

Alburnus vistonicus, a new species of shemaya from eastern Greece, with remarks on *Chalcalburnus chalcoides macedonicus* from Lake Volvi (Teleostei: Cyprinidae)

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Alburnus vistonicus, new species, from Lake Vistonis drainage, Greece, is distinguished from other Aegean species of *Alburnus* by gill raker and scale counts. A new replacement name (*A. volviticus*) is proposed for *Chalcalburnus chalcoides macedonicus* Stephanidis, 1971 from Lake Volvi (Greece), a junior secondary homonym of *A. macedonicus* Karaman, 1928.

Introduction

Thirty-eight species are presently recognised in the European and Western Asian genus *Alburnus* (Bogutskaya, 1997; Bogutskaya et al., 2000; Freyhof & Kottelat, 2007; Kottelat & Freyhof, 2007; Özulug & Freyhof, 2007). As expected in such a large genus, there are groups of species more similar and maybe more closely related to each other.

The species, subspecies and forms often synonymised with *A. chalcoides* form one such species group called shemayas; they are clearly distinguished from other *Alburnus* species (see Kottelat & Freyhof, 2007, for details); shemaya is a common name in Russian language used as an English name for these fishes already by Berg (1949) and Maitland (2000). Within shemayas,

there is a group of large growing species, the *A. mento* species group (*A. danubicus*, *A. mento*, *A. leobergi* and *A. sarmaticus*), restricted to the Black and Azov Sea basin (Freyhof & Kottelat, 2007). In the Aegean, Marmara, Black and Caspian Sea basins, there are 10 additional valid species (*A. chalcoides*, *A. carinatus*, *A. derjugini*, *A. istanbulensis*, *A. mandrensis*, *A. mentoides*, *A. nicaeensis*, *A. schischkovi* and two species from Greece described here). All European *Alburnus* species are diagnosed in Kottelat & Freyhof (2007) and shemayas occurring in Anatolian part of Turkey (*A. carinatus*, *A. derjugini*, *A. istanbulensis*, *A. nicaeensis* and two additional undescribed species) are discussed by Özulug & Freyhof (2007).

The aim of this study is to formally describe one additional species in the *A. chalcoides* group from Lake Vistonis drainage in the northern

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Aegean Sea basin, Greece. While *Alburnus* and *Chalcalburnus* have long been treated as distinct genera, following Bogutskaya (1997) and Bogutskaya & Naseka (2004) they are now considered as constituting a single lineage for which the name *Alburnus* has to be retained. Placing all species in the genus *Alburnus* makes *C. c. macedonicus* Stephanidis (1971) a junior secondary homonym of *A. alburnus macedonicus* Karaman (1928: 151). As both are valid species in the genus *Alburnus* (see Kottelat & Freyhof, 2007), a new name is provided for *Chalcalburnus chalcoides macedonicus*.

Material and methods

All fish were preserved in 5% formaldehyde. Measurements were made with dial callipers and recorded to 0.1 mm. All measurements are made point to point, never by projections. Methods for counts and measurements follow Kottelat & Freyhof (2007). Standard length (SL) is measured from the tip of the upper lip to the end of the hypural complex. The length of the caudal peduncle is measured from behind the base of the last anal-fin ray to the end of the hypural complex, at mid-height of the caudal-fin base. Lateral line scales are counted from the anteriormost scale (the first one to touch the shoulder girdle) to the posteriormost one (at the end of the hypural complex). Scales on the caudal fin itself are separated by "+". Gill rakers are counted on the first gill arch. The last two branched rays articulating on a single pterygiophore in the dorsal and anal fins are noted as "1½". The position of the anal-fin origin is given as the number of scales behind dorsal-fin base along dorsal midline under which is located the base of the first anal-fin ray. The length of the exposed part of the ventral keel is measured as the number of transverse scales rows along the exposed part of the keel, counted from the anus forwards. The holotype is included in the calculation of means and standard deviation (SD).

Abbreviations used: SL, standard length; HL, lateral head length; FSJF, Fischsammlung J. Freyhof, Berlin; MNHN, Muséum National d'Histoire Naturelle, Paris; ZMB, Museum für Naturkunde der Humboldt-Universität, Berlin. We use the Evolutionary Species Concept; see Mayden (2002). See Freyhof & Kottelat (2007) for material examined of European shemayas and Özulug & Freyhof

(2007) for material examined of *A. derjugini* from Russian and Turkish Black Sea coast and *A. carinatus*, *A. istanbulensis* and *A. nicaeensis* from western Turkey.

