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Review of literature and established mayfly species (Ephemeroptera, Insecta) from Bulgaria

[Übersicht über die Literatur und die festgestellten Eintagsfliegenarten (Ephemeroptera, Insecta) in Bulgarien]

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With 1 Table

Schlagwörter: Pseudocentroptilum, Ephemeroptera, Insecta, Bulgarien, Faunistik, Bibliographie

A review of the 102 species of Ephemeroptera so far recorded for the Bulgarian fauna and the references is provided. The larva of *Pseudocentroptilum pulchrum* is reported for Bulgaria for the first time.

Es wird eine Übersicht über die bisher festgestellten 102 Ephemeroptera-Arten der bulgarischen Fauna und die zugehörige Literatur gegeben. Die Larve der Art *Pseudocentroptilum pulchrum* wird zum ersten Mal für Bulgarien gemeldet.

The earliest reports of larvae of Ephemeroptera came from the German specialist SCHOENEMUND (1926) who determined 7 genera through material sent to him by W. Arndt. So far 102 taxa of the order of the bulgarian fauna have been published, 26 of them as larvae and imago, 12 as imago and 63 as larvae, comprising 32 genera and 15 families. 99 of them were determined to species and 2 to variety (Table 1).

The report of the find of a larva of *Thraulus* sp. by P. Beron in a pond near Karaach river near the Black Sea Coast (RUSSEV 1971) probably refers to the species *Thraulus thraker* (reported by JACOB 1988 for the Ropotamo, a tributary to the Black Sea). However the larva of this species has not yet been described.

Pseudocentroptilum pulchrum reported in this paper for the first time was found by students in April 1987 in the Harmanliiska river at the village of Malevo.

Enormous material of larvae of *Ecdyonurus* and *Rhithrogena* have been gathered in the course of hydrobiological and saprobiological expeditions along all Bulgarian water catchments awaits processing. The published results from this expedition provides faunistic data on the distribution of hydrofauna and larvae of Ephemeroptera in Bulgarian water catchment while the tables of hydrochemical studies and the saprobiological state of the river, indicating the current ecological situation. These studies involved the following rivers or water catchments: the Iskar (RUSSEV 1959; JANEVA & RUSSEV 1989); the rivers of Vitosha, tributaries of the Iskar river (RUSSEV 1961); the Arda (RUSSEV 1964); Maritsa (RUSSEV 1966, 1967; RUSSEV & al. 1981; UZUNOV & al. 1984); Rhodopes mountains (RUSSEV & JANEVA 1975); Ossam (RUSSEV 1977; RUSSEV &

Tab. 1: Larvae and imagines of mayflies from Bulgarian fauna published for the first time. L = Larvae; I = Imagines

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Autoren	Buresch	Caspers	Russev	Russev	Russev	Russev	Russev	Russev	MLuiellenra-u	Russev	Jacob	Sowa	Jacob	RJuasnseva &	Puthz	Braasch	Uzlu.nov &	Soldan	Raus.sev &	JBarcaoabsch &	BSroaladsanh &	Barla.asch &	BRuasasevh &	Saolw.a &	Jacob	Raussev &	Rpurssenvt publ.
Publikationsjahr	1936	1951	1957	1959	1960	1964	1966	1968	1969	1971	1972	1973	1974	1975	1977	1980	1981	1982	1984	1984	1985	1985	1986	1988	1988	1991	
SIPHLONURIDAE					L																						
Siphlonurus aestivalis (EATON)					L																						
S. armatus EATON					I																						
S. lacustris EATON			L																								
RALLIDENTIDAE					L																						
Ameletus inopinatus EATON																											
Metreletus balcanicus (ULMER)					L										LI												I
BAETIDAE																											
Baetis alpinus (PICTET)																											
B. atrebatinus EATON														L													
B. buceratus EATON									L																		
B. fuscatus (LINNÉ)														L													
B. gemellus EATON														L													
B. lutheri MUELLER-LIEBENAU									L																		
B. macani KIMMINS																	L										
B. melanonyx (PICTET)					L																						
B. muticus (LINNÉ)					L																						
B. niger LINNÉ														L													
B. pavidus GRANDI														L													
B. pentaphlebodes UJHELYI																			L								
B. rhodani (PICTET)			LI																								
B. scambus EATON					L																						
B. sinaicus (BOGOESCU)														L													
B. tracheatus KEFFERMUELLER & MACHEL																	L										
B. tricolor TSCHERNOVA					L																						
B. vardarensis IKONOMOV						L																					
B. vernus CURTIS					L																						
Raptobaetopus tenellus (ALBARDA)											L																
Centroptilum luteolum (MUELLER)					L																						

