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Spring aspect of Odonata of the Abrau Peninsula, the Black Sea coast of the West Caucasus, as observed in May 2018

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Abstract

Results of a brief examination of the spring aspect of Odonata at the Abrau Peninsula and some nearby localities on 21-27th May 2018 are presented. *Lestes dryas* and *Caliaeschna microstigma* are reported for the Peninsula for the first time, revealing the world northernmost record of the latter. Some old data of Odonata at Novorossiysk and some recent erroneous data on the Krasnodarskiy Krai are referenced and discussed. The known Odonata fauna of the Abrau Peninsula reaches 38 species.

Key words: Russia, West Caucasus, Black Sea coast, Krasnodarskiy Krai, Odonata, fauna, Abrau Peninsula, *Caliaeschna microstigma*, Red Data Book, crepuscular behaviour, preying by birds, phenology.

Introduction

The Abrau Peninsula is situated at the westernmost terminus of the Caucasus and gently protrudes into the Black Sea between the cities of Anapa and Novorossiysk. Its Odonata were examined only occasionally and shortly, on 11-12.06.1928 (Bartenev 1930), 5.08.2015, 9.07.2016 (Kosterin & Solovyev 2017) and 20-24.07.2017 (Kosterin 2017b). The data were summarised by Kosterin (2017: Table 1), revealing 34 species in total. No continuation of the work after 2017 was planned so that I decided to publish the previous report (Kosterin 2017b). However, I had to briefly revisit the area from May 21 to May 28, 2018. This was an unexpected occasion to witness the hitherto undocumented spring Odonata aspect of the Abrau Peninsula. The results are published here. However, I should note that the 2018 spring in the area was unusually early, with the phenology advanced for almost a month as compared to average. Most localities examined were visited in 2016 or 2017 (as indicated below), so for their detailed description see Kosterin & Solovyev (2017) or Kosterin (2017b). Few Odonata species were observed and mentioned below in a locality-wise manner, from the north to the south. Species not found at respective localities in July 2016-2017 are marked with an asterisk; species new for the Abrau Peninsula are boldfaced at the first mention.

Localities on the Abrau Peninsula and Odonata found there.

1. Lake Sukhoy Liman, 44.754-756° N, 37.454-458° E, 293 m a.s.l. (Kosterin 2017b: fig. 18; earlier examined on 23.07.2017), examined on 23.05.2018 at 16:30-19:30. No difference in the water level as compared to the last July noticed. Numerous *Lestes dryas* Kirby, 1890 (3 ♂♂, 4 ♀♀ collected; Figs. 1-2) in the adjacent meadows and in thickets of *Scirpus* (*Schoenoplectus*) *lacustris* L. at muddy banks but very few in the same above shallow water, where scarce *Ischnura elegans* (Vander Linden, 1820) (including tenerals) and mature males of **Sympecma fusca* (Vander Linden, 1820) occurred. Few males of **Brachytrion pratense* (Müller, 1764) cruised among rushes over the water (in habitus and behaviour somewhat resembling males of *Aeshna affinis* Vander Linden, 1820 which were there last July) and many of those flew and rested at lower branches at the forest margins at banks. Several individuals of **Anaciaeschna isoceles* (Müller, 1764) ranged over open banks (1 ♀ collected). Few large whitish darners were startled from rushes or observed flying high over them, presumably females of **Anax parthenope* (Selys, 1839).



Figure 1. *Lestes dryas* at Lake Sukhoy Liman, 23.05.2018: a – a male, b-d - females.



An unusual observation: all individuals of both sexes of *L. dryas* folded the wings above the abdomen about 30 seconds after landing (Fig. 2). Most individuals were immature and pruinose males were not frequent (Fig. 1a), but many specimens had broad blackish stripes of dull blackish melanisation along the meta-thoracic suture (Figs. 1a-c, 2).



Figure 2. A female of *Lestes dryas* at Lake Sukhoy Liman, 23.05.2018: a – immediately after landing, b – soon after landing.

