A NATURAL HYBRID OF *LEUCISCUS CEPHALUS* AND *ALBURNUS ALBURNUS* (PISCES, CYPRINIDAE) FROM THE IBAR RIVER (WESTERN SERBIA)

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Abstract — The hybrid *Leuciscus cephatus × Alburnus alburnus* was recognized in studying structure of the ichthyofauna of the middle course of the Ibar River, a right-hand tributary of the Western Morava (system of the Danube on the territory of Serbia). It is a hybrid reciprocal to the natural hybrid *Alburnus alburnus × Leuciscus cephatus* from the same river system (the Gruža River, a left-hand tributary of the Western Morava), which was described previously by the present author. The hybrid was identified on the basis of its intermediate characteristics and characteristics of the parent species, such as pharyngeal bones and teeth; shape of the scales; number, form, and structure of radial canals of the scales; morphology of branchiostegae on the first gill arch; and a complex of meristic and morphometric characters. With respect to its characteristics, this hybrid, like the hybrid *Alburnus alburnus × Leuciscus cephatus*, is closer to *L. cephatus*. However, in general appearance the hybrid more closely resembles the presumed maternal species. The phenomenon of reciprocal hybridization is discussed at some length.

INTRODUCTION

Published data indicate that the phenomenon of hybridization is unequally present in the Vertebrata. Relatively few natural hybrids have been registered in terrestrial vertebrates, whereas the situation is completely opposite in fish, where the frequency of occurrence of natural hybrids is incredibly high (Mayr, 1965). This applies particularly to freshwater fish, whose fertilization is usually external, with the result that hybridization is frequent. Hybridization is also brought about by anthropogenic disturbance of natural spawning grounds, as well as by construction of reservoirs, hydroelectric power plants, and other installations causing changes of the temperature regime and pollution of aquatic systems (Epplér and Bieniarz, 1979; Rjabov, 1979; Witkowski and Blachuta, 1989). Occasional hybridization has been discovered in the majority of fish families (Hubbs, 1955, 1961; Holčík, 1962; Hensel, 1969; Rjabov, 1979; Dobrovolov, 1986). Among freshwater fish, a large number of hybrids have been registered in the family Cyprinidae, whose many species are characterized by nonsimultaneous, but long and drawn-out spawning, with the result that spawning seasons overlap. Owing to the above-mentioned changes, fish species often become completely plastic in their requirements for a spawning substrate (Gasowska, 1968; Epplér and Bieniarz, 1979; Kokurewicz, 1979; Pethon, 1981; Blachuta and Witkowski, 1984; Crivelli and Dupont, 1987).

It has also been established that the frequency of hybridization of cyprinid species from different genera is fairly great (Pethon, 1978; Bianco, 1982; Crivelli and Dupont, 1987; Wood and Jordan, 1987; Economides and Sinis, 1988). The view exists that two species of different genera which when crossed give mature fertile hybrids should be included in a single genus (Dubois, 1981; Plateaux, 1981). It follows from this that the taxonomy of European cyprinids is insufficiently clear, regardless of the use of classical, modern cladistic, or other methods of analysis, which in fact do not resolve the question (Whitt et al., 1973; Hoves, 1981; Buth, 1984; Dobrovolov, 1986, Wood and Jordan, 1987). It is to be hoped that modern and other techniques yet to be devised will advance and contribute to the resolution of this problem.

THE STUDY AREA

The Ibar River (272 km) is the largest tributary of the Western Morava (Danube watershed). It is characterized by high density of the network of streams feeding it.
Depth of the river in its middle course varies from 0.5 to 2.0 m, but whirlpools up to 13 m deep are present. The river is 20 to 30 m wide. The throughput of water of the Ibar River in its middle course ranges from 45 to 60 m³, and water velocity is 1.2 m/s. The water attains a temperature maximum (19°C) in July and August. The bottom in the middle of the riverbed is pebbly and rocky, bud deposits of fine sand and sludge are present along the banks. The rocks are coated with moss and a greenish-brown mat of algae. During the summer, aquatic plants also develop from place to place. Reeds and sedge grow on the left bank. Sources of pollution of the Ibar are the Koparic, Zuta Prljina, and Belo Brdo lead and zinc mines, whose tailings are washed into the river. Also in direct proximity to it are the flotation of the “Trepa” plant, whose waste waters are burdened with heavy metals, and the “Kosovo” thermoelectric power plant, which through the Sitnica River constantly pollutes the Ibar with a great concentration of phenols. In regard to composition of the ichthyofauna, the middle course of the Ibar is a typical cyprinid stream, with dominance of Leuciscus cephalus (20.3%), while Alburnus alburnus is considerably less well represented (5.9%).

