A NEW ACANTHOCYCLOPS KIEFER, 1927 (COPEPODA: CYCLOPIDAE) FROM CAVES IN APUSENI MOUNTAINS (NORTH-WESTERN ROMANIA)

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Abstract.— A new stygobite species \textit{Acanthocyclops transylvanicus} sp. nov. is described from the north-western Romanian Carpathians (Apuseni Mountains) and is accommodated in the subterranean kieferi-group. \textit{Acanthocyclops transylvanicus} sp. nov. resembles closely \textit{A. biarticulatus} Monchenko, 1972 in the segmentation pattern of the swimming legs (3.2/3.2/3.2/3.2), but differs by the following characters: antennary second endopodite segment with 7 setae; distal articles of endopodites of P1 and P3 with 4 and 5 setae, respectively; absence of coxopodite ornamentation pattern in leg 4; leg 4 endopodite with 3-segmented appearance, but lacking a functional articulation between the second and third segment. We assume that the 2-segmented nature of the leg 4 endopodite as observed in both species is a convergent acquisition. The adult shape of the leg 4 endopodite in \textit{A. transylvanicus} sp. nov. results from the simple suppression of an arthrodial membrane formation. \textit{A. transylvanicus} is the ninth representative known in Romania which is accommodated in the \textit{kieferi}-group. An identification key for the species of \textit{kieferi}-group known to occur in Romania is given.

Key words.— Copepoda, Cyclopidae, \textit{Acanthocyclops}, taxonomy, new species, caves, Romania.

INTRODUCTION

Since the initial exploration of the groundwater realm in Romania at the beginning of the former century a considerable number of groundwater cyclopids have been discovered and described (Chappuis, 1924, 1925; Botoșâneanu and Damian, 1955; Pleșa, 1956, 1957; Damian-Georgescu, 1963; Pleșa \textit{et al.}, 1965; Pleșa, 1969; Pleșa \textit{et al.}, 1985; Iepure, 2001; Iepure, 2007a, b; Iepure and Defaye, 2008). The Apuseni Mountains (also known as the Western Carpathians, Fig. 1) located in north-western part of Romania, is the most intensively investigated karst area so far, and became known as a hot-spot in groundwater biodiversity (Botoșâneanu, 1985). This mountain unit consists of several well-defined Mesozoic age limestone and dolomite massifs (e.g., Bihor and Pădurea Craiului) showing highly diversified karst landscape (Onac and Constantin, 2004).

Thus far, twenty six species and subspecies of cyclopines are known to occur in the Apuseni and the associated mountains (Iepure, 2007a). Among them, five species appear to be endemic for Romania and are exclusively known from subterranean habitats (Iepure, 2007). The genus \textit{Acanthocyclops} Kiefer, 1927 appears to be the most diversified (Damian-Georgescu, 1963; Pleșa, 1985; Iepure, 2007) with five representatives currently assembled in the \textit{kieferi}-group:
A. deminutus (Chappuis, 1925), A. kieferi (Chappuis, 1925), A. propinquus Pleșa, 1967, A. plesi Iepure, 2001 and A. balcanicus bisaetosus Iepure, 2001 (Chappuis, 1925; Damian-Georgescu, 1963; Iepure, 2001) (Table 2; Fig. 1A).

Recent surveys of the fauna thriving in percolation water in several caves located in the Apuseni Mountains revealed the presence of several new copepod species (harpacticoids and cyclopid) (Meleg et al., in press). The present contribution deals with the description of a new subterranean cyclopoid of the kieferi-group in the genus Acanthocyclops. This new addition to the Romanian copepod fauna is discussed in terms of the diversity and distributional patterns of the kieferi-species group.

