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**THE DISTRIBUTION OF STONE CRAYFISH
AUSTROPOTAMOBIOUS TORRENTIUM (SCHRANK, 1803)
(CRUSTACEA: DECAPODA: ASTACIDAE) IN THE SOUTH-WEST
ROMANIAN MOUNTAIN AND SUB-MOUNTAIN AREA**

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Abstract. Data is presented in relation to the geographical distribution of the endangered crayfish species *Austropotamobius torrentium*. One hundred and seventy-four sampling stations situated along the streams of 15 geographical units from the South-West of Romania (Anina Mountains, Almăj, Dognecea, Godeanu, Locva, Țarcu, Retezat, Semenic, Mehedinți, Vâlcan, Parâng, Șureanu, Poiana Ruscă, Lipova Hills and Mehedinți Plateau) have been investigated. A distribution map was compiled. The data from older publications were collated. The actual habitat of this species occupies a large area of South-West Romania in the mountain and sub-mountain area, being absent in the Poiana Ruscă Mts, Lipova and Dognecea Hills.

Résumé. Données sur la distribution géographique de l'espèce menacée *Austropotamobius torrentium*. Un nombre de 174 endroits qui se trouvent sur les ruisseaux des 15 unités géographiques du Sud-Ouest de la Roumanie (les montagnes de Anina Almăj, Dognecea, Godeanu, Locvei, Țarcu, Retezat, Semenic, Mehedinți, Vâlcan, Parâng, Șureanu, Poiana Ruscă, les collines de Lipova et le plateau Mehedinți) ont été inventoriés. On a réalisé une carte détaillée de distribution. On a centralisé les données des autres publications qui étaient plus anciennes. L'habitat actuel de l'espèce occupe une grande partie du Sud – ouest de la Roumanie de la zone de montagne et sous montagne, et est absent dans les montagnes de Poiana Ruscă et les collines de Dognecea et Lipova.

Key words: *Astacus astacus*, *Austropotamobius torrentium*, crayfish, distribution, South-West Romania, endangered species, noble crayfish, stone crayfish.

INTRODUCTION

Three indigenous freshwater crayfish species reside in the Romanian aquatic ecosystems, i.e. the stone crayfish *Austropotamobius torrentium* (Schränk, 1803), the noble crayfish *Astacus astacus* (Linnaeus, 1758) and the narrow-clawed crayfish *Astacus leptodactylus* Eschscholtz, 1823 (Băcescu, 1967; Holdich et al., 2009; Pârvulescu, 2009 a). Recently, a new crayfish was discovered in Romania, belonging to the Cambaridae family, i.e. the spiny-cheek crayfish *Orconectes limosus* (Rafinesque, 1817) (Pârvulescu et al., 2009). In the European Council's Directive 92/43, *Austropotamobius torrentium* is rated as a "priority species" and thus a series of management measures are necessary to be carried out in the protected areas, among which is the periodic measurement of population density that is of great importance (Pârvulescu, in: Combroux et al., 2007). Moreover, both *A. torrentium* and *A. astacus* are considered by the IUCN as "vulnerable" (IUCN, 2010). These crayfish remain vulnerable to various threats: overexploitation, habitat modification and loss, pollution, the spread of non-indigenous crayfish species or crayfish plague (Holdich & Pöckl, 2005; Pârvulescu, 2009 b).

There are few data published regarding the freshwater crayfish species in Romania. First records of *Austropotamobius torrentium* in Romania place this

species in the Racovăț River, from Mehedinți Plateau (Scriban, 1908). Entz (1914) mentioned it in this area (Mehadia, Anina), but also in the centre of the Transylvanian Plateau. Călinescu (1929) talks about the species in the Cerna Basin on the Naibei Valley and Corcoaia. In the SW of Romania, the species is concentrated especially in the Mehedinți Plateau and in the South of the Banat Mountains. Băcescu (1967) studied the Romanian crayfish fauna in detail. The results of his studies are mentioned in the book “Crustacea, Decapoda” (in Romanian). During 1935-1962 there are mentions about its presence in the South-West, West, centre and North (Maramureș) of Romania. The “Grigore Antipa” National Museum of Natural History in Bucharest also holds approximately 160 specimens in its collection. From the area we studied, Băcescu found the species in 24 places in Caraș-Severin county. Bănărescu & Oprescu (1971) mentioned the species in Naidăș, Cerna’s tributary. The last study of the species, containing not only distribution data but also biometrical measurements, that were more complete than those of Entz, can be found in Papadopol & Diaconu (1987), who studied a material from Șușara stream, Nera’s tributary (collected in 1966 by the late Petre Bănărescu). Recent research has begun to be published from 2007 (Pârvulescu, 2008; Pârvulescu, 2009 c).

