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ODONATA OF THE RUSSIAN FAR EAST: A SUMMARY

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The history of dragonfly research in the Russian Far East is traced from 1856, and an annotated checklist is given of the 92 hitherto recorded regional spp. The biogeographical affinities of the Far-Eastern odon. fauna are briefly pointed out.

INTRODUCTION

The Far East of Russia is a vast and very heterogeneous territory in northeastern Asia (Fig. 1). The area has attracted the attention of investigators, including odonatologists, rather early. Nevertheless, until recently, its odonate fauna has remained very poorly known, especially so that of the northern districts. The history of dragonfly research in this region is here briefly outlined, and a species list is provided together with remarks on their regional distribution.

HISTORY OF DRAGONFLY RESEARCH IN THE RUSSIAN FAR EAST

The first data on Russian Far-Eastern dragonflies were published by HAGEN (1856a, 1856b). He listed 8 species from the Kamchatka peninsula and 4 species from the Okhotsk Seaboard. MOTSCHULSKY (1859), in a general faunistic article of the Amur Basin, registered the presence of 3 odonate species, but their correct identification was doubtful and the collecting localities were not indicated.

In 1872 the first special work on the dragonflies of northern Asia was published by SELYS-LONGCHAMPS. The author enumerated 44 species, including 8 from Kamchatka, 2 from Okhotsk Seaboard and 9 from the Amur Basin. The data of HAGEN (1856a, 1856b) were included in that list. Unfortunately, there were some obvious mistakes, especially concerning the Okhotsk Seaboard, for which some nearctic species were erroneously included.

In his subsequent work, SELYS-LONGCHAMPS (1887) listed 27 species for

eastern Asia, among which were 2 from South Ussuri (Primorye), 2 from Khabarovsk and Nikolaevsk-upon-Amur vicinities (Lower Amur), and 17 from Upper Amur.

In the first half of the twentieth century new data on the Russian Far East appeared mainly in publications of BARTENEF (1910, 1912, 1913, 1914a, 1914b, 1930, 1956). His data concern such places as Sakhalin, Ussuri district (Primorye), Lower Amur and (partly) Middle Amur. At the same time, the Japanese odonatologists were studying the fauna of Sakhalin (MATSUMURA, 1911; OGUMA, 1915a-c, 1922, 1926, 1932; KONO & TAMANUKI, 1928; OKUMURA, 1942; ASAHINA, 1949) and of the Kurile Islands (OKUMURA, 1942; ASAHINA, 1959). The summarising papers of ASAHINA (1949, 1959) contain evidence on 21 species from Sakhalin and 19 from the Kuriles. The small summary of Kamchatka's fauna by SJÖSTEDT (1927) and VALLE's (1932) paper on northern Asia should also be mentioned among the works of this period.