**MATERIALS AND METHODS**

A hybrid between a female of Leuciscus cephalus and a male of Alburnus alburnus (Fig.1) was caught on 26 April 2001 in the middle course of the Ibar River. The specimen was deposited in the collection of the Faculty of Science of the University of Kragujevac (FSUK). Specimens of the presumed parent species were also caught in the Ibar at the same locality where the hybrid was captured. Form and structure of the pharyngeal bones and teeth were investigated on the hybrid and the parent species, together with the morphology of scales and arrangement of branchiostegae on the first gill arch. The terminology and symbols of different fragments of the pharyngeal bone (Fig.2) are based on the terminology of Horoszewicz (1960). Size of the segmentum superiores, segmentum laterale, segmentum dentale, and segmentum adentale are expressed in % of segmentum abdominale.

![Fig. 1. Hybrid Leuciscus cephalus × Alburnus alburnus from the Ibar River.](image)

The Burdakov formula (1979) was used to determine form of the scales: \( F = H/D \), where \( H \) is the transverse radius of the scales, \( D \) their longitudinal radius. If \( F > 1 \), the scales are horizontally oval; if \( F < 1 \), they are vertically elongated. Primary, secondary, and incomplete radial canals were analyzed on the oral and caudal side of the scales. Of meristic characters, also analyzed were: branched (soft) rays in dorsal and anal fins; lateral line scales and transverse rows of scales above and below the lateral line. The morphometric characters analyzed were as follows: TI — total length, SI — standard length, PD — predorsal distance, pO-D — postdorsal distance, H — maximum body depth, h — minimum body depth, lpc — length of caudal peduncle, IP — length of pectoral fin, hD — depth of dorsal fin, ID — length of dorsal fin, lc — length of head, P-V — distance between P fin and V fin, pV — preentral distance, pA — preanal distance, IC — length of C fin (upper lobe), IV — length of ventral fin, hA — depth of anal fin, lA — length of anal fin, pRO — preorbital distance, pO — posorbital distance, Oh — horizontal diameter eye, hc — head depth, io — interorbital distance. These characters were measured with a slide rule and expressed as percents of standard length or head length. The hybrid index (Hindex) proposed by Hubbs and Kuronuma (1942) as modified by Nikoljukin (1972) was calculated for every character:

\[
\text{hybrid index} = H - M_1/M_2 - M_1
\]

where \( H \) is the numerical value of a character of the hybrid, while \( M_1 \) and \( M_2 \) are numerical values of the same character in the first and second parent species. Characters of the hybrid whose Hindex values approach 50 are intermediate, whereas Hindex values close to 0 or 100 for a compared character are identical to the same character for one or the other parent species. Values less than 0 or greater than 100 indicate that the characters are individual. The hybrid and analyzed specimens of
both parent species are virtually the same size, so their body proportions are comparable without any difficulty from the aspect of allometry. Age of the hybrid was determined by analysis of annual rings on scales taken above the lateral line and ahead of the front part of the dorsal fin. Scales were analyzed on an Amplival microscope, while sex and the stage of gonad development were determined macroscopically. The data for investigated organs and analyzed meristic and morphometric characters are presented in the tables and figures.

RESULTS

The parent species and hybrid of chub (Leuciscus cephalus) and bleak (Alburnus alburnus) were identified on the basis of analysis of a large number of morphological characters. Closer analysis indicates that the hybrid exhibits intermediate and individual qualities. On the other hand, it is similar in some characteristics to the parent species. The chub × bleak hybrid has a medium-sized body, thinner than chub and somewhat fatter than bleak. Head length is equal to maximal body height, whereas in both parents head length is less than maximal body height. Height of the head in back is greater than in chub and closer to its value in bleak. The upper part of the mouth is as in bleak, while most of the mouth is intermediate. The eye is larger than the eye of chub, but smaller than that of bleak. The base of the dorsal fin begins considerably behind the vertical drawn through the base of the ventral fins. Length of the anal fin base is intermediate. The upper margin of this fin is straight, also an intermediate trait. The lateral line is in the form of an arc, in which the hybrid is closer to bleak. The back is dark-greenish, the sides and belly silvery. The scales are large, as in chub, but without a dark border (hem) and drop off easily, as in bleak.

