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Checklist and distribution of the free-living copepods (Arthropoda: Crustacea) from Austria

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Abstract

A species list of 109 free-living copepod species (16 calanoids, 48 cyclopoids, 45 harpacticoids) inhabiting water bodies and semi-terrestrial biotopes from Austria is given. A total of 850 records all around the country are listed. For each species the following information is presented: synonyms, known localities in Austria, general distribution in the country and in the world and worldwide types of inhabited biotopes. Distribution maps for most of the calanoid and cyclopoid species are presented. Four species of cyclopoid species are new for the country: *Paracyclops poppei, Acanthocyclops kieferi, A. rhenanus, Graeteriella laisi,* the former from benthos of tributaries of the Danube, the latter three from groundwater. A temorid calanoid, *Eurytemora velox,* was found as new immigrant into the Danube.

Key words: Copepoda, Austria, inventory, distribution.

Zusammenfassung

In der vorliegenden Arbeit ist eine Liste der 109 freilebenden Copepoden-Arten (16 Calanoida, 48 Cyclopoida, 45 Harpacticoida) aus verschiedenen österreichischen Gewässern angeführt. Es wurden dafür insgesamt 850 Fundmeldungen berücksichtigt. Für jede Art ist folgende Information angeschlossen: Synonymia, Fundorte in Österreich, allgemeine Verteilung im Land und in der Welt sowie die Typen von Biotopen, in denen die Art welteit auftritt. Die Verbreitung der Calanoiden- und Cyclopoiden-Arten ist kartographisch dargestellt. Vier Cyclopoiden-Arten (*Paracyclops poppei, Acanthocyclops kieferi, A. rhenanus, Graeteriella laisi*) sind neu für Österreich; *P. poppei* wurde im Benthal von Donauzubringern, die drei anderen Arten im Grundwasser gefunden. Der Calanoide *Eurytemora velox* ist ein neuer Einwanderer in der österreichischen Donau.

Introduction

Within the 3 orders of Copepoda living in freshwater and semi-terrestrial biotopes in Austria, only the harpacticoids have been previously inventorised (LÖFFLER & NEUHUBER 1970). Based on 128 records, these authors listed 37 species. Faunistic or ecological surveys done over the last 3 decades, especially in groundwater (KIEFER 1976; DANIELOPOL 1983; POSPISIL 1994), Alpine lakes and ponds (REED 1970; JERSABEK & SCHABETSBERGER 1990) and rivers (KOWARC 1992; MOOG & al. 1995; GAVIRIA, 1994 and in press), together with unpublished data (V. Kowarc, "Arge Ökologie", Wien, and the author), added 103 records for the country and the number of species increased to 45.

The checklist of species of Calanoida and Cyclopoida has been elaborated based on published and unpublished data as well. Authors who specifically contributed to the survey of both orders are BREHM (1907, 1909, 1915, 1942), BREHM & RUTTNER (1926), PESTA

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(1911, 1912, 1915, 1917, 1923, 1924, 1928a, 1931, 1933, 1935, 1937a, 1937b, 1938a, 1938b, 1939, 1952a, 1952b, 1954), FINDENEGG (1938, 1943), PRIESEL-DICHTL (1959), SAMPL (1967), EINSLE (1971), NAUWERCK (1988), LÖFFLER (1957, 1959, 1960a, 1960b, 1965, 1978, 1979), HERZIG (1979, 1983), FORRÓ (1990, 1992a, 1992b) and POSPISIL (1989, 1994). Unpublished data on calanoids and cyclopoids have been provided by A. Herzig (Biologische Station Ilmitz), L. Forró (Museum of Natural History, Budapest), P. Pospisil (Inst. f. Zoologie, Universität Wien) and the author.

The 16 species of calanoids known from Austria include *Eurytemora velox,* a new immigrant into the Austrian Danube. It was collected for the first time in backwaters of the river in Klosterneuburg in 1993 and today it is known to occur in 8 localities from Niederösterreich and Wien (S. Gaviria & L. Forró, pers. obs.). Based on more than 400 records, the number of cyclopoid species totals to 48.

Collections made during the last 6 years in benthic habitats of rivers, in lakes and in ponds increased the knowledge on the distribution of some species. For instance, *Paracyclops poppei* collected in the Kamp river and in the Marchfeld Canal near the Danube, is new for the country, while *Eucyclops speratus* is new for Niederösterreich. Intensive groundwater surveys made by P. Pospisil (University of Vienna) also increased the number of cyclopoid species: two *Acanthocyclops* species, *A. kieferi* and *A. rhenanus* are now known from groundwaters near the Danube and from Seewinkel respectively. *Graeteriella laisi* from groundwater in Taugl/Hallein, Salzburg is new for the country too (P. Pospisil, unpublished data).

The purpose of this inventory is to identify and publish the list of species found in Austria and the compilation of the localities where each species occur.

Some problems concerning the correct systematic position of some populations of *Acanthocyclops (vernalis* and *robustus*) from mountain lakes and ponds in the eastern part of the country still remain. This is also true for populations of *Cyclops* from some lakes in the Lower Alps, which were classified as *C. strenuus.* Due to the discovery of new taxonomic characters - especially the ornamentation of the coxapodids and coxal plate of the fourth pair of thoracopods - some species could be *C. abyssorum* or *C. bohater.*

Material

Records found by the author ("S. Gaviria, personal observation, year") are supported by voucher material deposited at the Museum of Natural History, Vienna (NHMW) (Table 1) and at the author´s archive collection.

Checklist

For each species the presence in each federal state (T = Tyrol, S = Salzburg, K = Carinthia, St = Styria, O = Upper Austria, N = Lower Austria, W = Vienna, B = Burgenland) and the world distribution is indicated. The type of biotopes inhabited worldwide by each species is given. Following terms on the listed localities mean: "pers. obs.", personal observation; "pers. comm.", personal communication.

Tab. 1: Voucher material deposited at the Museum of Natural History, Wien (NHMW). Inventory Nr. 16708 - 16722 correspond to animals preserved in alcohol, Nr. 16723 - 16742 to dissected individuals. (S, Salzburg; O, Upper Austria; N, Lower Austria; W, Vienna; B, Burgenland; f = female; m = male; cop. = copepodite).

Nr.	species	locality	date	collector	individuals
16708	*E. gracilis*	S, Wallersee	08-08-1989	Reckendorfer	10 f, 10 m
16709	*M. albidus*	N, Marchfeldkanal	08-02-1993	Gaviria	15 f
16710	*A. spinosus*	B, Neusiedler See	10-10-1996	Gaviria	20 f, 19 m
16712	*M. kupelwieseri*	N, Moosbrunn, pond	24-04-1997	Kovanetz	8 f, 2 m, 3 cop.
16713	*E. serrulatus*	N, Moosbrunn, pond	24-04-1997	Kovanetz	19 f, 1 m
16715	*E. serrulatus*	O, Micheldorf, pond	24-04-1997	Hinteregger	10 f, 5 m
16716	*D. bicuspidatus*	N, Moosbrunn, pond	24-04-1997	Kovanetz	5 f, 1 m
16717	*M. fuscus*	O, Micheldorf, pond	24-04-1997	Hinteregger	3 f, 2 m, 7 cop.
16718	*A. robustus*	N, Regelsbrunn	23-09-1997	Holarek	1 f, 6 m
16719	*M. gigas*	W, Alte Donau	13-08-1997	Jurkowitsch	5 f, 1 m
16720	*E. serrulatus*	W, Alte Donau, Wasserpark	13-08-1997	Jurkowitsch	5 f, 1 m
16721	*E. velox*	N, Regelsbrunn	23-09-1997	Holarek	6 f, 5 m
16722	*N. hibernica*	N, Mittehaufen, Donau Au	05-05-1995	Gaviria, E.	10 f, 5 m
16723	*A. spinosus*	B, Neusiedler See	10-09-1996	Gaviria	1 m
16724	*A. spinosus*	B, Neusiedler See	10-09-1996	Gaviria	1 f
16725	*E. gracilis*	N, Wolkersdorf, castle pond	28-06-1994	Hinteregger	1 m
16726	*E. gracilis*	N, Wolkersdorf, castle pond	28-06-1994	Hinteregger	1 f
16727	*E. gracilis*	N, Weinviertel, pond at quarry Ölzant	04-04-1996	Ölzant	1 m
16728	*E. gracilis*	N, Weinviertel, pond at quarry Ölzant	04-04-1996	Ölzant	1 f
16729	*C. strenuus*	N, Gießgang Greifenstein, flooded forest	20-02-1997	Gaviria	1 f
16730	*C. strenuus*	N, Gießgang Greifenstein, flooded forest	20-02-1997	Gaviria	1 f
16731	*C. bohater*	S, Wallersee	10-11-1989	Reckendorfer	1 f
16732	*C. vicinus*	N, Marchfeldkanal, Gerasdorf	18-05-1993	Gaviria	1 f
16733	*D. bicuspidatus*	N, Marchfeldkanal, Langenzersdorf	14-06-1993	Gaviria	1 f
16734	*D. bicuspidatus*	N, Marchfeldkanal, Langenzersdorf	14-06-1993	Gaviria	1 f
16735	*M. viridis*	N, Marchfeldkanal, Langenzersdorf	07-09-1992	Gaviria	1 f
16736	*T. crassus*	N, Wolkersdorf, castle pond	28-06-1994	Hinteregger	1 f
16737	*E. serrulatus*	N, Marchfeldkanal, Deutsch Wagram	24-08-1992	Gaviria	1 f
16738	*E. speratus*	N, Marchfeldkanal, Langenzersdorf	10-11-1992	Gaviria	1 f
16739	*E. speratus*	N, Marchfeldkanal, Gerasdorf	20-05-1995	Gaviria	1 f
16740	*E. macruroides*	N, Gießgang Greifenstein, flooded forest	02-06-1997	Gaviria & Jobstmann	1 f
16741	*B. equinatus*	N, Lunz, Oberer Seebach	09-09-1990	Kowarc	1 f
16742	*N. hibernica*	N, Marchfeldkanal, Gerasdorf	25-05-1995	Flore & Sageder	1 f

Order Calanoida SARS, 1903a

Family Diaptomidae SARS, 1903a

Subfamily Diaptominae KIEFER, 1932

Genus *Acanthodiaptomus* KIEFER, 1932

Acanthodiaptomus denticornis (WIERZEJSKI, 1887)

Diaptomus denticornis WIERZEJSKI, 1887: 9

Localities: Tirol: Lichtsee, Oberberg-Gschnitztal (PESTA 1912, 1926), Piburgersee; (SCHABER 1976, 1985; S. Gaviria, pers. obs. 1996; FÜREDER 1995), Loarbecken (PESTA 1938a), Brixlegg-Kramsach (PESTA 1935), Gschößwand (PESTA 1935), Hintersteinersee (PESTA 1926), Fundustal (REED 1970), Hirschebensee (REED 1970); Salzburg: reservoir Kaprunertal and Stubachtal (PECHLANER 1959), Weißsee (PESTA 1937a), Dreibrüdersee (JERSABEK & al. 1996); Kärnten: St. Leonard (STEUER 1897), Niedere Tauern (PESTA 1912); Steiermark: Gwendlingsee (PESTA 1926), Speiksee (PESTA 1911); Niederösterreich: Lunzer Obersee (PESTA 1923; A. Herzig & H. Löffler, pers. comm.).

General distribution: Austria: mountains T, S, K, St, N (Fig. 1); **World:** Europe, Asia.

Biotope: temporary and perennial ponds, pelagic zone of lakes.

Genus *Arctodiaptomus* KIEFER, 1932

Subgenus *Arctodiaptomus* s.str. KIEFER, 1932

Arctodiaptomus (Arctodiaptomus) wierzejskii (RICHARD, 1888)

Diaptomus wierzejskii RICHARD, 1888: 43.
D. serricornis LILLJEBORG, 1888: 156.

Localities: Niederösterreich: Schwechat (PESTA 1954); Burgenland: Szerdahelyer Lacke, Seewinkel (LÖFFLER 1959).

General distribution: Austria: one known locality (pond) south of Vienna N; Seewinkel B (scarce) (Fig. 1); **World:** Palaearctic region.

Biotope: temporary ponds, pelagic zone of lakes (euryhaline).

Subgenus *Rhabdodiaptomus* KIEFER, 1932

Arctodiaptomus (Rhabdodiaptomus) alpinus (IMHOF, 1885)

Diaptomus alpinus IMHOF, 1885: 356.
D. montanus WIERZEJSKI, 1887: 6.
D. bacillifer (part.) SCHMEIL, 1893a: 7.
D. bacillifer var. *lagoraensis* BALDI, 1925: 30.

Localities: Tirol: Gschößwand (PESTA 1935, determined as *D. bacillifer*), Unterer Wildgerlossee (STEINBÖCK 1949, determined as *D. bacillifer*); Salzburg: Dreibrüdersee (JERSABEK 1993); Kärnten: Kreuzsee (S. Gaviria, pers.obs. 1995); Oberösterreich: Feichtauerseen (JERSABEK 1990).

General distribution: Austria: high mountain lakes T, S, K, O (Fig. 1); **World:** Europe.

Biotope: pelagic zone of lakes.

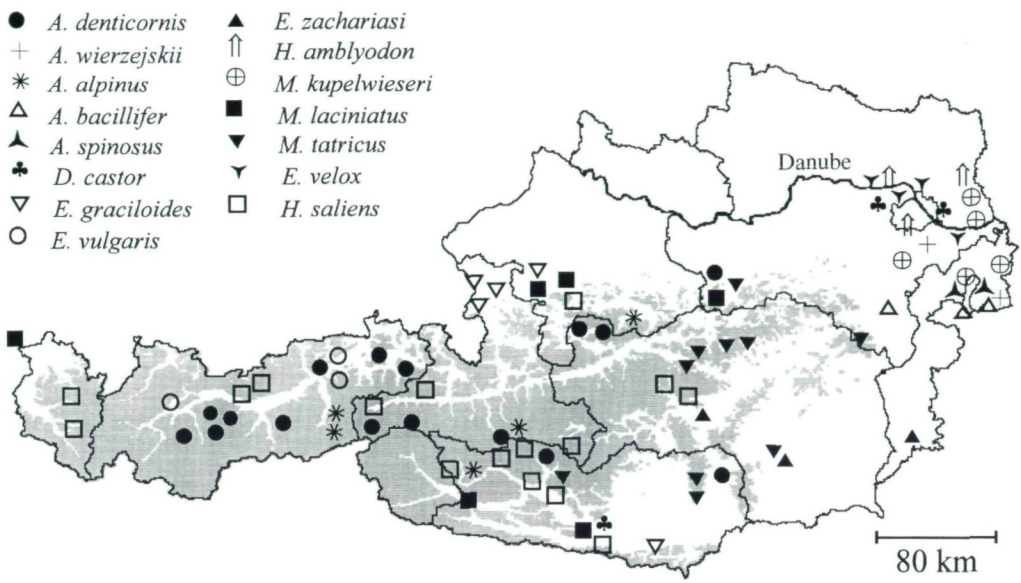

Fig. 1: Distribution map of calanoids (except *Eudiaptomus gracilis*).

Arctodiaptomus (Rhabdodiaptomus) bacillifer (KOELBEL, 1885)

Diaptomus bacillifer KOELBEL, 1885: 312.
A. natronophilus PONYI, 1956: 262.

Localities: Niederösterreich: Zwingendorfer Eisteich (A. Herzig, pers. comm.); Burgenland: Neusiedler See (LÖFFLER 1979), well (1) near Alber See, west of Illmitz (LÖFFLER 1960a), ponds (>5) Seewinkel (LÖFFLER 1959; METZ & FORRÓ 1989; FORRÓ 1992b), ponds Seewinkel (A. Herzig, pers.comm.; S. GAVIRIA, pers.obs.. 1997).