The data of all these authors, however, except the Japanese investigations of

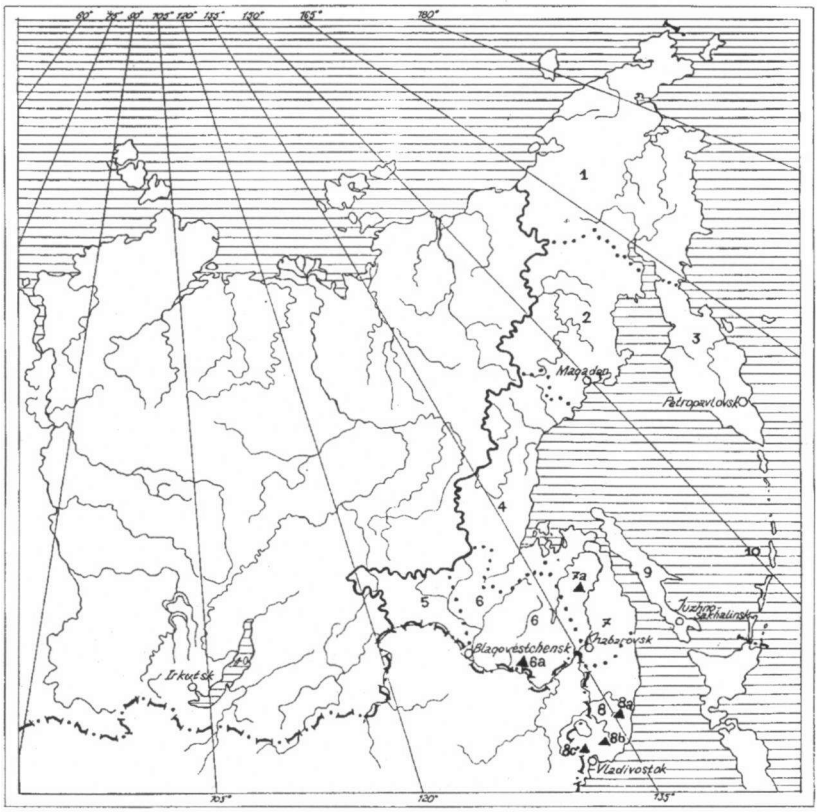

Fig. 1. Biogeographical regions of the Russian Far East. For explanation see the title in Table I.

Sakhalin and Kuriles, were more or less incidental and very fragmentary, mainly based on general insect collections. Systematic studies have been carried out during the last 50 years. It was B.F. Belyshev who investigated several districts of Primorye, mainly in the Monkhukhay River Basin, and who organised the collecting in Lower Amur, Okhotsk Seaboard and in Kamchatka (BELYSHEV, 1956, 1964, 1965a, 1965b, 1966; BELYSHEV & KURENCOV, 1964; BELYSHEV & STEPANCHUK, 1965; BELYSHEV et al., 1976).

During 1970-1990, one of the authors (A.Yu.H.) collected dragonflies in Kamchatka and in southern Primorye. He also examined material brought together by various entomological expeditions of the Siberian Branch of the USSR Academy of Sciences, which had explored the Chukotsk peninsula, Magadan region, Okhotsk Seaboard, Amur Basin, Primorye, and the Russian Far Eastern islands. As a result, the information on the regional fauna has increased but, until recently, the Amur Basin remained largely unexplored. In 1988-1995 the second author (E.I.M.) filled up this gap.

BIOGEOGRAPHY OF THE RUSSIAN FAR-EASTERN ODONATE FAUNA

We have now a fairly complete information on the fauna and distribution of dragonflies of the Russian Far East. The results are summarised in Table I, where all available evidence is combined and annotated. In this Table, the territory of the Russian Far East is divided into 10 large regions, and nature reserves are indicated. Since the latter are not economically exploited and their fauna is protected by law, the data on their odonate fauna are of particular interest.

Naturally, the distribution of different species in this territory is quite irregular. According to the scheme of zoogeographical division into districts (BELYSHEV & HARITONOV, 1981), about 90% of this area belongs to the Siberian subregion of the holarctic region of the boreal faunal realm, and some 10% (Primorye and partially Middle Amur) to the Eastern Asiatic subregion of the Subholarctic region. In spite of its small area, the odonate fauna of the Eastern Asiatic subregion is rather rich and peculiar, being enriched by penetrations of oriental species. In contrast, the dragonfly fauna of the Siberian subregion is comparatively poor, although it has a number of autochthonous elements of the eastern Siberian (Angarian) faunal complex and also some endemic species, such as e.g. *Coenagrion glaciale* and *Leucorrhinia intermedia*.

The number of species is considerably decreasing towards the North, although even in the very harsh climate of the Chukotsk peninsula and the Magadan region, 14 and 16 species have been recorded, respectively. This indicates the high adaptability of some odonate species.

