

GENERALIZED CONDITION OF DRAGONFLY (ODONATA) LARVAE OF LAKES AROUND KURA

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Abstract. The article provides information on the species composition and distribution of dragonfly larvae inhabiting the inland water basins of Azerbaijan (Aggol, Mehman, Nakhalkhchala, Hajigabul, Garaoglan, Yetim Kur, Marzli, Garkhun, Aynali). The article describes the species composition and distribution of dragonfly larvae inhabiting the inland water basins (Aggol, Mehman, Nakhalkhchala, Hajigabul lakes and Garaoglan, Yetim Kur, Marzli, Garkhun, Aynali) of Azerbaijan by seasons. Larvae are considered one of the most important tools for malaria prevention. At the same time, the larvae of dragonflies form the basis of the feed of fish and other aquatic animals.

Keywords: *Odonata, Larva, imago, dragonfly.*

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1. Introduction

Dragonflies are a species of Arthropods, a large and important group of invertebrates, this is one of the most important groups of insects (Insecta), which includes a group of animals leading two ways of life.

They spend the first, relatively long stages of their development in the aquatic environment, and the subsequent and relatively short stages in the terrestrial environment - in the air. Hydrobiologists study the species composition, quantity, importance and distribution of dragonflies in the aquatic environment, and entomologists study the development in the terrestrial environment - that is, the imago stages. Regardless of the environment in which they live, they play an important role in the continuous flow of matter and energy in nature (Guliyeva, 2016).

They spend the first, relatively long stages of their development in the aquatic environment, and the subsequent and relatively short stages in the terrestrial environment - in the air. Hydrobiologists researching the species composition, quantity, importance, and distribution of dragonflies in the aquatic environment, and entomologists.

Thus, in the aquatic environment, they form the basis of the diet of fish and other aquatic animals, in the dry (air) environment, they feed on mosquitoes, gnats and other pests and play an important role in regulating the number of these animals, they themselves become victims of vertebrates (reptiles, birds, etc.). About the biodiversity of such important dragonfly larvae formed in our water basins There is no information in the scientific literature on the study of their species composition, except for the research conducted by Gasimov in the reservoirs of the Lankaran natural region in the 40s of the XX century. However, it should be noted that in various hydrobiological studies, researchers of macrobenthos have given some information about the presence of one or

another dragonfly larvae in the benthos of aquifers (Dengina, 1949). Summarizing the information on dragonfly larvae until the 50s of the XX century, A. Bogachyov (1951) states that 47 species of dragonfly larvae were recorded in the freshwater fauna of Azerbaijan. Later this list was compiled by various hydrobiologists (Gasimov, 1965, 1972; Eyvazova, 1966; Abbasov, 1969; Khalilov, 1997; Sofiyev, 1969; Aliyev, 1971; Safarov, 1971; Abdurrahmanova, 1982 and others) significantly enriched their research.

It should also be noted that the species recorded before the 70s of the last century were summarized in Gasimov's book "Presnovodnaya fauna of the Caucasus" (1972). After the 1970s, the species recorded by different researchers in different years and in different reservoirs were scattered in different articles in a retail situation. This article aims to gather, systematize, analyze, and summarize information about the species of larvae in the retail state by showing them the area in which they are distributed and the watersheds (Mammadov *et al.*, 2019).

2. Comparative analysis of the collected results

Summarizing the information, we have collected about the larvae of dragonflies (Odonata), which are the object of our research, and their distribution in lakes (Guliyeva, 2015) and reservoirs (Aggol, Mehman, Nakhalikhchala, Hajigabul, Garaoglan, Yetim Kur, Marzli, Garkhun, Aynali), we can say the following (Aliyev, 2018).

At present, 4500 species of dragonfly larvae have been recorded in the world (Gasimov, 2004). 61 species belonging to 23 genera of 5 seasons were registered in the freshwater basins of the republic. The vast majority of dragonfly larvae in our reservoirs belong to the families Coenagrionidae (17 species) and Libellulidae (14 species). The genus Aeschnidae (8) is represented by species, Lestidae (7) by species, Gomphidae and Corduliidae (5) by species, Calopterygidae (2) and finally Euphalidae, Platycnemididae and Cordulegasteridae by only one species.

Now let's pay attention to the distribution of dragonfly larvae in the water bodies of the republic. Here we have highlighted in which water bodies one or another species of species are found.