The “Atlas of Crayfish in Europe” (Souty-Grosset et al., 2006), the most recent monograph on crayfish species of Europe, shows the age of the data regarding the distribution of crayfish species in Romania and the fact that a part of this work was published in Romanian language and therefore they couldn’t be accessible to foreigners.

Since the existing data relating to the distribution of the stone crayfish in Romania is rather obsolete, we thought to offer, as a result of these investigations, a distribution map for this species considered a “priority species” in order to assist in an efficient conservation management in the natural protected areas.

MATERIAL AND METHOD

Between July and September 2009 a total of 174 sampling stations were analyzed, in order to establish the distribution of *Austropotamobius torrentium* in the permanent waters in the upper sector of the main courses and tributaries in the mountain area and sub-mountain area of the South-West of Romania. The investigated area lies from South of the Mureș River and West of the Jiu and Strei rivers including the surface of 15 geographical units (i.e. mountains, plateaus, hills). The sampling stations were chosen at random, investigating an average of 10 mainstreams with permanent character per geographical unit, depending on its size. Each sampling station had on average about 200 m of river for investigation. On this occasion, observations were carried out regarding the riverbed morphology and the surrounding habitats. The crayfish were collected using direct hand sampling from the river bed, by checking into the galleries, spaces between rocks, roots and within banks. Where we couldn’t find any crayfish we declared the sampling station as one with “no crayfish” but only after investigating at least 300 m of river.

The crayfish were identified *in situ* according to their morphological features, sexed and photographed. Tissue for subsequent molecular analysis was sampled, by detaching the last pereopod on the right side and preserving it in alcohol (96%). Moreover, an inspection was carried out, to determine the specimens’ health status and potential parasites (Holdich, 2003). Subsequently, the specimens were set free exactly in the same location where they have been captured. To identify the

specimens, we used the keys in Ingle (1997), Souty-Grosset et al. (2006) and Părvulescu (2009 a).

A distribution map of older data was made using ArcMap and we took as reference the name of the rivers provided by the authors, which are the only data available from older literature. A distribution map of recent data was made taking into consideration the field data that were placed on a digital map at a 1:50,000 scale. We used Global Mapper program, we placed the points where we found each of the crayfish species as well as the points where those weren't found, obtaining a map of distribution points. Then, using InkScape, we coloured all the rivers and the distribution points making visible the water catchment areas. The distribution area was established later on after having analyzed the point's distribution, taking into consideration the biogeography of the species, on water collecting areas, relief and antropic impact.

RESULTS AND DISCUSSION

The older observations are difficult to locate in the field because of the lack of coordinates, making them almost impossible to use in the conservation management of the species. Nevertheless they show a good representation of the species especially in the southern part of South-West Romania (Fig. 1), but from this information it is hard to establish a clearly defined geographical area for this *A. torrentium*. On the other hand, due to their age, more than 30 years, it is very possible that the actual situation may not be the same anymore.

The results of the investigations (Tab. 1) are shown next according to the hydrographic basin where they were obtained.

The Timiș hydrographic basin. Twenty-two stations in several geographical units in this basin were investigated: Semenice, Țarcu and Poiana Ruscă Mts. *Austropotamobius torrentium* was found in 59% of the stations investigated. The maximum altitude at which the species was found was 860 m, on the Brebu stream, where eight specimens along 50 m of river were found. *Astacus astacus* was captured at only one station, on the Străjești stream that flows into the Timiș River at a lower altitude than the Pogăniș River.

The Cerna hydrographic basin. Twenty-two stations situated in four geographical units were investigated: Mehedinți, Semenice, Almăj, Godeanu Mts. The only crayfish species that was identified was *A. torrentium*, which was found in 40.9% of the stations investigated. The highest crayfish location was in the Areaca stream, at 760 m, where, because of the powerful flash flood, we could capture only one specimen. The greatest number of specimens were found in the Munc stream (Munc spring), Cerna's tributary, in the area of Băile Herculane where, along a distance of 80 m, six specimens were collected.

The Nera hydrographic basin. Nineteen stations distributed in the area of Anina, Almăj and Locva Mts were investigated; only *A. torrentium* was identified in 94.7% of the stations. With a relatively low altitude, the Nera basin has a big population of this species. In this region we also found the lowest altitude where we found *A. torrentium*, in Zlatița stream, at 60 m, where we captured five specimens in only 10 m of river investigated.