2. The road between Lake Sukhoy Liman and the former lake in the Shirokaya Shchel' valley, 44.723-754° N, 37.463-468° E, 62-317 m a.s.l. (earlier examined on 23.07.2017), was examined on 23.05.2018. All along the road solitary individuals of **A. isoceles* (1 ♀ collected) were observed ranging high (2-4 m) above it. More abundant were **B. pratense* (6 ♂♂ collected) which patrolled low over shady patches of the road or low above herbage, or rested low on bushes. Sometimes several individuals were found in one spot, displaying no antagonistic behavior at all. Once a larger whitish darner, most probably a female of **A. parthenope*, was startled from a sunlit bush.

3. The former lake in the Shirokaya Shchel' valley 1.5 km NW of Malyy Utrish village, 44.723-725° N, 37.452-453° E, 40 m a.s.l. (Kosterin 2017b: fig. 15; earlier examined on 23.07.2017), was examined on 24.05.2018. The lake was quite deep last July (not less than several metres, as seen from the traces of the former water edge), but it contained no macrophytes. In 2017, however, it was found completely dried up, with no feeding stream, no remnant of any water or even any wet pool, and with the former water bottom covered with dense annual grasses and herbs (*Elytrigia* sp., *Matricaria*

sp., *Vicia grandiflora* Scop. etc.). This disappearance could not result from climatic fluctuations and is most probably caused by some changes in the ground and surface water current and balance. Few *I. elegans* in annual herbage, several **A. isoceles* cruising high over the former water body, a female of **A. parthenope* of the blueish morph among them (captured and released), A male *A. imperator* ranged low over the annual herbage (captured and released), many **B. pratense* were startled from sparse bushes of the former bank.

4. The Mokraya Shchel' valley, 44.6943° N, 37.5153° E, 64 m a.s.l. (earlier examined on 21.07.2017 but no Odonata were found) was examined on 24.05.2018. This is the only permanent stream at the Black Sea coast between the Sukko and Dyurso Rivers. It is a shaded, tiny shallow stream (Fig. 3) with clean but rather warm water with mostly stony bottom with many black *Turbellaria* (an indicator of clear water), *Gammarus* sp. and large mayfly nymphs. It flows in a deep valley covered with dense broad-leaved forest. Two males (one collected) of *Caliaeschna microstigma* (Schneider, 1845) ranged low over the water, as is common for the species. At a forest edge facing the sea at the margin of the same valley, a teneral, still soft and with reddish-tinted wings, male of **Orthetrum coerulescens anceps* (Schneider, 1845) was startled from dry grass (surely it was not associated with the stream inside the valley).



Figure 3. The Mokraya Shchel' valley with a small shady stream which is a habitat of *Caliaeschna microstigma*, 24.05.2018.



Figure 4. The Dyrurso River at the lower bridge in Dyrurso valley, 400 m upstream of its mouth. A mat of *Chara* sp. is seen in the water. A habitat of *Ischnura elegans*, *Platycnemis pennipes*, numerous *Calopteryx splendens*. 25.05.2018.

5. The Dyrurso River at the lower bridge in Dyrurso village (Fig. 4), near 400 m upstream of its mouth, 44.6819° N, 37.5632° E, 5 m a.s.l. (earlier examined on 21-22.07.2017), was examined on 25.05.2018. In addition to the habitat description provided by Kosterin (2017) I want to add characteristics of this small river itself: very cold water, some large mats of *Chara* sp. (Fig. 4, suggesting very clear water), colonies of *Nostoc cyanobacteria* on stones, both in water and on the banks, and patches of *Potamogeton crispus* at some bays. Like in July 2017 (Kosterin 2017b), *Calopteryx splendens* (Harris, 1780) were extremely abundant (I counted 47 males and 20 females, looking fresh, of this species and none of other demoiselles), *Platycnemis pennipes* (Pallas, 1771) (mostly teneral) abundant, while *I. elegans* were less numerous. A male of **B. pratense* was resting on a reed leaf very close to the water in the evening (Fig. 5) (but no active individuals were observed next morning). No **A. isocles* were observed at the river, but few flew over roads and meadows of the valley in the morning of 25 and 26.05.2018, while in the dusk of 25.05.2018 a swarming crepuscular flight of numerous individuals of this species (1♂, 1♀ collected) started at ca 20:00 and finished with darkness at ca 20:20 (like a similar flight of *Aeshna mixta* Latreille, 1805 in July). These dragonflies tended to congregate at some half-closed gaps between bushes.