Table 1. Species and distribution of dragonfly larvae (Odonata, larvae) in lakes and ditches around the Kura in 2012-2016

No	Reservoirs around the Kura Species	Aggol	Mehman	Nakhalikhchala	Hajigabul	Yetim Kur	Garaoglan	Garkhun	Marzli	Aynali
1	2									
	Type: Arthropod									
	Class: Insecta									
	Group: Odonata									
	H/ group: Zygoptera									
	Family 1.Euphalidae									
1	<i>Epallage fatime</i> Charpentier, 1840		+							

1	2	3	4	5	6	7	8	9	10	11
	Family2. Calopterygidae									
2	<i>Calopteryx virgo</i> Linnaeus, 1758	+		+		+		+	+	+
3	<i>C.splendens</i> Harr.					+	+			
	Family 3. Lestidae									
4	<i>Lestes viridis</i> Vander Linden , 1825			+		+		+		+
5	<i>L.virens</i> Charpentier, 1825	+	+							
6	<i>L.barbarus</i> Fabricius, 1798	+			+		+		+	
7	<i>L.sponsa</i> Hansemann, 1823	+	+		+		+		+	
8	<i>L.dryas</i> Kirby, 1890		+							
9	<i>Sympecma fusca</i> Vander Linden, 1823		+	+	+	+	+	+	+	+
10	<i>S.paedisca</i> Brauer, 1877			+	+					
	Family 4. Platycnemididae									
11	<i>Platycnemis pennipes</i> Pallas, 1771	+	+							
	Family 5. Coenagrionidae									
12	<i>Ischnura elegans</i> Vander Linden,1820	+	+	+	+	+	+	+	+	+
13	<i>I.pumilio</i> Charpentier, 1825	+	+		+		+		+	
14	<i>Enallagma cyathigerum</i> Charpentier, 1840			+	+			+	+	+
15	<i>Coenagrion concinnum</i> Iohanson, 1859						+			
16	<i>C.puella</i> Linnaeus, 1758	+	+	+	+	+	+	+	+	+
17	<i>C.hastulatum</i> Charpentier, 1825		+	+	+					
18	<i>C.armatum</i> Charpentier, 1840	+		+	+			+	+	
19	<i>C.vernale</i> Hagen,1839							+	+	
20	<i>C.lindenii</i> Selys,1840							+		
21	<i>C. lunulatum</i> Charpentier, 1840	+			+		+	+	+	
22	<i>C. pulchellum</i> Vander Linden, 1825	+		+	+					
23	<i>C.mercuriale</i> Charpentier, 1840	+	+	+	+	+	+			
24	<i>C.scitulum</i> Rambur, 1842	+	+	+	+	+	+	+	+	+
25	<i>C.johanssoni</i> Wallengren, 1894	+	+	+	+	+	+	+	+	+
26	<i>Erythromma lindenu</i> Selys, 1840	+		+	+		+		+	+
27	<i>E.najas</i> Hansemann, 1823		+	+	+	+	+	+	+	
28	<i>E.viridulum</i> Charpentier, 1840		+	+	+		+	+	+	+
	H/ group: Anisoptera									
	Family1. Gomphidae									
29	<i>Lindenia tetraphylla</i> Vander Linden, 1825			+	+					
30	<i>Gomphus pulchellum</i> Selys, 1840		+	+			+		+	+
31	<i>G. flavipes</i> Carpentier,1825									+
32	<i>G.vilgatissimus</i> Linnaeus, 1758			+						
33	<i>Ophiogomphus cecilia</i> Fourcroy, 1785					+				
	Family 2. Aeschnidae									
34	<i>Brachytron pratense</i> (Müller, 1764)				+					
35	<i>Aeschna juncea</i> Linnaeus, 1758		+			+		+	+	+
36	<i>A.affinis</i> Vander Linden, 1820	+		+	+		+			
37	<i>A.grandis</i> Linnaeus, 1758	+			+	+				
38	<i>A.cyanea</i> Müller, 1764	+			+		+			
39	<i>A.viridis</i> Eversman, 1836	+								
40	<i>Anax imperator</i> Leach, 1815	+			+		+	+	+	+
41	<i>A.parthenope</i> Selys, 1839				+					
	Family 3. Cardulegastridae									
42	<i>Cordulegaster</i> sp.					+	+			
	Family4. Corduliidae									
43	<i>Cordulia aenea</i> (Linnaeus, 1758)			+						