**MATERIAL AND METHODS**

The specimens were collected from the water percolating the vadose zone in Ungurului Cave (44°50'44"N; 22°24'38"E), Pădurea Craiului Mountains (north-western part of the Apuseni Mountains, north-western Romania) developed in Ladinian (middle Triassic) limestones (Orășeancu 1991) (Fig. 1A). The sampling site was located at about 300 m from the cave entrance (Oarga 2006, 2008). Dripping water, directed through a funnel, was collected into a plastic container and subsequently filtered through a 100 µm mesh net. The sampling of percolating water was performed continuously (see Pipan 2005) during November 2005, May 2006 (Oarga 2006, 2008) and July 2008 (Meleg et al. in press). Collected specimens were preserved in 70% ethanol for long term storage. Additional material from dripping water and pools in four other caves have been used for comparison, two from Pădurea Craiului Mountains: Ciur Izbuc Cave (46°43’86''N; 22°43’84''E) (lower Cretaceous limestone) and Întorsuri Cave (46°52’94''N, 22°34’53''E) and two from Bihor Mountains: Cotețul Dobreștilor Cave (46°39’90”N, 22°54’15”E) and Poarta Alunului Cave (46°37’24”N, 22°48’95”E) (Fig. 1A, Table 2).

Observations on specimens, transferred from ethanol to a mixture of ethanol and glycerol, were made on a Leica DMLB® phase-contrast and ZEISS microscope. Illustrations were made using a drawing tube mounted on the former. Un-dissected specimens are preserved in 70% ethanol. Type specimens and additional material is stored in the copepod collection of ISER (Cluj, Romania). Roman and Arabic numerals used armature formulae refer to spines and setae, respectively. Abbreviations used in the text and figures are: ISER, Institute of Speleology “Emil Racoviță”; ae, aesthetascs; exp1 – 3, first to third segment of exopodite; end1 – 3, first to third segment of endopodite; legs 1 – 6, first to sixth thoracopods; sp – spine.

![Figure 1](image-url)  
**Figure 1.** Distribution of the species from Acanthocyclops kieferi-group in groundwater habitats in Romania (see Table 2) (numbers refer to location description in Table 2; grey areas represent the limestone distribution in Romania). Letters refer to the following valleys: a – Iada Valley; b – Drăgan Valley; c – Someșul Cald River; d – Someșul Rece River; e – Crișul Alb River (Map modified after Onac & Constantin, 2003).
**TAXONOMY**

*ACANTHOCYLOPS TRANSYLVANICUS* sp. nov.

**Type locality.** Ungurului Cave, Pădurea Craiului Mountains, Bihor County (Romania), in water percolating from the cave ceiling.


**Additional material examined.** Bihorului Mountains (Bihor County, northwest Romania): 1 ♀, Coteşul Dobreştilor Cave, pools, leg. T. Brad, 18.III.2001; 1 ♀, Poarta Alunului Cave, pools, leg. O. Moldovan, 27.VIII.2001.

**Etymology.** From Transylvania, the Latin name of the region where Ungurului Cave, type-locality of the species, is located.

**Description.** Female. Habitus typical cyclopid shaped with a distinct constriction between prosome and urosome, and without surface ornamentation. Body length excluding caudal setae, 450 µm; cephalothorax width 116 µm (holotype) (Fig. 2A). Genital double-somite about 1.36 times wider than long. Seminal receptacle with anterior part expanded, but posterior part not (Fig. 2C). Copulatory canal spirally curved (Fig. 2C). Anterior receptacle nearly rectangular (Fig. 2C). The posterior margin of the urosomites lacking hyaline fringe. Anal somite with continuous row of spines along the postero-ventral border (Fig. 2C); postero-dorsal margin smooth (Fig. 2D). Anal operculum crescent covering anal area but not particularly protruded (Fig. 2D).

Caudal rami (Fig. 2C, D) slightly divergent, 1.8 times longer than wide; anterolateral seta positioned in dorsal plane and accompanied with spines at insertion; posterolateral seta as long as ramus with long spines at insertion. Medial seta slightly longer than posterolateral one. Dorsal seta inserted near the caudal inner edge and slightly longer than rami (Fig. 2D). Terminal median setae with breaking planes (Fig. 2C, D).