Figure 5. A male of *Brachytron pratense* at the lower bridge through the Dyurso River in Dyurso valley, 25.05.2018.

6. The Dyurso River at the upper bridge in Dyurso village (Fig. 6) 930 m upstream (ENE) of the former locality, 44.6901° N, 37.5658° E, 13 m a.s.l., was examined on 25.05.2018. An open area just downstream a bridge and a dam of a small reservoir, with a shallow river streaming over stones by two arms. As visited in the evening, only two males of **C. microstigma* were observed ranging low over the water. Two White Wagtails (*Motacilla alba* Linnaeus, 1758) were startled from a patch ca 5 x 1 m of stones forming a tiny 'island' between the two river arms (indicated in Fig. 6 with asterisks), which appeared to serve as their dining place, since numerous demoiselle wings were scattered on the stones and floating on the water surface between them (Fig. 7). I managed to collect in total 36 Odonata wings with quite surprising results: 20 male and 13 (2 fore and 9 hind) female wings of **Calopteryx virgo feminalis* Kosterin, 2017 (for details of the taxonomic situation with this taxon see Kosterin 2017a), 2 teneral male wings of *C. splendens* and 1 male forewing of **B. pratense*. That means that 930 m upstream the river, the demoiselle aspect changed from all **C. splendens* to overwhelmingly (15 times) predominating *C. virgo feminalis*. Several males of the latter were found to flutter and rest at high (2-4 m) tree branches at a forest road near this river section.



Figure 6. The Dyurso River at the upper bridge in Dyurso valley, 900 m upstream of the lower one (Fig. 4). A habitat of *Calopteryx virgo feminalis* and *Caliaeschna microstigma*, 25.05.2018. The stones where demoiselle wings dropped by wagtails were found are marked with asterisks.



Figure 7. Male wings of *Calopteryx virgo feminalis* left by White Wagtails at stones between the two arms of the shallow reach of the Dyurso River at the upper bridge in Dyurso valley (Fig. 6, see asterisks), 25.05.2018.

7. The Lake Abrau SE bank, 44.685-692° N, 37.589-600° E, 92-103 m a.s.l. (Kosterin & Solovyev 2017: fig. 3; earlier examined on 10.07.2017), was examined on 25.05.2018. Few *I. elegans*, a teneral male of *Orthetrum albistylum* (Selys, 1848) at banks. The same in July 2016 (plus few *S. fusca* not seen now).

8. Lake Krugloe, 44.679° N, 37.567° E, 69 m a.s.l. (Kosterin & Solovyev 2017: fig. 4; earlier examined on 10.07.2016), was examined on 25.05.2018. The lake and its surroundings are privatised by a resort of the same name and while freely accessible in 2017, this time it was offered for examination only for 15 minutes, the rest 45 min it was examined only from a nearby road from some distance. Abundant **L. dryas* (2 ♂♂ collected) and scarce *I. elegans* in reed. Several **A. isoceles* and one male of *A. imperator* patrolled open water, several males of **B. pratense* patrolled among dense reed. One male of each *Orthetrum albistylum* (Selys, 1848) and **Orthetrum cancellatum* (Linnaeus, 1758) perched on sticks at the banks, one more male of the latter sat on the nearby road (all *Orthetrum*s photographed but some from large distance). At least three individuals of **Calopteryx* sp. (most probably *C. splendens*) were observed flying over the water (their presence explainable since the lake has cold and deep water, most probably exchangeable through underground current from the large Lake Abrau to the sea). Only 7 species were met (4 new for the locality) as compared to 14 species found in July 2016. Absence of any *Coenagrion* spp. was strange. So, in total 21 species are now recorded from the lake.

