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Odonata recorded in February 2012 in Isabela and Aurora Provinces, Luzon Island and Polillo Island, Philippines

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Abstract

In February 2012, Odonata were recorded and voucher specimens collected in Luzon, The Philippines. The focus of study was set on localities near Dinapigue and San Mariano (Isabela Province), sites in Casiguran (Aurora Province) and on Polillo Island (Quezon Province). 60 Odonata species were recorded. Three are new to science and have been formally to be described. Four species were recorded for the first time in Luzon. *Amphicnemis furcata* and *Diplacodes nebulosa* were rediscovered after several decades since they were last documented from Luzon.

Introduction

The Odonata fauna of Luzon Island is fairly studied. Two decades ago, Hämäläinen & Müller (1997) listed 140 species from the island compiled from own and from formerly published studies. Since their synoptic work, various papers had been published listing additional island records (Gapud & Recuenco, 2001; Gapud, 2006; van Tol & Müller, 2003; van Tol, 2005; Villanueva, 2009; Villanueva et. al., 2009; Villanueva et. al., 2010). Presently, Luzon Island has 155 Odonata species and a dozen more still formally to be described.

Despite this, several species recorded from Luzon are poorly known and many are known only from the type material. This lack of good data is due to a lot of factors.





Figure 1. Mabuaya staff (Edmund Jose and Emiel Davina) crossing the river in Dinapigue, Isabela Province.



Figure 2. Trekking across steep slope of ultramafic forest.





Figures 3 a. Traveling on modified boat on one of the tributaries of Cagayan River.



Figures 3 b. Modified wharf in the river.





Figure 4. a - b. Traveling on top of water buffalo.





Figure 5. Traveling on poorly maintained road. Note the difference between road in mining area and government managed road like this.



Figure 6. Converting swamp into rice fields.





Figure 7.a – b. New road constructions. This opens the mountain and allows the flow of settlers thus facilitating the rapid destruction of the forest.





Figure 8. a. Converting land for agricultural purposes, b. burning the forest “kaingin” for agricultural purposes.





Figure 9. a. Mining road, b. mining road cut through the ultramafic forest.





Figure 10. Nickel Ore stockpile.



Figure 11. Third author resting on temporary shed made by mining company.



There are several sites that until now remain unexplored for most life forms particularly invertebrates due to inaccessibility (Figures 1 – 5). Species are lost including Odonata from habitat deterioration by increasing agricultural and infrastructural development (Figures 6 – 8), and hence they become scarcer to find. Presently, mining and land conversion issues magnify the problem (Figures 9 – 11).

The present report lists species encountered during a survey organized by the second author (Figure 12) to several localities situated in north-eastern Luzon (Figure 13). This part of the island is dominated by Sierra Madre Range (Figure 15a-b). It is the longest mountain range in the Philippines and a huge part of it is poorly explored for most groups of organisms. This mountain range is considered one of the key biodiversity areas in the archipelago.

The second author is presently working on the conservation of some threatened vertebrate species particularly the Philippine Crocodile (*Crocodylus mindorensis*) (Figure



Figure 12. Third author in front while the second author at the back crossing the river in San Mariano.



