkina 2009). Two males



from Lake Hora were reported (Ibid.) to be *B. leucosticta*, as well as were the three males collected by me at this lake. It is a pity that I failed to capture a single specimen of the same pair at the Blue Nile outlet of Lake Tana to check the claim in the same paper (Ibid.), based on six specimens, that it is inhabited by *B. impartita*.

It was strange to see a chlorocyphid, *P. caligata*, at a lake (and its females even at grassy swamps some hundred metres away from the lake). But, firstly, Lake Tana is huge and clear, with banks formed by volcanic rocks, so it provides conditions rather resembling riverine ones; and secondly, *P. caligata* was also reported from some other large lakes, such as Malawi, Chala (Dijkstra 2007) and some others (K.-D. Dijkstra, pers. comm.).



Figure 4. Details of male specimens of *Pseudagrion sparnatum* (left, head; middle, appendages in lateral view; right, appendages in dorsal view): a, b, collected at Lake Zengena on 02.08.2012 (for analogous ones photographed in nature see Fig.); c, collected at the Jara River left branch 9 km NNW of Hayk (a photo of the same specimen taken in nature is shown in Fig. 34d). Not to scale.



Notes on specimens

Pseudagrion spernatum Selys, 1881

Males of this species were numerous at banks of Lake Zengena (Fig. 4a, b), while no females were observed. Most of them were mature bearing a variable extent of pruinescence, however, I photographed a teneral male (Fig. 5) and collected an intriguing immature male (Fig. 6), still without pruinescence and with a strong ochraceous-yellowish tint of wings which, however, already lost glittering. This male had a tan-coloured frons and large pyriform postocular spots, also tan in colour, converging to a transversal occipital stripe (Fig. 6). Unboubted males of *P. spernatum* had concise and isolated greenish and roundish postocular spots and the frons obscured by pruinescence, yet seemingly black coloured beneath it (Fig. 4, left). Note that Pinhey (1964: 40) wrote the following on *P. spernatum natalense* Ris: "Labrum and genae pale, rest of head and face black above, with small green postocular spots, which may be isolated or narrowly linked across occiput" and did not provide any differences in the head coloration for other subspecies; however this statement could refer to mature individuals. In the teneral male photographed, the dark pattern was still far from saturation, and a contiguous light stripe across the head was recognisable (Fig. 5). I would suppose that the black pattern on the head is not formed at once but is expanding with age before maturation. However, K.-D.B. Dijkstra kindly informed me that he considers the tan frons as impossible in *P. spernatum*, so the male in question remains an enigma, and possibly even represents an unnamed species.



Figure 5. A teneral male of *Pseudagrion spernatum* at Lake Zengena, 02.08.2012.

The only male of *P. spernatum* found at the Jara River was pruinosed almost entirely (see Fig. 35d).

Coenagrionidae Gen. sp.

Among numerous males of the previous species, a teneral coenagrionid female was collected at Lake Zengena which was quite smaller (total length 32 mm, abdomen



24.5 mm, hind wing 18.5 mm but the wings are not spread well) than those males of *P. spernatum* (total 39.5-41.5 mm, abdomen 31.5-32 mm, hind wing 24 mm). The female had no spine on S8 (Fig. 7), which excludes Ischnurinae, but showed a character



Figure 6. Details (top left, head; bottom left, appendages dorsal view; right, appendages lateral view) of an immature male of *Pseudagrion* sp. Collected at Lake Zengena on 02.08.2012. Not to scale.

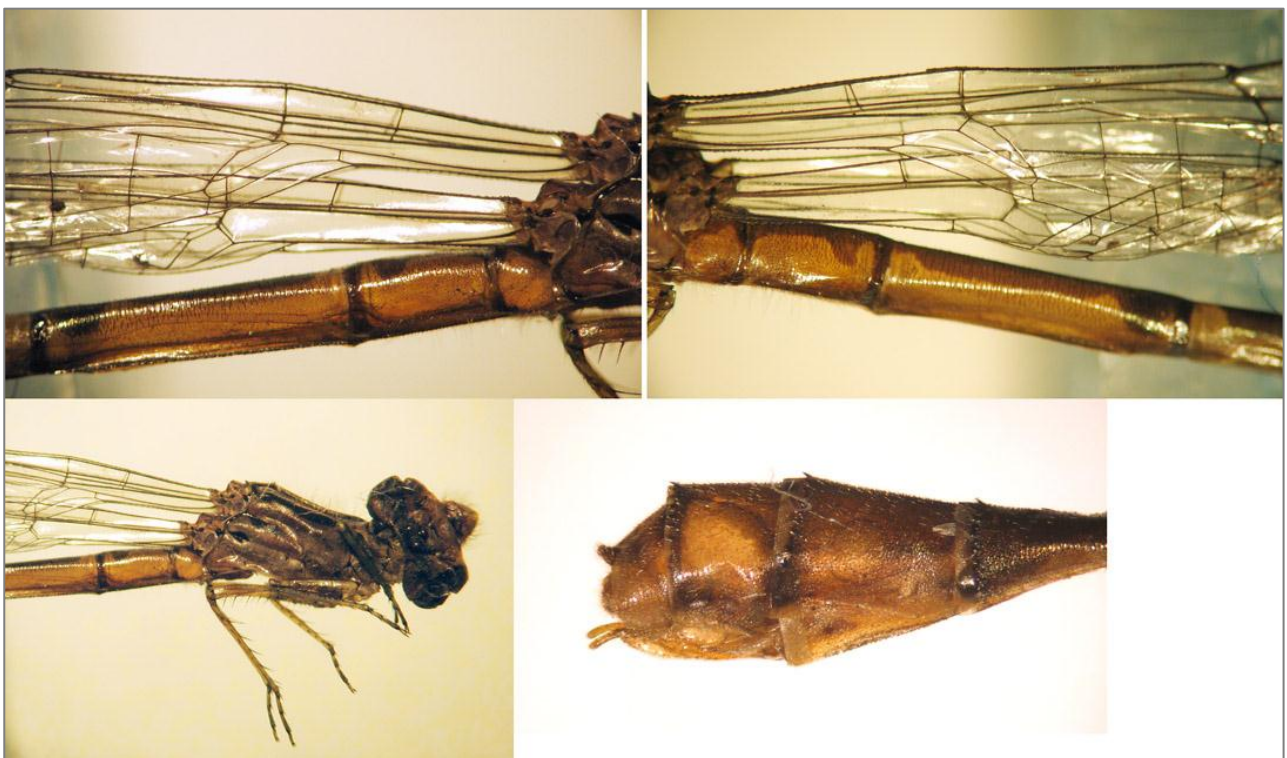


Figure 7. Details (top, wing bases; bottom left, head and thorax; bottom right, abdomen tip) of a teneral female of *Coenagrionidae* Gen. sp. collected at Lake Zengena on 02.08.2012. Not to scale.