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Pseudocentroptilum nanum (BOGOESCU)																										L	
P. pennulatum (EATON)						L																					
P. pulchrum (EATON)1																											L
Cloeon dipterum (LINNÉ)		L	I																								
Cl. simile EATON			L																								
Procloeon bifidum (BENGTSSON)					L																						
OLIGONEURIIDAE																											
Oligoneuriella pallida HAGEN							L																				
O. rhenana (IMHOF)			L		L																						
AMETROPODIDAE																											
Ametropus fragilis ALBARDA				L																							
ISONYCHIIDAE																											
Isonychia ignota WALKER			L																								
HEPTAGENIIDAE																											
Epeorus alpicola (EATON)			L																								
E. sylvicola (PICTET)			L																								I
Iron yougoslavicus SAMAL																LI											
Rhithrogena braaschi JACOB													I														
Rh. bulgarica BRAASCH, SOLDAN & SOWA																						I		L			
Rh. buresi SOWA												LI															
Rh. diaphana NAVAS	I																										
Rh. hybrida EATON					L																						
Rh. iridina KOLENATI																						I					
Rh. loyolaea NAVAS					L																						
Rh. semicolorata (CURTIS)			LI																								
Rh. sowai PUTHZ																						I					
Rh. thracica SOWA, SOLDAN & BRAASCH																								LI			
Ecdyonurus affinis (EATON)											L												I				
E. aurantiacus BURMEISTER											L												I				
E. carpaticus vitoschensis JACOB & BRAASCH																				I							
E. dispar (CURTIS)						L																					
E. forcipula (PICTET)														L													
E. helveticus (EATON)			I																								
E. insignis (EATON)			LI																								
E. macani THOMAS &SOWA																							LI				
E. picteti MEYER-DUERR														L													
E. russevi BRAASCH & SOLDAN																					I						
E. subalpinus KlAPALEK																	L										
E. submontanus LANDA																							LI				
E. torrentis KIMMINS							L																				
E. venosus FABRICIUS																											
Electrogena lateralis (CURTIS)	I		LI																								
E. macedonica (IKONOMOV)						L																					
E. quadrilineata (LANDA)																	L										

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Heptagenia coerulans (ROSTOCK)			L																								
H. flava (ROSTOCK)			L																								I
H. fuscogrisea (RETZIUS)			L																				I				
H. longicauda (STEPHENS)							L																				
H. sulphurea (MUELLER)				L																							
EPHEMERELLIDAE																											
Ephemerella ignita (PODA)			LI																								
Eph. maculocaudata IKONOMOV																		LI									
Eph. major (KLAPALEK)						L																					
Eph. mesoleuca (BRAUER)							L																				
Eph. mucronata BENGTSSON						L																					
Eph. mucronata unicolorata (IKONOMOV)																		L									
Eph. notata EATON			L																								
NEOEPHEMERIDAE																											
Neoephemera maxima (JOLY)										L																	
CAENIDAE																											
Caenis horaria (LINNÉ)			L		I																						
C. luctuosa BURMEISTER			L																								
C. macrura STEPHENS			L																								
C. rivulorum EATON						L																					
C. robusta EATON				L																							
Brachycercus harrisella CURTIS1				L																							
Cercobrachis minutus (TSHERNOVA)								L																			
LEPTOPHLEBIIDAE																											
Choroterpes picteti (EATON)			L																						I		
Thraulus thraker JACOB																											
Thraulus sp.										L																	
Paraleptophlebia cincta (RETZIUS)							L																				
P. lacustris IKONOMOV																										L	
P. submarginata (STEPHENS)			L																								
Habroleptoides confusa SARTORI & JACOB			L																								
Habrophlebia eldae JACOB & SARTORI																									LI		
H. fusca (CURTIS)						L																					
H. lauta EATON			L																								
POLYMITARCIDAE																											
Ephoron virgo (OLIVIER)			LI																								
PALINGENIIDAE																											
Palingenia longicauda (OLIVIER)	I		L																								
EPHEMERIDAE																											
Ephemera danica MUELLER			LI																								
Eph. lineata EATON										LI																	
Eph. vulgata LINNÉ	I		L																								
POTAMANTHIDAE																											
Potamanthus luteus (LINNÉ)			L		I																						

al. 1984); Tundzha (RUSSEV & al. 1984; JANEVA & RUSSEV 1985); Tsibritsa (RUSSEV & JANEVA 1985); Mesta (KOVACHEV & UZUNOV 1986); Struma (UZUNOV & KOVACHEV 1987); Russenski Lom (RUSSEV & al. 1987, 1988); Ogosta (JANEVA, 1991); Lom (RUSSEV & JANEVA 1991) and Jantra (RUSSEV & JANEVA in print).