Comparing the Far-Eastern and the North-American odonate faunas, it is easy to notice an almost complete absence of species with Far-Eastern/American or Beringian type of distribution. There are only two exceptions indicated in our Ta-

Table I

Regional occurrence of taxa in the Russian Far East. regions: (1) Chucotsk; — (2) Magadan region; — (3) Kamchatka; — (4) Okhotsk Seabord; — (5) Upper Amur; — (6) Middle Amur, entire region: (6a) Middle Amur, Khingansk Reserve; — (7) Lower Amur, entire region: Komsomolsk Reserve; — (8) Primmorye, entire region: (8a) Primorye, Sikhote-Alin Reserve, (8b) Primorye, Ussuri Reserve, (8c) Primorye, "Kedrovaya pad" Reserve; — (9) Sakhalin; — (10) Kurile Islands. — Indices: (+1) first record in Russia; — (+2) first record in the Russian Far East; — (+3) never confirmed after the first record by BARTENEF (1956); — (+4) by MOTSCHULSKY (1859); — (+5) by HAGEN (1856); — (+6) by BELYSHEV (1973); — (+7) by BARTENEF (1914); — (+8) by BARTENEF (1912); — (+9) by BARTENEF (1915)

Species \ Regions	1	2	3	4	5	6	6a	7	7a	8	8a	8b	8c	9	10
Calopteryx atrata Sel.										+					
C. japonica Sel.			+			+		+	+	+		+			
Mnais pruinosa costalis Sel.															+1
Lestes dryas Kirby	+	+	+	+	+	+	+	+		+		+	+	+	+
L. sponsa (Hans.)				+	+	+	+	+		+		+	+	+	+
L. temporalis Sel.										+		+	+		
Sympecma paedisca (Br.)					+	+	+	+	+	+		+	+		
Mortonagrion selenion (Ris)										+					
Cercion v-nigrum (Needh.)						+				+					
Coenagrion armatum (Charp.)			+	+						+		+			
C. ecornutum (Sel.)						+	+	+	+	+	+	+	+	+	
C. glaciale orientale Bel. & Har.	+	+		+	+	+	+	+	+	+	+				
C. hastulatum (Charp.)						+	+			+					
C. hylas (Trybom)		+	+	+		+	+	+		+		+	+		
C. johanssoni (Wallengren)	+	+	+	+	+	+	+	+	+	+			+		
C. lanceolatum (Sel.)		+	+	+	+	+	+	+	+	+	+	+		+	
C. lunulatum (Charp.)	+	+	+	+	+	+									
Erythromma humerale Sel.				+	+	+	+	+	+	+					
Nehalennia speciosa (Charp.)						+		+	+	+					
Enallagma belyshevi Har.*															+
E. boreale circulatum Sel.															+
E. c. cyathigerum (Charp.)			+			+				+	+	+			
E. nigrolineatum Bel. & Har.	+	+	+											+	
Ischnura asiatica (Br.)						+				+		+	+		
I. elegans (Vander L.)						+2									
Platycnemis pennipes (Pall.)						+2									
P. phyllopoda Djak.										+					
Denticnemis bicolor Bart.										+3					
Aeshna coerulea Ström			+	+				+		+					
A. crenata Hag.	+		+	+	+	+	+	+		+		+	+	+	+
A. juncea angustistyla Oguma														+	
A. juncea orientalis Bart.	+		+	+	+	+	+	+		+	+	+	+		+
A. mixta Latr.						+4					+				
A. palmata Hag.			+3												
A. subarctica elisabethae Djak.	+		+	+											
A. viridis Eversm.						+				+					
Anax junius (Dru.)			+												
A. parthenope julius Br.										+		+	+		
Aeschnophlebia kolthoffi Sjöst.										+			+		
A. zygoptera Bel.										+					
Anisogomphus maacki (Sel.)						+2									
Shaogomphus schmidti (Asahina)										+					
S. postocularis epophthalmus (Sel.)						+				+					