General distribution: Austria: eastern plains: Neusiedler See, Seewinkel B; Zwingendorfer Eisteich N (Fig. 1); **World:** Czech Rep., lowlands of the Pannonian region, Bulgarie, Pontic region, Poland.

Biotope: ponds, shallow lakes, littoral and pelagic zone of lakes (euryhaline).

Arctodiaptomus (Rhabdodiaptomus) spinosus (DADAY, 1891)

Diaptomus spinosus DADAY, 1891: 130.
D. faddeevi RYLOV, 1925: 314.

Localities: Burgenland: Neusiedler See (PESTA 1923, 1954; LÖFFLER 1979; HERZIG 1979; S. Gaviria, pers. obs. 1996 and 1997); ponds (>5) of the Seewinkel (LÖFFLER 1959; METZ & FORRÓ 1989, FORRÓ 1992b); ponds Seewinkel (S.Gaviria, pers. obs. 1996 and 1997; A. Herzig, pers. comm.).

General distribution: Austria: plains B: Neusiedler See, Seewinkel (Fig. 1); **World:** Pannonian region, eastern Turkey, Armenia, Iran.

Biotope: pools, pelagic zone of lakes (sodic waters).

Genus *Diaptomus* WESTWOOD, 1836

Subgenus *Diaptomus* s. str. WESTWOOD, 1836

Diaptomus (Diaptomus) castor (JURINE, 1820)

Monoculus castor JURINE, 1820: 50.
Diaptomus sovinsky DE GUERNE & RICHARD, 1891: 597.

Localities: Kärnten: Millstättersee (PESTA 1923); Niederösterreich: backwaters at Klosterneuburg (FORRÓ 1993); Wien: Stadlau (PESTA 1917).

General distribution: Austria: from high mountain lakes to lowlands (scarce) T, K, W (until 1917) (Fig. 1); **World:** Europe.

Biotope: temporary ponds, pelagic zone of lakes.

Genus *Eudiaptomus* KIEFER, 1932

Eudiaptomus gracilis (G.O. SARS, 1863)

Diaptomus gracilis SARS, 1863: 218.
D. Westwoodi LÜBBOCK, 1863: 203.
D. pusillus BRADY, 1913: 231.

Localities: Vorarlberg: Bodensee (PESTA 1917; KIEFER & MUCKLE 1959; EINSLE 1993); Tirol: Reintalersee (PESTA 1923), Achensee (PESTA 1923); Salzburg: Königssee (PESTA 1923), Kröttensee (PESTA 1923), Mattsee (MOOG & JAGSCH 1980), Obertrumer See (MOOG & JAGSCH 1980), Graben See (MOOG & JAGSCH 1980), Faistenauer Hintersee (PESTA 1923), Gründlersee (PESTA 1923), Zellersee (PESTA 1923); Kärnten: Pressegger See (FINDENEGG 1938), Turner See (EINSLE 1971; SAMPL 1970), Keutschacher See (EINSLE 1971), Klopeiner See (EINSLE 1971), Weißensee (EINSLE 1971), Längsee (HERZIG & al. 1973), Jeserzer See (LÖFFLER 1979), Millstättersee (PESTA 1923; KIEFER 1978; EINSLE 1971), Magdalensee (PESTA 1923), Faakersee (PESTA 1923), Ossiachersee (PESTA 1923; EINSLE 1971; KIEFER 1978), Wörthersee (PESTA 1923; EINSLE 1971; KIEFER 1978); Steiermark: Grundlsee (MODER 1986),Weizeldorfer Badesee (FRESNER 1995), Ratzteich (FRESNER 1995), Ferlacher Badesee (FRESNER 1995), Leopoldsteinersee (PESTA 1923), Auerlingsee (PESTA 1923); Oberösterreich: Attersee (PESTA 1923; MOOG 1979; KIEFER 1978), Mondsee (KIEFER 1978; NAUWERCK 1988), Wolfgangsee (KIEFER 1978), Traunsee (KIEFER 1978), Wallersee (RECKENDORFER 1992; S. Gaviria, pers. obs. 1991), Hallstättersee (PESTA 1923); Niederösterreich/Steiermark: Erlaufsee (PESTA 1923; SAMPL 1967); Niederösterreich/Oberösterreich: Donau (NAIDENOV 1985; HUMPESCH & MOOG 1994); Niederösterreich: Lunzer Untersee (PESTA 1923; S. GAVIRIA, pers.obs. 1996), Lunzer Obersee (MIKSCHI 1990), Steinbruchteich Ölzant, Weinviertel (S. Gaviria, pers. obs. 1996), Oberwaltersdorfer Badeteich (S. Gaviria, pers. obs. 1996 and 1997); Wien/Niederösterreich: Marchfeldkanal (S. GAVIRIA 1994, 1998), Alte Donau (PESTA 1917; STARMÜHLNER & al.. 1972; MIKSCHI & SCHWEIGER 1988; S. Gaviria, pers.obs. 1997), backwater ponds at Prater (STARMÜHLNER & al., 1972).

General distribution: Austria: lakes of Lower Alps, Waldviertel, Marchfeld, Wienerbecken, plains N, Danube V, T, S, K, St, O, N, W; World: Europe, United States, Siberia, Israel, Hong Kong.

Biotope: ponds, pelagic zone of lakes.

Eudiaptomus graciloides (LILLJEBORG, 1888)

Diaptomus graciloides LILLJEBORG, 1888: 156.

Localities: Salzburg: Mattsee (MOOG & JAGSCH 1980), Obertrumer See (MOOG & JAGSCH 1980), Grabensee (MOOG & JAGSCH 1980); Kärnten: Faakersee (EINSLE 1971; KIEFER 1978); Oberösterreich: Attersee (PESTA 1923).

General distribution: Austria: Faakersee K, Attersee O (1923); lakes in the north of Salzburg S (Fig. 1); **World:** Europe, north of Asia, China.

Biotope: pelagic zone of lakes.

Eudiaptomus vulgaris (SCHMEIL, 1898)

Diaptomus vulgaris SCHMEIL, 1898: 168.

Localities: Tirol: "Strad"-Teich near Tarrenz (PESTA 1924), Loarbecken (PESTA 1938b), Krumsee (PESTA 1923).

General distribution: Austria: Lower Alps T (Fig. 1); **World:** Europe, Asia.

Biotope: ponds, permanent pools, pelagic zone of lakes (scarce).

Eudiaptomus zachariasi (POPPE, 1886)

Diaptomus zachariae POPPE, 1886: 285.

Localities: Steiermark: Botanical Garden, Graz (PESTA 1923), pond near Leoben (PESTA 1923); Burgenland: fishpond at Güssing (A. Herzig, pers.comm.).

General distribution: Austria: environs of Leoben and Graz St, southern Burgenland B (scarce) (Fig. 1); **World:** central and eastern Europe.

Biotope: temporary ponds.

Genus *Hemidiaptomus* G.O. SARS, 1903b

Subgenus *Gigantodiaptomus* KIEFER 1932

Hemidiaptomus (Gigantodiaptomus) amblyodon (MARENZELLER, 1873)

Diaptomus amblyodon MARENZELLER, 1873: 593.

Localities: Niederösterreich: Altenberg (PESTA 1917), flood-plain of March river (PESTA 1917; HÖDL & RIEDER 1993); Marchegg, inundated grassland (S. Gaviria, pers.obs. 1997); Wien: Prater (PESTA 1917).

General distribution: Austria: lowlands N and W (until 1917) (Fig. 1); **World:** Europe, Asia (Siberia).

Biotope: inundation plains, temporary ponds.

Genus *Mixodiaptomus* KIEFER, 1932

Mixodiaptomus kupelwieseri (BREHM, 1907)

Diaptomus kupelwieseri BREHM, 1907: 321.
D. budapestiensis JUNGMAYER, 1914: 95.
D. lamellatus SPANDL, 1924: 93.

Localities: Niederösterreich: Lange Lüsse, Hainburger Pforte (S. Gaviria, pers. obs. 1995); Marchegg, pond at Pulverturm and inundated grassland (S. Gaviria, pers. obs. 1997), Moosbrunn, pond (S. GAVIRIA, pers. obs. 1997); Burgenland: Neusiedler See (PESTA 1954; LÖFFLER 1959), Szerdahelyer Lacke, Seewinkel (LÖFFLER 1959), Lange Lacke, Seewinkel (LÖFFLER 1959), Einsetzlacke (Krötenlacke), Seewinkel (LÖFFLER 1959), Golser See (LÖFFLER 1959), Dorfsee (LÖFFLER 1959).

General distribution: Austria: backwaters of river March and Moosbrunn N, Neusiedler See and Seewinkel B (Fig. 1); **World:** Austria, Czech Rep., Slovakia, southern and south-eastern Europe (DUSSART & DEFAYE 1983).

Biotope: ditches, marshes, ponds, pools, inundation plains, shallow lakes (euryhaline).

Mixodiaptomus laciniatus (LILLJEBORG, 1889)

Diaptomus laciniatus LILLJEBORG, 1889: 99.

Localities: Vorarlberg: Bodensee (PESTA 1923); Kärnten: Millstättersee (EINSLE 1971; KIEFER 1978), Turracher See (A. Herzig, pers.comm.); Oberösterreich: Attersee (PESTA 1923; MOOG 1979), Mondsee (PESTA 1923; KIEFER 1978; NAUWERCK 1988 - found until 1971); Niederösterreich: Lunzer Untersee (KIEFER 1978).

General distribution: Austria: lakes of the Lower Alps, Lunz Untersee V, K, O, N (Fig. 1); **World:** northern Europe from Scotland to Russia, southern Europe from Pyrenees to Lower Alps.

Biotope: small lakes, pelagic zone of lakes (cold-stenothermic).

Mixodiaptomus tatricus (WIERZEJSKI, 1883)

Diaptomus tatricus WIERZEJSKI, 1883: 24.
D. apenninicus BRIAN, 1927: 30.

Localities: Kärnten: Königsstuhl (PESTA 1924), Saualm (PESTA 1924), Bergtümpel at Saualpe (HONSIG-ERLENBURG & al. 1988), Klölingtümpelsee (PESTA 1924); Steiermark: environs of Graz (HARTMANN 1915), Zirbitskogel (BREHM 1915, 1926), region of Hochschwab (PESTA 1938a), region of Admonter Reichenstein (PESTA 1938a), region of Bösenstein (PESTA 1938a); Niederösterreich: Raxalpe (PESTA 1938a), Lunz, Almtümpel (BREHM 1907).

General distribution: Austria: from high mountains to lowlands (Fig. 1); **World:** southern and eastern Europe, Austria.

Biotope: temporary and permanent Alpine ponds.

Family Temoridae SARS, 1903a

Genus *Eurytemora* GIESBRECHT, 1881

Eurytemora velox (LILLJEBORG, 1853)

Temora velox LILLJEBORG, 1853: 86.

Localities: Niederösterreich: Greifenstein, Gießgang (GAVIRIA in press), backwaters of Klosterneuburg (FORRÓ 1993), Regelsbrunn (S. Gaviria, pers. obs. 1996, S. Gaviria & C. Holarek, pers. obs. 1997), Wien: Alte Donau, Wasserpark (S. Gaviria, pers.obs. 1997). Eberschüttwasser, Lobau (P. Pospisil, pers.comm.), Kühwörter Wasser, Lobau (S. Gaviria & C. Holarek, pers.obs. 1997)

General distribution: Austria: backwaters of Danube river N, W (since 1993) (Fig.1); **World:** Europe, Iran.

Biotope: ponds, backwaters of rivers, water bodies near the sea.

Genus *Heterocope* G.O. SARS, 1863

Heterocope saliens (LILLJEBORG, 1863)

Diaptomus saliens LILLJEBORG, 1863: 395.
H. robusta SARS, 1863: 225.
H romana IMHOF, 1888: 451.

Localities: Vorarlberg: Albonalpenmoortümpel (PESTA 1937a), Maiensee (PESTA 1937a); Tirol: Wildsee (PESTA 1923), Gschwandkopfsee (PESTA 1924); Salzburg: Lenzenbühelsee (PESTA 1924), Gerlosplatte (PESTA 1952a), Kitzbühler Alpen (PESTA 1939); Kärnten: Fresenhalsee (PESTA 1911, 1926), Atzenbergsee (PESTA 1924), Rosennocksee south of Königsstuhl (PESTA 1924, 1952a), Anderlesee (PESTA 1923), Kleiner See south of Anderlesee (PESTA 1923), Weißensee (Findenegg 1943); Steiermark: Niedere Tauern (PESTA 1926), Augstsee (PESTA 1923); Oberösterreich: Traunsee (PESTA 1923).

General distribution: Austria: from high mountains to Lower Alps V, T, S, K, St, O (Fig. 1); **World:** Europe.

Biotope: ponds, pelagic zone of lakes.

Order Cyclopoida SARS, 1918

Family Cyclopidae G.O. SARS, 1913

Subfamily Cyclopinae KIEFER, 1927

Genus *Acanthocyclops* KIEFER, 1927

Acanthocyclops gmeineri POSPISIL, 1989

Acanthocyclops gmeineri POSPISIL, 1989: 244.

Localities: Niederösterreich: groundwater at Regelsbrunn (P. Pospisil, pers.comm.); Wien: groundwater at Eberschüttwasser, Lobau (POSPISIL 1989, 1994).

General distribution: Austria: groundwater of Lobau and Regelsbrunn N, W (Fig. 2); **World:** Austria.

Biotope: groundwater (stygobiontic).

Acanthocyclops kieferi (CHAPPUIS, 1925)

Cyclops kieferi CHAPPUIS, 1925: 159.

Localities: Niederösterreich: groundwater at Regelsbrunn (P. Pospisil, pers.comm.).

General distribution: Austria: groundwater of Regelsbrunn N (Fig. 2); **World:** Central Europe, Yugoslavia, Ukraine, Spain.

Biotope: groundwater (stygobiontic).

Acanthocyclops rhenanus KIEFER, 1936

Acanthocyclops rhenanus KIEFER,1936b: 168.

Localities: Burgenland: groundwater near Apetlon, Seewinkel (P. Pospisil, pers. comm.).

General distribution: Austria: groundwater of Seewinkel B (Fig. 2); **World:** Germany, Austria.

Biotope: groundwater (stygobiontic)

Acanthocyclops robustus (SARS, 1863)

Cyclops robustus SARS, 1863: 245.
Cyclops brevispinosus HERRICK, 1884: 148.
C. americanus MARSH, 1893: 202.

Localities: Vorarlberg: Bodensee (KIEFER & MUCKLE 1958; EINSLE 1993); Oberösterreich: Mondsee (NAUWERCK 1988); Niederösterreich: Lunzer Obersee (MIKSCHI 1990), Waldviertel, pond near Heinreichs (P. Pospisil, pers.comm.), Waldviertel, pond at Seyfrieds (P. Pospisil, pers.comm.), Danube reservoir Altenwörth (C. Jersabek & A. Herzig, pers.comm.), Gießgang Greifenstein, inundated grassland and forest (GAVIRIA in press), Regelsbrunn (S. Gaviria, pers. obs. 1996; S. Gaviria & C. Holarek, pers. obs. 1997), side branch of Untere Thaya (FORRÓ 1993), Lange Lüsse, Hainburger Pforte (S. Gaviria, pers. obs. 1995), Danube river (HONSIG & HUMPESCH 1994); Wien/Niederösterreich: Marchfeldkanal (GAVIRIA 1994, 1998); Wien: spring at Kreuzeichenwiese (P. P. Pospisil, pers.comm.); groundwater at Eberschüttwasser, Lobau (DANIELOPOL 1983); Burgenland: Seewinkel (METZ & FORRÓ 1989; FORRÓ 1992b), Neusiedler See (S. Gaviria, pers. obs. 1996; LÖFFLER 1979; HERZIG 1979; PESTA 1954 as *A. vernalis*).