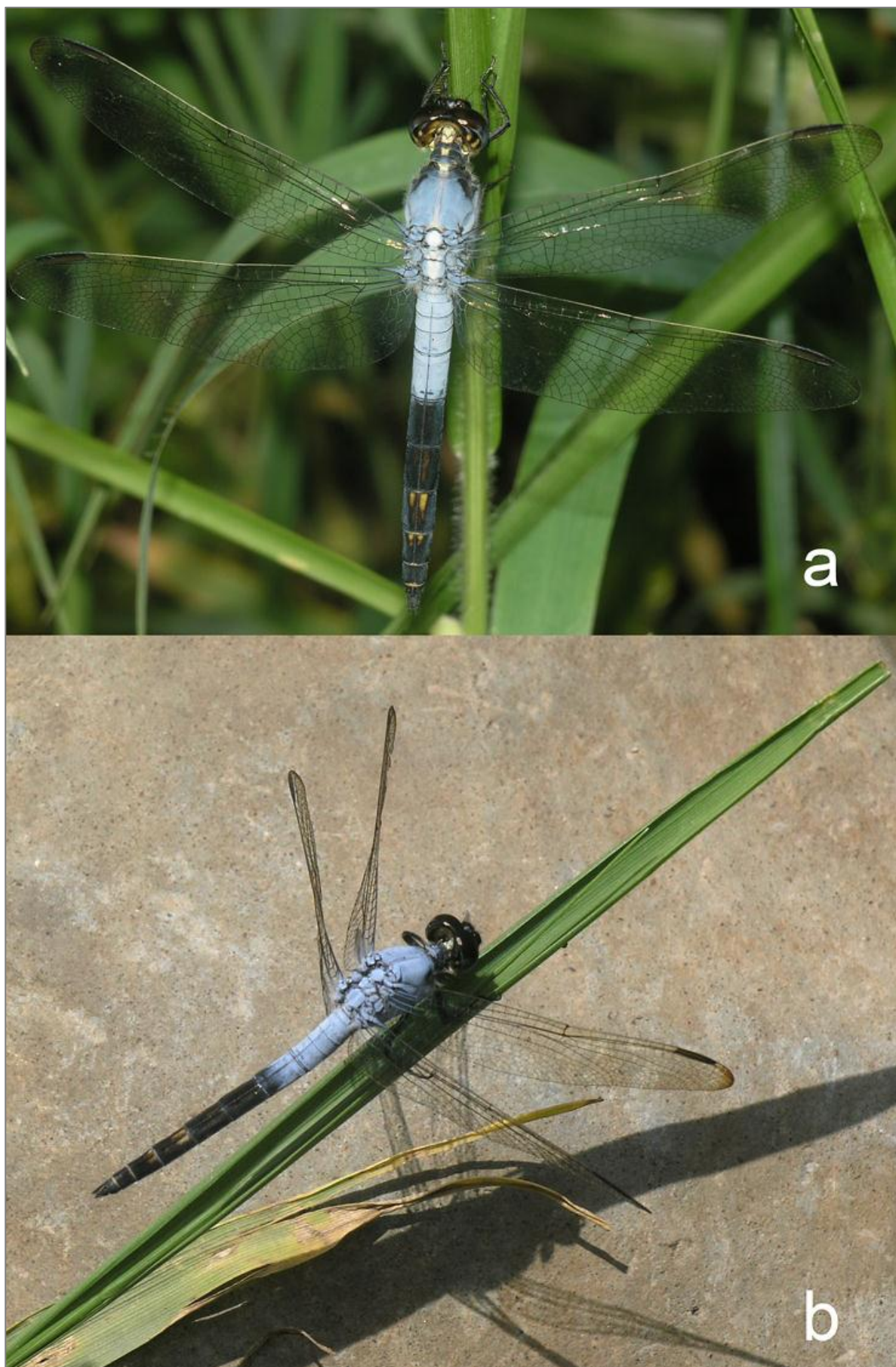


Figure 8. Males of *Nesciothemis farinosa* at: a, Lake Tana in Bahir Dar, 02.08.2012; b, Lake Hayk, 06.08.2012.



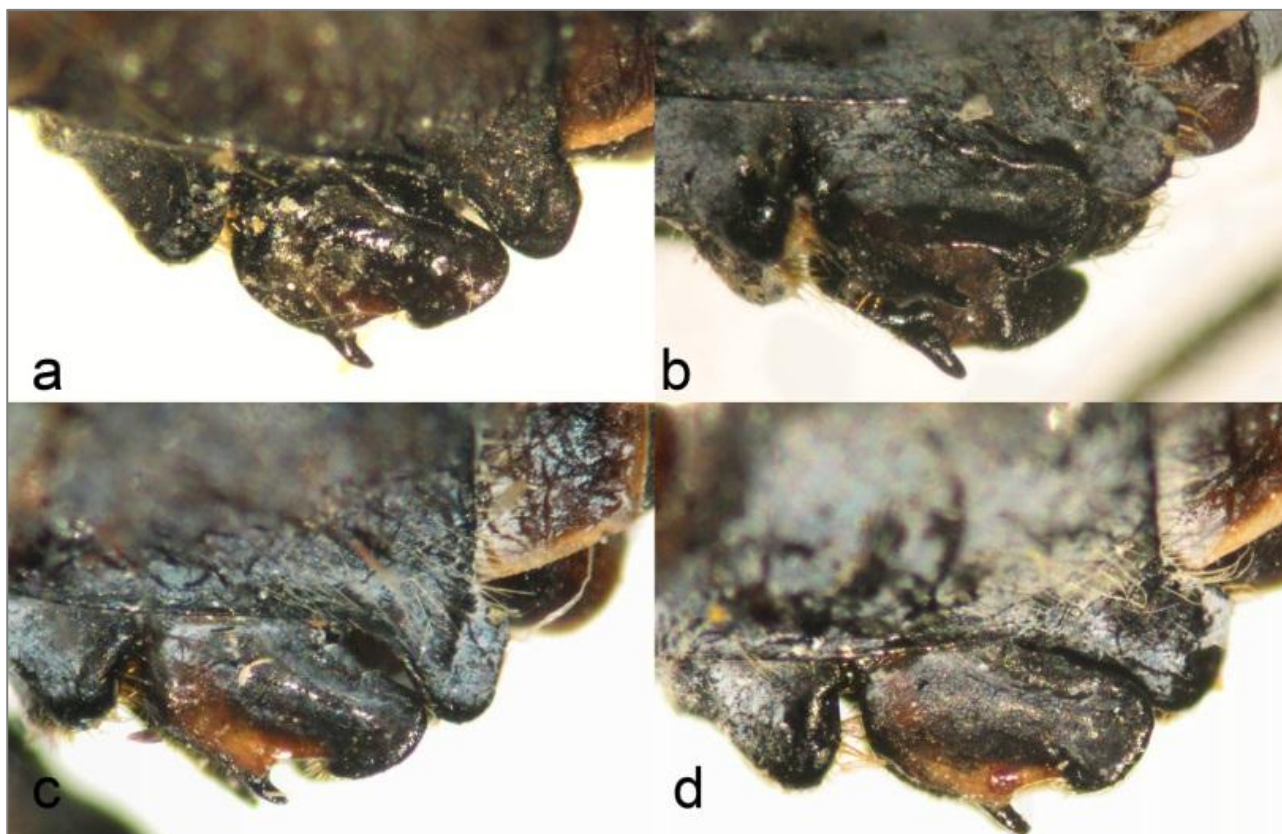


Figure 9. Hamuli of *Nesciothemis farinosa*: two males of collected at Lake Tana in Bahir Dar on 02.08.2012 (a, b) and of two males collected at Lake Hayk, 06.08.2012 (c, d).

found in some genera in that subfamily (although this is considered as rather unreliable by K.-D. Dijkstra, pers. comm.): Cux disposed distally of the anal vein origin for about its length, on at least the fore wings (Fig. 7).

Nesciothemis farinosa (Förster, 1898)

The species was met at Lake Tana and at Lake Hayk (plus the nearby Jara River). I collected two mature and one immature males and photographed a mature one at Lake Tana (Fig. 8a) and collected two mature males and photographed two mature males at Lake Hayk (Fig. 8b). The males from Tana were noticeably smaller: hw 32-32.5 mm, abd 28 mm versus hw 34-35 mm, abd 30 mm at Lake Hayk. Besides, males from Hayk had obviously dark-rimmed wingtips while dark pigmentation was hardly noticeable in specimens from Lake Tana. In the Hayk males, the groove and ridge below and between the hook and lobe of the hamulus is light-coloured (Fig. 9c, d), having a swelling in one male (Fig. 9d), although the body pruinescence and wing pigmentation suggest their being fully mature. In the Tana males, there is only some lightening inside the groove (Fig. 9a, b). These differences seem to be of no taxonomical significance but are noteworthy since some hamular characters are supposed to show a cline towards the West African taxon *Nesciothemis pujoli* Pinhey, 1971 (K.-D.B. Dijkstra, pers. comm.).