Alburnus volviticus, new replacement name (Figs. 1)

Chalcalburnus chalcoides macedonicus Stephanidis, 1971: 224, 240, fig. 5 (type locality: Greece: Lake Volvi)

Material examined. MNHN 1975-0733, 5, 135-161 mm SL; Greece: Lake Volvi; P. S. Economidis, Feb 1971. – FSJF 1665, 23, 107-186 mm SL; Greece: Lake Volvi at Mikra Volvi, 40°41'N 23°32'E; P. S. Economidis & J. Freyhof, 27 May 2005.

Diagnosis. *Alburnus volviticus* is distinguished from the other species of shemayas and Turkey by the combination of: anal-fin origin 1½-2½ scales behind dorsal-fin base; 14-16½ branched anal-fin rays; 25-31 gill rakers; length of gill raker at angle between upper and lower limbs of first gill arch 60-90% of opposite inner gill filament; 56-66+4 lateral line scales; ventral keel exposed for 5-8 scales in front of anus; head length 22-24% SL; predorsal length 53-57% SL; caudal peduncle depth 1.8-2.4 times in its length; eye diameter 5.4-7.3% SL, 1.0-1.3 times in interorbital distance; interorbital distance 6.0-7.3% SL; no faint, dark midlateral stripe; numerous small tubercles in nuptial males.

Description. See Figures 1 for general appearance and Table 1 for morphometric data of 20 specimens. Medium size, compressed and moderately deep body (Table 1). Mouth oblique, lower jaw projecting beyond upper jaw up to ½ eye diameter. Head length 1.0-1.1 times in body depth at dorsal-fin origin. Eye diameter 1.0-1.3 times in interorbital distance. Caudal peduncle depth 1.8-2.4 times in its length. Dorsal- and anal-fin margins concave. Distance between pelvic-fin origin and dorsal-fin origin equal to about half of pelvic-fin length. Anal-fin origin 1½-2½ scales behind dorsal-fin base. Ventral keel exposed for 5-8 scales in front of anus. 25-31 gill rakers. Length of gill raker at angle between upper and lower limbs of first gill arch 60-90% of opposite inner gill filament. Largest recorded specimen 300 mm TL (Stephanidis, 1971).



Fig. 1. *Alburnus volviticus*, same data as FSJF 1665, about 120 mm SL, not preserved; Greece: Lake Volvi at Mikra Volvi.

Dorsal fin with $8\frac{1}{2}$ branched rays. Caudal fin forked, with $9+8$ branched rays. Anal fin with $14\frac{1}{2}$ (4), $15\frac{1}{2}$ (6), $16\frac{1}{2}$ (2) branched rays. Pectoral fin with 16-17 rays. Pelvic fin with 9-10 rays. Axillary pelvic lobe present. Lateral line complete, reaching caudal-fin base, perforating 56-66 scales on body and 4 on caudal-fin base. $9\frac{1}{2}$ scale rows between dorsal-fin origin and lateral line, 18 circumpeduncular scales, 3 scale rows between pelvic-fin origin and lateral line.

Coloration. Body silvery, back brown, fins hyaline. Yellowish brown in preservative.

Etymology. Named for Lake Volvi, the only known habitat of this species. An adjective.

Distribution. Greece: basin of Lake Volvi. It possibly was also present in Lake Koronia where it is now extirpated (P. S. Economidis, pers. com. 2005).

Remarks. We follow Bogutskaya (1997) and Bogutskaya & Naseka (2004) and synonymise *Chalcalburnus* with *Alburnus*. This makes *C. chalcoides macedonicus* Stephanidis (1971: 225) a junior secondary homonym of *A. alburnus macedonicus* Karaman (1928: 151). As both are valid species in the genus *Alburnus*, we establish *A. volviticus* as a new replacement name for the junior homonym *C. c. macedonicus* Stephanidis, 1971.