9. Lake Limanchik 44.670-671° N, 37.590-592° E, 4 m a.s.l., was examined on 25.05.2018, not examined before. A small (180 × 120 m) lagoon separated from the sea by a narrow and low shingle spit, the opposite bank facing a steep forested slope, shallow banks overgrown with tall reed leaving only small patches of the banks open, few willow trees. Few **I. elegans* in reed, one **A. isoceles* patrolling a nearby road.

Miscellaneous observations in adjacent areas

10. Taman' Peninsula, a pool in the Dymkova Balka valley, 45.216-218° N, 36.661-662° E, 16 m a.s.l. (Kosterin 2017b: fig. 21; earlier examined on 25-26.07.2017); examined on 21-22.05.2018. Few *I. elegans* in reed (including tenerals, 1 ♂ collected) and above the water; two males (1 collected) of *A. parthenope* patrolling the banks (in July 2017 the same plus *O. cancellatum* and *Sympetrum striolatum*). It is noteworthy that the collected male of *A. parthenope* was old, with darkened and torn wings; as found in this condition so early in the season it is likely to have dispersed from the south.

11. Gelendzhik City, SW slope of the crest of Markotkh Range, 44.586-587° N, 38.098-100° E, 495-536 m a.s.l.; examined on 26.05.2018 in the morning and midday. The crest is narrow, covered with tall ash/linden forest and some cleared areas with small buildings; the slope is steep, open, covered with steppe vegetation with some *Crataegus* bushes and ash groves in folds. Quite many *A. isoceles* swarmed above the crest, at open places and above the road. Very many of those were startled from a half-shaded rocky bluff formed by a road descending from the crest through a forest patch. Lastly, hundreds of individuals were found resting on low branches at the sunny side of a hawthorn stripe at a former road across the steppe slope, with about a dozen individuals taking off with each of my steps. Many groups of several individuals clustered very closely to each other (Fig. 8); at maximum I observed 8 individuals in one cluster but most probably some more had already been startled from this one. This looked like a 'landed swarm'. There was obviously some turnover between few flying individuals and the majority of them resting, but no doubt they would all get into the air at dusk for crepuscular swarming activity. No other darner (and any Odonata) species.



Figure 8. *Anaciaeschna isoceles* roosting at the bases of hawthorn bushes by an old road at a steep steppe SW slope under the Karkotkh Range crest in Gelendzhik, 27.05.2018.

12. The Arkhipo-Osipovka village env., 44.356-365° N, 36.536-539° E, 13-226 m a.s.l., was examined on 27.05.2018. A rivulet with open shingle banks with some vegetation patches including *Scirpus* (*Schoenoplectus*) *lacustris*: a male of *C. virgo feminalis*, few *P. pennipes*, a just emerged female of *Onychogomphus forcipatus* (Linnaeus, 1758) (collected). A shady dry valley of the left tributary: a male of *C. virgo feminalis* at sunlit tree branch at ca 2.5 m above the ground. A promising pond-like estuary was not examined. A forest road on a crest of the hill SE of the village: a female of *C. virgo feminalis* at a bush, several *A. isoceles* and one male of *A. parthenope* patrolling.