Antennule (Fig. 2B) 11-segmented, not reaching posterior margin of cephalothorax. Surface of segments apparently smooth. Armament on segments I to XI: I (8), II (4), III (8), IV (4), V (1+sp), VI (2), VII (3), VIII (2+ae), IX (2), X (2+ae) XI (7+ae). Aesthetasc on segment VIII linguiform, reaching distal part of segment IX. Aesthetasc on segment X short, piliform. Aesthetasc of bithek on segment XI filiform. Antenna (Fig. 3A) typically cyclopoid, lacking exopodite element. Praeexopodite region broken. Coxopodites with 2 abapodal setae, integument smooth. First to last endopodite segment with 1, 7, 7 setae, respectively. Mandible (Fig. 3B) with tiny palp bearing two short setae. Mandibular gnathobase devoid of ornamentation. Maxillulary arthrite (Fig. 3C) with 4 medio-apical spines and 7 medial elements (one element broken). Maxilla (Fig. 3D) with praecoexopodite and coxopodite fused that form the syncoxopodite. Syncoxa proximal endopodite of the maxilla bear 2 setae, median endopodite with one, and distal endopodite with 2 setae; basipodite with well-developed claw armed with fine teeth and bearing one accessorial claw and 1 setae. Endopodite 2-segmented, first segment with two serratate setae and second segment with two setiform setae and a robust one. Maxilliped (Fig. 3E) 4-segmented, with (from proximal to distal): 2, 2, 1 and 2 setae, respectively. Frontal surface of second and third segment ornamented with slender setules.

Legs 1–3 (Fig. 4) with 3-segmented exopodites and 2-segmented endopodites. Precoxal part (not illustrated) with smooth surface; medial setae of coxopodite present in all legs; basipodite of leg 1 with medial spine as long as the first endopodite segment, ornamented at insertion with long and slender spines. Medial edge of basipodite rounded and hairy in legs P2-P4; spine formula 2/3/3 and setae formula 4/4/4 (Table 1).

Leg 4 endopodite (Fig. 4D) with 3-segmented appearance but lacking functional articulation between ancestral second and third podomere. Distal part of leg 4 endopodite coinciding with ancestral third

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**Table 1. Armament of legs 1–4 in the female of* Acanthocyclops transylvanicus* n. sp.**

<table>
<thead>
<tr>
<th>Legs</th>
<th>Coxopodite</th>
<th>Basipodite</th>
<th>Exopodite</th>
<th>Endopodite</th>
</tr>
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<tbody>
<tr>
<td>Leg 1</td>
<td>0-1</td>
<td>1-1</td>
<td>I-0; I-1; II,2,2</td>
<td>0-1; 1,1I+1,2</td>
</tr>
<tr>
<td>Leg 2</td>
<td>0-1</td>
<td>1-0</td>
<td>I-0; I-1; II,1+3</td>
<td>0-1; 1,1+1,3</td>
</tr>
<tr>
<td>Leg 3</td>
<td>0-1</td>
<td>1-0</td>
<td>I-0; I-1; II,1+3</td>
<td>0-1; 1,1+1,3</td>
</tr>
<tr>
<td>Leg 4</td>
<td>0-1</td>
<td>1-0</td>
<td>I-0; I-1; II,1+3</td>
<td>0-1; 0-2; 1,II,2*</td>
</tr>
</tbody>
</table>

* 3-segmented appearance, articulation between segments 2 and 3 not functional.
Figure 2. Acanthocyclops transylvanicus n. sp. (Ungurului Cave, Romania); A – habitus female (dorsal view); B – antennula (ventral view, holotype); C – urosome, female (ventral view, paratype, Ungurului Cave); D – urosome, female (dorsal view, paratype, Ungurului Cave) (A scale 100 µm; B, C, D scale 50 µm).
Figure 3. *Acanthocyclops transylvanicus* n. sp. (Ungurului Cave, Romania) (female holotype); A – antenna (frontal view); B – mandible with the palp; C – maxillule (caudal view); D – maxilla (caudal view); E – maxilliped (frontal view) (scale 50 μm).
segment, 1.2 times longer than wide, bearing two terminal spines, inner apical spine 1.66 times as long as outer spine (Fig. 4D).