The Caraș hydrographic basin. Sixteen stations in the Anina Mts. and Dognecea Hills were investigated. Two crayfish species, *A. astacus* and *A. torrentium*, were identified. *Astacus astacus* was most often found occurring in over 68.7% of the stations, while *A. torrentium* appears only in 18.7% of the stations. At

Table 1

Sampling stations toponyms, geographic coordinates (Stereo 70) and captured specimens.

Rivers toponyms	Geographic coordinates	Altitude (m)	<i>Austropotamobius torrentium</i>	<i>Astacus astacus</i>	<i>Orconectes limosus</i>
Timiș hydrographic basin					
Brebu	45°14'03"N 22°08'47"E	860	5 ♂♂, 3 ♀♀	-	-
Grădiște	45°13'13"N 22°06'42"E	820	1 ♂, 1 ♀	-	-
Hididel	45°09'20"N 22°28'07"E	680	1 ♂, 4 ♀♀	-	-
Balota	45°25'05"N 22°31'25"E	650	1 ♂	-	-
Valea Vidra	45°25'05"N 22°31'25"E	620	4 ♂♂, 10 ♀♀	-	-
Valea Mare	45°25'26"N 22°31'08"E	615	5 ♂♂, 3 ♀♀	-	-
Luncavița	45°05'59"N 22°16'10"E	450	2 ♂♂, 1 ♀	-	-
Armeniș	45°14'21"N 22°21'25"E	440	3 ♂♂	-	-
Malița	45°20'19"N 22°21'38"E	420	4 ♂♂	-	-
Loznișoara	45°34'28"N 22°29'35"E	415	1 ♂	-	-
Slătinoara	45°21'38"N 22°22'01"E	395	1 ♂	-	-
Valea de Runc	45°22'46"N 22°07'47"E	320	1 ♀	-	-
Valea Petroșniței	45°19'14"N 22°14'14"E	300	1 ♂	-	-
Străjești	45°23'08"N 22°02'43"E	280	-	1 ♂, 2 ♀♀	-
Maciova	45°31'59"N 22°11'53"E	235	7 ♂♂, 4 ♀♀	-	-
Cerna hydrographic basin					
Areaca	45°02'11"N 22°37'12"E	760	1 ♂	-	-
Ponorovăț	41°04'10"N 22°27'49"E	720	1 ♂, 1 ♀	-	-
Pogara	45°04'12"N 22°27'23"E	650	1 ♂, 6 ♀♀	-	-
Munc	44°54'00"N 22°25'01"E	485	3 ♂♂, 3 ♀♀	-	-
Țăsna	44°52'16"N 22°29'56"E	420	2 ♂♂, 2 ♀♀	-	-
Verendin	45°04'24"N 22°15'20"E	420	1 ♂	-	-
Lăpușnicel	44°58'39"N 22°13'12"E	410	1 ♀	-	-
Slătinic	45°00'51"N 22°15'31"E	340	2 ♂♂, 1 ♀	-	-
Vânturătoarea	44°58'01"N 22°28'57"E	300	1 ♂	-	-
Sfîrdinu Mare	44°54'03"N 22°19'55"E	300	3 ♂♂, 2 ♀♀	-	-
Bârza	44°48'52"N 22°23'59"E	138	1 ♂, 6 ♀♀	-	-
Nera hydrographic basin					
Miniș	45°01'29"N 21°49'24"E	595	5 ♂♂, 2 ♀♀	-	-
Plopa	45°01'43"N 21°50'13"E	590	1 ♀	-	-
Rudăria	44°50'05"N 22°08'29"E	575	2 ♂♂, 6 ♀♀	-	-
Predilcova	45°01'57"N 21°52'39"E	505	1 ♂	-	-
Poneasca	45°03'29"N 21°57'36"E	465	2 ♂♂, 1 ♀	-	-
Golumbului	45°00'43"N 21°54'55"E	430	3 ♂♂	-	-
Țerova	44°59'10"N 22°09'40"E	380	1 ♂	-	-
Babii	45°01'18"N 21°54'24"E	350	1 ♂, 1 ♀	-	-
Bănia	44°51'43"N 22°02'43"E	340	1 ♂, 6 ♀♀	-	-
Righidia	44°56'09"N 21°57'57"E	310	4 ♂♂, 5 ♀♀	-	-
Lăpușnic	44°55'03"N 21°55'37"E	298	10 ♂♂, 8 ♀♀	-	-
Mocerîș	44°53'36"N 21°53'53"E	298	2 ♀♀	-	-

Table 1 (continued)