Discussion

Revealing the two spring damer species common in Europe, *A. isoceles* and *B. pratense*, as well as *L. dryas*, as abundant was not a surprise. More remarkable was their complete absence even in early July of 2016 (Kosterin & Solovyev 2017), while in July 2017 only another species of *Lestes*, *L. barbarus* (Fabricius, 1798) was present at Lake Sukhoy Liman (Kosterin 2017). This disappearance in July could be expected for *B. pratense*, the flight period of which ceases in Europe at the beginning of July (Bernard et al. 2015), but in the southern Europe, the flight period of *A. isoceles* is reported to gradually cease during July (Kalkman et al. 2015), while for *L. dryas* July is the main flight period (Boudot & Raab 2015). At the same time, Zygoptera of the summer aspect (*C. splendens*, *P. pennipes* and the omnipresent *I. elegans*), as well as *A. imperator*, were already on the wing in late May 2018. The origin of the observed individuals of *A. parthenope* and its seasonality is unclear, for the male collected at the Taman' Peninsula was already worn out (in May!). Quite surprising was the complete lack of sightings of any *Coenagrion* spp. and *Libellula* spp., as well as of *Pyrrosoma nymphula* (Sulzer, 1776). I also failed to find and prove rather unexpected species *Erythromma lindenii* (Selys, 1840) and *Cordulia aenea* (Linnaeus, 1758) collected in 1928 by Bartenev (1930).

It is noteworthy that the locality of the Mokraya Shchel' valley is the world northernmost record of *C. microstigma*, 0.02° or 01'40'' of latitude more northerly than the previous record at Kabardinka village at the same NW Caucasian coast (Kosterin & Solovyev 2017). It is unclear why this species was not observed at the Mokraya Shchel' valley last July, which was at the middle of its flight period. The actual northernmost habitat of this species could perhaps be the Sukko River (ca 44.803°) at the westernmost tip of the Caucasus, an area still unexamined.

Two species, *L. dryas* and *C. microstigma*, were recorded for the Abrau Peninsula for the first time. Kosterin (2017b) was not aware of the paper by Brauner (1903) who reported four species of Odonata, namely *Somatochlora metallica* (Vander Linden, 1825), *A. isoceles*, *B. pratense* and *A. parthenope*, from the environs of Novorossiysk on 17.05.1902 by the Julian calendar, that is 30.05.1902 by the modern Gregorian Calendar, in the same season as the observations reported here. Novorossiysk is at the East end of the Abrau Peninsula and should have been considered when summarising its fauna. These data were also reproduced by Bartenev (1930). Hence the three former species should have been added to the list by Kosterin (2017b). (I do not attribute to the Peninsula the data by Bartenev of 30.06.1928 from 'plavni', that is vast reeds, at Novorossiysk (Bartenev 1930), now absent, as those existed beyond the peninsula at a shallow river

mouth. Of species not reported for the Peninsula they included *Lestes macrostigma* Eversmann, 1836.) Together with now found *L. dryas* and *C. microstigma*, the total number of species known from the Abrau Peninsula reaches 38.

At present I doubt my previous (Kosterin 2017b) identification of Bartenev's locality 7, 'Abrau', as the Dyurso River mouth in Dyurso village (Loc. 5 above). Bartenev (1930: 5) described the locality as follows: "Abrau, 'limanchik' (a small liman) at the very sea coast. Dense thickets, surrounded by trees, water is fresh and current". This description better fits Lake Limanchik (loc. 9 above), officially named as Bartenev describes, and situated 3.5 km SSW of Abrau village and 2.7 km SE of Dyurso village. Anyway, this is almost equidistant from and close to both villages.

Kosterin & Solovyev (2017) reported the Doob River in Kabardinka (Gelendzhik Municipality) was inhabited by *C. virgo feminalis* throughout while *C. splendens* appeared as admixed to it only at its lowermost reaches (within 1.2 km before the mouth, although this figure was not mentioned in the cited paper). Now at the Dyurso River I faced this phenomenon much more expressed, as *C. splendens*, extremely numerous at the lower bridge in Dyurso village situated in 400 m from the mouth (where it was also abundant in July 2017, see Kosterin 2017b), was nearly completely substituted by *C. virgo* just 900 m upstream, at the upper village bridge. This was, unfortunately, an anecdotal observation and the issue of co-occurrence/displacement of these two species at small rivers of West Caucasus demands and deserves much more thorough investigation.