1	2	3	4	5	6	7	8	9	10	11
44	<i>Cordulia sp.</i>		+					+		
45	<i>Epiptera bimaculata</i> (Charpentier, 1825)			+						
46	<i>Somatochlora arctica</i> Zetterstedt, 1840						+			
47	<i>S. metallica</i> Vander Linden, 1825		+							
	Family 5. Libellulidae									
48	<i>Orthemum brunneum</i> Fonscolombe, 1837			+	+		+		+	+
49	<i>O. cancellatum</i> Linnaeus, 1758		+							
50	<i>O. albistylum</i> Selys, 1848	+	+							
51	<i>Libellula depressa</i> Linnaeus, 1758	+	+	+	+	+	+	+	+	+
52	<i>L. quadrimaculata</i> Linnaeus, 1758		+							
53	<i>L. fulva</i> Müller, 1764		+		+					
54	<i>Crocothemis erythraea</i> Brulle, 1832			+	+		+			
55	<i>Sympetrum danae</i> Sulzer, 1776	+			+					
56	<i>S. flaveolum</i> Linnaeus, 1758	+			+					
57	<i>S. depressiusculum</i> Selys, 1841				+			+		
58	<i>S. vulgatum</i> Linnaeus, 1758	+	+		+	+	+	+	+	+
59	<i>S. striolatum</i> Charpentier, 1840	+		+	+					
60	<i>S. sanguineum</i> Müller, 1764	+	+		+					
61	<i>S. meridionale</i> Selys, 1841	+		+	+			+	+	+
	Total (61)	28	26	28	36	16	25	21	23	18

Table 2. Species composition and distribution of dragonfly larvae (Odonata, larvae) in lakes and reservoirs around the Kura basins in 2020

1	Species	Reservoirs around the Kura								
		Aggol	Mehman	Nakhalkhchala	Hajigabul	Yetim Kur	Garaoglan	Garkhun	Marzi	Aynali
2	3	4	5	6	7	8	9	10	11	
	Type: Arthropod									
	Class: Insecta									
	Group: Odonata									
	H/ group: Zygoptera									
	Family1. Euphalidae									
1	<i>Epallage fatime</i> Charpentier, 1840		+							
	Family2. Calopterygidae									
2	<i>Calopteryx virgo</i> Linnaeus, 1758	+		+		+		+		
3	<i>C. splendens</i> Harr.							+		
	Family 3. Lestidae									
4	<i>Lestes viridis</i> Vander Linden, 1825					+		+	+	
5	<i>L. virens</i> Charpentier, 1825	+	+	+						+
6	<i>L. barbarus</i> Fabricius, 1798	+			+	+	+		+	+
7	<i>L. sponsa</i> Hansemann, 1823	+	+		+	+	+		+	+
8	<i>L. dryas</i> Kirby, 1890							+		
9	<i>Sympetma fusca</i> Vander Linden, 1823		+			+		+		
10	<i>S. paedisca</i> Brauer, 1877				+					
	Family 4. Platycnemididae									
11	<i>Platycnemis pennipes</i> Pallas, 1771	+	+	+						+

