

# FURTHER STUDIES ON THE TAXONOMY OF THE GENUS *CHONDROSTOMA* (OSTEICHTHYES, CYPRINIDAE): SPECIES FROM EASTERN EUROPE

by

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**ABSTRACT.** - After the study of additional material from Eastern Europe, the following nomenclatorial changes to our former revision of the genus *Chondrostoma* are proposed: *C. colchicum kubanicum* is a synonym of *C. colchicum*, while *C. oxyrhynchum cyri* is a synonym of *C. oxyrhynchum*.

**RÉSUMÉ.** - Après avoir étudié un matériel plus abondant de l'Europe orientale, l'auteur propose de modifier la nomenclature des espèces et sous-espèces du genre *Chondrostoma*, adoptée dans sa révision de 1987, de la façon suivante: *C. colchicum kubanicum* est un synonyme de *C. colchicum* et *C. oxyrhynchum cyri* un synonyme de *C. oxyrhynchum*.

**Key-words.**- Cyprinidae, *Chondrostoma*, Eastern Europe, Caucasus, Taxonomy.

Since the author's taxonomic revision of the genus *Chondrostoma* was published (Elvira, 1987a, b), additional material housed in the Zoological Institute of Leningrad has been studied. This has led to a better understanding of the variability of some eastern species from the USSR and the Caucasian region.

## MATERIAL AND METHODS

The methodology and preliminary fish material examined in this study were extensively described in Elvira (1987a, b). The abbreviations of features and acronyms of collections used in Elvira (1987a) are applicable here. Additional material used was the following:

*C. colchicum colchicum*. ZIL 5297, 1 ex., river Rion.- ZIL 5298, 2 syntypes, river Rion.- ZIL 5299, 3 syntypes, river Rion.- ZIL 8664, 1 ex., river Kvirila.- ZIL 11505, 1 syntype, river Cheba-dere, Artvin district.- ZIL 11517, 1 syntype, lake near Tschoroch, Batumi district.- ZIL 11863, 1 syntype, Batumi district.- ZIL 12651, 1 ex., river Josta.- ZIL 14801, 1 ex., river Chakva, Batumi district.- ZIL 14802, 3 ex., mouth of the river Ichjan-su, Batumi district.- ZIL 15111, 1 ex., river Notanebi.- ZIL 15162, 3 ex., river Degva, Batumi district.- ZIL 15163, 4 ex., river Notanebi, Kutais district.- ZIL 15824, 1 ex., mountain stream, S. of Sochi.- ZIL 16794, 3 ex., Sochi, Chernomorskaya district.- ZIL 29304, 3 ex., mouth of the river Tuapse, Tuapse.- ZIL 29787, 1 ex., mouth of the river Tuapse.- ZIL 30195, 1 ex., river Ashe.

*C. colchicum kubanicum*. ZIL 15297, 5 syntypes, river Kuban, Armavir.- ZIL 15298, 11 syntypes, Labanska.- ZIL 15299, 8 syntypes, river Kuban, Armavir.

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*C. oxyrhynchum oxyrhynchum*. ZIL 2881, 1 ex., river Sunzha.- ZIL 7079, 2 ex., river Ardon.- ZIL 7080, 1 ex., river Archonka.- ZIL 10922, 2 syntypes, river Kuma, Georgievsk.- ZIL 14796, 5 ex., river Rubas-chai, Derbent.- ZIL 14797, 1 ex., river Sulak, Chiriurt, Dagestan district.- ZIL 14798, 2 ex., river Martan, Grozny district.- ZIL 14799, 4 ex., river Terek, Chervlenoi.- ZIL 14800, 4 ex., river Sunzha, Starosunzha near Grozny.