Rivers toponyms	Geographic coordinates	Altitude (m)	<i>Austropotamobius torrentium</i>	<i>Astacus astacus</i>	<i>Orconectes limosus</i>
Ducin	44°52'31"N 21°53'47"E	280	3 ♂♂, 3 ♀♀	-	-
Răchita	44°47'07"N 21°50'20"E	270	2 ♀♀	-	-
Beiu	44°55'22"N 21°46'28"E	240	2 ♂♂, 1 ♀	-	-
Valea Slatinei	44°55'06"N 21°41'50"E	178	6 ♂♂, 8 ♀♀	-	-
Zlatița	44°51'46"N 21°29'09"E	60	4 ♂♂, 1 ♀	-	-
Caraș hydrographic basin					
Buhui stream	45°03'51"N 21°53'20"E	660	4 ♂♂, 4 ♀♀	2 ♂♂, 1 ♀	-
Navățu Mare	45°09'41"N 21°56'52"E	500	-	3 ♂♂, 2 ♀♀	-
Răviștea	45°03'10"N 21°52'35"E	475	-	2 ♂♂, 10 ♀♀	-
Comarnic	45°10'46"N 21°57'10"E	470	-	1 ♀	-
Toplița	45°10'56"N 21°56'56"E	465	-	3 ♂♂, 3 ♀♀	-
Celnicu Mare	45°06'48"N 21°51'46"E	435	-	1 ♂, 3 ♀♀	-
Dognecea	45°18'36"N 21°46'40"E	360	-	1 ♂	-
Câdeni	44°56'49"N 21°44'08"E	295	9 ♂♂, 14 ♀♀	-	-
Natra	45°06'21"N 21°46'09"E	295	-	1 ♂, 1 ♀	-
Potocelu	44°56'05"N 21°43'48"E	280	6 ♂♂, 11 ♀♀	-	-
Clocotici	45°14'43"N 21°50'28"E	270	-	6 ♂♂, 8 ♀♀	-
Ciornovăț	45°15'04"N 21°34'42"E	100	-	3 ♂♂, 5 ♀♀	-
Cârnecea	45°12'36"N 21°38'16"E	140	-	1 ♀	-
Bârzava hydrographic basin					
Dignacea	45°10'54"N 22°00'23"E	655	1 ♂, 2 ♀♀	-	-
Crivaia	45°12'10"N 22°00'38"E	600	-	1 ♂, 3 ♀♀	-
Grindești	45°13'14"N 22°00'33"E	595	-	2 ♂♂, 7 ♀♀	-
Radomir	45°15'48"N 22°02'59"E	470	1 ♂, 1 ♀	-	-
Crainicul	45°15'23"N 22°02'37"E	460	3 ♀♀	-	-
Bogatu	45°16'47"N 22°03'44"E	455	1 ♂	-	-
Râul Alb	45°17'32"N 21°59'41"E	430	1 ♂	-	-
Lișcov	45°17'32"N 22°02'33"E	380	1 ♂, 1 ♀	-	-
Cuptoare	45°16'36"N 21°57'35"E	360	2 ♂♂, 5 ♀♀	-	-
Stârnic	45°18'13"N 22°02'43"E	330	1 ♀	-	-
Doman	45°15'38"N 21°54'18"E	320	-	2 ♂♂, 6 ♀♀	-
Moravița	45°21'25"N 21°45'51"E	240	-	1 ♂, 1 ♀	-
Topolnița hydrographic basin					
Mălărișca	44°54'07"N 22°34'14"E	555	2 ♂♂, 1 ♀	-	-
Prejna	44°55'02"N 22°38'01"E	475	2 ♂♂, 4 ♀♀	-	-
Topolnița	44°49'14"N 22°34'09"E	420	2 ♂♂, 6 ♀♀	-	-
Jidoștița	44°43'53"N 22°33'24"E	330	5 ♂♂, 4 ♀♀	-	-
Șușița	44°43'35"N 22°35'55"E	220	3 ♂♂, 6 ♀♀	-	-
Jiu hydrographic basin					
Cerbului	45°28'21"N 23°29'08"E	795	1 ♂	-	-
Râscoalei	45°28'54"N 23°27'22"E	790	1 ♂	-	-
Aninoasa	45°25'19"N 23°17'26"E	730	5 ♂♂, 8 ♀♀	-	-
Motru	44°10'10"N 22°46'50"E	710	1 ♂, 1 ♀	-	-

Table 1 (continued)