Biological data on Ephemeroptera have been published in other studies. On migrations and compensation flights studies of RUSSEV (1959 b, 1972, 1973); on the characteristics of growth related to ecological conditions NACHEV (1979); on the significance of Ephemeroptera as bioindicators RUSSEV (1979) and JANEVA (1979); on productivity of Ephemeroptera in the strech of the Iskar river RUSSEV & DOSHKINOVA (1985); on the ecology of the Danube and the tributaries of the Black Sea RUSSEV (1968) and RUSSEV & al. (1991); on the significance of the Maritsa river in comparison with other benthos groups RUSSEV & JANEVA(1983); on the ecology, biology and distribution of *Palingenia longicauda* RUSSEV (1987); on extinct and threatened Ephemeroptera of Bulgarian fauna RUSSEV (1992).

References

BRAASCH, D. (1980): Iron yougoslavicus Samal neu für Italien und Bulgarien (Insecta, Ephemeroptera, Heptageniidae).- Faun. Abh. Mus. Tierk. Dresden **8**: 1-81, Dresden.

BRAASCH, D. & T. SOLDAN (1985):. Ein neuer Ecdyonurus der ruffii-Gruppe aus Bulgarien (Heptageniidae, Ephemeroptera).- Entomol. Nachr. Ber. **29**: 67-68, Dresden.

BRAASCH, D., T. SOLDAN & R. SOWA (1985) Rhithrogena bulgarica n. sp. und zwei für die Fauna Bulgariens neue Eintagsfliegenarten (Ephemeroptera, Heptageniidae).- Faunist. Abhandl. Staatl. Mus. Tierk. Dresden **12**: 125-127, Dresden.

BRAASCH, D. & B. RUSSEV (1986): Zur Kenntnis der Heptageniidae - Fauna (Ephemeroptera) Bulgariens I.- Acta Zool. Bulg. **32**: 48-51, Sofia.

BURESCH, I. (1936): Beitrag zur Kenntnis der Neuropterenfauna Bulgariens.- Mitt. Bulg. Entom. Gemein. **9**: 135-150 [in Bulg.].

CASPERS, H. (1951): Biozoenotische Untersuchungen über die Strandarthropoden im bulgarischen Küstenbereich des Schwarzen Meeres.- Hydrobiologia **3**: 131-193, Den Haag.

JACOB, U. (1972): Beitrag zur autochthonen Ephemeropterenfauna in der Deutschen Demokratischen Republik.- 158 S., Diss. Fak. Math. Naturw. Karl-Marx-Univ. Leipzig.

JACOB, U. (1974): Rhithrogena braaschi n.sp., eine neue Heptageniidae aus Bulgarien (Insecta, Ephemeroptera).- Entom. Nachrichten u. Ber. **18**: 167-174, Dresden.

JACOB, U. (1988): Thraulus thraker sp.n.aus Bulgarien (Insecta, Ephemeroptera: Leptophlebiidae).- Reichenbachia **26**: 1-3, Dresden.

JACOB, U. & D. BRAASCH (1984): Neue und statusrevidierte Taxa der Ecdyonurus helveticus-Großgruppe (Ephemeroptera, Heptageniidae).- Entomol. Abh., Staatl. Mus. Tierk. Dresden **48**: 53-61, Dresden.

JANEVA, I. (1979): Einige Vertreter der Gattung Baetis (Ephemeroptera) als limnosaprobe Bioindikatoren.- Proc. II. Int. Conf. Ephemeroptera Krakow: 139-144.

JANEVA, I. (1991): Saprobiological state of the river Ogosta in various periods of stady.- Hydrobiology **36**: 32-48, Sofia [in Bulg.].

JANEVA, I. & B. RUSSEV (1985): Trends in changes of the hydrobiological and saprobiological state of the Tundhza river. II. May-November, 1981.- Hydrobiology **26**:15-36, Sofia [in Bulg.].

JANEVA, I. & B. RUSSEV (1989): Saprobiological state of the Iskar River in the initial years following the putting into operation of the Sofia purifying station.- Hydrobiology **34**: 3-18, Sofia [in Bulg.].

KOVACHEV, S. & Y. UZUNOV (1986): Formation of macroinvertebrate communities in the course of the biological selfpurification of the Mesta river.-Arch. Hydrobiol. Suppl. **72** (Monograph. Beitr.): 427-526, Stuttgart.