BIOMETRIC CHARACTERISTICS

Table I and Fig. 3 present results of comparative analysis of meristic and morphometric characters of the hybrid and parent species. Intermediate qualities of the hybrid are recognizable in the number of soft rays in the anal fin, number of scales in the lateral line, number of transverse rows of scales above the lateral line, and number of branchiostegae on the first gill arch. On the other hand, the number of soft rays in the dorsal fin has an individual or hybrid nature. The remaining two of seven characters (number of transverse rows of scales below the lateral line and number of pharyngeal teeth) are invariable, i.e., they are the same as in both parents. In the majority of meristic characters, this hybrid is close to the bleak × chub reciprocal hybrid from the Gruža River (Table I).
Figure 3 presents values of plastic characters of the chub × bleak hybrid. This hybrid has six (27.3%) intermediate characteristics, 11 (50%) individual characteristics, and five (22.7%) characteristics identical to those of the parent species. Of the latter, 60% are closer to chub, while 40% are closer to bleak. Intermediate characteristics are manifested in body length (SL), minimal body height (h), length of the pectoral fins (IP), length of the anal fin (IA), preventral distance (pV) and eye diameter (Oh). In the majority of plastic characters, however, this hybrid exhibits individual (or hybrid) features, in which it differs significantly from the bleak × chub hybrid (Fig. 4).

PHARYNGEAL BONES AND TEETH

The pharyngeal bones of this hybrid are intermediate between bones of the presumed parent species, although they exhibit many specific qualities (Fig. 5). The dorsal part of the pharyngeal bone is bent almost at a right angle, so that the upper dorsal segment (seg superior) and lateral segment (seg laterale) are formed, in which the hybrid does not differ from either parent species. With respect to length, however, both of these segments exhibit individual qualities (Table II). The upper extremity (extr superior) in the hybrid is strongly bent upward and tapered, in regard to which it is closer to chub. The lateral lamina (lam lateralis) is clearly expressed and similar to that in bleak. The ventral segment (seg abdominalis) of the pharyngeal bone (at the level of the last tooth) is somewhat protuberant (conv maurus) and occupies an intermediate position. The adental segment (seg adentale) narrows gradually and is intermediate in length. The dental segment (seg dentale) in the present hybrid is also of intermediate length, in which it is similar to the bleak ×

![Fig. 3. Comparison of some morphometric characters in L. cephalus × A. alburnus hybrid (H) and parent species (L.c. — L. cephalus; A.a. — A. alburnus). Values are based on data in Appendix I.](image)

![Fig. 4. Comparison of some morphometric characters in A. alburnus × L. cephalus hybrid (H) and parent species (A.a. — A. alburnus; L.c. — L. cephalus). Values are based on data of Šorić (1986).](image)
chub reciprocal hybrid from the Gruža River. The teeth of the chub × bleak hybrid are visibly degenerated and in a 2.5−5.2 arrangement, as in both parents. Form of the teeth in the hybrid is closer to that observed in bleak, but in chewing surface they are closer to the teeth of chub, since the first three teeth have a bumpy surface. In bleak the chewing surface is dentate.

**Figure 5. Pharyngeal bones and teeth of the parent species, *L. cephalus* and *A. alburnus* and its reciprocal hybrids.**

**Number, Arrangement, and Form of Branchiospinae**

The branchiospinae of the chub × bleak hybrid exhibit a hybrid nature. Their number is greater than in chub, but smaller than in bleak (Table I). Morphology of the branchiospinae is also specific. They are long and slender, with a stick-like appearance similar to that in bleak, but are sparsely arranged on the gill arch, in regard to which the hybrid is closer to chub (Fig. 6).