Stephanidis (1971: 238) distinguished *A. volviticus* (as *C. c. macedonicus*) from *A. chalcoides* (as *C. c. chalcoides*) by having more gill rakers (26-30 [25-31 in our material]). Stephanidis (1971: 224-228) did not mention the number of gill rakers in *A. chalcoides* and he did not mention if he had examined material of that species. It seems likely that the gill-raker counts mentioned by Stephanidis (1971) are those of Berg (1949), as this is the

only literature cited by Stephanidis (1971) in which gill-raker counts are given. Berg (1949) only mentioned gill-raker counts for *A. chalcoides* from Caspian Sea basin (average 22-23), *A. mentoides* from Crimea (19-25) and *A. derjugini* from eastern Black Sea coast (21-27) [but Berg based his account of *A. derjugini* on specimens from Chornaya, which actually are *A. mentoides*; see discussion by Özulug & Freyhof (2007)]. The shemaya from Lake Volvi clearly has more gill rakers than these species (25-31). Also, Stephanidis (1971) mentioned that the Lake Volvi shemaya is distinguished from *A. chalcoides* by having a different length of gill rakers in the upper and lower part of the gill arch. The gill arch on his drawing (p. 226) does not differ from the situation we observed in other shemayas; the gill rakers on the lower part of the arch are always longer than those on the upper part of the arch.

The only shemaya whose range is close to that of *A. volviticus* (Lake Volvi) is *A. vistonicus* from Lake Vistonis. Both lakes are located along the northern shore of the Aegean Sea, but their morphology and ecological functioning differ greatly. Lake Volvi is a pure freshwater lake situated at some distance from the sea, to which it is connected by a small stream, while Lake Vistonis is a coastal lagoon separated from the sea only by a narrow ribbon of land and with a salinity gradient between its opening to the sea and its tributaries. *Alburnus volviticus* is distinguished from *A. vistonicus* by having more gill rakers (25-31 vs. 21-25) and the anal-fin origin about $1\frac{1}{2}$ - $2\frac{1}{2}$ scales behind dorsal-fin base (vs. $\frac{1}{2}$ - $1\frac{1}{2}$).

The only other *Alburnus* species from Greece having been included into the former genus *Chalcalburnus* by Economidis (1986), *A. belvica* from Lakes Prespa, seem not to belong to shemayas as it has less scales in lateral series in front of the hypural complex (48-58 vs. 54-64) and in

contrast to all shemayas it has only 3 scales on the caudal fin itself (vs. 4-5, very exceptionally 3 in all shemayas). *Alburnus volviticus* is distinguished from *A. belvica* by having 25-31 gill rakers (vs. 30-38) and 56-66 + 4 lateral line scales (vs. 48-58 + 3).

Alburnus volviticus is geographically close to shemayas from the Marmara Sea basin (*A. carinatus*, *A. nicaensis* and *A. istanbulensis*). It is distinguished from *A. carinatus* (from Lakes Manyas and Apolyont, Anatolia) by having 25-31 gill rakers (vs. 33-39), anal-fin origin $1\frac{1}{2}$ - $2\frac{1}{2}$ scales behind dorsal-fin base (vs. $\frac{1}{2}$ -1 scales behind dorsal-fin base) and the head length 1.0-1.1 times in body depth at dorsal-fin origin (vs. 0.9-1.0). *Alburnus volviticus* is distinguished from *A. nicaensis* (from Lake Iznik, Anatolia) by having a shorter head (length 22-24 % SL vs. 24-27) and the length of the gill raker at the angle between the upper and lower limbs of the first gill arch 60-90 % of the length of the opposite inner gill filament (vs. 45-60 %). It is distinguished from *A. istanbulensis* by having the anal-fin origin $1\frac{1}{2}$ - $2\frac{1}{2}$ scales behind the dorsal-fin base (vs. $\frac{1}{2}$ - $1\frac{1}{2}$),

the ventral keel exposed for 5-8 scales in front of the anus (vs. 8-12) and the length of the gill raker at the angle between the upper and lower limbs of the first gill arch 60-90 % of the opposite inner gill filament (vs. 30-55 %) and numerous small tubercles in the nuptial males (vs. few and large).