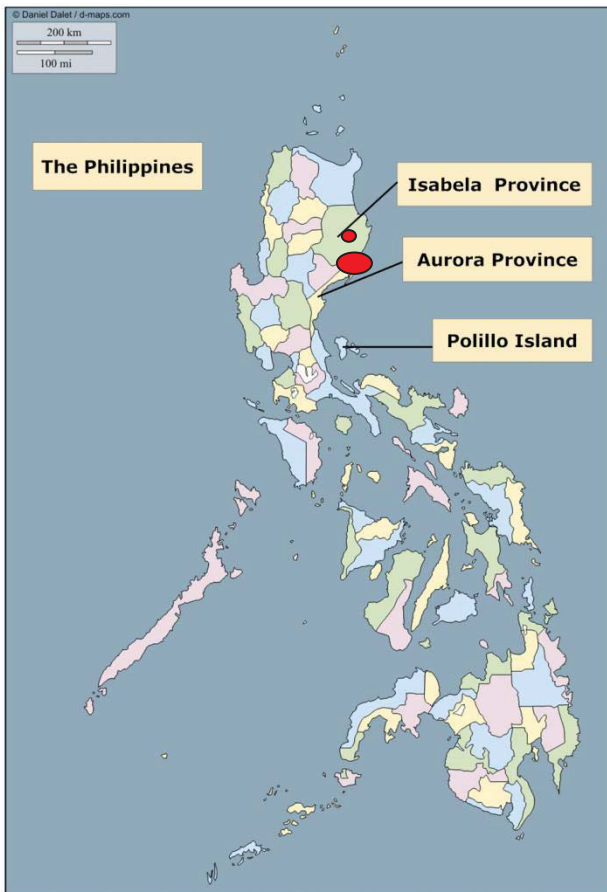


Figure 13: Map of the study site (approximate field site in Luzon: red spot). http://d-maps.com/carte.php?lib=philippinen_Lankarte&num_car=26028&lang=de



Figure 15. *Crocodylus mindorensis* (Philippine crocodile).





Figure 15 a–b. Sierra Madre Mountain range.



14). In line to this work, surveys (Figures 16 – 25) to various poorly explored or unexplored mountains in Luzon are regularly conducted, and this time we had the opportunity to join that expedition organised by the Institute of Environmental Sciences from the Leiden University.



Figure 16. Study site: Dibulo Falls, Dinapigue.





Figure 17. River in Dinapigue, Isabela Province.



Figure 18: Head waters of Dibulo falls.





Figure 19: Shallow river in Casiguran, Aurora Province.



Figure 20: Rice field in Casiguran, Aurora province.





Figure 21: Head waters of Dibulo falls.



Figure 22: River in San Mariano.





Figure 23: Head water of Malat River, Burdeos, Polillo island.





Figure 24: Small stream in Casiguran, Aurora Province.



Figure 25: Lake Dunoy, San Mariano, Isabela Province.



Aside from the lists of species encountered from Luzon. A short list of species seen from Polillo is also included. The short trip was conducted to secure some photographs of least known species of Odonata from Polillo documented earlier (Villanueva, 2010a; Villanueva, 2010b).

Method

Odonata were recorded and voucher specimens collected between February 5 – 12, 2012, in Dinapigue (16° 40' N, 122° 21'E) (Figure 26) and February 14– 20, 2012, in San Mariano (16°59'N 122°1'E) (Figure 27), both under Isabela Province by the third author.

He managed a short trip to visit some interesting sites in Casiguran (16°17'00N 122°02'40"E), Aurora Province. A short trip in Polillo Island (14° 49' N, 121° 54' E) was made from February 21 – 23, 2012.



Figure 26. Third author on standing behind the marker of the Municipality of Dinapigue, Isabela Province.





Figure 27. Municipal Hall of San Mariano, Isabela Province.

Results

The present survey revealed 60 species under 11 families including three species that are new to science. Four species were recorded for the first time in Luzon. Two species (*Amphicnemis furcata* and *Diplacodes nebulosa*) were rediscovered after several decades since they were last documented from Luzon.

Annotated species list

Calopterygidae

1. *Neurobasis luzoniensis* Selys, 1879

Recorded: Malat River, Burdeos, Polillo Is. (14° 57' N, 121° 59'E)

Remark: The sites presently explored in Isabela and Aurora provinces provide suitable habitats for this species and old records are known from the nearby municipalities. It is interesting to note that not a single individual of this very conspicuous species was found. Although no direct evidence will support, the recent series of typhoons and tropical depressions that brought flood could be the reason for the demise of the local population.





Figure 28. Preferred habitat of *Neurobasis luzoniensis*.

Habitat (Figure 28): This species is found on open to partly open streams and rivers. Trees around the stream bank do not shade the stream thus the water is exposed to full sunlight. The water is usually shallow and males are frequented perching on protruding rocks along the waterways. The females on the other hand are seen along the nearby vegetation.

Chlorocyphidae

2. *Cyrano unicolor* (Hagen in Selys, 1869)

Recorded: Malat River, Burdeos, Polillo Is.; Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.

Habitat: This species is seen perching on twigs in an open to shaded forested waterways. It is usually encountered few meters from the ground.