Notes on the country and its Odonata.

General notes

The rainy period in Ethiopia lasts from March to September, with heavier rains from June to September. So we arrived during heavy rains two month before cessation of the rainy season. Correspondingly, we saw the land fresh-green throughout, including the Afar Desert, that so much contrasted to the impressions of the head of our team, Nikita Vikhrev, who visited southern Ethiopia this March to find it completely dry. The rains happened every night except for the night 09/10.8 (the heaviest ones being accompanied by flight of winged termites if occurring soon after dusk), and most days also in the afternoon or evening. On 02-05.08 at Lake Tana, thunderstorms came regularly late in the day. At the night 06/07.08, a bridge was said to have collapsed south of Kombolcha but then repaired. Next night 07/08.08 at Hayk, nearly permanent illumination of flashing of distant lighting and rumbling of thunder lasted throughout most of the rainy night. Next day more southerly we witnessed the consequences of that unique storm as rocks fallen onto the road from adjacent slopes. Between Kombolcha and Debre Sina the road was completely blocked so that a several km long line of cars and trucks was formed and made us return to Woldia and take another road to the south through Afar. However, every day offered enough good weather to work, and only 30.07 was mostly rainy, although rain stopped for hours and sun appeared for a while.

We followed a somewhat triangular route: from Addis Ababa NNW to Lake Tana, then E to Woldia, then SW to midway between Kombolcha and Debre Sina, from where we returned to Woldia, descended to Mile onto the Afar Plain and drove S to SW to Awash, from where through Debre-Zeyit to Addis Ababa, as shown in Fig 1. Long sections of our route, except for its Afar part, went over the upland above 2,000 m a.s.l., although all long stays, except for the first one at Debre Libanos, were below this level. Indeed, Ethiopia appeared a “two floor country”, as it was said by Vladimir Dinets, a famous contemporary Russian/American traveller. The largest in area, upper ‘eucalypt floor’ is cold, gloomy, overpopulated and nearly devoid of nature while the lower, quite African ‘acacia floor’ is hot and dry, rather underpopulated and offering quite an intact nature and biodiversity, including Odonata.

Upland north of Addis Ababa, its gorges and a crater lake

The NNW part of the route, from Addis Ababa to some distance north of Debre Markos went over rather a smooth plateau and remarkably kept about the same elevation of 2,500 m a.s.l. The landscape was very gloomy and quite unpleasant. It was a flat or hilly land, finely terraced by stones, be it pasture or arable land, literally immersed into wondering heavy clouds, so that one had to cross them as masses of fog or rain, with sun appearing in gaps for a while. As first glance, the landscapes reminded Nikita of arctic regions in summer. The land beyond fields was covered with a green



carpet of extremely short grass, obviously adapted to permanent overgrazing by immense number of skinny livestock. The fields were either finely green (mostly in Oromia), or muddy and being ploughed by pairs of bulls (mostly in Amhara). All earth roads and settlement streets were just mud, so that people wore either rubber boots or went with bare feet, as any other footwear were impractical. Trees were represented exclusively by alien eucalypts (*Eucalyptus globulus* Labill.), which grew everywhere but were obviously planted rather than propagated spontaneously, and never very tall. Numerous brooks and rivers crossing the plateau in all directions looked like fierce torrents with turbid, mostly reddish-brown, rarely grey coloured water. This was evidence for the continued and dramatic erosion of the arable land. Some stops at the smaller brooks with grey water provided no Odonata. No doubt this was not the best time for lotic species to mate and oviposit at brooks or rivers, so, if present, the imagines still should hide somewhere on dispersal, but the weather did not favour their discovery. Lentic habitats, such as ponds or grassy river floods, were nearly absent in this area.

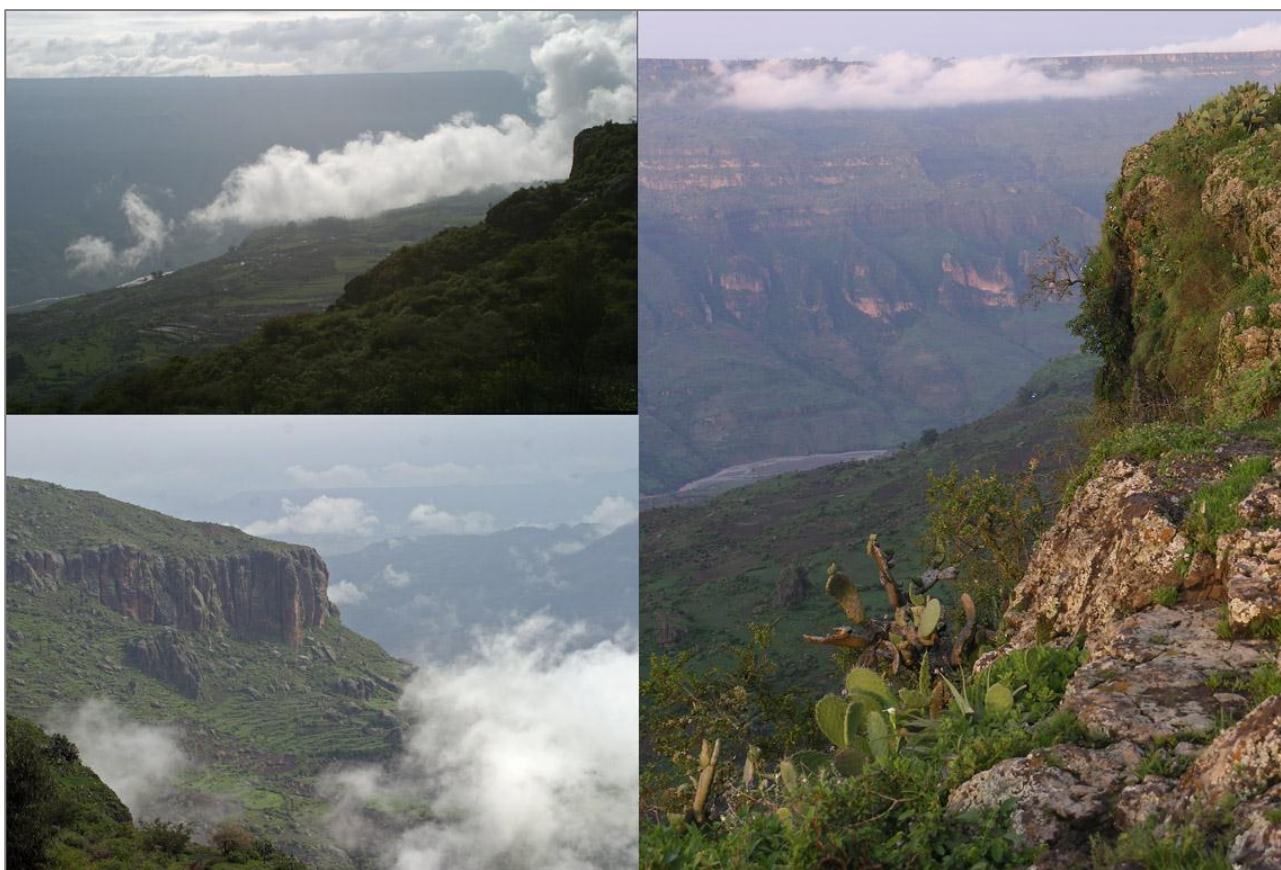


Figure 10. The Jama River Gorge at Debre Libanos, 29-30.07.2012.

This flat plateau, made by trap basalt, was suddenly cut through with tremendous chasms, 1-1.5 km deep, of the Muger, Jama and Blue Nile gorges. The gorge slopes were extremely steep, with tall vertical cliffs (those of the Jama River near Debre Libanos offered almost no ways down, Fig. 10) and revealed several crossed layers of



hard igneous rocks separated by thick softer strata. These gorges were flanked on both sides by the same gloomy and boring flatlands, with villages and eucalypts just like what we had left behind, while looking down into the gorges was breath-taking.