Rivers toponyms	Geographic coordinates	Altitude (m)	<i>Austropotamobius torrentium</i>	<i>Astacus astacus</i>	<i>Orconectes limosus</i>
Valea Ungurului	45°21'49"N 23°19'08"E	700	3 ♂♂	-	-
Valea Roşie	45°27'09"N 23°22'14"E	685	1 ♂, 2 ♀♀	-	-
Micota	45°08'14"N 22°48'12"E	560	1 ♀	-	-
Obîrşia	45°01'32"N 22°40'34"E	520	3 ♂♂, 1 ♀	-	-
Valea lui Dragu	44°01'41"N 22°42'20"E	500	2 ♂♂, 2 ♀♀	-	-
Capra	45°05'36"N 22°43'27"E	495	2 ♀♀	-	-
Isverna	44°58'47"N 22°37'18"E	440	2 ♂♂, 2 ♀♀	-	-
Brâgleasca	44°58'02"N 22°38'39"E	435	5 ♂♂, 7 ♀♀	-	-
Turtaba	44°58'19"N 22°41'97"E	410	2 ♂♂, 3 ♀♀	-	-
Nadanova	44°56'47"N 22°39'06"E	410	1 ♂, 1 ♀	-	-
Coşuştea	44°55'43"N 22°40'51"E	400	7 ♂♂, 9 ♀♀	-	-
Brebina	45°01'16"N 22°42'40"E	395	1 ♂, 3 ♀♀	-	-
Valea Ursului	44°58'54"N 22°43'59"E	380	2 ♂♂, 6 ♀♀	-	-
Tismana	45°05'59"N 22°55'22"E	340	-	2 ♂♂, 4 ♀♀	-
Valea Bulbei	44°59'42"N 22°47'09"E	295	1 ♂, 2 ♀♀	-	-
Strei hydrographic basin					
Crivadia	45°27'55"N 23°15'17"E	700	1 ♂	-	-
Peştera	45°28'21"N 22°57'58"E	700	2 ♂♂, 4 ♀♀	-	-
Valea Zlatina	45°29'39"N 22°45'28"E	620	1 ♂	-	-
Sâlaş	45°29'06"N 22°56'14"E	600	1 ♂	-	-
Râu Mare	45°27'36"N 22°49'27"E	550	9 ♂♂, 11 ♀♀	-	-
Balta	45°30'28"N 22°52'59"E	470	5 ♂♂, 6 ♀♀	-	-
Valea Vânătorului	45°36'39"N 23°07'37"E	470	2 ♂♂, 4 ♀♀	-	-
Ohaba	45°31'43"N 23°08'44"E	460	1 ♂, 2 ♀♀	-	-
Mureş direct tributaries					
Stânceasca	45°52'25"N 22°39'01"E	245	-	3 ♂♂	-
Ţiganilor	45°59'09"N 22°23'14"E	180	-	1 ♂	-
Danube direct tributaries					
Radimna	44°48'09"N 21°42'41"E	440	2 ♀♀	-	-
Cameniţa	44°44'37"N 21°47'34"E	410	1 ♂	-	-
Sirinea	44°38'21"N 22°05'10"E	360	1 ♀	-	-
Bahna	44°50'21"N 22°31'38"E	275	1 ♂	-	-
Dragoselea	44°41'00"N 22°03'48"E	230	4 ♂♂, 4 ♀♀	-	-
Valea Mare	44°44'28"N 21°43'05"E	220	3 ♂♂, 8 ♀♀	-	-
Eibenthal	44°34'08"N 22°07'18"E	190	2 ♀♀	-	-
Belobreşca	44°48'39"N 21°29'51"E	190	3 ♂♂, 3 ♀♀	-	-
Mraconia	44°40'59"N 22°14'43"E	180	2 ♀♀	-	-
Valea Racovăţ	44°45'55"N 22°28'07"E	150	2 ♂♂, 4 ♀♀	-	-
Strenica	44°32'47"N 22°04'26"E	110	2 ♂♂, 1 ♀	-	-
Valea Satului	44°40'32"N 22°17'51"E	110	1 ♂, 2 ♀♀	-	-
Mala	44°41'39"N 22°20'34"E	100	4 ♂♂, 4 ♀♀	-	-
Ogradena	44°40'25"N 22°17'57"E	100	2 ♂♂, 1 ♀	-	-
Berzasca (dws.)	44°39'02"N 21°58'06"E	95	-	-	9 ♂, 33 ♀♀
Gura Văii	44°40'26"N 22°33'54"E	80	3 ♂♂, 3 ♀♀	-	-
Liborajdina (dws)	44°40'13"N 21°46'33"E	70	-	-	4 ♀♀