MÜLLER- LIEBENAU, I. (1969): Revision der europäischen Arten der Gattung Baetis Leach, 1815 (Insecta, Ephemeroptera).- Gewässer und Abwässer **48/49**: 1-214, Krefeld.

NATSCHEV, N. (1979): Die Größencharakteristiken der Larven als Quelle ökologischer und biologischer Information bei der Art Epeorus assimilis Eaton Ephemeroptera).- Hydrobiology **8**: 44-57, Sofia.

PUTHZ, V. 1977. Über die europopäschen Arten der Gattung Metreletus Demoulin (Siphlonuridae, Ephemeroptera).- Philippia **3**: 199-205, Kassel.

RUSSEV, B. (1957): Beitrag zur Kenntnis der Eintagsfliegen (Ephemeroptera) Bulgariens.- Bull. Inst. Zool. Sofia **6**: 558-563 [in Bulg.].

RUSSEV, B. (1959): Beitrag zur Erforschung des Makrobenthos der Donau am bulgarischen Ufer.- Compt. Rend. Acad. Bulg. Sci. **12,(4)**: 345-348, Sofia.

RUSSEV, B. (1959a): Influence of industrial waste waters upon life in Arda and Iskur rivers.- Nature **4**: 50-55, Sofia [in Bulg.].

RUSSEV, B. (1959b.): "Vol de compensation pour la ponte" de Palingenia longicauda (Oliv.) (Ephem.) contre le courant du Danube.- Compt. Rend. Acad. Bulg. Sci.**12(2)**: 165-168, Sofia.

RUSSEV, B. (1960): Neue Eintagsfliegen für die Fauna Bulgariens.- Beitr. Ent. **10**: 697-705, Berlin.

RUSSEV, B. (1961): Hydrobiologische Untersuchungen an einigen Bächen des Vitosa Gebirges.- Bull. Zool. Inst. Sofia **10**: 211-265; Sofia [in Bulg.].

RUSSEV, B. (1964): Hydrobiologische Untersuchungen der Arda und einiger ihrer Nebenflüsse.- Bull. Inst. Mus. Zool. Sofia **17**: 5-49, Sofia [in Bulg.].

RUSSEV, B. (1966): Hydrobiologische Untersuchungen der Marica. I.- In: Die Fauna Thrakiens"III.- Zool. Inst., Mus., BAW, Sofia: 231-291 [in Bulg.].

RUSSEV, B. (1966a): Ephemeropteren und Plecopteren aus bulgarischen Höhlen.- Intern. J. Speleology **2**: 191-194, Lehre.

RUSSEV, B. (1967): Hydrobiologische Untersuchungen der Marica. II. Saprobiologische Bewertung für die Jahre 1965 und 1966.- Bull. Inst. Zool. Mus Sofia **25**: 87-99, Sofia [in Bulg.].

RUSSEV, B. (1968): Ökologische Untersuchungen über die Ephemeropterenlarven der Donau vor dem bulgarischen Ufer.- Limnol. Berichte, 10. Jubiläumstag. Donauforsch. Sofia: 295-303.

RUSSEV, B. (1971): New representatives of Ephemeroptera and Plecoptera (Insecta) for the Fauna of Bulgaria.- Bull. Inst. Zool. Mus. Sofia **33**: 111- 114, Sofia [in Bulg.].

RUSSEV, B. (1972): Über die Migration der Rheobionten in Fließgewässern.- Verh. Internat. Verein. Limnol. **18**: 730-734, Stuttgart.

RUSSEV, B. (1973): Kompensationsflug bei der Ordnung Ephemeroptera. -Proc. 1st Intern. Conf. Ephemeroptera Leiden, Netherland: 132-142.

RUSSEV, B. 1977. Die Verunreinigung und Selbstreinigung des Ossam nach den strukturellen Änderungen seiner Benthosfauna.- Hydrobiology **6**: 3-22, Sofia [in Bulg.].

RUSSEV, B. 1979. Die Anpassungsfähigkeit der Ephemeropteren an die Verunreinigung der Gewaesser und die Möglichkeit ihrer Aushuetzung als limnosaprobe Bioindikatoren.- Proc. 2nd Int. Conf. Ephemeroptera Warszawa-Krakow: 145-149.

RUSSEV, B. (1987): Ecology, life history and distribution of Palingenia longicauda (Olivier) (Ephemeroptera).- Tijdschr. Ent. **130**: 109-127, Amsterdam.