Figure 11. Geladas *Theropithecus gelada* (Rueppel, 1835) in the Jama River Gorge at Debre Libanos, 29.07.2012.

Rivers (which were brown in colour this season) fell down the slopes with most impressive waterfalls I have ever seen. Next morning after a rainy day at Debre Libanos, a considerable torrent falling into the chasm appeared at a gully which was empty a day before. The slopes were covered with dense shrub vegetation, including spiny acacias whose spread and height increased at lower altitudes. At high altitudes, the vegetation included a lot of alien *Opuntia*, and lower down impressive candelabra-like succulent *Euphorbia abyssinica* J.F. Gmel. were seen. The gorge edges were occupied by troops of the Ethiopian endemic, gelada (*Theropithecus gelada* (Rueppel, 1835)) (Fig. 11). They ate *Opuntia* on slopes or grazed over fresh grass on flat surfaces; in the evening they rested on rocks or commenced military actions against neighbouring troops producing a lot of shouting. At Debre Libanos they ignored people and travelled across roads and yards, often seen mixed with cattle, sheep or beehives. Although it was really hard to believe for such a weird country, Ethiopia many times served as mankind's cradle, for it was Ethiopia where *Ardipithecus* started walking on two legs, and early gracile *Australopithecus* as well as early *Homo* appeared (although most findings were made in the Afar Depression). Those geladas



looked as being pretty next in the queue behind humans, to readily produce a next conscious species if humans disappear. Birds were extremely numerous, diverse, not so cautious and easy to observe, as elsewhere in Ethiopia. I was nearly ignorant of them but was very impressed by bearded vultures (*Gypaetus barbatus* L.) so often flying so near at Debre Libanos while in Altai or Caucasus they were so hard to see. As to other creatures, the upper slope shrubbery offered a lot of diverse flies, many large bumblebees and wasps and even some day flying hawk moths (?*Macroglossus*) but almost no butterflies, except for scarce *Zizeeria* sp., *Lepidochrysops* sp. and *Junonia orithya* (Linnaeus, 1758), the latter so common also in Indochina.



Figure 12. A male of *Orthetrum caffrum* at Debre Libanos, 30.07.2012. Photo by I. Gomyranov.

We passed by the Muger gorge, lived two days at the edge of the Jama gorge at Debre Libanos, and worked for two days at the bottom of Blue Nile gorge. The Jama River gorge at the German Ethio Lodge where we stayed at Debre Libanos was deep and inaccessible because of steepness of its slopes (Fig. 10), but this stay offered us an opportunity to find some of the very scanty upland dwelling Odonata at the plateau very edge. A thorough search near brooks, at pools and wet cliffs near waterfalls and at pools of small brooks flowing over stony beds among shrubbery provide nothing but a single *Pantala flavescens* noticed in the air in a sunny gap between two passing clouds. It was very unexpected to find a large *Anax* exuvia on a rock in ca 5 m apart from and 2.5 m above the Gur River, which was a powerful red-brown torrent. The exuvia was headless, that is old so that the larva could develop in the river before heavy rains when it was calmer, besides it was situated next to a tiny bay between two rocks with slower current (allowing a large gyrid beetle to patrol its surface). In a gap between rains of 30.07, an immature male of *O. caffrum* was found by our fellow Ilya Gomyranov to perch on stones (Fig. 12) on a former field not far from this river as well, but it remained unknown from where it in fact had



emerged. There were two small ponds in holes specially carved in rock on the lodge territory; they had grey coloured water, from where some asteraceous plants emerged, as well as, weirdly, some *Lathyrus* sp. In spite of rather a lifeless appearance, they supported a population of *A. elongatum*, both sexes of which kept to banks and emergent vegetation (Fig. 13), and a single male of *P. subfurcata* was found by Nikita (one of just two damselflies found at the smaller pond). At about 11 a.m. on 29.08, at overcast foggy weather, I observed a small greyish aeshnid which ranged fast for a while at 1.5-3 m above the water and high grassy bank, soon it disappeared and never observed on repeated visits to these ponds this and next days at any time and weather.



Figure 13. A male of *Africallagma elongatum* at a small artificial pond at Debre Libanos, 29.07.2012.

The Blue Nile gorge was 1.5 km deep, dropping from the surrounding plateau at the regular elevation of 2,500 m a.s.l. to as low as to 1,085 m. The weather in the gorge was moderately hot, sunny on 31.07 (in spite of fog and rainshowers on the plateau) and slightly overcast on 01.08. While descending we passed several promising small brooks in stony gorges, at medium elevation the slopes were occupied by endless villages with some ponds, but we did not examine them. For some reason the lower



levels were almost unpopulated and even at the brand new bridge (Fig. 14) there were just several huts and very scarce trade. The lower slopes were covered almost exclusively with quite tall acacias of variable density. Quite a lot of butterflies appeared, represented mostly of various Pieridae, so diverse in Africa, but there were also *Orythia hierta* (Fabricius, 1798), *Hypolymnas misippus* (Linnaeus, 1758), *Danaus chrysippus* (Linnaeus, 1758) (all the three, again, familiar in Indochina), and few small Lycaenidae. Another baboon species, Anubis (*Papio anubis* (Lesson, 1827)), replaced geladas, with troops wandering in the woods and along the road. Groups of grivets (*Chlorocebus aethiops* (Linnaeus, 1758)) were repeatedly seen as well in the wood.



Figure 14. The Blue Nile Gorge at the bridge of the road Addis Ababa – Bahir Dar, 31.08.2012.

In spite of its name, the Blue Nile was dark-brown and very fast, sometime carrying entire trees fallen to water. Nearby the water smelled unpleasantly with some sulphur-organics making breathing somewhat difficult. At mouths of the tributaries, black boggy ooze was deposited. This ooze indeed looked able to provide the notorious fertility of the Delta in Egypt. Naturally, no Odonata were seen close to the Nile. A broad ground road went off the main road following the Nile downstream at some height. Above it and among surrounding acacias, 2-3 individuals of *Zygonyx* appeared from time to time flying at 1-5 m above the ground. Although so few in number they were obviously aggregated as appearing and disappearing together. (As at the nearby rivulet I collected a territorial male of *Z. torridus*, I suppose they represented the same species.) On a vertical surface of a large rock, a female of *B.*



strachani perched (Fig. 2), being very cryptic against its greyish surface, and made short excursions into the air. Low in the grass I collected a teneral female of *O. chryso-stigma* (with a characteristic thoracic pattern).



Figure 15. Two Blue Nile right tributaries, downstream (a, b, 31.07.2012) and upstream (c, 01.08.2012) the bridge of the road Addis Ababa – Bahir Dar, the habitats of *Trithemis dejouxi* (Fig. 16), the former also of *Pseudagrion sublacteum* and *Zygonyx torridus*.

There were two right Blue Nile tributaries nearby: a larger just upstream of the bridge (Fig. 15c) and a smaller one at a distance downstream, at the end of the road just mentioned (Fig. 15a, b). Both were fast, had moderately turbid grey water and flowed in narrow rocky gorges with more gentle upper slopes covered with sparse acacias. The lowermost reaches were surpassed with the Nile ooze, upstream of which the rivulets flowed upon shingle banks. At some distance more upstream, both passed rock clefts, too narrow to pass by walking along the water. I went round through gentle upper slopes above such place at the smaller tributary and penetrated its middle valley, where it flowed through a chain of alternating rapids and tiny waterfalls and small basins in stepwise smoothly shaped rocks formed by pressed sand but not yet sandstone. This resembled some rivulets with sandstone beds in the Cardamoms of Cambodia, but the rocks were more smooth and light, arboreal vegetation around differed as represented mostly by acacias, and lotic Odonata, although at last found, were much less abundant and diverse. There were males of *T. dejouxi*, perching on stones near the water (Fig. 16), not choosing conspicuous ones and not showing stone selectivity and fidelity. They were common enough to see 2-3 in view, mostly chasing each other, and once I noticed a female on a large rock. A single male of *Z. torridus* patrolled above the brook. And lastly, there were *P. sublacteum*, of which I saw two males and one tandem. They used to fly and hover for a long time just above the surface of pools and basins, as if going to land at the water edge, but very rarely did so. Their behaviour resembled that of *Prodasineura*, with the remark-



able difference that as reaching the outlet of the pool, they slipped down the tiny waterfall to the lower laying pool (and perhaps ascended to the upper lying ones as well but I did not see this). I did not get to the reaches upstream of the impermeable cliff of the larger rivulet, but the reach downstream them was longer than in the smaller river and several *Trithemis* appeared there as well. In addition, I twice had uncertain sightings of *Zygonyx*.