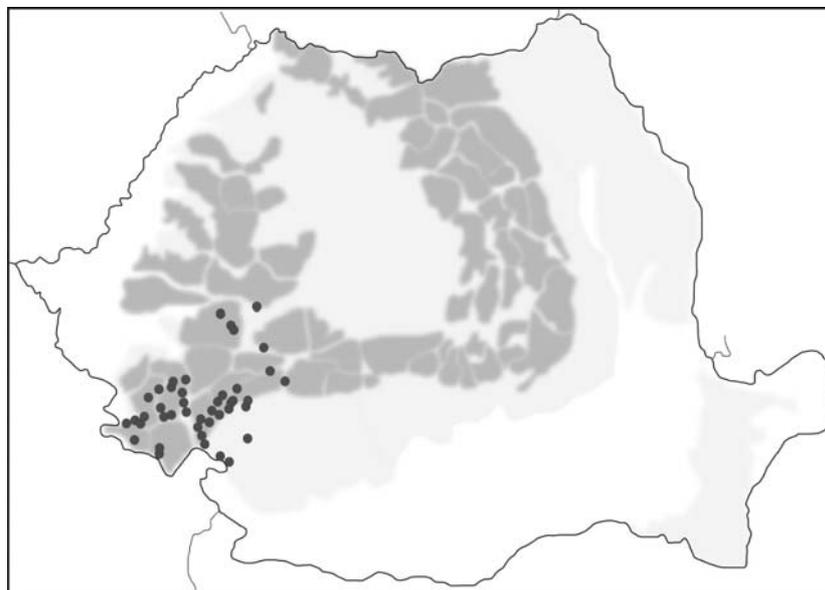


Fig. 1 - Distribution points of *Austropotamobius torrentium* in South-western Romania, based on data at least 10 years old.

Buhui station (660 m altitude) both species were found. It is very interesting and hard to explain the presence of *A. torrentium* in the Buhui stream, a fact also mentioned by Băcescu in 1967, in the volume "Crustacea, Decapoda", one possible explanation could be its artificial introduction when the dam on the Buhui Lake was built with rocks taken from the Poneasca stream from the Nera basin, situated at a close distance to this one.

The Bârzava hydrographic basin. Twelve stations were investigated in the area of Semenic, Anina, Dognecea, two species of crayfish being found, 58.3% being *A. torrentium* and 33.3% being *A. astacus*. *Astacus astacus* was found at a higher altitude, at 600 m (Crivaia), while *A. torrentium* was captured at 655 m altitude, the highest altitude for this basin at the Dignacea location.

The Topolnița hydrographic basin. Six stations were investigated, situated on the Mehedinți Plateau. We found out that the species *A. torrentium* was very well represented in all the stations where the investigations were made.

The Jiu hydrographic basin. Twenty-eight stations in Retezat, Țarcu, Vâlcan and Mehedinți Plateau were investigated. *Austropotamobius torrentium* being identified at of 64.2% of them. A well represented population was found in the Aninoasa stream, higher than Aninoasa place, where 13 specimens were captured along a distance of 110 m of river investigated. From the local inhabitants' information, they consume crayfish very often, and our investigations show that the species is at a very favourable density. Also, Jiul de Est (Eastern Jiu) represents eastern limit of the species distribution area in Romania.

The Strei hydrographic basin. Investigations were made in the Retezat, Țarcu and Șureanu Mts. We found only one species of crayfish, *A. torrentium*. This was found in 44.4% of the stations, at an altitude starting at 470 m. The highest location was Peștera stream, at 700 m altitude were six specimens were found.