<table>
<thead>
<tr>
<th></th>
<th><em>L. cephalus</em></th>
<th><em>A. alburnus</em></th>
<th><em>L. cephalus</em> x <em>A. alburnus</em></th>
<th><em>A. alburnus</em> x <em>L. cephalus</em></th>
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<tr>
<td>Seg superior</td>
<td>65.15</td>
<td>68.65</td>
<td>85.48</td>
<td>69.89</td>
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<td>Seg laterale</td>
<td>65.28</td>
<td>61.19</td>
<td>74.19</td>
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<td>83.87</td>
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<tr>
<td>Seg adentale</td>
<td>48.42</td>
<td>58.20</td>
<td>54.84</td>
<td>66.66</td>
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</table>

Table II. Length of segments of the pharyngeal bone in species and hybrids.
SCALE MORPHOLOGY, NUMBER OF RADIAL CANALS, AND THEIR ARRANGEMENT

Scales of the chub × bleak hybrid are of the same size as in chub, but they are thin and drop off easily, as in bleak. The ratio between the transverse and longitudinal radius of the scales is $F = 0.91$. The corresponding value is $F = 0.95$ for chub and $F = 1.05$ for bleak. According to these data, this hybrid and chub, like a hybrid bleak × chub from the Gruža River, have vertically elongated scales, whereas the scales in bleak are most often horizontally oval (Fig. 7). With respect to the number of primary canals (Table III) on the oral and caudal side and secondary canals on the caudal side, the hybrid is similar to chub, while the number of secondary canals on the oral side of the scales exhibits individual qualities. Incomplete radial canals are most often absent, but one or two are present rarely, as in both parents.

Fig. 6. Branchial spines of the parent species and hybrids.

Fig. 7. Scales of the parent species and hybrids.
DISCUSSION

Hybridization of chub and bleak is a relatively frequent phenomenon, although chub belongs to the lithophilic, bleak to the phytophilic ecological reproductive group (Wheeler, 1978; Witkowski and Blachuta, 1980; Bianco, 1982). It has also been established that these species under altered conditions become indifferent in their requirements for a spawning substrate (Witkowski and Blachuta, 1980; Šorić, 1986; Crivelli and Dupont, 1987). In most cases, hybrids between bleak and chub and other species of fish are found in reservoirs, brooks, and rivers where spawning grounds have been for all practical purposes destroyed, where depth variations and changes in the temperature regime are frequent, and where pollution is present (Hubbs, 1955; Gasowska, 1968; Wheeler, 1978; Witkowski and Blachuta, 1980; Blachuta and Witkowski, 1984).

Šorić (1986) corroborated this with the finding of a bleak × chub hybrid in the Gruža River (Fig. 8) only after the construction of a reservoir for water supply purposes. In later investigations on the ichthyofauna of the middle course of the Ibar River — which like the Gruža belongs to the watershed of the Western Morava — the author by means of differential analysis recognized the chub × bleak reciprocal hybrid.

As already stated, the middle course of the Ibar River is polluted by lead and zinc mines, whose tailings are constantly washed into the river and can be one of the significant causes of hybridization between these species. In addition to this, waste waters burdened with heavy metals and phenols flow into the river. On January 19 of this year, the concentration of phenols attained a level of 310 µg/l (data of the Research Institute of Kosovo). While spending time on the Ibar during this period, we observed fish kills and noticed that fish withdrew into tributaries or moved down-stream far enough to reach places where tolerant concentrations of pollution were achieved or self-purification set in. In the year 2001, chub and bleak spawned in the second half of May. We postulate that their simultaneous spawning is a consequence of the indicated changes in the Ibar River. A large number of authors hold that hybridization in aquatic systems that retain their natural character is very rare and accidental (Nikoljukin, 1972; Witkowski and Blachuta, 1980; Witkowski, 1982).

Intermediateness of the chub × bleak reciprocal hybrid from the Ibar River and the bleak × chub reciprocal hybrid from the Gruža River in relation to the parent species is clearly manifested in many meristic, morphometric, osteological, and anatomical characters (Tables I–III, Figs. 3–7), although significant overlapping between the hybrids and the parent species is also evident. The chub × bleak hybrid aged 3+ years and specimens of the bleak × chub hybrid aged 5+ years from the Gruža River had developed sexual organs. At the end of the second half of April, the male hybrid from the Ibar had testes in stage IV of maturity, while three female hybrids caught in the Gruža at the end of March had ovaries in stage III of maturity. This supports the assertion of Daget and Bauchot (1976) that intergeneric hybrids can be either extremely fertile or completely sterile.