Comparing *A. volviticus* to shemayas from Black Sea basin, *A. volviticus* is geographically close to *A. schischkovi* of rivers Rezovska (Turkey) and Veleca (Bulgaria). *Alburnus volviticus* is distinguished from *A. schischkovi* by having 25-31 gill rakers (vs. 21-27), the length of the gill raker at the angle between the upper and lower limbs of the first gill arch 60-90 % of the opposite inner gill filament (vs. 30-50), ventral keel exposed for 5-8 scales in front of the anus (vs. 8-12) and numerous small tubercles in nuptial males (vs. few and large). *Alburnus volviticus* is distinguished from *A. mandrensis* (from Lake Mandras drainage, Bulgaria) by having the length of the gill raker at the angle between the upper and lower limbs of first gill arch 60-90 % of the opposite inner gill filament (vs. 30-55), the anal-fin origin $1\frac{1}{2}$ - $2\frac{1}{2}$

Table 1. Morphometric data of *Alburnus volviticus* (holotype, MNHN 1975-0733; paratypes MNHM 1975-0733; FSJF 1665, n=20) and *A. vistonius* (holotype, ZMB 33660; paratypes ZMB 33777, MNHN 1975-808; FSJF 1719, 1822, n=19)

	<i>A. volviticus</i>				<i>A. vistonius</i>			
	mean	min	max	SD	mean	min	max	SD
SL (mm)	147.8	135.3	161.0		130	106	212	
In percent of standard length								
Dorsal head length	16.3	15.1	17.3	0.5	17.1	15.3	17.9	0.7
Lateral head length	22.9	21.9	23.8	0.5	23.3	21.2	24.2	0.7
Predorsal length	54.7	53.4	56.6	1.0	55.3	52.1	57.3	1.1
Prepelvic length	48.6	46.1	52.2	1.8	48.2	46.3	50.2	1.0
Preanal length	69.4	66.2	72.4	1.7	67.2	64.9	70.6	1.6
Head depth at eye	11.7	10.7	12.5	0.5	11.8	11.0	12.5	0.4
Head depth at nape	15.6	14.4	16.3	0.7	16.2	15.2	17.7	0.6
Body depth at dorsal-fin origin	23.3	21.9	25.2	1.0	23.6	21.7	25.0	1.1
Caudal peduncle depth	9.2	8.6	9.9	0.4	9.5	8.8	10.1	0.4
Caudal peduncle length	18.8	16.7	21.4	1.3	20.0	18.5	21.4	0.8
Head width at gill opening	11.6	10.5	19.1	0.3	11.7	10.9	12.6	0.5
Body width at dorsal-fin origin	10.2	8.3	11.7	0.9	12.6	10.4	14.7	1.2
Dorsal fin length	17.9	16.4	19.5	0.8	18.0	15.4	19.1	0.9
Anal-fin base length	15.1	13.1	17.0	0.8	15.3	14.3	17.4	1.0
Pelvic fin length	14.6	13.6	15.9	0.6	14.3	12.2	15.3	0.7
Pectoral fin length	19.2	18.2	21.4	0.8	18.5	16.1	19.4	0.8
In percent of head length								
Eye diameter	26.3	23.8	31.3	1.9	24.9	21.7	29.0	2.1
Interorbital distance	30.7	27.8	33.0	1.2	31.8	30.0	34.1	1.0
Snout length	28.2	24.5	30.2	1.2	30.7	29.4	31.6	0.6

scales behind the dorsal-fin base (vs. below the base of the last dorsal-fin ray or $\frac{1}{2}$ -1 scales behind), a narrower interorbital area (interorbital distance 6.0-7.3 % SL vs. 7.3-8.0) and 14-16½ (usually 15½) branched anal-fin rays (vs. 13-15½, usually 14½).

Alburnus volviticus is distinguished from the two small shemayas from northern and eastern Black Sea basin, *A. mentoides* (Crimea) and *A. derjungini* (eastern Black Sea basin), by having 25-31 gill rakers (vs. 21-27 in *A. derjungini*, 18-23 in *A. mentoides*), the absence of a faint dark midlateral stripe (vs. presence), a shorter head (length 22-24 % SL vs. 23-27) and the anal-fin origin $1\frac{1}{2}$ -2½ scales behind the dorsal-fin base (vs. $\frac{1}{2}$ -1½) and having numerous small tubercles in nuptial males (vs. few large tubercles in *A. derjungini* and *A. mentoides*).

Comparing *A. volviticus* to shemayas included into the *A. mento* species group from Black and Azov Sea basins (see Freyhof & Kottelat, 2007), *A. volviticus* is distinguished from *A. danubicus* from Lower River Danube by having 14-16½ branched anal-fin rays (vs. 17-20½) and from *A. mento* from the lakes in the upper Danube drainage by having 25-31 gill rakers (vs. 21-25) and the ventral keel exposed for 5-8 scales in front of the anus (vs. 8-12). It is distinguished from *A. sarmaticus* and *A. leobergi* (from drainages of the Azov and western and northern Black Seas) by having 14-16½ (usually 15½) branched anal-fin rays (vs. 15-17½, usually 16½) and the length of the gill raker at the angle between the upper and lower limbs of first gill arch 60-90 % of the opposite inner gill filament (vs. 30-55). We suspect that *A. volviticus* might be closely related to the species of the *A. mento* group and not to the shemaya of the geographically close Lake Vistonis, which in turn is much more similar to geographically closer species as *A. istanbulensis* and *A. carinatus*.