Bartenev (1930: 44) wrote that *A. isocetes* "obviously flies mostly where bogged lowlands broadly reside between the sea and mountains; there it occurs both by small bogs and bogged water bodies and at large relic lakes (Inkit, Anyshkhtsara etc.). Maybe absence of records of this species between Novorossiysk and Adler is connected with the lack of suitable lowlands?" However, Gelendzhik and Arkhipo-Osipovka are between Novorossiysk and Adler and the species was observed at both, in enormous quantities at the former (while the area of boggy lowland habitats by the Black Sea coast could have only been reduced since Bartenev's times).

Recently the luxuriant and superbly illustrated Red Data Book of Krasnodarskiy Krai (Zamotaylov et al. 2017) has been published, which concerns nine taxa of Odonata: *Calopteryx splendens mingrelica* Selys, 1868; *Chalcolestes parvidens* Artobolevskii, 1929, *E. lindenii*, *Ophiogomphus cecilia* Fourcroy, 1785, *A. imperator*, *B. pratense*, *Cordulegaster insignis mzymtae* Bartenev, 1929, *Libellula pontica* Albarda, 1887 and *Sympetrum tibiale* Ris, 1897. The articles are detailed and look very scientific, but some obviously contain misinformation. The dot map of *O. cecilia* contains 24 localities and the text says "In Krasnodarskiy Krai, local populations of the species occur in the plain, least frequently in the foothill zone", while this species has never been reported from the Caucasus at all. The article for *S. tibiale* is illustrated with a photograph of *Sympetrum sanguineum* (Müller, 1764) taken from Internet while the dot map includes four localities, two at Novorossiysk and two at Gelendzhik. The reliable Caucasian records of the species, however, originated from Kabardino-Balkar Republic, Stavropol Province and Dagestan Republic (Dumont et al. 2018). I contacted with the authors of the Odonata articles (not coinciding with the Editors in the here provided reference)

and they kindly informed me that they are not experts but had to compile the articles from data left from some other person who previously had agreed to write the articles but ceased the work. Most probably those data resulted from larval misidentifications. I would also comment that *A. imperator* and *B. pratense* are common species hardly deserving protection. There are localities at the Abrau Peninsula in the dot maps for the following species: *E. lindenii* (2 localities, the text says they were at Sukko village and Lake Abrau), *A. imperator* (2 localities) and *B. pratense* (4 localities).

All observed individuals of *Lestes dryas* folded their wings above the abdomen for about 30 seconds after landing. As *L. dryas* is an "open wing perching"-species (see Paulson 2004, Reinhardt 2006; the same as to my extensive Siberian experience), this behavior is unusual, and seems to be not currently understood. Paulson (2004) documented several situations where *Lestes* species folded their wings when - in most cases - anisopteran individuals were approaching. Torralba Burrial & Ocharan (2003): observed two „resting males of *L. virens* [which] folded up the wings in a heavy rainshower the way most other zygopterans do rather than holding them half open in the Lestidae mode." Species of the genus *Lestes*, immediately after moult and sometimes (dependent on air temperature?) after the maturation period fold up their wings (Jödicke 1997: 198). The wings are also folded in the final phase of senescence (Jödicke 1997: 246). However, neither of these circumstances concerned my curious observation.