1	2	3	4	5	6	7	8	9	10	11
	Family 5. Coenagrionidae									
12	<i>Ischnura elegans</i> Vander Linden, 1820	+	+	+	+	+	+	+	+	+
13	<i>I. pumilio</i> Charpentier, 1825	+	+		+		+		+	+
14	<i>Enallagma cyathigerum</i> Charpentier, 1840	+								
15	<i>Coenagrion concinnum</i> Iohanson, 1859	+	+		+					
16	<i>C. puella</i> Linnaeus, 1758		+	+	+	+	+	+		+
17	<i>C. hastulatum</i> Charpentier, 1825	+	+		+					+
18	<i>C. armatum</i> Charpentier, 1840	+						+	+	
19	<i>C. vernale</i> Hagen, 1839	+		+						+
20	<i>C. lindeni</i> Selys, 1840	+		+						+
21	<i>C. lunulatum</i> Charpentier, 1840				+					
22	<i>C. pulchellum</i> Vander Linden, 1825	+		+	+					
23	<i>C. mercuriale</i> Charpentier, 1840	+	+			+	+	+		
24	<i>C. scitulum</i> Rambur, 1842	+	+	+	+	+	+	+	+	+
25	<i>C. johanssoni</i> Wallengren, 1894					+				
26	<i>Erythromma lindenu</i> Selys, 1840								+	
27	<i>E. najas</i> Hansemann, 1823	+	+			+	+	+	+	
28	<i>E. viridulum</i> Charpentier, 1840	+	+				+	+	+	
	H/ group: Anisoptera									
	Family 1. Gomphidae									
29	<i>Lindenia tetraphylla</i> Vander Linden, 1825	+		+	+					
30	<i>Gomphus pulchellum</i> Selys, 1840						+			
31	<i>G. flavipes</i> Charpentier, 1825		+							
32	<i>G. vilgatisimus</i> Linnaeus, 1758							+		
33	<i>Ophiogomphus cecilia</i> Fourcroy, 1785					+				
	Family 2. Aeschnidae									
34	<i>Brachytron pratense</i> (Müller, 1764)							+		
35	<i>Aeschna juncea</i> Linnaeus, 1758		+			+			+	
36	<i>A. affinis</i> Vander Linden, 1820				+		+			+
37	<i>A. grandis</i> Linnaeus, 1758	+		+	+	+	+			
38	<i>A. cyanea</i> Müller, 1764	+		+	+		+			+
39	<i>A. viridis</i> Eversman, 1836	+								
40	<i>Anax imperator</i> Leach, 1815	+		+	+	+		+	+	
41	<i>A. parthenope</i> Selys, 1839				+			+		
	Family 3. Cordulegastridae									
42	<i>Cordulegaster</i> sp.					+				
	Family 4. Corduliidae									
43	<i>Cordulia aenea</i> (Linnaeus, 1758)		+							
44	<i>Cordulia</i> sp.		+							
45	<i>Epitheca bimaculata</i> (Charpentier, 1825)			+						
46	<i>Somatochlora arctica</i> Zetterstedt, 1840			+						
47	<i>S. metallica</i> Vander Linden, 1825						+			
	Family 5. Libellulidae									
48	<i>Orthetrum brunneum</i> Fonscolombe, 1837							+		
49	<i>O. cancellatum</i> Linnaeus, 1758		+							
50	<i>O. albistylum</i> Selys, 1848	+	+							
51	<i>Libellula depressa</i> Linnaeus, 1758	+	+	+	+	+	+	+		+
52	<i>L. quadrimaculata</i> Linnaeus, 1758									+
53	<i>L. fulva</i> Müller, 1764		+		+					
54	<i>Crocothemis erythraea</i> Brulle, 1832								+	

1	2	3	4	5	6	7	8	9	10	11
55	<i>Sympetrum danae</i> Sulzer, 1776	+		+	+					+
56	<i>S.flaveolum</i> Linnaeus, 1758	+		+	+					+
57	<i>S.depressiusculum</i> Selys, 1841				+		+			
58	<i>S.vulgatum</i> Linnaeus, 1758	+	+	+	+	+		+	+	+
59	<i>S.striolatum</i> Charpentier, 1840	+								
60	<i>S.sanguineum</i> Müller, 1764	+	+							
61	<i>S.meridionale</i> Selys, 1841	+		+	+				+	
	Total (61)	31	24	20	24	18	16	19	15	19

3. Conclusion

According to the results (Table 1), in the lakes and reservoirs around the Kura, Aggol - 28, Mehman - 26, Nakhchivan - 28, Hajigabul - 36, Yetim Kur - 16, Garaoglan - 25, Garkhun - 21, Marzli - 23 and Aynali - 18 species are represented. According to the number of species in the inland water basins of the country, Coenagrion is the first with 11 species, Sympetrum and Aeschna are the second with 6 species, and Lestes is the third with 5 species. The remaining genera are represented by 1 - 3 species (Guliyeva 2019).

To determine the species composition of dragonfly larvae in lakes and reservoirs, a seasonal researching was carried out in 2020 (Table 2). According to the results of the researching, Aggol - 31, Mehman - 24, Nakhlikhchala - 20, Hajigabul - 24 and Etim Kur - 18, Garaoglan - 16, Garhun - 19, Marzli - 15, Ainali - 19 species of dragonfly larvae were registered in the lakes. Improvement in hydrological conditions also influenced the number of species, the intensity of encounters and quantitative indicators (Guliyeva, 2020).

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