Finally, *A. volviticus* is distinguished from the geographically very distant *A. chalcoides* from the Caspian Sea basin by having 25-31 gill rakers (vs. 18-22), the ventral keel exposed for 5-8 scales in front of the anus (vs. 8-12) and a larger eye (diameter 4.8-5.7 % SL vs. 5.4-7.3; eye diameter 1.0-1.3 times in the interorbital distance vs. 1.3-1.6).

Alburnus vistonicus, new species

(Fig. 2-3)

Holotype. ZMB 33660, 217 mm SL; Greece: Lake Vistonis; P. S. Economidis & J. Freyhof, 28 May 2005.

Paratypes. MNHN 1975-808, 2, 159.5, 169.0 mm SL; Greece: Lake Vistonis, 41°03'N 25°07'E; P. S. Economidis, Oct 1972. – ZMB 33777, 10, 51.7-137.6 mm SL; Greece: tributary of Lake Vistonis on road to Abrosia, 41°05.397'N 25°11.986'E; P. S. Economidis & J. Freyhof, 28 May 2005.

Additional material. FSJF 1822, 21, 51.4-144.7 mm SL; same data as ZMB 33777. – FSJF 1719, 6, 150-184 mm SL; same data as holotype.

Diagnosis. *Alburnus vistonicus* is distinguished from the other species of shemayas by the combination of: anal-fin origin about $\frac{1}{2}$ -1½ scales behind dorsal-fin base; 13-15½ branched anal-fin rays; 21-25 gill rakers; 57-67 + 4 lateral line scales; ventral keel exposed for 5-12 scales in front of anus; head length 21-24 % SL; predorsal length 52-56 % SL; depth of caudal peduncle 1.9-2.4 times in its length; length of caudal peduncle 19-22 % SL, eye diameter 5.1-6.7 % SL, 1.1-1.6 times in interorbital distance, 22-29 % head length; few, large tubercles in nuptial males.

Description. See Figure 2-3 for general appearance and Table 1 for morphometric data of holotype and 18 additional specimens examined.

Medium size, compressed and moderately deep body (Table 1). Mouth oblique, lower jaw slightly projecting beyond upper jaw in small specimens, strongly projecting in some specimens larger than 140 mm SL. Eye diameter 1.1-1.6 times in interorbital distance, 22-29 % head length. Caudal peduncle depth 1.9-2.4 times in its length. Dorsal- and anal-fin margins concave. Distance between pelvic-fin origin and dorsal-fin origin equal to about $\frac{1}{3}$ - $\frac{1}{2}$ of pelvic-fin length. Anal-fin origin $\frac{1}{2}$ -1½ scales behind dorsal-fin base. Ventral keel exposed for 5-12 scales in front of anus. 21-25 (mode 23) gill rakers [Economidis, 1974: 42, reported 20-27 gill rakers]. Few, large tubercles in nuptial males. Largest recorded specimen 217 mm TL.

Dorsal fin with $8\frac{1}{2}$ branched rays. Caudal fin forked, with 9+8 branched rays. Anal fin with 13-15½ branched rays. Pectoral fin with 16-17

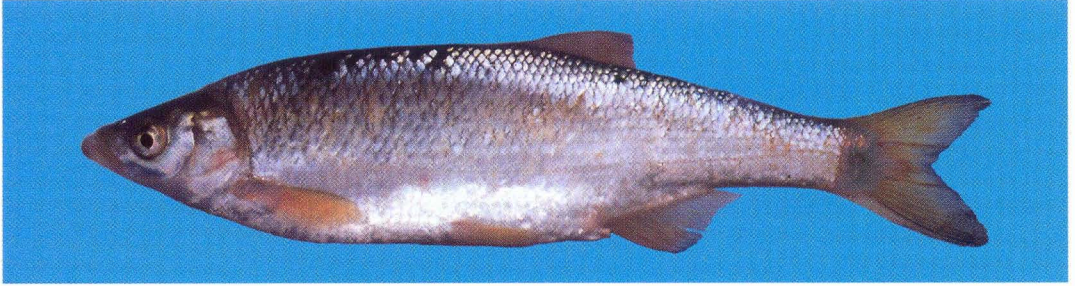


Fig. 2. *Alburnus vistonicus*, ZMB 33660, 217 mm SL, holotype; Greece: Lake Vistonis.