Leg 5 (Fig. 2C) 2-segmented, basal segment armed with outer setae; distal segment sub-quadrate, distinctly articulating on basal segment, bearing one external terminal seta 3.2 times longer than the subapical medial spine, the latter slightly shorter than the distal segment. Leg 6 armed with three elements: one medialmost long seta and two equally sized outer spines (Fig. 2D).

Male. Habitus as in the female, except for separated urosomes 2 and 3. Body length, excluding furcal setae, 400 µm, cephalothorax width 160 µm (allotype) (Fig. 5A). Posterior margin of anal somite completely set with uninterrupted row of spinules (Fig. 5B, C). Anal operculum rounded, not protruded, without ornamentation (Fig. 5B). Caudal rami and setal lengths similar as in female. Antennule 16-segmented, geniculated, with principal aesthetasc on segments I, IV, IX and XIII (not illustrated). Aesthetasc linguiform and relatively shorter. Cephalic appendages, legs 1–3 and leg 5 as in the female. The leg 4 endopodite with a reduced functional articulation between median and terminal segment (Fig. 5D). Ancestral third segment of leg 4, 1.06 times wider than long, the medial spine 1.7 times as long as lateral spine (Fig. 5D). Leg 6 bearing 3 elements: outer and median one setiform, inner one spinyform and rather robust (Fig. 5C).

**Comments.** *Acanthocyclops transylvanicus* n. sp. is attributed to *Acanthocyclops* according to the current definition of the genus: the fifth leg represented by two segments with the distal article armed with a small subapical medial spine (Einsle 1996, Dussart and Defaye 2001).

*Acanthocyclops transylvanicus* n. sp. shares the 11-segmented antennula with twenty six epigean and hypogean taxa currently ascribed to the genus (Einsle, 1996; Pandourski, 1997; Galassi and DeLaurentis, 2004; Mercado, Suarez-Morales and Silva-Branco, 2006; Lee and Chang 2007; Iepure and Defaye, 2008). Fifteen obligate living subterranean taxa with this feature in common have been assembled by Pandourski (1997) in the *kieferi*-group. Three other species were discovered subsequently and assigned to this particular species group (Iepure 2001; Iepure and Defaye, 2008). *Acanthocyclops transylvanicus* n. sp. appears to be related to the *kieferi*-group by the following similarities: an 11-segmented female antennule, the shape of the genital receptacle as in *A. kieferi*, oligomerisation of the swimming legs and similar spine and seta formula of the exopodites (2.3.3.3 and 4.4.4.4, respectively). The main difference between the present species and the eight congener present in the Apuseni Mountains is the segmentation pattern of the swimming legs in which all legs having a two-segmented endopodite (formula: 3.2/3.2/3.2/3.2). Although the leg 4 endopodite still displays the conventional form of a 3-segmented ramus and retained the spinular armament located at the transition between the former median and terminal segments, the 2-segmented nature of the ramus is obvious because of the absence of a clear articulation rim and the unaltered thickness of the integument.

Among the members of the *kieferi*-group only *A. biarticulatus* Monchenko, 1972 described from central Asia, displays a similar oligomerisation pattern (Monchenko, 1974; Mirabdullahay and Kuzmetov, 1997). However there are several significant differences between these two species. *Acanthocyclops transylvanicus* n. sp. differs from *A. biarticulatus* in the following characters: antennary second endopodal segment with 7 setae (9 in *A. biarticulatus*); distal articles of endopodites of P1 and P3 with 4 and 5 setae, respectively; (5 setae and 6 setae in *A. biarticulatus*); the leg 4 exopodite surface without ornamentation on anterior part (ornamented with a row of spinules in *A. biarticulatus*) (according to Mirabdullahay and Kuzmetov, 1997); in *A. biarticulatus* the proximal exopodite segment of each swimming leg possesses an inner setae, while in *A. transylvanicus* n. sp. P1-P4 lack inner seta on the first exopodite (Fig. 4); and the distal segment of P5 is slightly longer than wide in *A. biarticulatus*, while in the new species the distal segment is sub-quadrate (Fig. 2C).