General distribution: Austria: Bodensee V, Mondsee O, Lunzer Obersee N, backwaters of Danube and Thaya rivers, Danube river, lowlands N, W, Seewinkel and Neusiedler See B; **World:** Europe, northern Africa, Asia, Neotropical region, New Zealand.

Biotope: groundwater, rivers, backwaters, littoral of ponds, pelagic zone of lakes.

Remarks: *Acanthocyclops vernalis* reported from Alpine lakes and ponds could be *A. robustus*. The species present at Seewinkel was determined by LÖFFLER (1959) as *A. vernalis* and by FORRÓ (1992b) as *A. robustus*. In the past, the spine formula 2:3:3:3 was used for the determination of *A. vernalis* and 3:4:4:4 for *A. robustus* (KIEFER 1978; DUSSART 1969). Today it is known that animals of both species can have both spine formulas. The morphology of the genital segment, with lateral borders forming chitin-like corners in *A. vernalis* and being rounded in *A. robustus*, should be used to distinguish between the two species. These determinations should be revised to establish the correct taxonomic position of the species or to find localities where both species co-exist.

Acanthocyclops sensitivus (GRAETER & CHAPPUIS, 1914)

Cyclops sensitivus GRAETER & CHAPPUIS, 1914: 507.

Localities: Vorarlberg: drill well (1) Lauterach, near Bregenz (PESTA 1934); Tirol: hyporrheal of Lech river (TILZER 1968); Salzburg: groundwater of Salzburger Becken, Lower Alps (PRIESEL-DICHTL 1959); Niederösterreich: backwaters of Danube river between Greifenstein and Wien (MOOG & al. 1995); Wien: well (1) at Maria Grün, Prater (KIEFER 1964), groundwater at Eberschüttwasser, Lobau (DANIELOPOL 1983; POSPISIL 1994); well (1) at Kagran (KIEFER 1964; EINSLE 1993).

General distribution: Austria: groundwater of the Alps T, Lower Alps V, S, Kagran, Lobau and Prater W (Fig. 2); **World:** Central Europa, Great Britain.

Biotope: groundwater (stygobiontic).

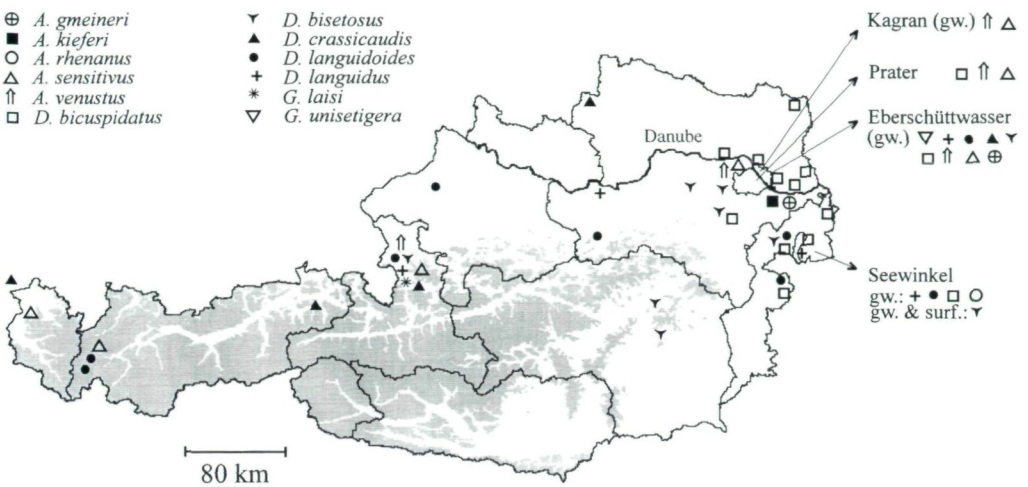

Fig. 2: Distribution maps of species of *Acanthocyclops* (except *A. robustus* and *A. vernalis*), *Diacyclops* and *Graeteriella* (gw, groundwater; surf., surface water).

Acanthocyclops venustus (NORMAN & SCOTT, 1906)

Cyclops venustus NORMAN & SCOTT, 1906: 189.

Localities: Salzburg: groundwater of Salzburger Becken, Lower Alps (PRIESEL-DICHTL 1959); Niederösterreich: well (1) at Weidling (KIEFER 1964); Wien: well (1) at Kagran (KIEFER 1964; EINSLE 1993), groundwater at Eberschüttwasser, Lobau (DANIELOPOL 1983; POSPISIL 1994), well (1) at Maria Grün, Prater (KIEFER 1964).

General distribution: Austria: groundwater of Lower Alps S, Wiedling N, Kagran, Lobau and Prater W (Fig. 2); **World:** Europe.

Biotope: groundwater, bogs.

Acanthocyclops vernalis (FISCHER, 1853)

Cyclops vernalis, FISCHER 1853: 90.
Cyclops elongatus, CLAUS 1863: 97.
C. lucidulus SARS, 1863: 245.
C. parcus HERRICK, 1882: 229.

Localities: Vorarlberg: bog pond, Albonalpe, Arlberg ? (PESTA 1937a), Bodensee ? (PESTA 1923; KIEFER 1978), Lünersee ? (PESTA 1923), Tilisunasee ? (PESTA 1923); Tirol: pond at Laubkogelgrat, Kelchalpe ? (PESTA 1937b), pond at Gerlosplatte ? (PESTA 1952), Kühbodentümpel, Zillertaler Alpen ? (PESTA 1937a), Waldtümpel, Brixlegg-Kramsach ? (PESTA 1935), Zireinersee ? (PESTA 1923), Laperlache, Gschößwand ? (PESTA 1935), Rote Lache, Gschößwand ? (PESTA 1935), alp ponds at Magdeburgerhütte, Solsteingebiet, Kalkalpen ? (PESTA 1935), Schlickersee, Stubaital ? (PESTA 1915), Kitzbühler Alpen ? (PESTA 1952b), Schwarzsee ? (STEINBÖCK 1949); Salzburg: Weißsee, Großglockner region ? (PESTA 1933), groundwater of Salzburger Becken, Lower Alps ? (PRIESEL-DICHTL 1959), reservoirs Kaprunertal and Stubachtal ? (PECHLANER 1959); Kärnten: Saureggersee ? (PESTA 1923), Berghaustümpel, Königsstuhl region ? (PESTA 1923), Speiksee ? (PESTA 1911), pond at Unterer Mühldorfersee ? (PESTA 1911); Steiermark: Oberer

Giglachsee ? (PESTA 1923), Sonntagskarsee ? (PESTA 1923), Oberer Klaftersee ? (PESTA 1923), Mittlerer Klippensee ? (PESTA 1923) ; Oberösterreich: Kampspitzsee ? (PESTA 1923), well (1) near Mondsee (P. Pospisil, pers.comm.); Niederösterreich: Danube reservoir Altenwörth (C. Jersabek & A. Herzig, pers.comm.), spring Kreuzeichenwiese, Wienerwald (P. Pospisil, pers.comm.); Niederösterreich/Wien: Marchfeldkanal (GAVIRIA 1994 1998); Wien: Hanselgrund-Altarm, Lobau (P. Pospisil, pers.comm.), groundwater at Eberschüttwasser, Lobau ? (DANIELOPOL 1983), Donaukanal ? (DANIELOPOL 1983); Burgenland: ponds (>5) at Seewinkel ? (LÖFFLER 1957, 1959), drill well (1), Osliper Meierhof ? (LÖFFLER 1960b).

General distribution: Austria: Alps ?, Lower Alps ?, plains N,W and B ? , Danube river; **World:** Holarctic.

Biotope: groundwater, bogs, ponds, littoral zone of lakes.

Remarks: Reports of this species done before 1993 are uncertain. See *A. robustus*.

Genus *Cyclops* O.F. MÜLLER, 1785

Cyclops abyssorum prealpinus (KIEFER, 1939)

Cyclops abyssorum prealpinus KIEFER, 1939: 94.
Cyclops abyssorum carinthicus LINDBERG, 1955: 99..

Localities: Vorarlberg: Bodensee (DUSSART & DEFAYE 1985); Kärnten: Weißensee (LINDBERG 1955), Faaker See (EINSLE 1971), Klopeiner See (EINSLE 1971), Millstätter See (EINSLE 1971), Ossiacher See (EINSLE 1971), Turnersee (EINSLE 1971), Goggausee (HERZIG & MOOG 1976); Steiermark: Grundlsee (MODER 1986); Oberösterreich: Mondsee (NAUWERCK 1988), Attersee (MOOG 1979).

General distribution: Austria: lakes of Lower Alps V, K, St, O (Fig. 3); **World:** northern and southern Prealpine lakes.

Biotope: pelagic zone of lakes (oligotrophic to mesotrophic).

Remarks: *Cyclops abyssorum carinthicus* from Weißensee should be considered a synonym of *C. abyssorum prealpinus* (EINSLE 1971).

Cyclops abyssorum tatricus (KOZMINSKI, 1927)

Cyclops strenuus f. *tatricus* KOZMINSKI, 1927: 114.

Localities: Vorarlberg: Kalbelesee (AMANN 1970; GNAIGER 1978); Tirol: Finstertaler Seen (BRETSCHKO 1975), Rotfelssee (REED 1970), Nördersee (REED 1970), Geirneggsee (REED 1970), Oberer Plenderlesee (REED 1970), Mittlerer Plenderlesee (REED 1970), Gurgler Tümpel (REED 1970), Hirschebensee (REED 1970), Gössenköllesee (GNAIGER 1978; PRAPTOKARDYIO 1979; S. Gaviria, pers. obs.1995), Drachensee (LÖFFLER 1983); Niederösterreich: Lunzer Untersee (EINSLE 1993; S. Gaviria, pers. obs. 1996).

General distribution: Austria: high Alpine lakes V, T, Lunzer Untersee N (Fig. 3); **World:** Alps, High Tatra, Montenegro.

Biotope: pelagic zone of mountain and high mountain lakes.

Remarks: Several authors recognized this subspecies as the group of *C. abyssorum* inhabiting high mountain lakes. EINSLE (1969, 1971, 1993) demostrated the sexual isolation of this subspecies and other groups of *Cyclops* spp. with chromatin-disminution experiments

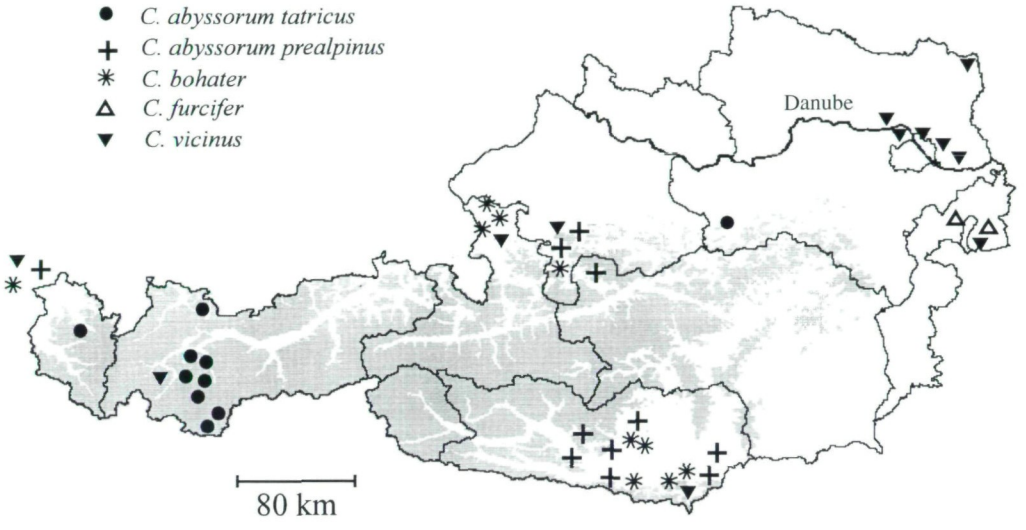

Fig. 3: Distribution map of species of *Cyclops* (except *C. strenuus*).

Cyclops bohater KOZMINSKI, 1933

Cyclops bohater KOZMINSKY, 1933: 105.

Localities: Vorarlberg: Bodensee (KIEFER 1954); Salzburg: Wallersee (S. GAVIRIA, pers. obs. 1992; RECKENDORFER 1992), Mattsee (MOOG & JAGSCH 1980), Obertrumer See (MOOG & JAGSCH 1980); Kärnten: Afritzer See (EINSLE 1971), Faakersee (EINSLE 1971), Keutschachersee (EINSLE 1971), Ossiachersee (EINSLE 1971), Wörthersee (LINDBERG 1957; EINSLE 1971); Oberösterreich: Mondsee (NAUWERCK 1988).

General distribution: Austria: Prealpine lakes V, S, K (Fig. 3); **World:** Central Europe between France and Estonia, prealpine lakes.

Biotope: littoral and pelagic zone of lakes.

Cyclops furcifer CLAUS, 1857

Cyclops furcifer CLAUS, 1857: 208.
C. minutus LILLJEBORG, 1901: 24.
C. lacunae LOWNDES, 1926: 142.

Localities: Burgenland: Neusiedler See (LÖFFLER 1957), Salziger See, Tadten (LÖFFLER 1959).

General distribution: Austria: just known from the Neusiedler See and from one pond of the Seewinkel (Fig. 3); **World:** Palaearctic.

Biotope: temporary ponds, shallow lakes.

Cyclops strenuus FISCHER, 1851

Cyclops strenuus FISCHER, 1851: 418.

Localities: Vorarlberg: Bodensee (PESTA 1923 ?; KIEFER 1973; KIEFER & MUCKLE 1959 ?), Lünersee ? (PESTA 1923), Tilisunasee ? (PESTA 1923); Tirol: Starnbergsee ? (PESTA 1923), Achensee ? (PESTA 1923), Klamjochsee ? (PESTA 1923), "Hirschlacke", Rofan region, Kalkalpen ? (PESTA 1931), Schwarzensee, Zillertal ? (PESTA 1915, 1923), Zirmsee ? (PESTA 1915), Großer Dreizinnensee ? (PESTA 1915), Weißsee, Großglockner ? (PESTA 1933), Reithersee (PESTA 1923), Unterer Torjochsee ? (PESTA 1923), Wolfgangsee (PESTA 1923), Zellersee ? (PESTA 1923), groundwater of Salzburger Becken, Lower Alps (PRIESEL-DICHTL 1959), Faistenauer Hinterersee ? (PESTA 1923); Kärnten: Fresenhalsee ? (PESTA 1911, 1923), Weissensee ? (PESTA 1911), Faaker See ? (PESTA 1911), Magdalenensee ? (PESTA 1911), Großer Magdalenensee ? (PESTA 1923), Faakersee ? (PESTA 1923), Kleiner See, southern of Anderlesee ? (PESTA 1923), Millstätter See ? (PESTA 1923; Findenegg 1943), Ossiacher See ? (PESTA,1911, 1923; Findenegg 1943), Wörthersee ? (PESTA 1923; Findenegg 1943), Klopeiner See ? (Findenegg 1943), Weißensee ? (PESTA 1923; Findenegg 1943), Zirmsee ? (PESTA 1923); Pressegger See ? (Findenegg 1938), Keutschacher See (Findenegg 1938), Turnersee (Findenegg 1938); Steiermark: Leopoldsteiner See ? (PESTA 1923), Grundlsee ? (PESTA 1923), Schwarzsee, Turracherhöhe ? (PESTA 1923); Oberösterreich: Attersee ? (PESTA 1923), Hallstätter See ? (PESTA 1923), Traunsee ? (PESTA 1923); Niederösterreich: Klosterneuburg, backwaters (FORRÓ 1996), Gießgang Greifenstein (GAVIRIA in press), side branches of Untere Thaya (FORRÓ 1993), Moosbrunn, pond (S. Gaviria, pers. obs. 1997), Marchegg, pond, Wienertür (S. Gaviria, pers. obs. 1997); Wien: Obere Lobau (PFAFFENWIMMER 1986); Burgenland: ponds (>5) at the Seewinkel (LÖFFLER 1959; METZ & FORRÓ 1989; FORRÓ 1992b), Neusiedler See (PESTA 1954; FORRÓ 1990, 1992a), wells (23) at Seewinkel (LÖFFLER 1960a), well (1) near Oggau (LÖFFLER 1960a), well (1) at Purbach (LÖFFLER 1960a), draw-well (1), Zurndorf (LÖFFLER 1960b); Danube river (NAIDENOV 1985).