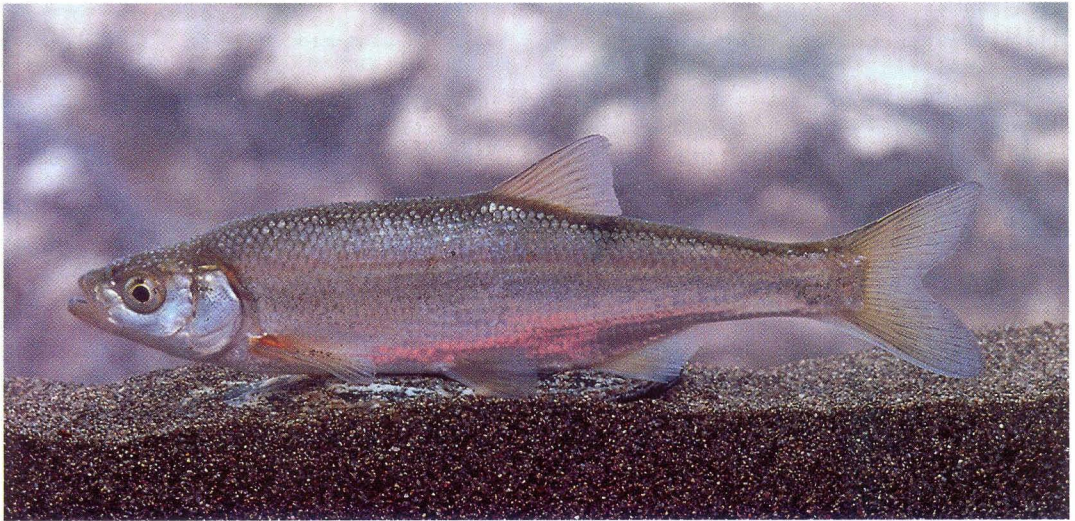


Fig. 3. *Alburnus vistonicus*, same data as ZMB 33777, about 120 mm SL, not preserved; Greece: tributary of Lake Vistonis on road to Abrosia.

rays. Pelvic fin with 9-10 rays. Axillary pelvic lobe present. Lateral line complete, reaching caudal-fin base, perforating 57-67 scales on body and 4 on caudal-fin base. $9\frac{1}{2}$ scale rows between dorsal-fin origin and lateral line, 18 circumpeduncular scales, 3 scale rows between pelvic-fin origin and lateral line.

Coloration. Body silvery, back brown, fins hyaline.

Etymology. Named for Lake Vistonis, the only known habitat of this species. An adjective.

Distribution. Lake Vistonis drainage (Greece). The *Alburnus* population from Filiouris drainage (Economidis (1974) is expected to be conspecific.

Remarks. *Alburnus vistonicus* is known only from Lake Vistonis, a coastal lake on the northern shore of the Aegean Sea. Lake Vistonis is located between the ranges of *A. istanbulensis* in the east and *A. volviticus* in the west. *Alburnus vistonicus* is most similar to *A. istanbulensis* and *A. carinatus*. *Alburnus vistonicus* is distinguished from *A. istanbulensis* by having fewer gill rakers (21-25 $n=20$ vs. (24) 26-35, $n=86$). There is no overlap in gill raker counts between our material of *A. vistonicus* and *A. istanbulensis* (from both Marmara and Black Sea basins), but Economidis (1974) reported 20-27 gill rakers in his material from Lake Vistonis. We decided to treat *A. vistonicus* as a species distinct from *A. istanbulensis* because:

- 1) Among the 86 *A. istanbulensis* examined (see Özulug & Freyhof, 2007 for material), the count 25 was not observed and the count 24

was observed only twice (see Table 1 in Freyhof & Kottelat, 2007). The 24 gill-rakers count was observed only in old material from Lake Sapanca (ZMH 3871) and this is the part of the range of *A. istanbulensis* geographically most distant from Lake Vistonis (the peculiarity of the Lake Sapanca shemaya is discussed by Özulug & Freyhof, 2007). This means, except the two individuals from Lake Sapanca, the overlapping range in gill raker counts between *A. vistonicus* and *A. istanbulensis* would be only two gill rakers, if data presented by Economidis (1974) are taken into account.