RUSSEV, B. (1992): Threatened species of Ephemeroptera (Insecta) from Bulgaria.- Lauterbornia **9**: 13-17, Dinkelscherben.

RUSSEV, B. & M. DOSHKINOVA (1985): On the development and productivity of mayfly larvae (Ephemeroptera, Insecta) in a stretch of the Iskar river.- Hydrobiology **25**: 3-16, Sofia.

RUSSEV, B.& I. JANEVA (1975): Hydrofaunistische Erforschungen einiger rhodopischer Gewässer.- In: La faune des Rhodopes. Materiaux.- Acad. Bulg. Sci.: 11-39, Sofia [in Bulg.].

RUSSEV, B. & I. JANEVA (1983): The significance of mayflies (Ephemeroptera, Insecta) as structural constituents of benthic zoocenoses of the Maritsa river.- Hydrobiology **19**: 14-24, Sofia.

RUSSEV, B. & I. JANEVA (1986): Hydrobiological review of the right tributary of the Danube - the river Cibrica.- Hydrobiology **28**: 36-45, Sofia [in Bulg.].

RUSSEV, B. & I. JANEVA (1991): Hydrobiological state of the river valley of the river Lom.- Hydrobiology **36**: 13-31; Sofia [in Bulg.].

RUSSEV, B. & I. JANEVA (in press): Die Tendenzen in den Veränderungen biozoenotischer und saprobiologischer Zustand des bulgarischen Donauzuflusses Jantra nach dem Makrozoobenthos.- Wasser und Abwasser, Wien.

RUSSEV, B., I. JANEVA & M. CANKOVA (1991): Distribution and Ecology of the larvae from order Ephemeroptera (Insecta) in the Bulgarian Black Sea tributaries.- Hydrobiology **36**: 56-67, Sofia [in Bulg.].

RUSSEV,B., I. JANEVA & R. DETCHEVA (1984): Einige Besonderheiten in der Selbstreinigung des Donauzuflusses Ossam.- Hydrobiology **21**: 14-28, Sofia.

RUSSEV, B., I. JANEVA & R. DETCHEVA (1988): Trends in the changes of the saprobiological condition of the river Beli Lom and structural characteristics of its benthic zoocenoses during the 1982-1984 period.- Hydrobiology **32**: 31-43; Sofia [in Bulg.].

RUSSEV, B., J. UZUNOV, S. KOVACHEV, I. JANEVA & L. IVANOVA (1981): Tendencies of the changes in the saprobic conditions of the Maritsa river.- Hydrobiology **14**: 51-64; Sofia [in Bulg.].

RUSSEV, B., M. NIKOLOVA & M. DIMITROVA (1984): Hydrobiological and Saprobiological Altrernations in the Tunja River. I. 1955-1967.- Hydrobiology **22**: 59-73, Sofia [in Bulg.].

RUSSEV, B., M. NIKOLOVA & I. JANEVA (1987): Tendences in the changes of the hydrobiological state of the Rusenski Lom river valley.- Hydrobiology **31**: 65-82, Sofia [in Bulg.].

SCHOENEMUND, E. (1926): Plecopteren und Ephemeriden aus Bulgarien.- Zool. Anz. **47**: 235-239, Jena.

SOLDAN, T. (1982): A redescription of Ephemerella maculocaudata Ikonomov with Notes on Balkan species of the genus Ephemerella (Ephemeroptera, Ephemerellidae).- Acta Zool. Bulg. **20**: 44-50, Sofia.

SOWA, R. (1973): Note sur quelques éspecès paléarctiques de Rhithrogena Eaton (Ephemeroptera, Heptageniidae).- Bull. Acad. Pol. Sci. **21**: 21-26, Warszawa.

SOWA, R., T. SOLDAN & D. BRAASCH (1988): Rhithrogena thracica sp. n. - a new species of mayfly from Bulgaria with a description of subimago and larva of Rh. bulgarica Braasch et al. (1985) (Ephemeroptera, Heptageniidae).- Acta Zool. Bulg. **36**: 31-38, Sofia.

UZUNOV, J. & S. KOVACHEV (1987): The macrozoobenthos of Struma River: an example of a recovered community after the elimination of a heavy industrial impact with suspended mateials. -Arch. Hydrobiol. Suppl. **76** (Monograph. Beitr.): 169-196, Stuttgart.

UZUNOV, J., B. RUSSEV, S. KOVACHEV & I. JANEVA (1981): Species composition and distribution of the Macrozoobenthos of the Maritsa river.- Hydrobiology **14**: 3-15, Sofia [in Bulg.].

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