3. *Rhinocypha colorata* (Hagen in Selys, 1869)

Recorded: Sitio San Isidro, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.



Habitat: This species is tolerant to human disturbance. It can be found even in areas with significant human activity. It can tolerate streams that have agricultural and domestic runoffs. It can be found in open to partly open streams where it perches on twigs and leaves near the waterways.

4. *Rhinocypha turconii* Selys, 1891

Recorded: Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.

Euphaeidae

5. *Euphaea refulgens* Hagen in Selys, 1853

Recorded: Malat River, Burdeos, Polillo Is.

Remark: This species is widely distributed in Luzon bio-geographic region. It has several geographic variants (see Needham & Gyger 1939: 245). The central Luzon population has the most extensive wing markings. However, this species was not encountered during the present fieldwork in Isabela and Aurora provinces.

Habitat: This species shares the same habitat with *Neurobasis luzoniensis*.



Figure 29. *Lestes praemorsus praemorsus* male.



Lestidae6. *Lestes p. praemorsus* (Selys, 1862) (Figure 29)

Recorded: Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

Platystictidae7. *Drepanosticta hamalaineni* Villanueva, van der Ploeg & van Weerd 2011 (Figure 30)

Recorded: Dibulo creek, Dibulo, Dinapigue, Isabela, Luzon Is. [16°40'00.5"N, 122°21'00.00"E]

Remark: This species was previously only known from the type material collected in Palanan (Dipinantahikan area, Dipagsangaan, 16°53'39"N, 122°20'47"E). This locality is situated north of Dinapigue of about 25km. The present data provides an extension of the known range.



Figure 30. *Drepanosticta hamalaineni* male.



8. *Sulcosticta* sp.n. 1 (Figure 31)

Recorded: Dibulo creek, Dibulo, Dinapigue, Isabela, Luzon Is.

Remark: A single male was found. The posterior pronotal lobe resembles those of *S. pallida* van Tol 2005, a species recorded in the nearby province of Nueva Vizcaya. These two species however differ markedly on the structure of the cerci and paraprocts.



Figure 31. *Sulcosticta* sp. male.

9. *Sulcosticta* sp.n. 2

Recorded: Dibulo creek, Dibulo, Dinapigue, Isabela, Luzon Is.

Remark: The present species resembles close to *S. vantoli* Villanueva & Schorr 2011 from Polillo Island based on the posterior pronotal lobe shape. It differs from that species on the shape of the cerci and paraprocts. Eleven males were collected but the female remained elusive.



Platycnemididae10. *Risiocnemis atropurpurea* (Brauer, 1868) (Figure 32)

Recorded: Malat River, Burdeos, Polillo Is.; Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.; Dibulo creek, Dibulo, Dinapigue, Isabela, Luzon Is.



Figure 32. *Risiocnemis atropurpurea* male.

11. *Risiocnemis elegans* Kitagawa, 1990 (Figure 33)

Recorded: Sitio San Isidro, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Aurora Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.; Dibulo creek, Dibulo, Dinapigue, Isabela, Luzon Is.

Remark: The present material represents the newest record of this least known species of *Risiocnemis*. Hämäläinen (1991) reviewed the subgenus *Risiocnemis* and mentioned this species. However due to absence of material available for study, it was not re-described and placed in “species incertae sedis”. A short note is given “In case disordered penile structures were figured, the male may even prove to be conspecific with *R. varians* sp.n.”.





Figure 33. *Risio cnemis elegans* in tandem. This is the first photo made of this species from the field.



Figure 34. *Risio cnemis ignea* male.



12. *Risiocnemis haematopus* (Selys, 1882)

Recorded: Malat River, Burdeos, Polillo Is.

13. *Risiocnemis ignea* (Brauer, 1868) (Figure 34)

Recorded: Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.; Dibulo creek, Dibulo, Dinapigue, Isabela, Luzon Is.

14. *Risiocnemis serrata* (Hagen in Selys, 1863)

Recorded: Malat River, Burdeos, Polillo Is.; Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.

Coenagrionidae15. *Agriocnemis f. femina* (Brauer, 1868)

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Dilasag swamp, Dilasag, Aurora, Luzon Is. (16° 24' N, 122° 13' E).