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References

- Bartenev, A.N. 1930. Materialy k poznaniyu Zapadnogo Kavkaza v odonatologicheskom otnoshenii [Materials for the knowledge on West Caucasus in odonatological respect]. Trudy Zapadnokavkazskoi assotsiatsii nauchno-issledovatel'skikh institutov [Proceedings of the West Caucasian Association of Scientific Research Institutes] 72 (14): 1-138 (In Russian with German Zusammenfassung but not a title).
- Bernard, R., Kalkman, V.J., & Ivinskis, P.. 2015. *Brachytron pratense* (Müller, 1767). In: Boudot, J.-P. & Kalkman, V.J. (eds) Atlas of the European Dragonflies and Damselflies. KNNNV Publishing, the Netherlands, pp. 182-184.
- Boudot, J.-P. & Raab, R. 2015. *Lestes dryas* Kirby, 1890. In: Boudot, J.-P. & Kalkman, V.J. (eds) Atlas of the European Dragonflies and Damselflies. KNNNV Publishing, the Netherlands, pp. 56-58.
- Brauner, A.A. 1903. Notices sur divers Odonates. Revue russe d'entomologie 3(2): 89-91. (in Russian, French title).
- Dumont, H.J., Borisov, S.N. & Schröter, A. 2018. On the nature and distribution of *Sympetrum tibiale*, a rare Central Asian species spilling over into Europe (Odonata: Libellulidae). Odonatologica 47 (1-2): 23-42.

- Jödicke, R. (1997): Die Binsenjungfern und Winterlibellen Europas. Die neue Brehm-Bücherei 631. 277 pp.
- Kalkman, V.J., Iversen, I.I. & Nielsen, E. 2015. *Aeshna isoceles* (Müller, 1767). In: Boudot, J.-P. & Kalkman, V.J. (eds) Atlas of the European Dragonflies and Damselflies. KNNNV Publishing, the Netherlands, pp. 157-158.
- Kosterin, O.E. 2017a. *Calopteryx virgo feminalis* subsp. nov., a long known under the same name but hitherto formally nameless subspecies from the Caucasian Black Sea Coast. International Dragonfly Fund Report 107: 45-57.
- Kosterin, O.E. 2017b. Update to Odonata of the Black Sea coast of the western Caucasus, Russia International Dragonfly Fund Report 110: 1-23.
- Kosterin, O.E. & Solovyev, V.I. 2017. Odonata found in mid-summer 2015 and 2016 at the north-westernmost Black Sea Coast of the Caucasus, with the first record of *Cordulegaster picta* Selys, 1954 in Russian Federation. International Dragonfly Fund Report 107: 1-44.
- Paulson, D.R., 2004. Why do some zygopterans (Odonata) perch with open wings? International Journal of Odonatology 7: 505-515.
- Reinhardt, K. (2006): Open questions in the evolution of openwing perching in the Zygoptera (Odonata): a comment on Dennis Paulson. International Journal of Odonatology 9(1): 103-110.
- Torralba Burrial, A.; Ocharan, F.J. (2003): Cambio en la posición de reposo de *Lestes virens* (Odonata: Lestidae) por efecto de una lluvia fuerte. Boletín de la Sociedad Entomológica Aragonesa 32: 233.
- Zamotaylov A.S., Lokhman Yu.V. & Volfov B.I. (eds) Red Data Book of Krasnodar Territory. Animals. Third edition. Krasnodarskiy Kray Administration, Krasnodar, 2017. 720 pp. (in Russian, with English title).

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

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

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

Reference cited in the text should read as follows: Tillyard (1924), (Tillyard 1924), Swezey & Williams (1942).

The reference list should be prepared according to the following standard:

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

Tillyard, R., 1924. The dragonflies (Order Odonata) of Fiji, with special reference to a collection made by Mr. H.W. Simmonds, F.E.S., on the Island of Viti Levu. Transactions of the Entomological Society London 1923 III-IV: 305-346.

Citations of internet sources should include the date of access.

The manuscript should end with a list of captions to the figures and tables. The latter should be submitted separately from the text preferably as graphics made using one of the Microsoft Office products or as a high resolution picture saved as a .jpg .tif or .ps file. Pictures should be at least 11 cm wide and with a minimum 300 dpi resolution, better 360 dpi. Line drawings and graphics could have 1200 dpi for better details. If you compose many pictures to one figure, please submit the original files as well. Please leave some space in the upper left corner of each picture, to insert a letter (a, b, c...) later. Hand-made drawings should be scanned and submitted electronically. Printed figures sent by the post could be damaged, in which case authors will be asked to resubmit them.

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