General distribution: Austria: Bodensee V, high Alpine and Prealpine lakes ? V, T, S, K, St, O, lowlands of eastern Austria N, B; **World:** Palaearctic.

Biotope: groundwater, rivers, backwaters, periodic ponds, littoral and pelagic zone of lakes.

Remarks: reports on mountain lakes of the Alps and Lower Alps are uncertain, because most *Cyclops* from the area were until 1969 identified as *C. strenuus* or belonging to the *C. strenuus* - group, as it was pointed out by SAMPL (1971) for the Carinthian lakes.

These animals could belong to *C. abyssorum*, *C. bohater* or to both of them. For instance, both species cohabit Faaker See, Ossiacher See and Wörthersee (EINSLE 1971).

Cyclops vicinus ULJANIN, 1875

Cyclops vicinus ULJANIN, 1875: 30.

Localities: Vorarlberg: Bodensee (KIEFER & MUCKLE 1959); Tirol: Piburgersee (S. Gaviria, pers. obs. 1995; FÜREDER 1995); Salzburg: Wallersee (RECKENDORFER 1992); Kärnten: Ferlacher Badesee (FRESNER 1995); Oberösterreich: Mondsee (NAUWERCK 1988); Niederösterreich: Danube reservoir Altenwörth (C. Jersabek & A. Herzig, pers.comm.), Klosterneuburg, backwaters (FORRÓ 1996), side branches of Untere Thaya (FORRÓ 1993); Wien/Niederösterreich: Marchfeldkanal (GAVIRIA 1994, 1998); Wien: Obere Lobau (PFAFFENWIMMER 1986), Alte Donau (S.Gaviria, pers. obs. 1997); Burgenland: ponds (>5) Seewinkel (METZ & FORRÓ 1989; FORRÓ 1992b); Danube river (NAIDENOV 1985)

General distribution: Austria: Prealpine lakes V, S, O, Piburger See T, Ferlacher Badesee K, lowlands N, W, Seewinkel B, Danuber river (Fig. 3); **World:** Holarctic, India, Cuba.

Biotope: rivers, backwaters, pelagic zone of eutrophicated lakes.

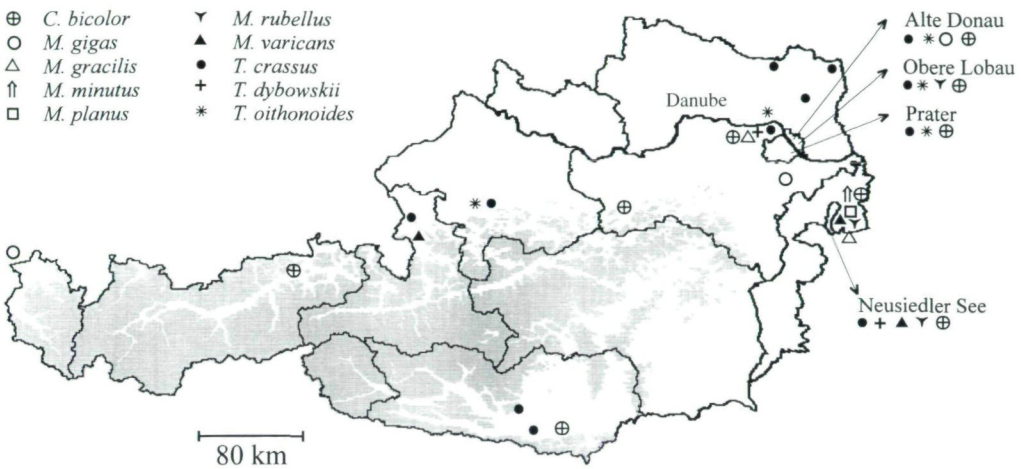

Fig. 4: Distribution map of the species of *Cryptocyclops*, *Thermocyclops*, *Metacyclops*, *Megacyclops gigas*, *Microcyclops* (*M. rubellus* and *M. varicans*).

Genus *Cryptocyclops* SARS, 1927a

Cryptocyclops bicolor (G.O. SARS, 1863)

Cyclops bicolor G.O. SARS, 1863: 253.
C. longicaudatus POGGENPOL, 1874: 72.
C. brevisetosus, *C. tenuicaudis* DADAY, 1885: 255.

Localities: Tirol: Loarbecken, Brixlegg, Kramsach (PESTA 1938); Kärnten: Turnersee (SAMPL 1970); Niederösterreich: Lunzer Untersee (PESTA 1923), backwater of Klosterneuburg (FORRÓ 1996); Wien: Alte Donau (STEUER 1901; PESTA 1954), backwaters at Stadlau (PESTA 1917), Lusthauswasser, Prater (VORNATSCHER 1938); Burgenland: Hallabernlacke (Hollabernlacke), Seewinkel (LÖFFLER 1959), Neusiedler See (PESTA 1954; LÖFFLER 1979).

General distribution: Austria: Loarbecken (Kramsach) T, Turnersee K, Lunzer Untersee, backwaters at Klosterneuburg N, lowlands W, B (Fig. 4); **World:** Holarctic, southwestern Asia, Africa.

Biotope: benthic zone of backwaters of rivers, temporary ponds, littoral zone of lakes.

Genus *Diacyclops* KIEFER, 1927

Diacyclops bicuspidatus (CLAUS, 1857b)

Cyclops bicuspidatus CLAUS, 1857b: 209.
C. pulchellus SARS, 1863: 246.
C. thomasi FORBES, 1882: 680.

Localities: Niederösterreich: Danube reservoir Altenwörth (C. Jersabek & A. Herzig, pers. obs.), side branches of Untere Thaya (FORRÓ 1993), Marchegg, pond, Wienertür (S. Gaviria, pers. obs. 1997), Moosbrunn, pond (S. Gaviria, pers. obs. 1997); Wien: Alte Donau (PESTA 1928b), Obere Lobau (PFAFFENWIMMER 1986), Lusthauswasser Prater (VORNATSCHER 1938), groundwater at Eberschüttwasser, Lobau (DANIELOPOL 1983;

POSPISIL 1994), pond near Alte Donau (PESTA 1928b), Marchfeldkanal (S. GAVIRIA 1994, 1998); Burgenland: ponds (7) Seewinkel (FORRÓ 1992b); wells (24) at Seewinkel (LÖFFLER 1960a), well (1) near Oggau (LÖFFLER 1960a), well (1) near Rust (LÖFFLER 1960a), wells (2) near Tadten (LÖFFLER 1960a), Neusiedler See (PESTA 1954; LÖFFLER 1979; FORRÓ 1990, 1992a), draw-well (1) near Neusiedl (LÖFFLER 1960b), wells (3) near Zurndorf (LÖFFLER 1960b), well Radbrunnen (1) near Möchhof (LÖFFLER 1960b), draw-well (1) near Oggau (LÖFFLER 1960b), wells Radbrunnen (2) near Nikkitsch (LÖFFLER 1960b), tank at Kroatisch Geresdorf (LÖFFLER 1960b), well Radbrunnen (1) near Wittmannsdorf (LÖFFLER 1960b); Danube river (HUMPESCH & MOOG 1994).

General distribution: Austria: eastern lowlands N, W, B, Danube river and tributaries, backwaters N (Fig. 2); **World:** Holarctic.

Biotope: groundwater, rivers, periodic and perennial small water bodies, littoral zone of ponds and lakes, profundal zone of lakes.

Diacyclops bisetosus (REHBERG, 1880)

Cyclops bisetosus REHBERG, 1880: 543.

Localities: Salzburg: groundwater of Salzburger Becken, Lower Alps (PRIESEL-DICHTL 1959); Steiermark: cave Katerloch at Weiz (KIEFER 1964), cave Lurhöhle at Peggau (KIEFER 1934 pers. comm. P. Pospisil); Niederösterreich: Moosbrunn, groundwater supplied pond (S. Gaviria, pers. obs. 1997), groundwater, Purkersdorf (P. Pospisil, pers.comm.), groundwater St. Pölten (P. Pospisil, pers.comm.); Wien: groundwater at Eberschüttwasser, Lobau (P. Pospisil, pers.comm.); Burgenland: well (1) near Furchslochlacke (LÖFFLER 1960a), well (1) near Genselsteller, Illmitz (LÖFFLER 1960a), well (1) at Oberer Stinkersee (LÖFFLER 1960a), well (1) near Luß (LÖFFLER 1960a), well (1) near St. Andrä (LÖFFLER 1960a), well (1) near Albrechtsfeld (LÖFFLER 1960a), well (1) near Lange Lacke (LÖFFLER 1960a), well (1) near Meriko psz. (LÖFFLER 1960a), well Radbrunnen (1) Seemühle, northern of Oggau (LÖFFLER 1960b), ponds (>5) at Seewinkel (LÖFFLER 1959).

General distribution: Austria: groundwater of the Alps T and Lower Alps S, caves Lurhöhle (Peggau) and Katerloch (Weiz) St, groundwater N, W, B, groundwater of Seewinkel B (Fig. 2); **World:** Paelaearctic, Australian region, Cuba.

Biotope: groundwater, interstitial zone, periodic and perennial small water bodies, bogs, salt-ponds, fitotelms.

Diacyclops crassicaudis (G.O. SARS, 1863)

Cyclops crassicaudis G.O. SARS, 1863: 249.
C. brucei SCOTT, 1899: 93.

Localities: Vorarlberg: Bodensee (EINSLE 1993); Tirol: Jochberger Ache (S. Gaviria, pers. obs.); Salzburg: groundwater of Salzburger Becken, Lower Alps (PRIESEL-DICHTL, 1959); Niederösterreich: well (1) at Fischbach, Waldviertel (A. Fuchs & S. Gaviria, pers. obs. 1998); Wien: groundwater at Eberschüttwasser, Lobau (P. Pospisil, single finding).

General distribution: Austria: Bodensee V, Jochberger Ache T, groundwater of the Lower Alps S, groundwater of Waldviertel, backwaters of Danube river N (Fig. 2); **World:** Holarctic.

Biotope: groundwater, brooks, periodic small water bodies (cold stenothermic).

Diacyclops languidoides (LILLJEBORG, 1901)

Cyclops languidoides LILLJEBORG, 1901: 61.

Localities: Tirol: Moostal (TILZER 1968), Almajurtal (TILZER 1968); Oberösterreich: groundwater near Ried (P. Pospisil, pers.comm.); Salzburg: groundwater of Salzburger Becken, Lower Alps (PRIESEL-DICHTL 1959); Niederösterreich: Mausrodlteich near Lunz (CHAPPUIS 1934); Wien: groundwater at Eberschüttwasser, Lobau (DANIELOPOL 1983; POSPISIL 1994); Burgenland: pump-well (1), Ostliper Meierhof (LÖFFLER 1960b), well Radbrunnen (1), Lutzmannsburg (LÖFFLER 1960b), well (1) at Albrechtsfeld, St. Andrä (LÖFFLER 1960a).

General distribution: Austria: groundwater of Lower Alps T and S, cave Mausrodlhöhle (Lunz) N, groundwater of Lobau W and B (Fig. 2); **World:** Holarctic.

Biotope: groundwater, interstitial zone.

Diacyclops languidus (G.O. SARS, 1863)

Cyclops languidus G.O. SARS, 1863: 249.

Localities: Salzburg: groundwater of Salzburger Becken, Lower Alps (PRIESEL-DICHTL 1959); Niederösterreich: riparian groundwater of river Ybbs (P. Pospisil, pers.comm.); Wien: groundwater at Eberschüttwasser, Lobau (POSPISIL 1994); Burgenland: well (1) beside of Eiser Kanal (LÖFFLER 1960a), Neusiedler See (LÖFFLER 1979).

General distribution: Austria: groundwater of Lower Alps S, Ybbs N and Lobau W, Neusiedler See B (Fig. 2); **World:** Europe, Iran, Sri Lanka, Japan, Quebec.

Biotope: groundwater, bogs, ponds, littoral zone of lakes.

Genus *Graeteriella* BREHM, 1926

Graeteriella laisi (KIEFER, 1936a)

Diacyclops laisi KIEFER ,1936a: 85.

Localities: Salzburg: groundwater of Taugl river, Hallein (P. Pospisil, pers.comm.).

General distribution: Austria: one locality, groundwater of Taugl river (Hallein) S (Fig. 2); **World:** France, Austria.

Biotope: karst groundwater (stygobiontic).

Graeteriella unisetigera (GRAETER, 1908)

Cyclops unisetifera GRAETER, 1908: 49.

Localities: Wien: groundwater at Eberschüttwasser, Lobau (POSPISIL 1994).

General distribution: Austria: groundwater of Lobau W (Fig. 2); **World:** Europe.

Biotope: groundwater (stygobiontic).

Genus *Megacyclops* KIEFER, 1927

Megacyclops gigas (CLAUS, 1857b)

Cyclops gigas CLAUS, 1857b: 207.

Localities: Vorarlberg: Bodensee (KIEFER & MUCKLE 1959); Niederösterreich: pond at Moosbrunn (S. Gaviria, pers. obs. 1997); Wien: Alte Donau, Wasserpark (S. Gaviria, pers. obs. 1997).

General distribution: Austria: Bodensee V, and known from 2 localities in N and W (Fig. 4); **World:** Europe, Nearctic, northern Africa.

Biotope: perennial ponds, profundal zone of lakes.

Remarks: The species has not always been recognized. It can be confunded especially with the big winter-forms of *M. viridis* (EINSLE 1993). It is widespread in the Prealpine lakes and ponds in Germany. It probably has a wider distribution at the Austrian Lower Alps.

Megacyclops viridis (JURINE, 1820)

Monoculus quadricornis viridis JURINE, 1820: 46.
Cyclops brevicornis CLAUS, 1857a: 32.
C. vulgaris SARS, 1918: 40.

Localities: Vorarlberg: Bodensee (PESTA 1923); Tirol: Lansermoorsee (PESTA 1923), Loarbecken, Brixlegg-Kramsach (PESTA 1938b); Salzburg: Faistenauer Hintersee (PESTA 1923), Zellersee (PESTA 1923); Kärnten: Millstättersee (PESTA 1923); Steiermark: Grundlsee (PESTA 1923), cave Lurhöhle at Peggau (KIEFER 1964); Oberösterreich: Attersee (PESTA 1923), Hallstättersee (PESTA 1923); Niederösterreich: Seebach, Lunz (S. Gaviria, pers. obs. 1986), Lunzer Mittersee (BREHM 1909; PESTA 1923), Lunzer Obersee (MIKSCHI 1990), cave Mausrodlhöhle near Lunz (CHAPPUIS 1934), cave Hermannshöhle near Kirchberg am Wechsel (STROUHAL 1954), Danube reservoir Altenwörth (C. Jersabek & A. Herzig, pers.comm.), Gießgang, inundated grassland and forest, Greifenstein (GAVIRIA in press), side branches of Untere Thaya (FORRÓ 1993), pond at Marchegg, Wienertür (S. Gaviria, pers. obs. 1997), pond at Moosbrunn (S. Gaviria, pers. obs. 1997); Wien/Niederösterreich: Marchfeldkanal (GAVIRIA 1994, 1998); Wien: Alte Donau (STEUER 1901; PESTA 1954; S. Gaviria, pers. obs. 1997), Obere Lobau (PFAFFENWIMMER 1986), Lusthauswasser, Prater (VORNATSCHER 1938), Laaerberg (PESTA 1917), Hermesteich, Lainz (PESTA 1954), well (1) Jedlersee (KIEFER 1964), Richardshof at Mödling (KIEFER 1964); Burgenland: Neusiedlersee (PESTA 1954; LÖFFLER 1959; FORRÓ 1990, 1992a), well Radbrunnen (1), Seemühle, Oggau (LÖFFLER 1960b), ponds (> 5) at Seewinkel (LÖFFLER 1959, FORRÓ 1992 b), Halbjochlacke, Seewinkel (S. Gaviria, pers. obs. 1996), cistern at castle Deutschkreuz (LÖFFLER 1960b), wells (2) near Tadten (LÖFFLER 1960a), wells (2) near St. Andrä (LÖFFLER 1960a), well (1) at Heid, field (LÖFFLER 1960a), well (1) near Pamhagen (LÖFFLER 1960a), wells (3) at Lange Lacke (LÖFFLER 1960a), wells (2) near Obere Stinkerlacken (LÖFFLER 1960a).