Figure 35. *Amphinemesis furcata* male.



16. *Amphicnemis furcata* Brauer, 1868 (Figure 35)

Recorded: (11♂♂, 3♀♀) Ditinagyan swamp, Casiguran, Aurora, Luzon Is.; (11♂) Dilasag swamp, Dilasag, Aurora, Luzon Is.

Remark: This represents the newest material for this species since its description over a hundred years ago. Although there is a large local population of it, it remained poorly studied until now. The existence of good population in Aurora shows the need of extensive survey to poorly explored regions in the archipelago to get proper information to assess the threat and conservation status of the species. The limited information about the species is accounted for the lack of extensive fieldwork done.

17. *Amphicnemis* sp.n. (Figure 36)

Recorded: Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.

Remark: The present species is close to *Amphicnemis mcgregori* Needham & Gyger, 1939. However, it is clearly distinct from that species. (Villanueva, in press) treated the genus *Amphicnemis*, regrettably the new find could not be integrated in this review paper.



Figure 36. *Amphicnemis* sp.n. male.



18. *Argiocnemis rubescens intermedia* Selys, 1877

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Sitio San Isidro, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Dilasag swamp, Dilasag, Aurora, Luzon Is.

19. *Ceriagrion lieftincki* Asahina, 1967 (Figure 37)

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Dilasag swamp, Dilasag, Aurora, Luzon Is.



Figure 37. *Ceriagrion lieftincki* male.

20. *Ischnura senegalensis* (Rambur, 1842)

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Dilasag swamp, Dilasag, Aurora, Luzon Is.

21. *Paracercion* sp.n. (Figure 38)

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

Remark: This dainty damselfly is the fourth species of the genus in the country. It is clearly distinct from its congeners with its bluer colouration, and the structure of cerci. Several material were collected unfortunately majority were damaged by ants and only four males are now available for further study.



This species perches close to the water on twigs and leaves of water plants at open shade less sites. Males are seen chasing each other defending a particular territory. Several pairs in tandem were observed.