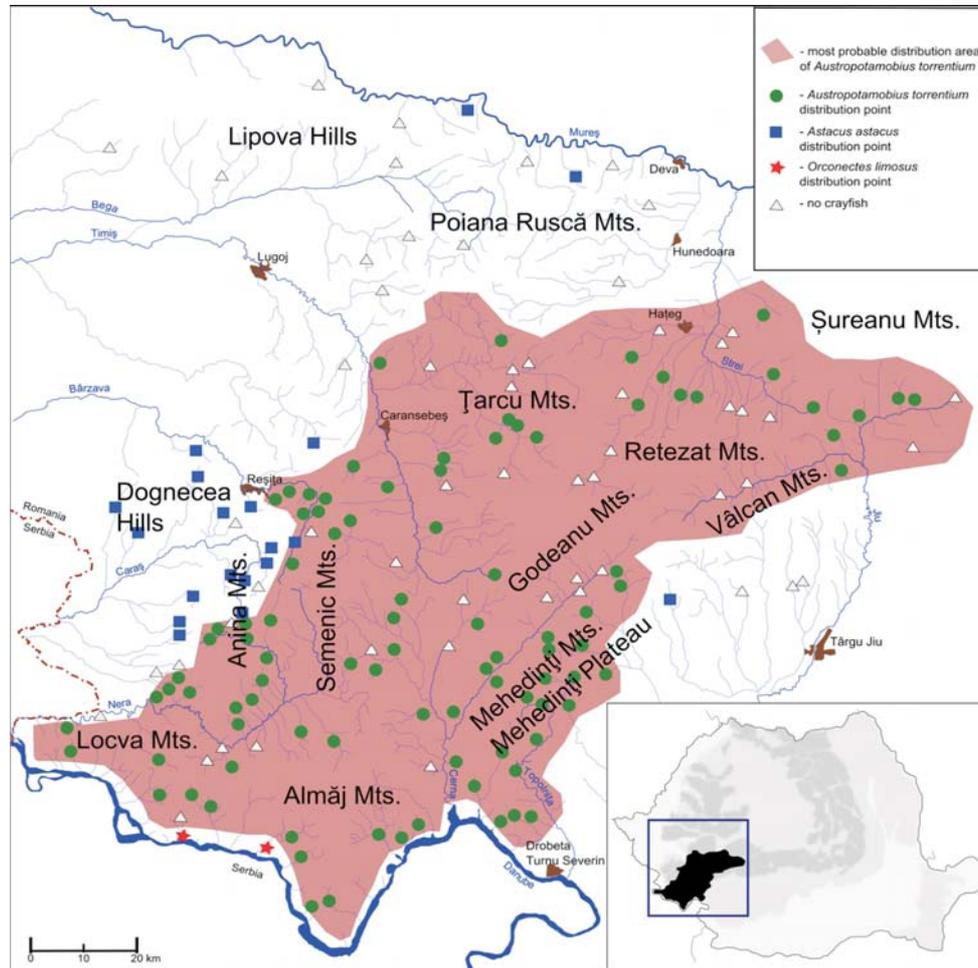


Fig. 2 - The distribution area of the *Austropotamobius torrentium* obtained from the data assembled during the 2009 campaign in the SW of Romania.

The Bega tributaries. Six tributaries were investigated in the Poiana Ruscă Mts. and Lipova Hills but we could not find any species of crayfish.

The direct Mureș tributaries. Eight direct tributaries of the Mureș River from Poiana Ruscă Mts. and Lipova Hills were investigated, indicating the presence of one species of crayfish, *A. astacus* at two stations, Stănceasca and Țiganilor, situated at an altitude of 245, respectively 180 m.

The direct Danube tributaries. Seventeen streams have been investigated in the Almăj, Locva Mts. and the Mehedinți Plateau. *Austropotamobius torrentium* was found in 88.2% of the stations. Upstream of the Berzasca River, in Dragoselea stream, lives *A. torrentium*, the investigations in the lower sector of the river showed the presence of the North American species *Orconectes limosus*. More than 40 individuals being collected from the river mouth into the Danube as far as 2000 m

upstream on this river. Also, this invasive species was found up to 150 m upstream on the Liborajdina River. Although the distribution of the two species did not overlap this fact is very important showing that *O. limosus* could occupy the territory of the protected species *A. torrentium*.

As a result from the data obtained, the most frequent species of crayfish in the mountain and sub-mountain area of the SW of Romania is *A. torrentium*, excepting Bega basin and the direct tributaries of Mureş. In a small number of cases, *A. astacus* was found in the higher area of the Caraş basin. Mixed populations between *A. torrentium* and *A. astacus* were found in one station, Buhui stream from the Caraş hydrographical basin. In fig. 3 we present a graph showing the frequency of the three species of crayfish in the hydrographical basins investigated.