General distribution: Austria: Lower Alps V, T, S, K, St, O, N, lowlands N, W, B, Danube river, backwaters of rivers Danube, March, Thaya N; **World:** cosmopolitan except Australian region.

Biotope: groundwater, rivers, periodic ponds, littoral and sublittoral zone of lakes.

Genus *Mesocyclops* KIEFER, 1927

Mesocyclops leuckarti (CLAUS, 1857a)

Cyclops leuckarti CLAUS, 1857a: 35.
C. simplex POGGENPOOL, 1874: 70.
C. tenuicornis ULJANIN, 1875: 30.
C. pectinatus DADAY, 1885: 223.

Localities: Vorarlberg: Bodensee (PESTA 1923; KIEFER & MUCKLE 1959); Tirol: Lansersee (PESTA 1923), Schwarzsee, Kitzbühl (PESTA 1923), Loarbecken, Brixlegg-Kramsach (PESTA 1938); Salzburg: Zellersee (PESTA 1923), Reithersee (PESTA 1923), Wallersee (RECKENDORFER 1992), Mattsee (PESTA 1923; MOOG & JAGSCH 1980), Wolfgangsee (PESTA 1923), Obertrumer See (MOOG & JAGSCH 1980), Grabensee (MOOG & JAGSCH 1980); Kärnten: Faaker See (PESTA 1923), Ossiacher See (PESTA 1923), Weißensee (PESTA 1923), Goggausee (HERZIG & MOOG 1976), Jeserzer See (LÖFFLER 1979), Keutschachersee (EINSLE 1971), Klopeiner See (EINSLE 1971), Millstätter See (EINSLE 1971), Rauschelesee (EINSLE 1971), Turnersee (EINSLE 1971); Oberösterreich: Attersee (MOOG 1979), Mondsee (NAUWERCK 1988), Traunsee (PESTA 1923); Niederösterreich: pond at quarry, Weinviertel (S. Gaviria, pers. obs. 1996), pond near Gerasdorf (S. Gaviria, pers. obs. 1994), Gießgang Greifenstein, inundated forest (GAVIRIA in press), backwaters at Klosterneuburg (FORRÓ 1996), Danube reservoir Altenwörth (C. Jersabek & A. Herzig, pers.comm.); Wien: Alte Donau (STARMÜHLNER & al.. 1972; S. Gaviria, pers. obs. 1997), backwaters at Stadlau (PESTA 1917), Obere Lobau (PFAFFENWIMMER 1986), groundwater at Eberschüttwasser, Lobau (DANIELOPOL 1983); Burgenland: Martenthallacke, Seewinkel (LÖFFLER 1959), Wörtenlacke, Seewinkel (LÖFFLER 1959), limnocrene near Sieggraben (LÖFFLER 1960b), Neusiedlersee (PESTA 1954; HERZIG 1979; LÖFFLER 1979; FORRÓ 1990, 1992a); Danube river (HUMPESCH & MOOG 1994).

General distribution: Austria: from Prealpine lakes to eastern lowlands, Danube river and backwaters. Known from all the states with exception of Steiermark; **World:** Europe, northern Asia.

Biotope: groundwater, backwaters, perennial ponds, littoral and pelagic zone of lakes.

Genus *Metacyclops* KIEFER, 1927

Metacyclops gracilis (LILLJEBORG, 1853)

Cyclops gracilis LILLJEBORG, 1853: 208.

Localities: Niederösterreich: backwaters at Klosterneuburg (FORRÓ 1996); Burgenland: Szerdahelyer Lacke (LÖFFLER 1959), Schwarzer See, Seewinkel (LÖFFLER 1959), Dorfsee at Wallern (LÖFFLER 1959).

General distribution: Austria: backwaters of the Danube at Klosterneuburg N, Szerdahelyer Lacke, Dorfsee (Wallern), Schwarzer See B (Fig. 4); **World:** Palaearctic, Senegal, Ruanda, India.

Biotope: backwaters, perennial ponds, littoral and pelagic zone of lakes.

Metacyclops minutus (CLAUS, 1863)

Cyclops minutus CLAUS, 1863: 102.
C. longicaudatus BRADY, 1892: 88.
Metacyclops unacanthus LINDBERG, 1936: 9.

Localities: Burgenland: well (1) at Untere Luz, Seewinkel (LÖFFLER 1960a), well (1) western of Illmitz (LÖFFLER 1960a), Langelacke at Andau (LÖFFLER 1959), northern Krainerlacke, Seewinkel (LÖFFLER 1959), southern Krainerlacke, Seewinkel (LÖFFLER 1959).

General distribution: Austria: wells and ponds in Seewinkel B (Fig. 4); **World:** Palaearctic, Africa, Sri Lanka, Malaysia.

Biotope: groundwater, periodic ponds.

Metacyclops planus (GURNEY, 1909)

Cyclops planus GURNEY, 1909: 293.

Localities: Burgenland: Wörthenlacke, Seewinkel (LÖFFLER 1959), Lange Lacke, Seewinkel (LÖFFLER 1959), Schwarzer See, Seewinkel (LÖFFLER 1959), Huldenlacke, Seewinkel (LÖFFLER 1959).

General distribution: Austria: Seewinkel B (Fig. 4); **World:** southern and eastern Europe, Austria, northern Africa, Asia Minor, Iran.

Biotope: perennial, periodic and aperiodic small water bodies.

Genus *Microcyclops* CLAUS, 1893

Microcyclops rubellus (LILLJEBORG, 1901)

Cyclops rubellus LILLJEBORG, 1901: 75.

Localities: Wien: Eberschüttwasser, Lobau (P. Pospisil, pers.comm.); Burgenland: Martenthallacke, Seewinkel (LÖFFLER 1959), Neusiedler See (LÖFFLER 1979).

General distribution: Austria: Lobau W, Seewinkel and Neudiedler See B (Fig. 4); **World:** Holarctic, Cuba, Africa.

Biotope: small water bodies, bogs, littoral zone of lakes.

Microcyclops varicans (G.O. SARS, 1863)

Cyclops varicans G.O. SARS, 1863: 252.
C. orientalis ULJANIN, 1875: 33.

Localities: Salzburg: groundwater of Salzburger Becken, Lower Alps (PRIESEL-DICHTL, 1959); Burgenland: Neusiedlersee (PESTA 1954; LÖFFLER 1979a; FORRÓ 1990), Salzsee (METZ & FORRÓ 1989).

General distribution: Austria: groundwater of Lower Alps N, Neusiedler See and Salzsee B (Fig. 4); **World:** cosmopolitan.

Biotope: freshwater and salt ponds, littoral zone of lakes.

Genus *Thermocyclops* KIEFER, 1927

Thermocyclops crassus (FISCHER, 1853)

Cyclops crassus FISCHER, 1853: 92.
C. hyalinus REHBERG, 1880: 542.
Thermocyclops (Thermocyclops) crassus RYLOV, 1948: 305.
Mesocyclops (Thermocyclops) hyalinus KIEFER, 1929b: 52.

Localities: Salzburg: Wallersee (RECKENDORFER 1992); Kärnten: Ossiacher See (PESTA 1923; EINSLE 1971 as *Th. hyalinus*), Wörthersee (EINSLE 1971 as *Th. hyalinus*); Oberösterreich: Attersee (U. Einsle, pers.comm.); Niederösterreich: pond at quarry, Weinviertel (S. Gaviria, pers. obs. 1996), pond near castle, Wolkersdorf (S. Gaviria, pers. obs. 1995), backwaters at Klosterneuburg (FORRÓ 1996), side branch of Untere Thaya (FORRÓ 1993 as *Th. hyalinus*); Wien: Lusthauswasser, Prater (VORNATSCHER 1938), Obere Lobau (PFAFFENWIMMER 1986), Lobau (P. Pospisil, pers.comm.), Alte Donau, Sturzlwasser (PESTA 1928b), Alte Donau (S. Gaviria, pers. obs. 1997); Burgenland: Neusiedler See (PESTA 1954 as *C. hyalinus*; LÖFFLER 1959 as *Th. hyalinus*; HERZIG 1979).

General distribution: Austria: Wallersee S, Attersee O, Wörthersee, Ossiacher See K, northern N, backwaters at Klosterneuburg N, Alte Donau W, Neusiedler See B (Fig. 4); **World:** cosmopolitan (except Australian region).

Biotope: backwaters, perennial ponds, pelagic zone of lakes.

Thermocyclops dybowskii (LANDE, 1890)

Cyclops dybowskii LANDE, 1890: 362.

Localities: Niederösterreich: backwaters at Klosterneuburg (FORRÓ 1996); Burgenland: Neusiedler See (LÖFFLER 1979a).

General distribution: Austria: backwaters of the Danube at Klosterneuburg N, Neusiedler See B (Fig. 4); **World:** Palaearctic, Cuba.

Biotope: perennial ponds, littoral (occasional) and pelagic zone of ponds and lakes.

Thermocyclops oithonoides (G.O. SARS, 1863)

Cyclops oithonoides G.O. SARS, 1863: 241.

Localities: Oberösterreich: Attersee (PESTA 1923); Niederösterreich: backwater pond at Greifenstein (S. Gaviria, pers. obs. 1996), Gießgang Greifenstein, side branch (Gaviria in press); Wien: Lusthauswasser, Prater (VORNATSCHER 1938), Alte Donau (STARMÜHLNER & al. 1972, S. Gaviria, pers. obs. 1997), Obere Lobau (PFAFFENWIMMER 1986), Lobau (P. Pospisil, pers.comm.), backwaters at Stadlau (PESTA 1917), groundwater at Eberschüttwasser, Lobau (POSPISIL 1994).

General distribution: Austria: Attersee O, backwaters of the Danube in N and W (Fig. 4); **World:** Palaearctic.

Biotope: backwaters, pelagic zone of ponds and lakes.

Genus *Speocyclops* KIEFER, 1937

Speocyclops cerberus (CHAPPUIS, 1934)

Cyclops (Diacyclops) cerberus CHAPPUIS, 1934: 212.

Localities: Steiermark: cave Kraußhöhle, Gams (CHAPPUIS 1934; EINSLE 1993; P. Pospisil, pers. comm.).

General distribution: Austria: cave Kraußhöhle (Gams) St (Fig. 5); **World:** Austria.

Biotope: caves (stygobiontic).

Subfamily Eucyclopinae KIEFER, 1927

Genus *Austriocyclops* KIEFER, 1964

Austriocyclops vindobonae KIEFER, 1964

Austriocyclops vindobonae KIEFER, 1964: 482.

Localities: Niederösterreich: groundwater at St. Pölten (P. Pospisil, pers.comm.); Wien: well (1) at Kagran (KIEFER 1964); groundwater at Eberschüttwasser, Lobau (POSPISIL 1994).

General distribution: Austria: groundwater at St. Pölten N, Kagran and Lobau W (Fig. 5); **World:** Austria.

Biotope: groundwater (stygobiontic).

Genus *Ectocyclops* BRADY, 1904

Ectocyclops phaleratus (KOCH, 1938)

Cyclops phaleratus KOCH, 1938: 9.
C. canthocarpoides FISCHER, 1851: 426.
C. fischeri POGGENPOL, 1874: 73.
C. adolescens HERRICK, 1882: 231.
C. perarmatus CRAGIN: 1883: 72.
C. quinquepartitus MARSH, 1913: 17.

Localities: Niederösterreich: backwaters at Klosterneuburg (FORRÓ 1996), groundwater (pumping tube) in Eberschüttwasser, Lobau (P. Pospisil, singular finding); Burgenland: Szerdahelyer Lacke, Seewinkel (LÖFFLER 1959), Hallabernlacke, Appetlon, Seewinkel (LÖFFLER 1959), Neusiedler See (LÖFFLER 1959).

General distribution: Austria: one locality in a backwater system of the Danube river at Kosterneuburg N, two pools (pans) of the Seewinkel and Neusiedler See B (Fig. 5); **World:** cosmopolitan.

Biotope: backwaters, littoral (benthic) zone of ponds and lakes.

Genus *Eucyclops* CLAUS, 1893

Eucyclops denticulatus (GRAETER, 1903)

Cyclops serrulatus var. *denticulata* GRAETER, 1903: 491.
C. (Leptocyclops) lilljeborgi SARS, 1918: 73.

Localities: Tirol: Mittersee at Fernpaß, Biberwier (PESTA 1923).

General distribution: Austria: Mittersee at Fernpaß (Biberwier), T (Fig. 5); **World:** Holarctic.

Biotope: littoral zone of small water bodies with macrophytes.

Eucyclops graeteri (CHAPPUIS, 1927)

Cyclops graeteri CHAPPUIS, 1927: 42.
C. macrurus var. subterranea GRAETER, 1907: 850.

Localities: Wien: groundwater at Eberschüttwasser, Lobau (POSPISIL 1994).

General distribution: Austria: groundwater of Lobau W (Fig. 5); **World:** Europe, Japan.

Biotope: groundwater (stygobiontic).

Eucyclops macruroides (LILLJEBORG, 1901)

Cyclops macruroides LILLJEBORG, 1901: 85.

Localities: Tirol: Landhausteich, Zillertalereingang (PESTA 1937a); Niederösterreich: Lunzer Obersee (MIKSCHI 1990), Gießgang and inundated forest, Greifenstein (GAVIRIA in press), backwaters at Klosterneuburg (FORRÓ 1996); Wien: Alte Donau, Stürzlwassers (PESTA 1928b, 1937a; STARMÜHLNER & al. 1972); Burgenland: Szerdahelyer Lacke, Seewinkel (LÖFFLER 1959); Danube river (HUMPESCH & MOOG 1994).

General distribution: Austria: Zillertaleingang T, Lunzer Obersee, backwaters of the Danube N, Alte Donau W, one pond at the Seewinkel, B (Fig. 5); **World:** Palaearctic, Nigeria.

Biotope: backwaters, perennial ponds, ponds and littoral zone of lakes.