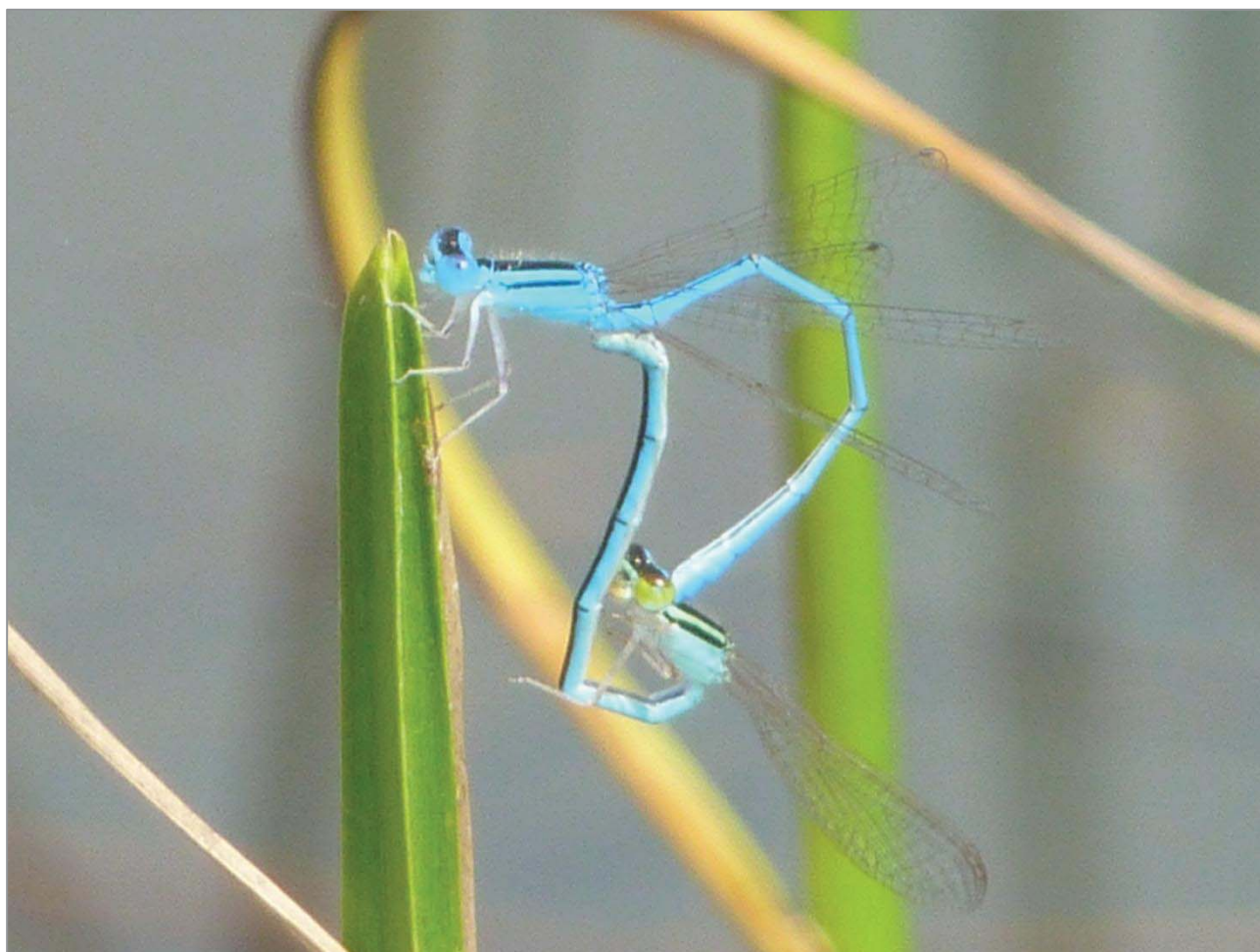


Figure 38. *Paracercion* sp. n. in tandem.

Habitat (Figure 39 – 40): This species is found both in Dunoy and in Narra Lake. The collected specimen came from Narra Lake. The lake is diversely structured by rich hydrophilous vegetation and an open water surface. Although the substrate is muddy, the water is clear.

22. *Pseudagrion microcephalum* (Rambur, 1842)

Recorded: Dilasag swamp, Dilasag, Aurora, Luzon Is.

23. *Pseudagrion p. pilidorsum* (Brauer, 1868)

Recorded: Malat River, Burdeos, Polillo Is.; Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.





Figure 39. Habitat of the new *Paracercion*.



Figure 40. Habitat of the new *Paracercion*.



24. *Pseudagrion r. rubriceps* (Selys, 1876) (Figure 41)

Recorded: Dilasag swamp, Dilasag, Aurora, Luzon Is.



Figure 41. *Pseudagrion r. rubriceps* male.



Figure 42. *Teinobasis corolla* male.



25. *Teinobasis corolla* Needham & Gyger, 1939 (Figure 42)

Recorded: Malat River, Burdeos, Polillo Is.

26. *Teinobasis filiformis* (Brauer, 1868)

Recorded: Malat River, Burdeos, Polillo Is.; Sitio San Isidro, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

27. *Teinobasis olivacea* Ris, 1915 (Figure 43)

Recorded: Sitio San Isidro, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.; Dilasag swamp, Dilasag, Aurora, Luzon Is.



Figure 43. *Teinobasis olivacea* male.

28. *Teinobasis samaritis* Ris, 1915

Recorded: Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

29. *Teinobasis strigosa* Needham & Gyger, 1939

Recorded: Malat River, Burdeos, Polillo Is.



30. *Xiphiagrion cyanomelas* Selys, 1876

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

Aeshnidae31. *Anax panybeus* Hagen, 1867

Recorded: Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

32. *Gynacantha* sp.

Recorded: Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.

Remark: A single female was collected. The genus requires revision as to facilitate proper identification of females collected without accompanying males.

Gomphidae33. *Heliogomphus bakeri* Laidlaw, 1925

Recorded: Malat River, Burdeos, Polillo Is.

Corduliidae34. *Hemicordulia m. mindana* Needham & Gyger, 1937

Recorded: Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

Remark: This is the first record for Luzon. The species is widely distributed in the Philippine archipelago.