Figure 16. A male of *Trithemis dejouxi* at the Blue Nile right tributary downstream the bridge of the road Addis Ababa – Bahir Dar (Fig. 15a, b), 31.07. 2012.

I went several hundred metres along the (excellent) road off the Nile left bank, examined a shady brook with a tall waterfall (no Odonata) and at last found a gem of a small (just 1 x 3 m) and warm grassy roadside pool formed by water seeping from a small shady cliff and accumulated behind the road border (Fig. 17). Three nice bluish male dragonflies perched on the emerging tall grass side by side: *P. portia*, *O. julia* (Fig. 18c, d) and tiny *O. abbotti* (Fig. 18a, b). On the grass and bush branches nearby I collected four more *O. abbotti* and photographed some of them (one female immature, still not pruinose, Fig. 18a) and three medium-sized *Orthetrum*, one more was



collected when flying low in a roadside drainage concrete ditch. In the evening I discovered that among five medium-sized *Orthetrum* four were *O. julia* and one was *O. chrysostigma*, with a totally pruinose thorax that prevented me to recognise it as a third *Orthetrum* species in haste.



Figure 17. A pool at the road Addis Ababa – Bahir Dar at the right side of the Blue Nile Gorge, 01.08.2012, a habitat of *Orthetrum abbotti* (Fig. 18a, b), *O. chrysostigma*, *O. julia* (Fig. 18c, d) and *Palpopleura portia*.

The Blue Nile is the border between Oromia Province (*kilil*), in the south, and Amhara Province, in the north. Having crossed the gorge, we returned to the wet upland eucalypt hell, sometimes updated by small conifer plantations on hill tops. However, soon after Debre Markos the land descended to 1,800, all fields became green, and eucalypts disappeared to give space to sparse impressive *Ficus*, umbrella-like *Acacia* and groups of palms, but we did not figure out a stop. Then the road rose back to the upland, with the only difference that some forest patches appeared on hill slopes and a lot of bamboo was seen cultivated and processed in the countryside. We stopped at a small hill which obviously retained a patch of impressive native forest. It was composed of various broad-leaved trees with irregularly slanting and winding thick black trunks thickly covered with epiphytic ferns, club mosses (*Selaginella* sp.) and mosses. Yet the ground layer was evidently impoverished by overgrazing. It occurred to me to reach the hill top where I was struck with a fantastic view: a clear and blue



lake in a cup-like crater with steep slopes clad with dense forest. It appeared to be Lake Zengena (Fig. 19), of whose existence we had no idea. At a distance the bank lowered and there appeared a place inhabited by the mantled guereza (*Colobus guereza* Rueppel, 1835) which could be seen on trees, for some entrance fee.



Figure 18. *Orthetrum* at the pool at the road Addis Ababa – Bahir Dar at the right side of the Blue Nile Gorge, shown on Fig. 17: a, *O. abbotti*, an immature female; b, *O. abbotti*, a mature male; c, d, *O. julia*, mature males; 01.08.2012. Not to scale.

I climbed down to the water from a high steep bank via muddy paths through the forest, at the lower levels of which a lot of tall bamboo grew (making it looking as an Indochinese forest), then reached the lake at the guereza place. The water was clean and deep already close to the banks, at which the surface was covered with numerous





Figure 19. Lake Zengena, a habitat of *Pseudagrion spernatum* (Fig. 20) and *Anax imperator*, 02.08.2012.



Figure 20. Males of *Pseudagrion spernatum* at Lake Zengena (Fig. 19), 02.08.2012.



discarded wings of termites. The banks were either firm or had a narrow strip of silt with some tall *Typha* cattail growing, with tree and bush trunks hanging over the water. The lake seemed perfectly intact, but only three Odonata species were observed. Males of *P. spernatum* were abundant at the bank (but no females seen), perching on stems and leaves (Fig. 20), with the above considered intriguing male found among them. A teneral female of a smaller Coenagrionidae gen. sp. was also collected (Fig. 7). Several males and an ovipositing female of *A. imperator* were observed but, strangely, not a single libellulid.



Figure 21. *Platycypha caligata*: a, male on a Lake Tana bank in Bahir Dar, 02.08.2012; b, female at a margin of a grassy swamp nearby, 04.08.2012.

Lake Tana and surroundings

Quite in advance of Lake Tana, the road descended to lower levels and went mostly through green maize fields, with sparse impressive *Ficus* and umbrella-like *Acacia*, at



some places through savannah with low *Acacia* bushes. There were broad shallow swamps at Bahir-Dar suburbs, mostly utilised to pile rubbish.



Figure 22. Hippopothames (*Hippopothamus amphibius* Linnaeus, 1758) in Lake Tana at the Blue Nile outlet, 04.08.2012.

Huge (76 x 66 km) Lake Tana, from which the Blue Nile flows, had clear water. Its banks were formed by large, dark, porous stones of volcanic origin. Bays were overgrown with dense reed thickets, obviously formed by a representative of the genus *Saccharum* (where the sugar cane belongs), in which a variable amount of papyrus (*Cyperus papyrus* L.) participated (the latter supported numerous hanging weaver nests), with some semi-aquatic *Persicaria* (*Polygonum* s.l.), which could be the common water pepper (*P. hydropiper* (L.) Delabre), in the low level. However, even at such bays the bottom was not silty but formed with the same stones. There was only one Odonata species observed at open banks, and so surprising at a lake, it belonged to Chlorocyphidae: males of *P. caligata* perched on stones near the water (Fig. 21a) or emerging *Persicaria* plants and were quite common. These stones looked suitable for libellulids such as *Orthetrum* spp., but these were absent. At patches of reed and other emerging vegetation, Odonata were more diverse. There were males of *P. masaicum* and *P. kaffinum*: the former was found more common at our hotel in Bahir Dar, while the latter at an examined vegetated bank patch at the Blue Nile outlet. In the last site, there were also purple males of *T. annulata* and violet males of *T. stictica*, in equal number, and scarce (just one seen) *N. farinosa* perching on stems of



Scirpus sp. and many *A. inversa* and *I. senegalensis* among emerging *Persicaria*. This site was visited on a boat excursion to see hippopotamuses, and indeed, we easily observed two small groups of them resting in water (Fig. 22). The area looked too restricted to support a natural population of so huge animals, on the other hand, they were hardly transported there from elsewhere to amuse tourists. Anyway, at the very outlet we landed at a cape surrounded by very shallow brown water overgrown with *Persicaria*, in which we observed just *I. senegalensis* and disturbed two just emerged *C. erythaea*. On the firm bank, two males of *Brachythemis* with black banded wings fluttered. I failed to capture them, in spite of this being seemingly so easy, so cannot say which of the two recently resolved sibling species (both of which I met later, they were: *B. impartita* as at Lake Hayk or *B. leucosticta* as at Lake Hora). A sole male of *T. annulata* was also found at a small reed patch.