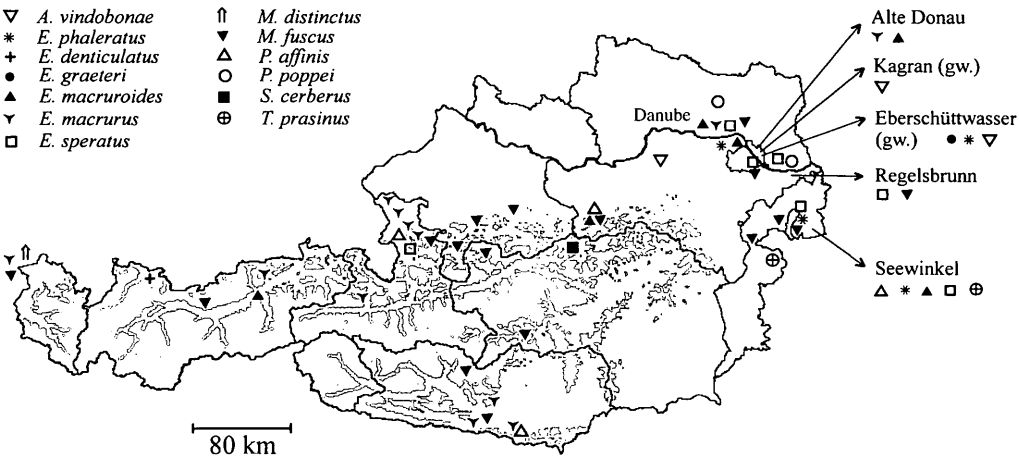

Fig. 5: Distribution map of species of *Austriocyclops*, *Eucyclops* (except *E. serrulatus*), *Macrocyclops*, (except *M. albidus*), *Paracyclops* (except *P. fimbriatus*), *Speocyclops*, *Tropocyclops* and *Ectocyclops phaleratus* (gw., groundwater).

Eucyclops macrurus (G.O.SARS, 1863)

Cyclops macrurus SARS, 1863: 254.
C. maarensis VOSSELER, 1889: 118.

Localities: Vorarlberg: Bodensee (KIEFER & MUCKLE 1959); Tirol: Krummsee (PESTA 1923); Salzburg: Zellerse (PESTA 1923), Mattsee (PESTA 1923; MOOG & JAGSCH 1980), Faistenauer Hintersee (PESTA 1923), Wolfgangsee (PESTA 1923), Wallersee (PESTA 1923); Kärnten: Großer Magdalenensee (PESTA 1923), Ossiachersee (PESTA 1923), Turnersee (SAMPL 1970); Niederösterreich: Danube reservoir Altenwörth (C. Jersabek & A. Herzig, pers.comm.); Wien: Alte Donau, Stürzlwasser (PESTA 1928b); Danube river (NAIDENOV 1985).

General distribution: Austria: Prealpine lakes V, T, S, K, Danube river N, Alte Donau W (Fig. 5); **World:** Holarctic.

Biotope: rivers, perennial ponds, ponds, littoral zone of lakes.

Eucyclops serrulatus (FISCHER, 1851)

Cyclops serrulatus FISCHER, 1851: 423.
C. agilis KOCH, 1838: 3.
C. anophthalmus JOSEPH, 1882: 6.
C. pectinifer CRAGIN, 1883: 71.
C. varius var. proximus var. brachyurus LILLJEBORG, 1901: 89.
C. agiloides SARS, 1909: 31.
C. serrulatoides LABBE, 1927: 200.

Localities: Vorarlberg: Bodensee (KIEFER & MUCKLE 1959), Maiensee, Arlberg (PESTA 1937a), Kleinsee, Albonalpe, Arlberg (PESTA 1937a), Lünersee (PESTA 1923), Tilisunasee (PESTA 1923); Tirol: Unterer Plenderlesee (PESTA 1915, 1923), Pfitscherjochsee, Pfitschertal (PESTA 1915, 1923), Dreizinnen Seen (PESTA 1915), Unterer Seebisee (PESTA 1915), Hirschlacke, Nockspitzgebiet (PESTA 1937 a), Lansermoorsee (PESTA 1923), Seebisee (PESTA 1923), Harlosangertümpel, Kitzbühler Alpen (PESTA 1937a), Loar-

becken, Brixlegg-Kramsach (PESTA 1938b), Piburger See (FÜREDER 1995), Gurgler Tümpel (REED 1970), Pillersee (REED 1970), Rotfelssee (REED 1970), Unterer Schwenzer See (REED 1970), Peilstein (REED 1970), Königstal (REED 1970), Itlsee (REED 1970); Salzburg: Mattsee (MOOG & JAGSCH 1980), Wallersee (MOOG & JAGSCH 1980), Tümpel bei Bruck (PESTA 1937a), Weißsee, area of Großglockner (PESTA 1933), Wolfgangsee (PESTA 1923), Pillersee (PESTA 1923), Weißsee, at Tauernjoch (PESTA 1923), Zellersee (PESTA 1923), Faistenauer Hintersee (PESTA 1923), Mattsee (PESTA 1923), groundwater of Salzburger Becken (PRIESEL-DICHTL 1959); Kärnten: Wörthersee (PESTA 1911), Magdalenensee (PESTA 1911), pool at St. Leonard (PESTA 1911), Oberer Mühldorfersee (PESTA 1911 1923), Fresenhalsee (PESTA 1911 1923), Millstätter See (PESTA 1923), Großer Magdalenensee (PESTA 1923), Anderlesee (PESTA 1923), Kleiner See, southern of Anderlesee (PESTA 1923), Oberer Lanischsee (PESTA 1923), Lanischsee (PESTA 1923), Jeserzer See (LÖFFLER 1979); Steiermark: Unterer Sonntagssee (PESTA 1923), Auerlingsee (PESTA 1923), Filssee (PESTA 1923), Oberer Giglachsee (PESTA 1923), Grundlsee (PESTA 1923), Mittlerer Klippensee (PESTA 1923), Lambrechtersee (PESTA 1923), cave Lurhöhle, Peggau (KIEFER 1934 pers. comm. P. Pospisil), Weizelsdorfer Badesee (FRESNER 1995); Oberösterreich: reservoir Staning (S. Gaviria, pers. obs. 1994), Attersee (PESTA 1923), Hallstättersee (PESTA 1923), Traunsee (PESTA 1923), pond at Mitteldorf (S. Gaviria, pers. obs. 1997); Niederösterreich: Lunzer Obersee (PESTA 1923; MIKSCHI 1990), Lunzer Mittersee (BREHM 1909; PESTA 1923), Lunzer Untersee (PESTA 1923), Danube reservoir Altenwörth (C. Jersabek & A. Herzig, pers. comm.), Gießgang and backwaters at Greifenstein (GAVIRIA in press), backwaters at Klosterneuburg (FORRÓ 1996), Rußbach (GAVIRIA 1994), side branches of Untere Thaya (FORRÓ 1993), pond at Moosbrunn (S. GAVIRIA, pers. obs. 1997); Wien/Niederösterreich: Marchfeldkanal (GAVIRIA 1994, 1998; ERNEGGER & al. 1998); Wien: groundwater at Eberschüttwasser, Lobau (POSPISIL 1994), Hermesteich, Lainz (KIEFER 1964), Alte Donau (PESTA 1954; S. Gaviria, pers. obs. 1997), backwaters at Stadlau (PESTA 1917), Obere Lobau (PFAFFENWIMMER 1986), Lusthauswasser, Prater (VORNATSCHER 1938); Burgenland: limnocrene near Sieggraben (LÖFFLER 1960b), well Radbrunnen (1), Wittmansdorf (LÖFFLER 1960b), well Radbrunnen (1), Seemühle, Oggau (LÖFFLER 1960b), wells (2) at Osliper Meierhof (LÖFFLER 1960b), well Radbrunnen (1) at Lackendorf (LÖFFLER 1960b), cistern at Kroatisch Geresdorf (LÖFFLER 1960b), wells (3) near Halbturm (LÖFFLER 1960a), well (1) near Tadten (LÖFFLER 1960a), wells (8) near Andau (LÖFFLER 1960a), wells (7) near St. Andrä (LÖFFLER 1960a), wells (3) near Podersdorf (LÖFFLER 1960a), well (1) near Wallern (LÖFFLER 1960a), wells (12) near Apetlon (LÖFFLER 1960a), wells (12) at Lange Lacke (LÖFFLER 1960a), wells (3) at Unterer and Oberer Stinkersee (LÖFFLER 1960a), wells (2) near Gols (LÖFFLER 1960a), well (1) near Oggau (LÖFFLER 1960a), wells (2) near Rust (LÖFFLER 1960a), well (1) at Purbach (LÖFFLER 1960a), pond at Rust (LÖFFLER 1960a), pond at Oberloisdorf (LÖFFLER 1960a), ponds (>5) Seewinkel (LÖFFLER 1959; METZ & FORRÓ 1989), Neusiedler See (PESTA 1954; LÖFFLER 1959, 1979a; FORRÓ 1990, 1991); Danube river (NAIDENOV 1985).

General distribution: Austria: all around the country; **World:** cosmopolitan.

Biotope: groundwater, rivers, backwaters, all types of small water bodies, benthic zone of lakes.

Eucyclops speratus (LILLJEBORG, 1901)

Cyclops varius var. *speratus* LILLJEBORG, 1901: 88.

Localities: Salzburg: groundwater of Salzburger Becken (PRIESEL-DICHTL 1959); Niederösterreich: Gießgang Greifenstein (GAVIRIA in press), backwaters at Regelsbrunn (S. Gaviria, pers. obs. 1996); Wien/Niederösterreich: Marchfeldkanal (GAVIRIA 1994, 1998); Wien: Lusthauswasser, Prater (VORNATSCHER 1938); Burgenland: Neusiedler See (PESTA 1954; LÖFFLER 1979a); Weißer See, Seewinkel (LÖFFLER 1959).

General distribution: Austria: groundwater of Lower Alps S, backwaters of Danube river N, lowlands N, W, B (Fig. 5); **World:** Holarctic, South Africa, India, Cuba, Colombia.

Biotope: rivers, backwaters, perennial and periodic (scarce) ponds, littoral zone of lakes.

Genus *Macrocyclops* CLAUS, 1893

Macrocyclops albidus (JURINE, 1820)

Monoculus quadricornis albidus JURINE, 1820: 44.
Cyclops annulicornis KOCH, 1838: 6.
C. tenuicornis CLAUS, 1857a: 31.
C. pennatus CLAUS, 1857a: 55.
C. clausi POGGENPOL, 1874: 70.
C. signatus ULJANIN, 1875: 29.
C. josephi MONIEZ, 1889: 176.
C. gyrinus FORBES, 1891:707.
C. viridosignatus BYRNES, 1909: 23.

Localities: Tirol: Piburger See (PESTA 1923; FÜREDER 1995), Achensee (PESTA 1923), Loarbecken, Brixlegg-Kramsach (PESTA 1938b); Salzburg: Mattsee (PESTA 1923), Zellersee (PESTA 1923), Faistenauer Hintersee (PESTA 1923), Niedertrumer See (MOOG & JAGSCH 1980), Mattsee (MOOG & JAGSCH 1980); Kärnten: Großer Magdalenensee (PESTA 1923), Ossiacher See (PESTA 1923); Niederösterreich: Lunzer Untersee (PESTA 1923); Danube reservoir Altenwörth (C. Jersabek & A. Herzig, pers.comm.); Gießgang and backwaters, Greifenstein (GAVIRIA in press), backwaters at Klosterneuburg (FORRÓ 1996), side branches of Untere Thaya (FORRÓ 1993); Wien/Niederösterreich: Marchfeldkanal (GAVIRIA 1994, 1998); Wien: groundwater at Eberschüttwasser, Lobau (POSPISIL 1994), Alte Donau (STARMÜHLNER & al. 1972) Obere Lobau (PFAFFENWIMMER 1986), backwaters at Stadlau (PESTA 1917); Burgenland: pond near Rust (LÖFFLER 1960a), Neusiedler See (LÖFFLER 1979a); Danube river (HUMPESCH & MOOG 1994).

General distribution: Austria: from the Alps until lowlands T, S, K, St, N, W, B, Danube river; **World:** cosmopolitan (except Australian region).

Biotope: groundwater, rivers, backwaters, perennial ponds, littoral zone of ponds and lakes.

Macrocyclops distinctus (RICHARD, 1887)

Cyclops tennuicornis var. *distinctus* RICHARD, 1887: 162.
C. gracilifornis LANDE, 1890: 345.
C. annulicornis RICHARD, 1891: 225.
C. bistriatus SCOURFIELD, 1898: 325.

Localities: Vorarlberg: Bodensee (EINSLE 1993).

General distribution: Austria: just known from Bodensee V (Fig. 5); **World:** Europe, New Zealand, India.

Biotope: small water bodies with macrophytes, littoral zone of ponds and lakes.

Macrocyclops fuscus (JURINE, 1820)

Monoculus quadricornis fuscus JURINE, 1820: 47.
Cyclops signatus KOCH, 1838: 8.
C. coronatus CLAUS, 1857a: 29.
C. tenuicaudis (part.) HERRICK, 1884: 153..

Localities: Vorarlberg: Bodensee (PESTA 1923); Tirol: Wildsee, Seefeld (PESTA 1923); Salzburg: Faistenauer Hintersee (PESTA 1923); Kärnten: Berghaustümpelsee, area of Königsstuhl (PESTA 1923), Großer Magdalenensee (PESTA 1923); Steiermark: Lambrechtersee (PESTA 1923), Grundlsee (PESTA 1923); Oberösterreich: Attersee (PESTA 1923), Hallstätter See (PESTA 1923), pond near Micheldorf/Krems (S. GAVIRIA, pers. obs. 1997); Niederösterreich: Lunzer Untersee (PESTA 1923), Gießgang Greifenstein, inundated

forest (GAVIRIA in press), backwaters of Regelsbrunn (S. GAVIRIA, pers. obs. 1996); Wien: Lusthauswasser, Prater (VORNATSCHER 1938); Burgenland: pond near Rust (LÖFFLER 1960a), Neusiedler See (PESTA 1954; LÖFFLER 1979a), limnocrene at Sieggraben (LÖFFLER 1960b).

General distribution: Austria: in the whole country (Fig. 5); **World:** Palaearctic, South America, Malaysia.

Biotope: groundwater, backwaters, perennial ponds, littoral and profundal zone of lakes.

Genus *Paracyclops* CLAUS, 1893

Paracyclops affinis (G.O. SARS, 1863)

Cyclops affinis SARS, 1863: 256.
C. pygmaues REHBERG, 1880: 546.

Localities: Salzburg: groundwater of Salzburger Becken, Lower Alps (PRIESEL-DICHTL 1959); Kärnten: Turnersee (SAMPL 1970); Niederösterreich: Lunzer Untersee (PESTA 1923); Wien: Alte Donau (PESTA 1928b); Burgenland: Szerdahelyer Lacke, Seewinkel (LÖFFLER 1959).

General distribution: Austria: known from 5 sites in the country: 1 lake in the Alps, 1 lake in the southern Lower Alps, 2 sites in the eastern country, 1 site in groundwater of Salzburg; **World:** Holarctic, Orientalis, Ethiopic region.

Biotope: groundwater, benthic zone of small water bodies, littoral zone of ponds and lakes.

Paracylops fimbriatus (FISCHER, 1853)

Cyclops fimbriatus FISCHER, 1853: 94.
C. crassicornis SARS, 1863: 256.
C. graedleri HELLER, 1870: 47.
C. pauper FRIC, 1872: 233.
C. magniceps VERNET, 1878: 532.
C. margoi DADAY, 1885: 264.
C. bathybius DADAY, 1897: 167.