*C. oxyrhynchum cyri*. ZIL 3888, 3 ex., Transcaucasia.- ZIL 3889, 7 ex., Transcaucasia.- ZIL 3899, 8 ex., Tiflis.- ZIL 5180, 3 ex., Kars-Tschai.- ZIL 9098, 14 ex. (syntypes of *Chondrostoma leptosoma*), river Araxes, Karadany.- ZIL 9099, 4 ex. (syntypes of *Chondrostoma leptosoma*), river Araxes, Karadany district.- ZIL 9107, 12 ex. (syntypes of *Chondrostoma leptosoma*), river Araxes.- ZIL 10226, 5 ex., river Kura, Borzhomi.- ZIL 10919, 2 syntypes, Tiflis.- ZIL 15263, 1 ex., river Kura, Ardagan.- ZIL 15264, 2 ex., river Araxes, Kepri-kei.- ZIL 15516, 6 ex. (syntypes of *Chondrostoma leptosoma*), river Araxes, Dorulfy.- ZIL 18569, 1 ex., river Kura, Ardagan.- ZIL 20771, 1 ex., river Karasu, Ardabil.- ZIL 37508, 12 ex., river Daligaj.- MNHN A.3877, 1 ex., Tiflis.

*C. nasus nasus*. Dnepr river basin: ZIL 2975, 1 ex., river Dnepr.- ZIL 11985, 2 ex., river Dnepr, Nenasitets.- ZIL 11986, 2 ex., river Dnepr, Nenasitets.

*C. variabilis*. Don river basin: ZIL 15920, 1 ex., river Don, Zadonsk.- Volga river basin: ZIL 3440, 1 ex., river Oka.- ZIL 7893, 3 ex., river Wetuga, Woskressensk.- ZIL 8672, 2 ex., Kungur.- ZIL 9036, 2 ex., river Kama.- ZIL 9049, 1 ex., Kungur.- ZIL 10571, 1 ex., river Kama.- ZIL 10707, 1 ex., Volga delta.- ZIL 15241, 1 ex., Orenburg district.- ZIL 15434, 1 ex., Ufa district.- MNHN 3140, 2 ex., Moscou.- Ural river basin: ZIL 2067, 1 ex., river Ural.- ZIL 15240, 1 ex., river Nakas, Orenburg district.- ZIL 15425, 1 ex., river Ural, Orenburg.- ZIL 15790, 1 ex., river Ural, Orenburg.- ZIL 34605, 6 ex., river Ural, Yanvartsevo.- ZIL 34606, 16 ex., river Ural, Charjkin.- ZIL 40973, 4 ex., river Great Ik, Mrakovo.- ZIL 41240, 2 ex., river Ural near Guriev.

## RESULTS

The new data and results about the eastern populations of the genus are:

\**Chondrostoma colchicum* Derjugin, 1899.

*Chondrostoma colchicum kubanicum* Berg, 1914.

The author's former opinion on the species was based on the study of 12 specimens (Elvira, 1987a, b). After the study of 65 specimens from the Coruh, Rion, Mzymta, Ashe, Sochi, Tuapse and Kuban rivers, the formerly accepted subspecies from the Kuban is included in the synonymy of *C. colchicum*, now considered a monotypic species.

The main differences distinguishing subspecies were the number of scales and gill-rakers (Elvira, 1987b). Clinal variations affecting these features do not suffice to define subspecies. Non-significant values of the coefficient of difference were found for the different basins. Nevertheless, the number of scales increases from N. to S., while the number of gill-rakers increases from S. to N.

Overall variation of the main meristic characters for the species are: LLS 54-69, TLS 7-10/1/5-6, DFR 8(9), PtFR 15-18, PvFR 8(9), AFR (8)9-10, NFT (6/6) 6/5 (5/5), NGR 24-31.

\**Chondrostoma oxyrhynchum* Kessler, 1877.

*Chondrostoma cyri* Kessler, 1877.

*Chondrostoma oxyrhynchum cyri*: Elvira 1987.

The former results were based on the study of 25 specimens (Elvira, 1987a, b), while present report refers to 116 specimens from the Kura, Rubas-Tschai, Sulak, Terek and Kuma. New data do not support the existence of two formerly



accepted subspecies. *C. oxyrhynchum cyri* is thus included in the synonymy of *C. oxyrhynchum*, a monotypic species.

The only meristic feature used to separate the subspecies was the number of scales (Elvira, 1987b). Clinal variation is responsible to the increment of scales from S. to N. Nevertheless, no significant value of the coefficient of difference was found among the populations studied.