Since the species and subspecies of *kieferi*-group are morphologically extremely similar and their recognition requires a set of additional characters and micro-characters, our findings related to leg 4 endopodite development might be useful in their characterization. In *A. biarticulatus* the second and the third endopodites of the leg 4 are completely fused and have a compact appearance in which the original 3-segmented nature of the ramus is lost. In *A. transylvanicus* n. sp. the leg 4 endopodite retained the 3-segmented aspect but close examination clearly show that the original second and third endopodite segments are united (Fig. 4D). Consequently, it is assumed here that i) the 2-segmented nature of the leg 4 endopodite as observed in both species is convergently acquired character, and ii) while in *A. transylvanicus* the adult shape of the endopodite has resulted from a simple suppression of an arthroderal membrane formation, the shape of this ramus in the adult of *A. biarticulatus* seems to be related to the suppression of structural differentiation in the earlier developmental stages (for leg 4 in stage CIV).

**Zoogeographic remarks.** The diversification pattern of the subterranean *Acanthocyclops* species accommodated to *kieferi*-group has been proved to be high in the Alpine-Carpathian chain, within the Slovenian and Italian Alps (Kiefer, 1930; Kiefer, 1937; Ferreira, et al., 2007; Galassi et al., 2009), Romanian
Figure 4. Acanthocylops transylvanicus n. sp. (female holotype) (Ungurului Cave, Romania); A – leg 1; B – leg 2; C – leg 3; D – leg 4 (frontal view) (scale 100 µm).
Figure 5. *Acanthocyclops transylvanicus* n. sp. (male) (Ungurului Cave, Romania); A – habitus male (ventral view); B – urosome (dorsal view); C – urosome (ventral view); D – leg 4 (frontal view) (A scale 100 µm; B – E, scale 50 µm).
Carpathians (Chappuis, 1925; Damian-Georgescu, 1963; Pleșa, 1985; Pleșa, 1969; Iepure, 2001; Iepure and Defaye, 2008) and the Balkan Mountains (or Stara Planina) in Serbia and Bulgaria (Pandourski, 1993, 1994, 1997, 2007; Pandourski and Bobiț, 2008). The species from Western Europe have scattered distribution in specific sites from the Spanish and French Pyrenees (Kiefer, 1937; Stoch et al., 2004; Galassi et al., 2009). The only species found in Central Asia, *A. biarticulatus* (Monchenko, 1972, 1974; Mirabdulayev and Kuzmetov, 1997) appears to be the closest to the new species described herein.

Eastern and south-eastern Europe display so far the highest diversification of the group (Pandourski 1997, Iepure 2007, Iepure and Defaye 2008). In Romania the group has high level of radiation in north-western part of the Carpathians, the Apuseni outcrop (Fig. 1A). *Acanthocyclops transylvanicus* is the ninth species accommodated to *kieferi*-group found in Romania, and the twelfth representant of the genus in subterranean habitats (Pleșa, 1985; Iepure, 2007). In this massif beside *Acanthocyclops transylvanicus* there are other five species belonging to the group, the distributional areas of which do not significantly overlap, but are immediately adjacent to each other. These species are found in caves and interstitial habitats of two major karst massifs of the Apuseni: Pădurea Craiului located in the north-western part of the Apuseni, and Bihor Mountains located in the south (Onac & Constantin, 2004) (Table 2; Fig. 1A).