Localities: Vorarlberg: Lünersee (PESTA 1923); Tirol: interstitial zone, glacial brook at Obergurgl (KIEFER 1976), pond at Ampmoosalpe, Rofangruppe, Kalkalpen (PESTA 1935), small pond near Magdeburger Hütte (PESTA 1935), Schwefelsee near Amberger Hütte (PESTA 1935) Piburgersee (FÜREDER 1985) ; Salzburg: groundwater of Salzburger Becken, Lower Alps (PRIESEL-DICHTL 1959); Kärnten: Jeserzer See (DUDZINSKI 1979), Millstätter See (PESTA 1923); Steiermark: cave Lurhöhle, Peggau (KIEFER 1934 pers. comm. P. Pospisil), Weizelsdorfer Badesee (FRESNER 1995), spring at Pinkenkogel, Semmering (KIEFER 1964); Oberösterreich: Attersee (PESTA 1923), Hallstätter See (PESTA 1923); Niederösterreich: Lunzer Mittersee (PESTA 1923), cave Hermannshöhle, Kirchberg am Wechsel (KIEFER 1964), Falkensteinhöhle (STROUHAL 1954), well (1) at Langenzersdorf (KIEFER 1964), wells (2) at Schagges and Harbach, Waldviertel (A. Fuchs & S. Gaviria, pers. obs. 1998), groundwater at Eberschüttwasser, Lobau (DANIELOPOL 1983), side branches of Untere Thaya (FORRÓ 1993), Danube reservoir Altenwörth (A. Herzig & Ch. Jersabek, pers. comm.); Wien/Niederösterreich: Marchfeldkanal (GAVIRIA 1994, 1998; ERNEGGER & al. 1998); Wien: spring at Kreuzeichenwiese (P. Pospisil, pers.comm.); Wien: backwaters of Stadlau (PESTA 1917), Alte Donau (STARMÜHLNER & al. 1972); Burgenland: wells (6) near Halbturm (LÖFFLER 1960a), well (1) near Frauenkirchen (LÖFFLER 1960a), wells (2) near Wallern (LÖFFLER 1960a), wells (4) near Illmitz (LÖFFLER 1960a), well (1) near Obere Halbjochlacke (LÖFFLER 1960a), Szerdahelyer Lacke, Seewinkel (LÖFFLER 1959), well Radbrunnen (1), Gattendorf (LÖFFLER 1960b), well (1), Nickelsdorf (LÖFFLER 1960b), well Pumpbrunnen (1) at Zurndorf (LÖFFLER 1960b), well Radbrunnen (1) at Mönchhof (LÖFFLER 1960b), draw-wells (2) at Oggau (LÖFFLER 1960a, b), well Radbrunnen (1), Kroatisch Minihof (LÖFFLER 1960b), cistern at Kroatisch Geresdorf (LÖFFLER 1960b), Neusiedler See (FORRÓ 1990); Danube river (NAIDENOV 1985).

General distribution: Austria: in the whole country; **World:** cosmopolitan.

Biotope: groundwater, brooks, benthic zone of perennial ponds, littoral and profundal zone of lakes.

Paracyclops poppei (REHBERG, 1880)

Cyclops poppei REHBERG, 1880: 550.

Localities: Niederösterreich: Kamp river (P. Pospisil, pers.comm.); Wien/Niederösterreich: Marchfeldkanal (GAVIRIA 1994, 1998).

General distribution: Austria: new for the country from benthos of tributaries of the Danube in N, W (Fig. 5); **World:** Europe, America, Tunisia, South Africa, Israel.

Biotope: groundwater, brooks, rivers, benthic zone of perennial ponds, littoral and profundal zone of lakes.

Genus *Tropocyclops* KIEFER 1927

Tropocyclops prasinus (FISCHER, 1860)

Cyclops prasinus FISCHER, 1860: 652.
C. longicornis VERNET, 1871: 44.
C. fluviatilis HERRICK, 1882: 131.
C. magnoctavus CRAGIN, 1883: 70.
C. horvathi DADAY, 1885: 212.
C. pentagonus VOSSELER, 1886: 167.
C. pusillus BRADY, 1904: 124.
C. tenellus SARS, 1909: 52.

Localities: Burgenland: Martenthallacke, Apetlon, Seewinkel (LÖFFLER 1959); limnocrene near Sieggraben (LÖFFLER 1960b).

General distribution: Austria: known just from 2 sites in B (Fig. 5); **World:** Palaearctic, Ethiopian region, Oriental region, America, Philippines.

Biotope: perennial ponds, littoral and pelagic (scarce) zone of ponds.

Order Harpacticoida SARS 1911
(new records after 1970)

The localities compiled by LÖFFLER & NEUHUBER (1970) for each species were not repeated here. However, they are included in the description of the general distribution of the species for the country. No distribution maps of the harpacticoids are given.

Family Ameiridae MONARD, 1927

Genus *Nitocra* BOECK, 1865

Nitocra hibernica (BRADY, 1880)

Canthocamptus hibernicus BRADY, 1880: 52.
Nitocra hibernica SCHMEIL, 1894b: 78.
Nitocra incerta (RICHARD) SARS, 1927b: 328.

Nitocra inuber (SCHMANKEWITSCH) GURNEY, 1927: 545.
not *Dactylopus inuber* SCHMANKEWITSCH, 1875: 165.

Localities: Niederösterreich: Melk, Danube river (KIEFER 1976); Danube river, between Greifenstein and Wien (MOOG & al. 1995); Wien: Danube river, Freudenau (S. Gaviria, pers. obs. 1995), groundwater at Eberschüttwasser, Lobau (DANIELOPOL 1983); Wien/ Niederösterreich: Marchfeldkanal (GAVIRIA 1994, 1998).

General distribution: Austria: Danube river and tributaries, backwaters N, W, Neusiedler See B; **World:** Palaearctic.

Biotope: benthic zone of rivers, brooks, small water bodies and lakes (from freshwater to oligohaline).

Genus *Nitocrella* CHAPPUIS, 1924

Nitocrella hirta tirolensis KIEFER, 1963

Nitocrella hirta tirolensis KIEFER, 1963: 49.

Localities: no new reports

General distribution: Austria: groundwater at Innsbruck T; **World:** Austria, Switzerland.

Biotope: groundwater (stygobiontic).

Nitocrella hofmilleri BREHM, 1953

Nitocrella hofmilleri BREHM, 1953: 14.

Localities: no new reports after 1970.

General distribution: Austria: wells near Salzburg S; **World**: Austria.

Biotope: groundwater (stygobiontic).

Family Canthocamptidae BRADY, 1880

Genus *Attheyella* BRADY, 1880

Subgenus *Attheyella* s.str. BRADY, 1880

Attheyella (Attheyella) crassa (SARS, 1863)

Canthocamptus crassus SARS, 1863: 232.
Attheyella crassa CHAPPUIS, 1928 : 46; 1929a : 486.
A. crassa schmeili GAGERN, 1938: 175, 179.

Localities: Oberösterreich: Feichtauerseen (JERSABEK & SCHABETSBERGER 1990); Niederösterreich: Danube river between Altenwörth and Greifenstein (MOOG & al. 1995), Danube river at Melk (KIEFER 1976), Obererseebach, Lunz (KOWARC 1992); Wien/Niederösterreich: Marchfeldkanal (GAVIRIA 1998); Wien: groundwater at Eberschüttwasser, Lobau (DANIELOPOL 1983).

General distribution: Austria: from Alps (up to 2500 m) until lowlands V, S, O, N, W, B, Danube river N; **World:** Palaearctic.

Biotope: groundwater, benthic zone of rivers, brooks, small water bodies and lakes.

Attheyella (Attheyella) wierzejski (MRÁZEK, 1893b)

Canthocamptus wierzejskii MRÁZEK, 1893B: 121.
Attheyella (Attheyella) wierzejskii CHAPPUIS, 1928: 46; 1929a : 486.

Localities: Oberösterreich: springs at Kalkalpen (WEIGAND & TOCKNER 1995); Niederösterreich: Danube river at Melk (KIEFER 1976 - wrong transfer of LÖFFLER & NEUHUBER 1970), Obere Ybbs, at Langau and Weißenbach (KIEFER 1976), Oberer Seebach, Lunz (KIEFER 1976; KOWARC 1992).

General distribution: Austria: Prealpine springs and lakes O, brooks and lakes near Lunz N and Mariazell St, Gründlsee St, Leithagebirge B; **World:** Europe.

Biotope: groundwater, springs, benthic zone of rivers and brooks, profundal zone of lakes (summer-cold-stenothermic).

Subgenus *Brehmiella* CHAPPUIS, 1928

Attheyella (Brehmiella) dentata (POGGENPOOL, 1874)

Canthocamptus dentatus POGGENPOOL, 1874: 73.
Canthocamptus northumbricus BRADY, 1880: 57.
Attheyella (Brehmiella) northumbrica CHAPPUIS, 1928: 48; 1929a : 486.
A. (B.) dentata LANG, 1948: 976.
Brehmiella northumbrica STERBA, 1969: 162.

Localities: no new reports

General distribution: Austria: Lunzer Untersee N; **World:** Europe until Caspian Sea, Mongolia, China.

Biotope: groundwater, benthic zone of small water bodies and lakes.

Attheyella (Brehmiella) trispinosa (BRADY, 1880)

Canthocamptus trispinosus BRADY, 1880: 55.
Attheyella (Brehmiella) trispinosa CHAPPUIS, 1928: 46; 1929a: 488.

Localities: Niederösterreich: Danube river, between Greifenstein and Wien (MOOG & al. 1995).

General distribution: Austria: Faistenauer Hintersee S, Danube river N, Alte Donau (1928) W, Seewinkel and Neusiedlersee B; **World:** Europe, northern Africa, Israel, Turkey.

Biotope: benthic zone of small water bodies and lakes.

Genus *Bryocamptus* CHAPPUIS, 1929b

Subgenus *Arcticocamptus* CHAPPUIS, 1929a

Bryocamtus (Arcticocamptus) abnobensis KIEFER, 1929a

Bryocamptus (Arcticocamptus) rhaeticus abnobensis KIEFER, 1929a: 321.
B. (A.) abnobensis KIEFER, 1933: 185.
A. abnobensis BORUTZKY, 1952: 219; DAMIAN-GEORGESCU, 1970: 134.

Localities: Tirol: two puddles in Gaißbergtal, Obergurgl (REED, 1970).

General distribution: Austria: Gaißbergtal (2345 - 2340 m), Obergurgl T; **World:** Central Europe, Rumania, Yugoslavia.

Biotope: wet mosses in Alpine regions.

Bryocamptus (Arcticocamptus) alpestris (VOGT, 1845)

Cyclopsine alpestris VOGT, 1845: 17.
Bryocamptus (Arcticocamptus) alpestris CHAPPUIS, 1929a : 479.
Arcticocamptus alpestris BORUTZKY, 1952: 222.

Localities: Tirol: Obergurgl, Ötztaler Alpen (KIEFER, 1976).

General distribution: Austria: Moostal, region of Arlberg (1700-2300m), Ötztaler Alpen (2060-2600m) T; **World:** Europe (high mountains).

Biotope: groundwater, wet mosses, springs, benthic zone of lakes (cold-stenothermic alpine form).

Bryocamptus (Arcticocamptus) cuspidatus (SCHMEIL, 1893a)

Canthocamptus cuspidatus SCHMEIL, 1893a: 36.
Bryocamptus (Arcticocamptus) cuspidatus, CHAPPUIS, 1929a : 479.
Arcticocamptus cuspidatus BORUTZKY, 1952: 223; DAMIAN-GEORGESCU, 1970: 127.

Localities: Tirol: Ötztaler Alpen, end of the valley and Obergurgl (KIEFER 1976), Ötztaler Alpen, ponds near Unterer Schwenzersee, Zirbelwald, Gaißbergtal, Auf der Nase (REED 1970), Stubai, Dresdner und Sulzenauerhütte (KIEFER 1976); Niederösterreich: Oberer Seebach, Lunz (KIEFER 1976; KOWARC 1992), Obere Ybbs at Langau and Weißenbach (KIEFER 1976).

General distribution: Austria: high Alps T, K, St, region of Lunz and Waldviertel N; **World:** Europe, Greenland, Canada.

Biotope: groundwater, mosses (*Sphagnum*), littoral and profundal zone of rivers, brooks and lakes.

Bryocamptus (Arcticocamptus) laccophilus (KESSLER, 1914a)

Canthocamptus laccophilus KESSLER, 1914a: 628.
Bryocamptus (Bryocamptus) laccophilus CHAPPUIS, 1929a : 479.
Arcticocamptus (B.) laccophilus PESTA, 1932: 108.
A. laccophilus BORUTZKY, 1952: 221.

Localities: Tirol: 2 ponds near Soomsee (REED 1970), pond near Tribessee (REED 1970), Unterer Plenderlesee (REED 1970).

General distribution: Austria: known only from 4 sites: ponds near Soomsee and Tribessee, Unterer Plenderlesee T; **World:** Central Europe, France, Poland, Rumania.

Biotope: mosses, helocrenes, benthic zone of ponds.

Bryocamptus (Arcticocamptus) rhaeticus (SCHMEIL, 1893a)

Canthocamptus rhaeticus SCHMEIL, 1893a: 23.
Bryocamptus (Arcticocamptus) rhaeticus CHAPPUIS, 1929a : 479.
Arcticocamptus (Bryocamptus) rhaeticus PESTA, 1932: 110.
A. rhaeticus BORUTZKY, 1952: 220; DAMIAN-GEORGESCU, 1970: 132.

Localities: Ötztaler Alpen (KIEFER 1976), Ötztaler Alpen, Mittlerer Schwenzer See, ponds near Soomsee (REED 1970) , Stubai, Dresdner Hütte and Obergurgl (KIEFER 1976); Oberösterreich: Feichtauerseen (JERSABEK & SCHABETSBERGER 1990); Niederösterreich: Obere Ybbs at Langau (KIEFER 1976), Weißenbach, Obere Ybbs (KIEFER 1976), Oberer Seebach (KIEFER 1976), Lunzer Obersee (PESTA 1923; KIEFER 1976).

General distribution: Austria: groundwater and high Alpine lakes V, T, brooks and lakes near Lunz, Obere Ybbs N, well at Mattighofen, Feichtenauer Seen O; **World:** Central and western Europe.

Biotope: groundwater, benthic zone of small water bodies and lakes (cold-stenothermic).

Bryocamptus (Arcticocamptus) vandouwei (KESSLER, 1914a)

Canthocamptus vandouwei KESSLER, 1914a: 626.
Bryocamptus (B.) vandouwei CHAPPUIS, 1929a: 479.
Arcticocamptus (B.) vandouwei PESTA, 1932: 106.
A. vandouwei BORUTZKY, 1952: 220.

Localities: Tirol: Ötztaler Alpen, Obergurgl (KIEFER 1976), Ötztaler Alpen, ponds at Langtal, pond near Soomsee (REED 1970), Stubai, Dresdner and Sulzenauerhütte (KIEFER 1976).

General distribution: Austria: high Alps T; **World:** Pyrenées, Alps, Tatra, Carpathian Mountains, Island.

Biotope: groundwater, mosses, interstitial zone of brooks, high mountain ponds.

Subgenus *Bryocamptus* s.str. CHAPPUIS, 1929b

Bryocamptus (Bryocamptus) minutus (CLAUS, 1863)

Canthocamptus minutus CLAUS, 1863: 122.
Bryocamptus minutus minnesotensis CHAPPUIS, 1929b: 44.
Bryocamptus (Bryocamtus) minutus CHAPPUIS, 1929a: 478.

Localities: Oberösterreich: Feichtenauerseen (JERSABEK & SCHABETSBERGER 1990); Niederösterreich: Oberer Seebach, Lunz (KOWARC 1992), Danube river between Altenwörth and Greifenstein (MOOG & al. 1995); Wien: groundwater at Eberschüttwasser, Lobau (DANIELOPOL 1983; POSPISIL 1994); Burgenland: Neusiedler See (LÖFFLER 1979a).

General distribution: Austria: all around the country, Danube river and backwaters N; **World**: holarctic, North America to Yukatán.

Biotope: all types of water bodies, also groundwater and benthic zone of big rivers.

Bryocamptus (Bryocamptus) vejdovskyi (MRÁZEK, 1893a)

Canthocamptus vejdovskyi MRÁZEK, 1893a: 35, 38.
Bryocamptus (Bryocamptus) vejdovskyi CHAPPUIS, 1929a: 478.

Localities: Niederösterreich: periodic water bodies in the region of Lunz (BREHM 1942); Burgenland: Stooberbach (V. Kowarc, pers.comm.).