At Lake Tana we stayed in Tana Hotel in Bahir Dar, with a territory best fit for our purposes. From the hotel gallery we often had an opportunity to observe males of *P. caligata* perching on sunlit protruding tree branches at the height of 2-3 m (in about 100 m from the lake). Just near the lake bank there was a very shallow artificial pond overgrown with low *Persicaria* and tall papyrus (it appeared to hide at least two Nile monitors, *Varanus niloticus* (Linnaeus, 1758), a huge and a small one). Its dragonfly community resembled the Nile outlet: a lot of *A. inversa* (Fig. 23) (I had a strong impression that they were seen mostly in the evening) and *I. senegalensis*, which spread to the surrounded grass and clumps, where we collected also several *N. farinosa* (Fig. 8a) and a young male of *Brachythemis lacustris*: it had rather reddish-yellow abdomen and the wing orange coloration extended to the nodes but still expressed in veins only. In spite of its name, the latter species prefers riverine habitats so most probably that male came from the main lake rather than from the pond. (For some reason, no black-banded *Brachythemis* were observed at this locality.) At the pond, I also collected a teneral female of *P. massaicum*, which could migrate from the lake as well. In addition to the lake fauna was *Acisoma* (two individuals seen).

The road leading to the hotel crossed broad (hundred of metres) open areas filled with even freshly green grass and inundated with about waist-deep stagnant water (Fig. 24). From the first glance I mistook them for rice fields but they seemed to be an example how the local natural vegetation looks like if not disturbed by humans. They were surrounded by vigorously flowering *Lantana* bushes and behind them by taller bushes and omnipresent acacias. Surprisingly, Odonata were rather scarce among the inundated grass, including the expected *A. inversa* (Fig. 23b) and *I. senegalensis*, which were present in very moderate quantities. At more open pools, bright males of *C. glabrum* (Fig. 25a) and both sexes of *Acisoma* were sometimes found. Among marginal *Lantana* bushes there were both sexes of *C. glabrum*, but females predominated (Fig. 25b), a mature male of *D. lefebvrei* (the only individual of the common species seen during the whole trip) and some teneral dragonflies and





Figure 23. *Agriocnemis inversa*: a, an immature male at a small pond on the Lake Tana bank at Tana Hotel in Bahir Dar, 03.08.2012; b, copula on a grassy swamp nearby, 04.08.2012. Not to scale.



damselflies: two males of *P. massaicum*, a male and three females of *C. erythraea*, and an immature male of *T. stictica*, which was very welcome as still showing the black pattern not yet obscured by the pruinosity. Under the canopy of acacias, I was struck to find four females of *P. caligata* perching closely to each other on the last sunlit sticks: a chlorocyphid at a grassy swamp! (but surely dispersed from the nearby lake). From a similar place I disturbed an *Aeshna*-looking dull-greyish aeshnid with two light stripes on each thorax side: it flew several times along a gap among low trees and disappeared. This was the behaviour of a crepuscular darner disturbed at daytime.



Figure 24. A grassy swamp at Tana Hotel in Bahir Dar, 04.08.2012.

In this area where the Blue Nile has birth, a compulsory program item was visiting (via a long muddy ground road) its famous waterfalls at Tiss Isat village. They were said to lose in their might and beauty after the hydropower station had been constructed and took most water into its channel, but yet impressive in the rainy season (Fig. 26). And they were, especially as having the brownish-red colour of erosion. We visited the falls in sunny weather, in view of a slowly approaching thunderstorm. The surrounding hill slopes were covered with fresh grass and sparse bushes but for some reason were poor in insects. However, there were dragonflies. Several individuals of





Figure 25. *Ceriagrion glabrum* at a grassy swamp at Tana Hotel in Bahir Dar (Fig. 24), 04.08.2012: a, a male in inundated grass; b, a female on a bush at the margin.

Z. natalensis (somehow I managed to catch one male, in a manner seen in Fig. 27) soared at a steep sunny gorge slope opposite to the mightiest waterfall, illustrating the notorious connection of this genus to waterfalls. Two times I saw a male of *A. imperator* appearing among them. Downstream the waterfalls and impressive Portuguese stone bridge the Nile (or, more precisely, its part left after hydropower channel) hid in a deep rock crevice leaving a terrace with fine green grass. For some reason it was almost untouched, with just a single goat grazing (locals reported about many





Figure 26. The famous Blue Nile Waterfalls at Tiss Isat village, a habitat of *Zygonyx natalensis*, 03.08.2012.





Figure 27. The author hunting for *Zygonyx natalensis* above a steep slope next to the Blue Nile Waterfalls, 03.08.2012. Photo by I. Gomyranov.

snakes there), scattered rocks and three small pools (Fig. 28). At one of the pools I found a tandem of *P. commoniae* (new for Ethiopia!), at another its male, and at the third a tandem of *P. subfurcata*; on nearby rocks two mature *O. chrysostigma* males perched, and another one at the black ooze under the bridge.

Leaving the Lake Tana area at a gloomy morning, we had a 40 minute stop, at 1,840 m a.s.l., at a small rivulet flowing in a wide stony bed with slightly turbid grey water, with some maize fields and a young eucalypt plantation at the higher bank. I went for quite a distance along but found just one damselfly at a relatively calm reach (Fig. 29), the only representative of its species, new for Ethiopia, during the trip: a male of *P. salisburyense* (Fig. 3). At the nearby field there was a teneral, still stripy, male of *T. furva*. Three mature males were, however, found perching on stones near the rivulet tributary, a small brook flowing through fields. There were also a male of omnipresent *P. subfurcata*.

Generally, Lake Tana and its area were relatively rich in Odonata, with species composition varied from locality to locality, and obviously deserved more study.





Figure 28. A tiny grassland with rocks and pools on the Blue Nile right terrace downstream the Portugese Bridge at Tiss Isat village, a habitat of *Proischnura subfurcata*, *Pseudagrion commoniae* and *Orthetrum chrysostigma*, 03.08.2012.





Figure 29. A rivulet 3 km SSE Zegye in rural surroundings, a habitat of *Pseudagrion salisburyense* (Fig. 3), 05.08.2012.



Highlands

After crossing the Blue Nile, the road at first lead to the North through mostly a grassland area rich in very shallow, perhaps temporary swamps with either clear or turbid water, which we did not examine. After Addis Zemen it turned to the east and soon ascended to the foremost steps of an upland, with some small but impressive mountains. Surprisingly, we entered into a patch of a seemingly virgin, dark, dense and mossy forest which covered ridges and dells. Internet provided its name: Alem Saga forest in Kolay-Dengors Kebele (“protected by local people in collaboration with the government”) (Amsalu, 2010). Those valleys must have hid interesting Odonata but again, we did not figure out a stop, while at the next upland step the forest ended as suddenly as began. Tall eucalypt plantations appeared, which managed to cover even the very mountain tops. Under them the ground was grassless and eroded, covered with just scarce moss. Some plantations were cut leaving large lifeless areas of stumps.



Figure 30. A damp grassland with a brook at 3,200 m a.s.l. near the Guna Mt., a habitat of *Ischnura abyssinica*, 05.08.2012.

After Debre Tabor, at the vicinity of Guna Mt. as judging from the map, the road continued to ascend steadily, reached 3,200 m a.s.l. and continued through a latitudinally oriented ridge more or less keeping that elevation. Generally we noticed that



in Ethiopia, both population and roads tend to as high levels as possible. We made a short stop and had an opportunity to examine a tiny brook flowing through an even grassland (Fig. 30); there were some grazing cattle and donkeys but the meadow looked well and even showed several bright red inflorescences of *Aloe* sp. The brook flowed either through a chain of small pools, or hid in a narrow crevice in turf, or its water flowed over the meadow surface without any bed. At first the weather was overcast and there was nothing but with some sunbeams several damselflies appeared flying over the pools, including a copula. They appeared to be *Ischnura abyssinica*, an Ethiopian endemic characteristic to highlands, which we did not find elsewhere.



Figure 31. After a snowstorm at the road between Gashema and Woldia, ca 12°N, 05.08.2012.