The first karst massif, the Pădurea Craiului, hosts three cave species within the hydrographic basin of Crișul Repede (Table 2; Fig. 1). One species that was described from a cave pool by Pleșa (1956) from a tributary of Crișul Repede River (Iadului Valley) as *Diacyclops languidoides speleus* Pleșa, 1956 was placed in synonymy with *D. (Acanthocyclops) stygius diminutus* by Monchenko (1974) and undertaken by Dussart and Defaye (2006). However, the validity of this species needs to be reconfirmed. The second karst massif, the Bihor, harbors five stygobites of the group in caves and interstitial habitats of three hydrographical basins: the upper Crișul Negrului basin (on the Sighiștel Valley) (3 species) (Damian-Georgescu, 1963; Pleșa, 1969); the upper part of the Arieș River (2); and the upper part of the Someșul Cald River (2) (Table 2, Fig. 1A). The endoreic basin of Bâlileasa-Cetățile Ponorului (in northern part of Bihor massif) hosts one cave endemic (Iepure, 2001). The tap water of the Institute of Speleology from Cluj Napoca town is the locality where P. A. Chappuis (1925) described three species accommodated to the *kieferi*-group: *A. reductus* (Chappuis, 1925), *A. kieferi* and *A. stygius* (Chappuis, 1924). Cluj Napoca is located at the conjunction between the Apuseni Mountains, the Someșan Plateau and the Transylvanian field (Fig. 1A). The town is crossed by the Someșul Mic River formed by the confluence of two headstreams coming from the Apuseni, Someșul Cald and Someșul Rece. In 1925 the water system of Cluj Napoca was supplied from the alluvial aquifer of the Someșul Mic River, 5 km upstream from the town. Nowadays, these species could not be found again in the type locality because of drinking water depuration, but they might probably still inhabit the Someșul Mic aquifer.

Within the southwestern part of the Romanian Carpathians, in the Banat, the radiation of the subterranean *Acanthocyclops* species is low in comparison-with the previous karst outcrops (Fig. 1B, Table 2). Banat Mountains is dominated by Jurassic and Cretaceous limestones (Onac and Constantin 2004). Three species assigned to the *kieferi*-group are known only from caves especially from the vadose zone: one species is found in one cave from the northern Banat (cf. Pleșa 1965); one in the middle part (Petkovski 1972) (presence of which needs to be reconfirmed) and one from southern part of Banat, known from eight caves within two close aquifers, both tributaries to the Danube (Mi niș and Cerna) (Iepure and Defaye, 2008) (Table 2, Fig. 1B).

The six south-easternmost European species accommodated to this group have a narrow distribution within the Balkan Mountains crossing eastern Serbia and northern Bulgaria respectively (Pandourski and Bobiț, 1993; Pandourski, 1993, 1994, 1997; Pandourski and Bobiț, 2008). They distributions are almost contiguous, comparable with those congeners from the Apuseni. The taxa have been recorded from various karst subterranean habitats (the vadose zone, springs and interstitial) with one exception, *A. propinquus* found in one site in mosses from Vitosha massif in central Bulgaria (Apostolov and Pandourski, 2004).

The Timok valley in eastern Serbia (part of Balkan Mountains) hosts two species in one single cave, *A. stygius* (cf. Pandourski and Bobiț, 2008, needs to be reconfirmed) and *A. iskrecensis* (Chappuis, 1924; Pandourski and Bobiț, 2008); the Balkan Mountains in northern Bulgaria contain three species, *A. iskrecensis*, *A. radevi* and *A. propinquus*; and the Rila-Rodopi chain in southern Bulgaria hosts two species, *A. balcanicus* and *A. strimonis* (Pandourski, 1997). All these massifs together with the Romanian Carpathians, are parts of the Alpine chain uplifted during the Alpine orogeny that began in the late Mesozoic and ended during Tertiary (Moores and Fairbridge, 1998). The species from the *kieferi*-group is supposed to originate from a common ancestor that differentiates at the end of Pliocene and beginning of Quaternary when the epigean populations got extinct as a result of habitats loss during the repeated climate cooling (Pandourski 1997, Apostolov and Pandourski 2004). However, with the current knowledge of the species
Table 2. Distribution of the members of the *Acanthocyclops kieferi*-group in groundwater habitats in Romania (location numbers refer to these in Fig. 1) (Note: tap water is the former water distribution of Cluj in 1921 coming from the alluvial aquifer located at 5 km from the town).