- 2) Economidis (1974) examined 13 shemayas from Lake Vistonis and 11 from River Filiouris (P. S. Economidis, pers. comm.). He did not state the frequencies of the counts 26 and 27 and it is not clear whether specimens from Filiouris might have slightly higher gill-raker counts. We examined 20 individuals and have not observed these counts and it seems doubtful that they would be frequent. Although the overlap in gill raker counts between *A. istanbulensis* and *A. vistonicus* seems great, only very few individuals might have gill-raker counts within this overlap zone.

Alburnus vistonicus is also very similar to *A. carinatus* by body shape, but is distinguished by having fewer gill rakers (21-25 vs. 33-39).

Alburnus vistonicus is geographically close but not very similar to *A. volviticus* and *A. nicaeensis*. *Alburnus vistonicus* is distinguished from *A. volviticus* by having fewer gill rakers (21-25 vs. 25-31) and the anal-fin origin about $\frac{1}{2}$ - $1\frac{1}{2}$ scales behind dorsal-fin base (vs. $1\frac{1}{2}$ - $2\frac{1}{2}$) and few, large tubercles in nuptial males (vs. numerous and small). *Alburnus vistonicus* is distinguished from *A. nicaeensis* by having the anal-fin origin about $\frac{1}{2}$ - $1\frac{1}{2}$ scales behind the dorsal-fin base (vs. $1\frac{1}{2}$ - $2\frac{1}{2}$) and a shorter head (length 21-24 % SL vs. 24-27).

Comparing *A. vistonicus* to the geographically close *A. schischkovi* from Bulgaria, it is distinguished by having the anal-fin origin about $\frac{1}{2}$ - $1\frac{1}{2}$ scales behind the dorsal-fin base (vs. $1\frac{1}{2}$ - $2\frac{1}{2}$), and by having a proportionally large eye (eye diameter 1.1-1.6 times in interorbital distance, vs. 0.9-1.2) in specimens of the same size range (106-212, mean 130 mm SL in *A. vistonicus* vs. 114-131, mean 120 mm SL in *A. schischkovi*).

The range of *A. vistonicus* is quite distant from that of the remaining Black Sea shemayas *A. mandrensis* (Bulgaria), *A. mentoides* (Crimea) and

A. derjungini (eastern Black Sea basin). It is distinguished from *A. mandrensis* by having 21-26 gill rakers (vs. 25-30) and a more slender caudal peduncle (depth 1.9-2.4 times in its length vs. 1.7-2.0). *Alburnus vistonicus* is distinguished from *A. derjungini* and *A. mentoides* by having a shorter head (length 21-24 % SL vs. 23-27). It is further distinguished from *A. mentoides* by having a more slender caudal peduncle (depth 1.9-2.4 times in its length vs. 1.7-1.9).

Comparing *A. volviticus* to the shemayas included into the *A. mento* species group from the Black and Azov Sea basins (see Freyhof & Kottelat, 2007), *A. vistonicus* is distinguished from *A. danubicus* from the lower Danube by having 13-15½ branched anal-fin rays (vs. 17-20½) and from *A. mento* from the lakes in the upper Danube drainage by having the anal-fin origin about $\frac{1}{2}$ - $1\frac{1}{2}$ scales behind dorsal-fin base (vs. $1\frac{1}{2}$ - $2\frac{1}{2}$) and 13-15½ branched anal-fin rays (vs. 15-17½). *Alburnus vistonicus* is distinguished from *A. sarmaticus* and *A. leobergi* by having the anal-fin origin about $\frac{1}{2}$ - $1\frac{1}{2}$ scales behind dorsal-fin base (vs. $1\frac{1}{2}$ - $2\frac{1}{2}$), 13-15½ branched anal-fin rays (vs. 15-17½) and 21-26 gill rakers (vs. 27-34 in *A. sarmaticus* and 24-28 in *A. leobergi*). Based on the characters examined, *A. vistonicus* is surprisingly similar to the *A. chalcoides* (Caspian Sea basin) from which it is distinguished by having 21-25 gill rakers (vs. 18-22). They are the geographically most distant species within shemayas.

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