The road proceeded eastwards and kept to the ridge, with the impressive Mesket Escarpment to the north and a no less impressive chasm opening to the south. It was still covered with eucalypts, with acacias appearing only on steep slopes. After Gashema, the upland seemed flat to resemble that at the beginning of our trip but differed in much more stones everywhere, mostly arranged into field and terrace borders. The weather spoiled accordingly and we entered a heavy thunderstorm: it was obvious that rainy clouds tended to highland masses. We appeared to follow that thunderstorm which went ahead leaving a lot of water flowing everywhere through fields and villages and making each tiny brook furious. At last we noticed



something what we at first mistook for pieces of foam but it was snow, and then for some distance we passed a foggy area covered almost entirely with a fresh melting snow (on 5th August at 12°N!). Our driver supposed it looked like Russia but in fact it did not resemble anything we saw before (Fig. 31). The snow ended; and we drove through several fog masses as the road ascended to higher levels. Eucalypts almost disappeared leaving just groups of small saplings, some fields appeared not harvested yet, and huts were now made of stones. At the highest point of 3,470 m a.s.l., with the sun appeared, we made a short stop at a wet short grass meadow through which a tiny brook flowed. The meadow was full of 'alpine' flowers: white and yellow composites, yellow *Ranunculus* sp., violet *Trifolium* sp., and sparse yellow-to-red inflorescences of *Aloe*. The brook was full of tadpoles, but no Odonata were found.

The road proceeded over a narrow range between two impressive depressions and started to descend towards Woldia. Eucalypts appeared and filled all the mountains; here it was perhaps the first place seen where they propagate spontaneously rather than were planted. At lower levels even mixed eucalypt/acacia forests were seen. The landscape changed to mountains looking more or less as elsewhere in the world, with rather narrow ridges separated by broad valleys through which large rivers in broad stony beds flowed; I would say this superficially resembled the Altai Mts. A remarkable change here: bulls had huge horns converging to tips, and skinny camels appeared.

Hayk environs

After Woldia the road descended gradually along a longitudinally oriented mountain range, with vast valleys opening to the left and right, and eucalypts giving way to acacias. Here, the narrow grey streams had broad shingle beds devoid of vegetation suggesting that temporary powerful torrents occur after rain. We stopped at a steep-sided valley and narrow stony gorge which looked almost lifeless, in spite of relatively small river with a grey water (Fig. 32), but we found several *O. kollmannspergeri* males resting on large rocks near swift water of the main river or a small side seepage, and one female away from the water.

Further south we stopped at a bridge through a major Jara River flowing over a broad shingle bed in a wide valley. No Odonata were found at the main moderately swift grey river while a small side branch unexpectedly appeared astonishingly rich in them (Fig. 33). It had clear water with slow current, overgrown with semi-aquatic vegetation upon silty bottom, leaving just a central stream open and with a relatively firm bottom; some sections were nevertheless more fast and stony. (There I was impressed by a relative cleanness of the country, with an absence of garbage in spite of the dense population: it was pretty safe to walk along the silty bottom of the stream with bare feet.) Numerous damselflies and dragonflies of many species were literally





Figure 32. A rivulet gorge 1.5 km SW of Wergesa, the only found habitat of *Orthetrum kollmannspergeri*, 06.08.2012.





Figure 33. A small left branch of the Jara River 9 km NNW of Hayk, the richest habitat of 15 species of Odonata, 06.08.2012.

swarming at this branch, among which many were teneral. An hour spent there on 06.08 was far from being sufficient, so I returned to the same small locality next day for two hours. There were numerous tandems of *P. kersteni* (Fig. 34a-c) and *P. commoniae* (Fig. 34e) ovipositing into submerged vegetation, the latter species seemed to prefer faster reaches with less vegetation but this was not so explicit. (These two represented two different African clades of the genus *Pseudagrion*, A and B, said to have on average differing ecological preferences, see Dijkstra et al. 2007.) Single males of both were present as well (Fig. 35d-e). On the second day I photographed and collected only one, heavily pruinose male of *P. spernatum* (Fig. 35d) among the other species, but certainly saw one, perhaps the same individual, on the first day. Red-faced males of *P. sublacteum* were scarce (Fig. 35c). They perched on leaves of solitary tiny grasses just emerging above stretches of open fast water at the very middle of the branch and demonstrated rather strong perch fidelity. Only one tandem of this species was observed (Fig. 34d). At slow, most vegetated reaches, males of *P. massaicum* (Fig. 35a); *P. nubicum* (Fig. 35b) and males (Fig. 36) and tandem of *P. subfurcata* were common but not abundant. Both days, one orange male of *C. glabrum* and, seemingly, some teneral were encountered. Males of *O. chrysostigma*, with variable extent of thoracic pruinosity (Fig. 37a, c-d), and *T. arteriosa* (Fig. 38) were most numerous of dragonflies, both kept close to the water, the former perching on stones and the latter on grass. I had an impression that I saw not less numerous males of *O. kollmannspergeri*, smaller and with more stripy thoraces, but none appeared to be collected so I cannot exclude that this impression was left just by variable thoracic pruinosity of *O. chrysostigma*. I should say I was too obsessed by the diversity of *Pseudagrion* (six species at once!) and too restricted in time to pay much attention to *Orthetrum*. Quite frequently, *O. chrysostigma* were observed also





Figure 34. Tandems of *Pseudagrion* spp. at the Jara River left branch 9 km NNW of Hayk, 06-07.08.2012: a-c, *P. kersteni*; d, *P. sublacteum*; e, *P. commoniae*.

in copulae (Fig. 37b). Several males of *N. farinosa* were noticed at slower and more vegetated reaches, where quite many males and females of *P. portia* (Fig. 39) and rare males of *C. erythraea* perched on tall grasses. On 06.08 a ranging male of *A. imperator* appeared at a more open reach near the branch mouth and a rust-red male of *A. speratus* – at a more vegetated more upstream reach. Both were found at



the same patches next day. I tried to catch the latter but missed, in ca 20 minutes it re-appeared at the same reach. Almost all mentioned species except for *P. sublacteum*, *P. spernatum* and, of course, *Anax* spp. were found as well at a round stagnant pool with silty bottom at the very mouth of the branch. In total, eight damselfly and seven dragonfly species were found at this small locality. However, when we passed this site another day later (08.08) after a heavy night storm, we saw from the bridge a mighty muddy torrent in place of the lovely grassy river arm, which no doubt had washed out that tiny dragonfly paradise.



Figure 35. Males of six *Pseudagrion* spp. occurring altogether at the Jara River left branch 9 km NNW of Hayk, 07.08.2012: a, *P. massaicum*; b, *P. nubicum*; c, *P. sublacteum*; d, *P. commoniae*; e, *P. kersteni*; f, *P. spernatum*.





Figure 36. A male of *Proischnura subfurcata* at the Jara River left branch 9 km NNW of Hayk, 07.08.2012.





Figure 37. *Orthetrum chrysostigma* at the Jara River left branch 9 km NNW of Hayk, 06-07.08.2012: a, c-d, males; b, copula.



Figure 38. A male of *Trithemis arteriosa* at the Jara River left branch 9 km NNW of Hayk, 07.08.2012.





Figure 39. A male of *Palpopleura portia* at the Jara River left branch 9 km NNW of Hayk, 07.08.2012.

Not far from there we reached a large (7 x 5 km) and shallow Lake Hayk lying among gentle hills at 1900 m (without a single eucalypt in view! Fig. 40). Behind some huge rocks with impressive *Ficus* and *Acacia* trees there were Hayk Lodge where we stayed for two days, round the day observing pied kingfishers (*Ceryle rudis* L.) and human fishermen at their work. The latter sailed standing on bamboo bunches and drove small *Tilapia* into their nets by strong beating the water surface with their long poles. Fish was so numerous that the water looked boiling when one came near. The lodge owner complained us that “there are great ecological problems with our lake: the tilapia fish does not grow big”. He also said there was no bilharzia in the lake but the second day of our state we discovered some vesicles on our skin obviously marking penetration of *Schistosoma* cercaria. The flat banks nearby were clad with maize fields; once at night we heard quite a horrifying whoops from there and the guard said it was a hyena. Near the water the banks were wet and covered with short grass. Many *B. impartita* of both sexes fluttered there and rested mostly at light-coloured plant debris along the shore (Fig. 41). At seepages and in sparse Cyperaceae (?*Cyperus* sp.) sedge emerging from shallow water, there were many *I. senegalensis*. Some





Figure 40. Lake Hayk, a habitat of *Ischnura senegalensis*, *Pseudagrion massaicum*, *P. nubicum*, *Anax imperator*, *Ictinogomphus ferox*, *Crocothemis erythraea*, *Brachythemis impartita*, *Nesiothemis farinosa*, *Trithemis annulatus*, 06.08.2012.