Overall variation for the meristic characters of the species are: LLS 50-68, TLS (7)8-10/1/(3)4-6, DFR (7)8(9), PtFR (13)14-16(17-18), PvFR (7)8, AFR (8)9-10, NFT (6/6) 6/5 5/5, NGR 21-29.

The meristic variation is similar to that of *C. colchicum*, but both species can be distinguished by the mouth shape. While *C. colchicum* has a straight subterminal mouth, *C. oxyrhynchum* has an arched mouth with a thin horny layer on the lower lip.

\**Chondrostoma variabilis* Jakowlew, 1870.

The species was accepted as distinct after the study of 5 specimens from the Volga and the Ural (Elvira, 1987a, b). Coelho (1987) studied 2 specimens from the Volga river basin and concluded that it must be considered as *C. nasus variabilis*. After analysis of additional material (15 specimens from Volga and 32 from Ural), the differences seem to justify a distinctive species status. However, the geographically intermediate populations from the Dnepr and the Don are little known (the author has studied only 16 and 1 specimens, respectively). Further discussion on the taxonomic status of the area populations would best be undertaken after acquiring more knowledge of the variability in these rivers. For this reason, provisionally the populations from the Dnepr will continue to be regarded as *C. nasus nasus*, while those from the Don as *C. variabilis*. Nevertheless, their inclusion in these taxa must be tested with data from larger samples.

Overall variations currently known, based on the specimens from the Volga and Ural, are: LLS 51-61, TLS 8-9.1/4-5, DFR (8)9, PtFR (13-14)15-16, PvFR (7)8(9), AFR 9-10(11), NFT (6 6) 6/5 (5/5), NGR 27-33. The main difference from *C. nasus* is related to the number of pelvic soft rays: *C. nasus nasus* (Danube river basin, N = 18) had 8 (f1) or 9 (f17), while *C. variabilis* (Volga and Ural, N = 47) had 7 (f1), 8 (f42) or 9 (f4); C.D. = 1.57.

After the new changes, the taxonomic status of the species and subspecies of *Chondrostoma* is as follows:

- C. nasus nasus* (Linnaeus, 1758).
- C. nasus angorensis* Elvira, 1987.
- C. colchicum* Derjugin, 1899.
- C. genei* (Bonaparte, 1839).
- C. holmwoodii holmwoodii* (Boulenger, 1896).
- C. holmwoodii meandrensis* Elvira, 1987.
- C. kinzelbachi* Krupp, 1985.
- C. knerii* (Heckel, 1843).
- C. orientalis* Bianco & Banarescu, 1982.
- C. oxyrhynchum* Kessler, 1877.
- C. phoxinus* (Heckel, 1843).
- C. polylepis polylepis* Steindachner, 1865.
- C. polylepis willkommii* Steindachner, 1866.
- C. prespensis* Karaman, 1924.
- C. regium* (Heckel, 1843).
- C. scodrensis* Elvira, 1987.
- C. soetta* Bonaparte, 1840.
- C. toxostoma toxostoma* (Vallot, 1837).
- C. toxostoma arrigonis* (Steindachner, 1866).
- C. toxostoma miegii* Steindachner, 1866.
- C. toxostoma turiensis* Elvira, 1987.

- C. vardarensis* Karaman, 1928.  
*C. variabilis* Jakowlew, 1870.

#### DISCUSSION

*C. kinzelbachi* Krupp, 1985 from the river Orontes in Turkey and Syria, seemed initially to be close to *C. regium* (Krupp, 1985; Elvira, 1987a; Coelho, 1987). After the study of the type series by the author, it is concluded that the species can be distinguished for its slightly arched mouth with a thin lower lip, in front of the straight mouth and a thicker lower lip of *C. regium*. Osteological research on this form is now in progress.

Clinal variations affect many of the morphological characters involved in the taxonomy of the genus *Chondrostoma*. This fact must be considered before describing more new species or subspecies. The present trend in *Chondrostoma* is to abbreviate the number of species and/or subspecies formerly accepted, and to consider some formerly accepted species as subspecies.

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