In the light of their morphological characters, we consider that both of these hybrids are of the F1 generation. However, we speculate that renewed crossing with one of the parent species can occur and thereby give rise to a population with a complex origin. Describing the reciprocal hybrids Leuciscus leuciscus × Alburnus alburnus and Alburnus alburnus × L. leuciscus from the Jelešna Brook (Slovak Republic), Holčik (1962) likewise reported that they were with fully developed sexual organs. The indicated author recognized F1 hybrids and hypoth-

<table>
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<tr>
<th>RADIAL GROOVES ON SCALES</th>
<th>Primary</th>
<th>Secondary</th>
<th>Incomplete</th>
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<tbody>
<tr>
<td></td>
<td>oral</td>
<td>caudal</td>
<td>oral</td>
</tr>
<tr>
<td><strong>L. cephalus × A. alburnus</strong></td>
<td>Range</td>
<td>(2)–5(6)</td>
<td>5–7</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
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<td>5.70</td>
</tr>
<tr>
<td><strong>A. alburnus × L. cephalus</strong></td>
<td>Range</td>
<td>(1.3)–8</td>
<td>(3.4)–5(6–7)</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>4.90</td>
<td>6.30</td>
</tr>
<tr>
<td><strong>L. cephalus</strong></td>
<td>Range</td>
<td>(2)–6</td>
<td>(3)–4–5</td>
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<tr>
<td></td>
<td>Mean</td>
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<td>4.30</td>
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<tr>
<td><strong>A. alburnus</strong></td>
<td>Range</td>
<td>(0)–3(4)</td>
<td>(1)–2–4</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>1.83</td>
<td>2.82</td>
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Table III. Number of primary, secondary, and incomplete radial grooves on scales of hybrids and parent species.
esized that renewed crossing occurred between a female of the parent species *L. leuciscus* and the *L. leuciscus × A. alburnus* male hybrid.

In general appearance, the reciprocal hybrids from the watershed of the Western Morava significantly differ above all in that each more closely resembles the presumed maternal species (Fig. 1 and 8). It is also evident that they have different positions in relation to the parents and different degrees of deviation in hybrid qualities. The chub × bleak hybrid has 27.3% intermediate body proportions, the bleak × chub hybrid 40.9%. They also differ in regard to specific individual characteristics. The chub × bleak hybrid has 50.0% specific individual characteristics, the bleak × chub hybrid 31.8%. In both of these hybrids, of characters identical to those of the parent species, more than 60% are closer to chub. Describing reciprocal hybrids between *L. leuciscus* and *A. alburnus*, Holčík (1962) likewise reported that each of them more closely resembles *L. leuciscus* than *A. alburnus* in regard to meristic and morphometric characters, although the hybrids differ distinctly in general appearance and more closely resemble the maternal species. As Nikoljukin (1972) observed, it is typical that when two species of different genera are crossed, the hybrids generally inherit more qualities from the more primitive species. To judge from this, it follows that chub is a more primitive species than bleak. Comparing age and body length of the chub × bleak hybrid (3+ years, Tl = 150.0 mm) and the bleak × chub hybrids (5+ years, 225.0–245.0 mm) with the parent species, we are able to establish that only the bleak × chub hybrids exhibit a faster growth rate than the first parent species, i.e., that the growth of these hybrids is intermediate. Pethon (1978) and Bianco (1982) also report that growth of the hybrids they recognized is intermediate. Moreover, they recorded that in both of these hybrids, of plastic characters only the preadult distance and anal fin base length exhibit intermediateness (Fig. 3 and 4). However, large number of overlaps in intermediate qualities of these hybrids are manifest in meristic characters such as the number of soft rays in the anal fin; number of scales in the lateral line, number of transverse rows of scales above the lateral line, and number pharyngeal teeth.

Intermediateness in morphology of the pharyngeal bones and teeth of hybrids and the parent species is clearly manifested, although there are significant overlaps. In the chub × bleak hybrid, the upper extremity (*extr superior*) is strongly bent upward and tapered, in regard to which it is closer to chub. However, the lateral lamina (*lam lateralis*) is clearly expressed, as in bleak. The opposite is true in the bleak × chub hybrid. The upper extremity is closer to that of bleak, the lateral lamina to that of chub (Fig. 5). Also, intermediateness is manifested in length of the adenate and dentate segments (*seg adentale* and *seg dentale*, respectively) in the chub × bleak hybrid, whereas in the bleak × chub hybrid only the dentate segment is intermediate in length, the adenate segment being longer than in the parent species (Table II).