Stylurus annulatus (Djak.)										+					
S. flavipes (Charp.)					+	+		+	+					+	
Davidius lunatus (Bart.)										+		+			
Trigomphus citimus (Needh.)					+	+		+	+	+					
Nihonogomphus ruptus (Sel.)					+	+		+		+		+		+	
Ophiogomphus obscurus Bart.						+		+		+	+	+		+	
Sieboldius albardae Sel.						+		+		+					
Gomphidia confluens Sel.						+1									
Sinictinogomphus clavatus (Fabr.)										+					
Anotogaster sieboldii (Sel.)														+	+
Cordulia aenea amurensis Sel.		+	+	+	+	+		+	+	+	+			+	
Epitheca bimaculata sibirica Sel.			+	+	+	+		+	+	+				+	
Somatochlora alpestris (Sel.)		+2				+2	+2								
S. arctica (Zett.)	+		+	+		+	+	+		+	+	+	+	+	+
S. g. graeseri Sel.	+	+	+	+	+	+	+	+		+	+	+	+	+	+
S. japonica Matsumura														+	+
S. metallica exuberata Bart.			+			+	+	+		+		+	+		
S. s. sahlbergi Trybom	+	+	+	+											
S. uchidai Förster			+												+
S. v. viridiaenea (Uhler)						+		+		+				+	+
Epophthalmia elegans (Br.)						+				+					
Macromia bartenevi Bel.						+6									
M. sibirica Djak.						+				+					
Leucorrhinia dubia orientalis Bel.	+	+	+	+	+	+	+	+		+	+		+	+	+
L. intermedia Bart.	+	+	+	+	+	+	+	+		+					
L. ussuriensis Bart.				+7						+7					
Libellula quadrimaculata orientalis Bel.		+	+	+	+	+	+	+		+	+		+	+	+
Lyriothemis pachygastra (Sel.)										+					
Orthetrum albistylum speciosum (Uhler)						+				+					
O. melania (Sel.)															+
Deielia phaon (Sel.)										+					
Neurothemis fluctuans (Fabr.)										+8					
Sympetrum baccha matutinum Ris										+					
S. cordulegaster (Sel.)						+	+	+		+	+	+	+		
S. croceolum (Sel.)						+				+		+			
S. danae (Sulz.)		+	+	+	+	+	+	+	+	+	+	+	+	+	+
S. depressiusculum (Sel.)						+	+	+	+	+		+	+		
S. e. eroticum (Sel.)						+	+	+	+	+		+	+		
S. flaveolum (L.)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
S. frequens (Sel.)			+	+		+		+		+	+	+	+	+	+
S. ignotum Needh.						+1									
S. infuscatum (Sel.)										+		+	+		+
S. kunckeli (Sel.)										+9					
S. parvulum (Bart.)						+				+		+	+		
S. pedemontanum elatum (Sel.)															+
S. pedemontanum kurentzovi Bel.						+	+	+	+	+	+	+	+	+	
S. risi Bart.						+				+		+	+		
S. striolatum imitoides Bart.										+		+	+	+	+
S. uniforme (Sel.)				+		+		+	+	+		+	-		
S. vulgatum fuscopterum Bel.				+						+			+		
S. vulgatum imitans (Sel.)					+	+				+				+	
Pantala flavescens (Fabr.)			+			+		+		+		+	+	+	+
Total	14	16	28	27	22	58	25	37	24	71	16	34	25	27	23

* A revision of the status of this taxon is to be published shortly by Dr D.R. Paulson. — [Eds]

ble, namely *Aeshna palmata* and *Anax junius*. The former was recorded from Kamchatka by HAGEN (1956a, 1956b), but the record has never been confirmed, it might have been based on an erroneously labelled specimen. The latter species was found in Kamchatka by HAGEN (1856a, 18568b), and by BARTENEF (1913), and if there are no errors involved, its penetration from America into northern Asia must have taken place in comparatively recent times, as a result of typhoons (BELYSHEV & HARITONOV, 1981)

As a whole, the odonate fauna of the Russian Far East is rather closely related to the European one and does not have close relationships with the American fauna. The origin of the range of the small number (6) of holarctic species remains unknown.

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