<table>
<thead>
<tr>
<th>Species</th>
<th>Author</th>
<th>Location</th>
<th>Mountains/Plateau</th>
<th>Habitat</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>A. deminutus</em></td>
<td>(Chappuis, 1925)</td>
<td>(1) Poarta lui Ionele Cave</td>
<td>Bihor</td>
<td>Cave</td>
<td>Chappuis, 1925, 1933</td>
</tr>
<tr>
<td><em>A. deminutus</em></td>
<td>(Chappuis, 1925)</td>
<td>(2) Sighiștel Valley</td>
<td>Bihor</td>
<td>Intersitial</td>
<td>Damian-Georgescu, 1963</td>
</tr>
<tr>
<td><em>A. deminutus</em></td>
<td>(Chappuis, 1925)</td>
<td>(3) Neagra din Groapa de la Barsa Cave</td>
<td>Bihor</td>
<td>Cave</td>
<td>Pleșa, 1969</td>
</tr>
<tr>
<td><em>A. deminutus</em></td>
<td>(Chappuis, 1925)</td>
<td>(4) Crișul Repede Valley</td>
<td>Pădurea Craiului</td>
<td>Intersitial</td>
<td>Damian-Georgescu, 1963</td>
</tr>
<tr>
<td><em>A. deminutus</em></td>
<td>(Chappuis, 1925)</td>
<td>(5) Corbasca Cave</td>
<td>Bihor</td>
<td>Cave</td>
<td>Pleșa, 1969</td>
</tr>
<tr>
<td><em>A. kieferi</em></td>
<td>(Chappuis, 1925)</td>
<td>(6) Cluj Napoca</td>
<td>Someșan Plateau</td>
<td>Tap water</td>
<td>Chappuis, 1925</td>
</tr>
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<td><em>A. kieferi</em></td>
<td>(Chappuis, 1925)</td>
<td>(7) Vadu Crișului Cave</td>
<td>Pădurea Craiului</td>
<td>Cave</td>
<td>Pleșa, 1969</td>
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<td>(Chappuis, 1925)</td>
<td>(8) Sighiștel Valley</td>
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<td>Damian-Georgescu, 1963</td>
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<td>(9) Băița (Crișul Negru Valley)</td>
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<td>Intersitial</td>
<td>Damian-Georgescu, 1963</td>
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<td>(10) Aleșd (Crișul Repede Valley)</td>
<td>Pădurea Craiului</td>
<td>Intersitial</td>
<td>Damian-Georgescu, 1963</td>
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<td><em>A. kieferi</em></td>
<td>(Chappuis, 1925)</td>
<td>(11) Casa Lotrilor Cave</td>
<td>Banat</td>
<td>Cave</td>
<td>Pleșa, 1985</td>
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<td><em>A. kieferi</em></td>
<td>(Chappuis, 1925)</td>
<td>(12) Cluj Napoca</td>
<td>Someșan Plateau</td>
<td>Tap water</td>
<td>Chappuis, 1925, 1933</td>
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<td>(Chappuis, 1925)</td>
<td>(13) Cheile Gărliștei Cave</td>
<td>Banat</td>
<td>Cave</td>
<td>Petkovski, 1972</td>
</tr>
<tr>
<td><em>A. propinquus</em></td>
<td>Plesa, 1957</td>
<td>(14) Cluj Napoca</td>
<td>Someșan Plateau</td>
<td>Tap water</td>
<td>Chappuis, 1925, 1933</td>
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<tr>
<td><em>A. plesai</em></td>
<td>Iepure, 2001</td>
<td>(15) Magura Cave</td>
<td>Bihor</td>
<td>Cave</td>
<td>Pleșa, 1957</td>
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<td><em>A. balcanicus bisetosus</em></td>
<td>Iepure, 2001</td>
<td>(16) Fața Râchiții Cave</td>
<td>Bihor</td>
<td>Cave</td>
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<td>(17) Alun Cave</td>
<td>Bihor</td>
<td>Cave</td>
<td>Iepure, 2001</td>
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<td>Bihor</td>
<td>Cave</td>
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<td><em>A. milotai</em></td>
<td>Iepure &amp; Defaye, 2008</td>
<td>(19) Oase Cave</td>
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<td>Cave</td>
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<td>Cave</td>
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<td>(27) Ungurului Cave</td>
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<td>Cave</td>
<td>Present contribution</td>
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<td>Cave</td>
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<td>Cave</td>
<td>Present contribution</td>
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ACANTHOCYLOPS TRANSYLVANICUS N. SP. FROM THE APUSENI MOUNTAINS, ROMANIA

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