35. *Idionyx salva* Needham & Gyger, 1937

Recorded: Malat River, Burdeos, Polillo Is.

Remark: The present material has 3-sided fore wing triangle instead of a 4-sided. This species is darker than its congener *I. philippa*, a more distributed Philippine endemic. In *I. philippa*, the thorax is clearly yellowish with the presence of large yellow stripes. This is absent in *I. salva* where the yellow is limited to small spots near the coxae.

Libellulidae36. *Acisoma p. panorpoides* Rambur, 1842

Recorded: Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.



37. *Agrionoptera insignis* (Rambur, 1842)

Recorded: Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

38. *Brachydiplax c. chalybea* Brauer, 1868

Recorded: Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

39. *Diplacina braueri* Selys, 1882 (Figure 44)

Recorded: Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

40. *Diplacina lisa* Needham & Gyger, 1941 (Figure 45)

Recorded: Malat River, Burdeos, Polillo Is.



Figure 44. *Diplacina braueri* male.





Figure 45. *Diplacina lisa* female.

41. *Diplacina holgerhungeri* Villanueva, 2012 (Figure 46)

Recorded: Malat River, Burdeos, Polillo Is.

Remark: Two males of this most recently described species of *Diplacina* (Villanueva 2012) were found. This species was previously mentioned (Villanueva, 2010a; Villanueva, 2010b) under *Diplacina bolivari* yet present study shows that the material previously labelled as *D. bolivari* from Polillo belong to two taxa (*D. bolivari* and a new species).



Figure 46. *Diplacina holgerhungeri* male.



42. *Diplacodes trivialis* (Rambur, 1842)

Recorded: Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.

43. *Diplacodes nebulosa* (Fabricius, 1793) (Figure 47)

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

Remark: The present material represents the latest documentation of this species in Luzon after 70 years. This species is relatively rare in the site. However, given a good weather and more field hours more specimens can be secured.



Figure 47. *Diplacodes nebulosa* male.

44. *Hydrobasileus croceus* (Brauer, 1867)

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

45. *Neurothemis r. ramburii* (Brauer, 1866)

Recorded: Dibulo creek, Dibulo, Dinapigue, Isabela, Luzon Is.



46. *Neurothemis t. terminata* Ris, 1911

Recorded: Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.

47. *Orthetrum chrysis* (Selys, 1891)

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

48. *Orthetrum pruinosum clelia* (Selys, 1878)

Recorded: Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.

49. *Orthetrum s. sabina* (Drury, 1770)

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.

50. *Orthetrum luzonicum* Brauer 1868 (Figure 48)

Recorded: Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.



Figure 48. *Orthetrum luzonicum* male.

51. *Pantala flavescens* (Fabricius, 1798)

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.



52. *Potamarcha congener* (Rambur, 1842)

Recorded: Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.; Dibulo creek, Dibulo, Dinapigue, Isabela, Luzon Is.

53. *Rhodothemis rufa* (Rambur, 1842)

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

Remark: This is the first record for Luzon.

54. *Rhyothemis phyllis subphyllis* Selys, 1882

Recorded: Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.



Figure 49. *Rhyothemis resplendens* male.



55. *Rhyothemis r. regia* (Brauer, 1867)

Recorded: Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

Remark:

This is a first record in Luzon.

56. *Rhyothemis resplendens* Selys, 1878 (Figure 49)

Recorded: Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

Remark: Twelve male and a single female were collected. It also was recorded in Polillo Island (Villanueva, 2010a; Villanueva, 2010b) however that species was not seen during the present short visit in the island. This record represents the first record for Luzon. This species is more widespread in the Papuan faunal region.

57. *Tholymis tillarga* (Fabricius, 1798)

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Dibulo creek, Dibulo, Dinapigue, Isabela, Luzon Is.

58. *Tramea transmarina euryale* (Selys, 1878)

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

59. *Trithemis a. aurora* (Burmeister, 1839)

Recorded: Dunoy Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.; Mining site, Dimaluad, Dinapigue, Isabela, Luzon Is.

60. *Zygomma petiolatum* Rambur, 1842

Recorded: Narra Lake, Brgy. Disulap, San Mariano, Isabela, Luzon Is.

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