Figure 41. *Brachythemis impartita* at Lake Hayk, 06-07.08.2012; top, female; bottom, male.



males of *A. imperator* were seen patrolling along the banks. These seemed to be the only Odonata at those flat banks but many more occurred at the lake bank in front of the lodge (Fig. 40 below). The bank was formed by stones, occupied by numerous males of *N. farinosa*. Immediately at the bank the water was very shallow and warm, full of *Tilapia*, with sparse emerging grass, which harboured many *P. nubicum* (at first glance I mistook them for the expected but absent *P. subfurcata*, which of course are smaller), less numerous *I. senegalensis*; besides, one male of *P. massaicum* was found. A group of *B. impartita* could be observed there as well. Several metres apart the bottom got deeper and supported thickets of clubrush (*Schoenoplectus*), where few perching males of *C. erythraea*, *T. annulatus*, *N. farinosa* and ranging ones of *A.*



Figure 42. A male of *Ictinogomphus ferox* at Lake Hayk, 06.08.2012.

imperator could be found. When we arrived, a broken bullrush stem near open water was occupied by a male of *I. ferox* (Fig. 42) who made long flights over the water and always returned to the same place. He was not at all cautious and was easily photographed and collected, but I failed to find any more later. Among trees of the lodge small garden, males of *A. imperator* often patrolled. Apart from water, at



bushes and trees on rocky slopes above the lodge, I found males and females of *T. annulata*, a female of *O. chrysostigma* (a species not seen at the lake itself) and few *I. senegalensis*.

Further south, the road between Dessie and Kombolcha went through mountain valleys of rather similar outline but very impressive, clad with bushes, numerous candelabras of arboreal *Euphorbia abyssinica*, and more natural forest, with not so many eucalypts and some native trees beyond acacias. South of Kombolcha we entered a very broad valley occupied by a chain of what looked like large shallow lakes but were said to be just a river floodplain. We came to one of these, to find large flat area covered with mud, partly with a very short grass or very shallow water and with many wandering cows. In spite of still cloudy weather, several flying *P. flavescens* were observed (surprisingly rare during the trip) and a female of *Acisoma* was disturbed from the grass.

At the point where the road was blocked, in a valley with quite a secondary vegetation, I observed a male of *P. commoniae* above a broad and fast lateral river channel and a male of *C. glabrum* on its bank.

Afar Depression

We drove east from Woldia towards Mele, through a narrow mountain valley, passed a tunnel and descended to the level when eucalypts were completely replaced by acacias. Further descent through the foothills onto land with some gentle hills was marked by acacias becoming lower and sparser. Eventually they became sparse umbrella-like bushes, lower than a camel's height, and with quite a lot of bare gravelly ground, at some places with a strong yellow tint because of numerous flowers of some creeping plant. It was already the Afar Desert, that was not so easy to believe because of fresh green colour of vegetation: perhaps we arrived in the best but short time of the year. Quite often we crossed clayey valleys, some dry and some with considerable rivers. The weather was great, the people were scarce, thin and very colourfully dressed, the livestock was not numerous, but we did not figure out more than two stops. Close to Mele, we examined a large muddy cattle pond surrounded with acacias: many birds, no Odonata. Behind Mele we turned south and crossed the vast Yangudi Rassa National Park: just a green desert with much fewer cattle and people than beyond; for some reason a considerable area in its middle lacked any bushes but had many marabou, several in view simultaneously. Behind the national park we came close to a hill, in front of which the major Awash River flooded wide, to flow through vast reed thickets. Fortunately, we had a 20 minute stop at a roadside bay of this flooded area. The banks were covered by acacia bushes which tore the net, but a low muddy bank section covered with short grass was available. Patches



of fine green grass at the water provided several *A. sania* (the two females having a well developed vertical prothorax hind lobe). A barren bank was guarded by a large dark, slightly pruinose male of *Orthetrum* with a narrow abdomen (which could be *O. trinacria*); it ranged along the bank, rested on short sticks and escaped to be captured because the mud was hard to work through. A similar but lighter female was seen in a thorny bush but escaped. Several males and one tandem of *P. niloticum* were flying and hovering very low above the water surface or perched on scarce tiny emergent grasses. They were very difficult to catch as well because the water was so shallow that each net stroke provided a good piece of mud instead of a damsel.

Further on we passed the town of Awash, with Anubis baboon families on the road and surroundings already being rather a savannah than desert, which looked extremely lovely but remained unexamined. To the north of it, we passed the vast and shallow Lake Basaka, some fields of very rough black rocks formed by old lava floods, and a round crater also filled with the black lava. The bushes became denser and taller, now with a good share of some juniper-looking plant, but the area looked quite virgin. All this nature finished abruptly between Fet'o and Welenchiti, as replaced by fields and eucalypts.



Figure 43. *Pseudagrion hamoni* at Lake Hora in Debre Zayit, 10.08.2012: left, male; right, female.

Crater lakes at Debre Zeyit

Debre Zeyit is close to Addis Abeba and already resides in the upland 'eucalypt hell' but has several crater lakes and one non-crater lake within its borders. Lake Bishoftu





Figure 44. *Brachythemis leucosticta* at Lake Hora in Debre Zayit, 10.08.2012: top, female; bottom, male.



resembled Lake Zengena but was shallow and had rocky slopes almost vertical near the water, allowing access only at one point, occupied by locals who washed their cloths and bed-cloths. I could only observe several black-banded *Brachythemis* at a road surrounding the outer slopes of the crater. Lake Hora had lower and more gentle slopes allowing the conversion of part of its bank into a recreation zone, mostly woody but with some open area. Its Odonata to some extent resembled those of Lake Zengena: again there were scarce *A. imperator* (a male observed patrolling among rush (*Typha*) emerging from water) and many individuals of one species of *Pseudagrion*. But these were *P. hanomi* (Fig. 43), not hitherto recorded for Ethiopia: of both sexes, of variable pruinosity in males, found in herbage at some distance from water - most probably they were mostly imature. But there were two more species: many *I. senegalensis* in emerging vegetation and many *Brachythemis* at banks and small pools of an open area (while Lake Zengena lacked any libellulids) (Fig. 44). All they appeared to be *B. leucosticta* s. str., not *B. impartita* as at Lake Hayk, as earlier reported for this Lake Hora (Dijkstra & Matushkina 2009).

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65	2010	Villanueva, Reagan, Philippinen	Fieldwork on dragonflies on Samar Island (Philippines)
66	2010	Villanueva, Reagan, Philippinen	Fieldwork at Balut/Saranggani (Philippines) and Talaud islands (Indonesia)
67	2010	Villanueva, Reagan, Philippinen	Endemic species of the Diomabok-Lake region south of Davao, The Philippines
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
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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
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76	2011	Marinov, Milen, Christchurch, New Zealand	Odonata at artificial light sources – review paper
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78	2010	Villanueva, Reagan, Philippinen	Stereomikroskop
79	2010	Villanueva, Reagan, Philippinen	Odonata of the Diomabok-Lake region south of Davao, The Philippines Follow-up
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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		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
In Planung			
	2013	Ananian, Vasil, Yerevan, Armenia	Ecology of Cordulegaster vanbrinckae
	2013	Villanueva, Reagan, Davao, Philippinen	Odonata of Mt. Lomot and Mt. Sumagaya, The Philippines
	2013	Büsse, Sebastian, Göttingen, Germany	Epiophlebia in China