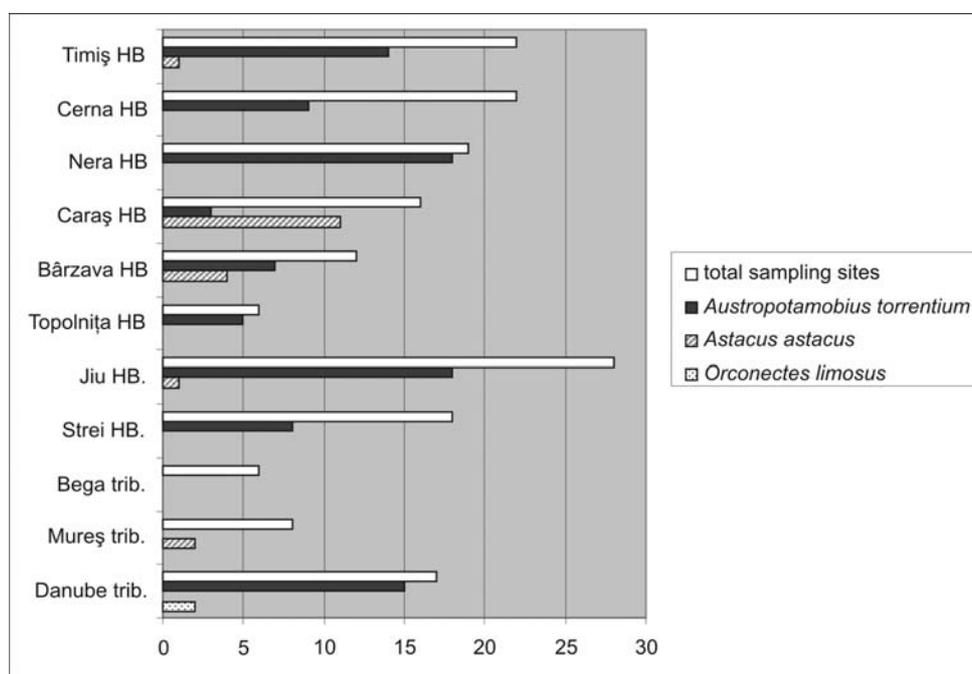


Fig. 3 - The frequency of the crayfish species in the hydrographical basins, investigated during the 2009 campaign in the SW area of Romania.

As for the geographical units, we can say that the species investigated live in: Almăj Mountains, Locva, Anina, Semenic, Mehedinți (including Plateau), Godeanu, Țarcu, Retezat, Vâlcan, Șureanu and that they are very poorly represented in the South of Poiana Ruscă Mountains.

At the end of the investigation we could establish the distribution area of the crayfish species *A. torrentium* for the SW area of Romania. The distribution area covers the entire area of the Locva Mountains, Almăj, Semenic, Mehedinți (including Plateau), Godeanu, Retezat, Țarcu, the North of the Vâlcan Mountains, the South-East of the Șureanu Mountains, the North, East and South of the Anina Mountains and only a small part of the Poiana Ruscă Mountains. The distribution area of stone crayfish covers the territory of six natural protected sites: the National

Park Cheile Nerei Beușnița, the Natural Park Semenic Cheile Carașului, the Natural Park Porțile de Fier, the Mehedinți Geopark, the National Park Retezat, and the National Park Domogled. The creation of several “Natura 2000” sites of community importance (OUG57/2007) was based on the presence of *A. torrentium*. The species was found to be absent in the area investigated of the Poiana Ruscă Mountains, the West and the centre of the Anina Mountains as well as in the Dognecea Hills, these areas being populated mostly by *A. astacus*. Only in the Lipova Hills we did not find any species of crayfish, during summer the waters being completely drained here.

More attention should be given to the situation found in the Berzasca River, where the invasive species *O. limosus* could very soon affect the native population of *A. torrentium* situated in the upper streams of the river. We have proposed to the environmental administrators of this region that they should monitor the situation periodically and to manually remove any invasive crayfish if they get nearer to the upper streams.

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DISTRIBUȚIA RACULUI-DE-PONOARE *AUSTROPOTAMOBIUS TORRENTIUM* (SCHRANK, 1803) (CRUSTACEA: DECAPODA: ASTACIDAE) ÎN ZONA MONTANĂ ȘI SUBMONTANĂ A SUD-VESTULUI ROMÂNIEI

REZUMAT

În această lucrare sunt prezentate date referitoare la distribuția geografică a speciei amenințate, *Austropotamobius torrentium*. Au fost investigate 174 locații aflate pe pâraiele a 15 unități geografice din sud-vestul României (Munții Aninei, Almăj, Dognecea, Godeanu, Locvei, Țarcu, Retezat, Semenic, Mehedinți, Vâlcan, Parâng, Șureanu, Poiana Ruscă, Dealurile Lipovei și Platoul Mehedinți). Exemplarele au fost capturate activ, căutând în albia râului spațiile folosite ca ascunzători, după care au fost eliberate în același loc de unde au fost capturate. A fost realizată o hartă detaliată de distribuție. Au fost centralizate și datele provenite din publicații mai vechi. Aria actuală de răspândire a speciei ocupă o mare parte din sud-vestul României în zona montană și submontană, lipsește din Dealurile Lipova și Munții Dognecei precum și în cea mai mare parte a Munților Poiana Ruscă.

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