The teeth of both hybrids are in a 2.5–5.2 arrangement, as in each of the parents. In the chub × bleak hybrid, however, they are fairly degenerated, secret (narrow), and moderately hooked, in which they are closer to the teeth of bleak. On the other hand, their chewing surface is not dentate, but is rather with poorly discernible bumps, as in chub. Form of the teeth is likewise intermediate in the bleak × chub hybrid: the first three teeth are similar to the first three in bleak, while the rest are closer to their counterparts in chub. The chewing surface in these hybrids is dentate, as in bleak. Gąsowska (1968) maintained that the formula and form of pharyngeal teeth in hybrids are especially variable when the teeth in the parent species are arranged in different rows.

Intermediateness of the hybrids is also manifested in the morphology, number, and arrangement of branchiospinae (Fig. 6). In the chub × bleak hybrid, the number of branchiospinae is greater than in chub, but less than in bleak. Their number is also smaller than in the bleak × chub hybrid, which at first glance does not differ from bleak. Differences are discernible too in the arrangement, form, and length of the branchiospinae. In the chub × bleak hybrid, they are arranged more sparsely on the gill arch, in regard to which they are closer to chub, but are long and stick-like, as in bleak. In the bleak × chub hybrid, the branchiospinae are as in bleak with respect to morphology, but are few in number, in which they are closer to chub. The branchiospinae of chub are shorter, conical, significantly fewer in number, and very sparsely arranged. In contrast to the bleak × chub hybrid, all three of whose specimens have virtually the same number of branchiospinae (14 or 15), the specimens of the *L. leuciscus × A. alburnus* hybrid described by Holčík (1962) exhibit pronounced variability of this character.

![Fig. 8. Hybrid *Alburnus alburnus × Leuciscus cephalus* from the Gruža River.](image)
The ratio of scale width to length is $F = 0.90$ in the chub × bleak hybrid and $F = 0.92$ in the bleak × chub hybrid. It follows from this that form of the scales in both of these hybrids is vertically elongated, in which they are similar to the scales of chub ($F = 0.95$). The scales of bleak are horizontally oval ($F = 1.05$), although a smaller number of them are vertically elongated ($F = 0.79$), as indicated by Blachuta and Witkowski (1984), or irregularly oval, as reported by Holčík (1962). Scales of the chub × bleak hybrid are relatively large (as in chub), but they are thin and drop off easily (as in bleak). Scales in the bleak × chub hybrid are similar to those of chub with regard to size, thickness, and insertion. In regard to primary canals on the oral and caudal side, both of the hybrids of chub and bleak are closer to chub (Table III). Secondary canals on the oral side in both hybrids exhibit individual qualities. Their number is smaller than in either of the parent forms. The number of these canals on the caudal side in both hybrids is closer to the indicated number in chub, while incomplete radial canals are very rare, as in the parent species.

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ПРИРОДНИ ХИБРИД *LEUCISCUS CEPHALUS* × *ALBURNUS ALBURNUS* (PISCES, CYPRINIDAE) ИЗ РЕКЕ ИБАР (ЗАПАДНА СРБИЈА)

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Хибрид *Leuciscus cephalus* × *Alburnus alburnus* је препознат приликом проучавања структуре ихтиофауне средњег тока реке Ибра, десне притоке Западне Мораве (Дунавски систем на подручју Србије). То је реципиентни хибрид природном хибриду *Alburnus alburnus* × *Leuciscus cephalus* из истог речног система (реке Груже, леве притоке Западне Мораве) којег је раније описао исти аутор. Идентификација хибрида извршена на основу његових интермедијарних и индивидуалних карактеристика, и карактеристика родитељских врста, као што су ждрелне кости и зуби; број, облик и структура радијалних каналића крлу- шти; морфологија бранхиоспина на првом шкружном луку и комплекса меристичких и морфометријских карактера (Таб. 1–3, Сл. 1–8). По својим особинама овај хибрид као и хибрид *Alburnus alburnus* × *Leuciscus cephalus* је ближи *L. cephalus*. Међутим, по општем изгледу хибрид више јачи на материцу врсте. Средњи ток реке Ибар загађују рудници олова и цинка, чије се јаловине перманентно сливају у реку, те оне могу бити један од битних узрока хибрилизације ових врста.