General distribution: Austria: riparian zone of Inn river T, Fresenhalsee K, region of Lunz (Oberer Seebach, periodic ponds and lakes), Waldviertel (bogs) N, Stooberbach B; **World:** Palaearctic.

Biotope: bogs, benthic zone of brooks, periodic and perennial small water bodies, lakes (prefers oligotrophic and dystrophic water bodies, scarce in eutrophied water bodies).

Subgenus *Limocamptus* CHAPPUIS, 1929b

Bryocamptus (Limocamptus) echinatus (MRÁZEK, 1893b)

Canthocamptus echinatus MRÁZEK, 1893b: 124.
C. (Echinocamptus) luenensis SCHMEIL, 1894a: 343.
Echinocamptus (Echinocamptus) echinatus CHAPPUIS, 1929a: 483; BORUTZKY, 1952: 233.
E. (Echinocamptus) luenensis CHAPPUIS, 1929a: 483.
Bryocamptus (Limocamptus) echinatus LANG, 1948: 1105.
E. (Limocamptus) luenensis BORUTZKY, 1952: 240.
Bryocamptus luenensis LÖFFLER, 1961: 393.

Localities: Tirol: Ötztaler Alpen, Obergurgl and end of the valley (KIEFER 1976), Ötztaler Alpen, Königstal, Unterer and Mittlerer Schwenzersee (REED 1970), Ötztaler Alpen, Geirneggsee, Rotfelssee, Berglersee, Oberer Pendlerlesee (REED 1970), Ötztaler Alpen, Obergurgl, Gurgler Tümpel and Itlsee (REED 1970); Oberösterreich: springs at Kalkalpen (WEIGAND & TOCKNER 1995); Niederösterreich: Obere Ybbs at Langau and Weißenbach (KIEFER 1976), brook near Waidhofen a.d.Ybbs (V. Kowarc, pers.comm.), Nellingbach (V. Kowarc, pers.comm.), Oberer Seebach, Lunz (KIEFER 1976; KOWARC 1992), Lunzer Obersee, excavations (KIEFER 1976); Burgenland: Leitha river (V. Kowarc, pers.comm.), Stooberbach (V. Kowarc, pers.comm.).

General distribution: Austria: Lüner See V, Ötztaler Alpen T, springs and wells O, Lunz (springs, brooks and lakes), brook at Waidhofen a.d. Ybbs, Nellingbach, southwestern Waldviertel N, Wolfsbrunn, Leitha river B; **World:** Europe, Iran.

Biotope: groundwater, mosses, springs, benthic zone of rivers and brooks, profundal zone of lakes (cold-stenothermic)

Bryocamptus (Limocamptus) hoferi (VAN DOUWE, 1908)

Canthocamptus hoferi VAN DOUWE, 1908: 281.
Echinocamptus (Limocamptus) hoferi CHAPPUIS, 1929a: 483, BORUTZKY, 1952: 240.
Limocamptus (Echinocamptus) hoferi PESTA, 1932: 117.
Bryocamptus (Limocamptus) hoferi LANG, 1948: 1107.

Localities: no new reports after 1970.

General distribution: Austria: Prealpine lakes V, O, Gams O, region of Lunz (caves, springs, wells), brook at Lunz N; **World:** Central and western Europe.

Biotope: caves, springs, littoral and profundal zone of brooks and lakes.

Subgenus *Rheocamptus* BORUTZKY, 1948

Bryocamptus (Rheocamptus) pygmaeus (SARS, 1863)

Canthocamptus pygmaeus SARS, 1863: 230.
Bryocamptus (Bryocamptus) pygmaeus CHAPPUIS, 1929a: 479.; LANG, 1948: 1079.
B. (Rheocamptus) pygmaeus BORUTZKY, 1952: 199.

Localities: Oberösterreich: springs at Kalkalpen, O (WEIGAND & TOCKNER 1995); Niederösterreich: Oberer Seebach (V. Kowarc pers. comm.).

General distribution: Austria: springs of calcarean Alps 0, brook near Lunz N; **World:** Palaearctic, Nearctic ?, New Zealand ?

Biotope: all types of water bodies, also groundwater and brackish water.

Bryocamptus (Rheocamptus) typhlops (MRÁZEK, 1893b)

Canthocamptus typhlops MRÁZEK, 1893b: 119.
Bryocamptus (Bryocamptus) typhlops CHAPPUIS, 1929a: 479; LANG, 1948: 1082.
B. (Rheocamptus) typholps BORUTZKY, 1952: 205.

Localities: Niederösterreich: Oberer Seebach (KIEFER 1976; V. Kowarc, pers.comm.), Obere Ybbs at Langau and Weißenbach (KIEFER 1976), Lunzer Obersee (KIEFER 1976); Burgenland: Lafnitz at Heiligenkreuz (V. Kowarc, pers.comm.), Leitha at Zurndorf (Kowarc, pers.comm.), Stooberbach (V. Kowarc, pers.comm.).

General distribution: Austria: Schneealpen, Karlgraben St, brooks and lakes in the region of Lunz, Obere Ybbs (groundwater) N, wells at Leithagebirge, Lafnitz, Leitha and Stooberbach B; **World:** Europe.

Biotope: groundwater, mosses, bogs, springs, benthic zone of rivers and brooks.

Bryocamptus (Rheocamptus) weberi (KESSLER, 1914b)

Canthocamptus weberi KESSLER, 1914b: 474.
Bryocamptus weberi bisetosus KIEFER, 1929a: 320.
Bryocamptus (Bryocamptus) weberi CHAPPUIS, 1929a: 479; LANG, 1948: 1083.
B. (Rheocamptus) weberi BORUTZKY, 1952: 206.

Localities: Burgenland: Stooberbach (V. Kowarc, pers.comm.).

General distribution: Austria: Waldviertel (bogs) N, Stooberbach B; **World:** Europe.

Biotope: caves, bogs, benthic zone of rivers and brooks, ponds.

Bryocamptus (Rheocamptus) zschokkei (SCHMEIL, 1893a)

Canthocamptus zschokkei SCHMEIL, 1893a: 31.
Bryocamptus (Bryocamptus) zschokkeii CHAPPUIS, 1929a: 479; LANG, 1948: 1067.
B. (Rheocamptus) zschokkei zschokkei BORUTZKY, 1952: 191.

Localities: Tirol: Ötztaler Alpen, Obergurgl and end of the valley (KIEFER 1976), Ötztaler Alpen, Obergurgl, pond at Zirbelwald (REED 1970), Ötztaler Alpen, Oberer and Unterer Plenderlesee (REED 1970), Ötztaler Alpen, Königstal, Mittlerer and Unterer Schwenzer See (REED 1970), Stubai, Dresdner and Sulzenauerhütte (KIEFER 1976); Oberösterreich: springs at Kalkalpen (WEIGAND & TOCKNER 1995); Niederösterreich: Lunzer Obersee (BREHM 1913; KIEFER 1976), Oberer Seebach (KIEFER 1976; V. Kowarc pers. comm.), Obere Ybbs at Langau and Weißenbach (KIEFER 1976).

General distribution: Austria: from high mountains to lowlands V, T, S, K, O, N, B; **World:** Holarctic.

Biotope: groundwater, caves, bogs, springs, littoral and profundal zone of rivers, brooks, small water bodies and lakes.

Genus *Canthocamptus* WESTWOOD, 1836

Canthocamptus staphylinus (JURINE, 1820)

Monoculus staphylinus JURINE, 1820: 74.
Canthocamptus minutus BAIRD, 1850: 204; BRADY, 1880: 48.
Canthocamptus staphylinus SCHMEIL, 1894b:17; LANG, 1948: 923.

Localities: Tirol: Gurgler Tümpel, Gurgler Tal (REED 1970); Piburgersee (FÜREDER 1995); Kärnten: Jeserzer See (DUDZINSKI 1979); Niederösterreich: Oberer Seebach, Lunz (V. Kowarc pers. comm.), Danube river between Rührdorf and Greifenstein (MOOG & al. 1995), Regelsbrunn (V. Kowarc, pers.comm.); Wien/Niederösterreich: Marchfeldkanal (GAVIRIA 1994, 1998); Wien: groundwater at Eberschüttwasser, Lobau (DANIELOPOL 1983; POSPISIL 1994).

General distribution: Austria: all around the country, Alps up to 3000 m, Danube river N; **World:** Palaearctic, Borneo, Panamá.

Biotope: in all types of surface waters, also in moist soils (prefers small water bodies; oligohaline, cold-stenothermic).

Canthocamptus staphylinus microstaphylinus (WOLF, 1905)

Canthocamtus microstaphylinus WOLF, 1905: 199; LANG, 1948: 930.

Localities: no new reports.

General distribution: Austria: all around the country, Alps up to 3000 m; **World:** Palaearctic, Venezuela ?

Biotope: in all types of surface waters, also in moist soils (prefers small water bodies; oligohaline, cold-stenothermic).

Genus *Echinocamptus* CHAPPUIS, 1929b

Echinocamptus pilosus (VAN DOUWE, 1911)

Canthocamptus pilosus VAN DOUWE, 1911: 475.
Echinocamptus (Echinocamptus) pilosus CHAPPUIS, 1929b: 45; BORUTZKY, 1952: 232.
Echinocamptus pilosus LANG, 1948: 1115.

Localities: Steiermark: cave Lurgrotte (U. Einsle, in JANETZKY & al. 1996); Oberösterreich: springs at Kalkalpen (WEIGAND & TOCKNER 1995).

General distribution: Austria: springs, wells, caves K, St, O, N, B; **World:** Central Europe, Turkey, Georgia.

Biotope: groundwater, caves, springs (stygobiontic, probably cold-stenothermic).

Genus *Elaphoidella* CHAPPUIS, 1929b: 49

Elaphoidella bidens (SCHMEIL, 1893b)

Canthocamptus bidens SCHMEIL, 1893b:73.
Attheyella coronata SARS, 1904: 641.
Elaphoidella bidens CHAPPUIS, 1929a: 491.
Elaphoidella bidens coronata CHAPPUIS, 1929a: 491.
Attheyella (Elaphoidella) bidens FRYER, 1957: 62.

Localities: Burgenland: Neusiedler See (LÖFFLER 1979a).

General distribution: Austria: Seewinkel and Neusiedler See B; **World:** cosmopolitan.

Biotope: thermal springs, lentic water bodies.

Elaphoidella elaphoides (CHAPPUIS, 1924)

Canthocamptus elaphoides CHAPPUIS, 1924: 29.
Elaphoidella elaphoides CHAPPUIS, 1929a: 490

Localities: no new reports

General distribution: Austria: spring near St. Primus K; **World:** Central Europe.

Biotope: groundwater (stygobiontic).

Elaphoidella gracilis (SARS, 1863)

Canthocamptus gracilis SARS, 1863: 231.
Elaphoidella gracilis CHAPPUIS, 1929a: 491.

Localities: Wien: groundwater at Eberschüttwasser, Lobau (DANIELOPOL 1983; POSPISIL 1994); Burgenland: Neusiedler See (LÖFFLER 1979a).

General distribution: Austria: Lunz (Obersee, bogs) N, groundwater of Lobau W, Neusiedler See B; **World:** Europe.

Biotope: moist soils, moist leaf litter, mosses, mossgrown riparian zone of lakes.

Elaphoidella plesai PESCE & GALASSI, 1994

Elaphoidella plesai PESCE & GALASSI, 1994: 91.

Localities: Steiermark: cave Lurgrotte (PESCE & GALASSI, 1994).

General distribution: Austria: cave Lurgrotte St; **World:** Austria.

Biotope: caves (stygobiontic).

Elaphoidella proserpina CHAPPUIS, 1934

Elaphoidellla proserpina CHAPPUIS, 1934: 214.

Localities: no new reports

General distribution: Austria: cave Wilhelminenhöhle (Lunz) N; **World**: Austria.

Biotope: groundwater, springs (stygobiontic).

Genus *Epactophanes* MRÁZEK, 1893

Epactophanes richardi MRÁZEK, 1893

Epacthophanes richardi MRÁZEK, 1893: 108.
E. richardi LANG, 1948: 1026.
E. richardi var. aculeatus KULHAVY, 1957: 41.
E. richardi var. angulatus KULHAVY, 1957: 41.
E. richardi var. bidens KULHAVY, 1957: 41.
E. richardi var. incertae KULHAVY, 1957: 41.

Localities: Tirol: Ötztaler Alpen, Obergurgl and end of the valley (KIEFER 1976); Wien: groundwater at Eberschüttwasser, Lobau (DANIELOPOL 1983).

General distribution: Austria: all around the country; **World:** cosmopolitan.

Biotope: groundwater, springs, phytotelmes, moist leaf litter, bogs, mosses, *Sphagnum*, benthic zone of rivers and brooks.

Genus *Hypocamptus* CHAPPUIS, 1929a

Hypocamptus brehmi (VAN DOUWE, 1922)

Maraenobiotus brehmi VAN DOUWE, 1922: 561.
Hypocamptus brehmi CHAPPUIS, 1929a: 482.

Localities: Tirol: Ötztaler Alpen, Obergurgl and end of the valley (KIEFER 1976), Ötztaler Alpen, Obergurgl, pond at Gaißbergtal (REED 1970).

General distribution: Austria: Alpine groundwater, regions of Arlberg and Ötztal T; **World:** Central Europe, Spain.

Biotope: groundwater, springs, benthic zone of rivers and brooks, mosses in the littoral zone of lakes.

Genus *Maraenobiotus* MRÁZEK, 1893b

Maraenobiotus brucei carpathicus CHAPPUIS, 1928

Maraenobiotus brucei carpathicus CHAPPUIS, 1928: 20.

Localities: no new reports

General distribution: Austria: Moostal, region of Arlberg T; World: Alps, southeastern Europe.

Biotope: groundwater, caves, springs (cold-stenothermic).

Maraenobiotus insignipes alpinus KEILHACK, 1909

Maraenobiotus alpinus KEILHACK, 1909: 313.
Maraenobiotus insignipes alpinus LANG, 1948: 1021.

Localities: no new reports

General distribution: Austria: Großfragant, Hohe Tauern K; **World:** Alpes (France, Austria).

Biotope: benthic zone of lakes.

Maraenobiotus vejdovskyi zschokkei (KREIS, 1920)

Maraenobiotus zschokkei KREIS, 1920: 3.
Maraenobiotus vejdovskyi zschokkei LANG, 1948: 1017.

Localities: Tirol: Ötztaler Alpen, Obergurgl (KIEFER 1976).

General distribution: Austria: groundwater of Ötztaler Alpen T; **World:** Alps (Switzerland, Austria).

Biotope: mosses and small accumulations of water in high mountain regions.

Genus *Moraria* SCOTT, 1893

Moraria brevipes (SARS, 1863)

Canthocamptus brevipes SARS, 1863: 233.
Moraria brevipes GURNEY, 1904: 648, 660; LANG, 1948: 1034; BORUTZKY, 1952: 336.
Moraria sarsi BORUTZKY, 1925: 28, 40.

Localities: Tirol: Ötztaler Alpen, Obergurgl and end of the valley (KIEFER 1976), Ötztaler Alpen, Obergurgl, pond at Gaißbergtal (REED 1970).

General distribution: Austria: Alpine groundwater in the regions of Ötztal and Arlberg T, Waldviertel (bogs), wells near Lunz N; World: Europe.

Biotope: mainly in bogs and mosses, scarcely in groundwater or small accumulations of water.

Moraria monticola (MENZEL, 1912)

Canthocamptus monticola MENZEL, 1912: 513.

Localities: no new reports

General distribution: Austria: Sulzfluh (Rhätikon) (2800 m) V; **World:** Switzerland, Austria.

Biotope: mosses in high mountain regions.

Moraria poppei (MRÁZEK, 1893b)

Op*hiocamptus poppei* MRÁZEK, 1893b: 114.
Moraria poppei BREHM, 1913: 578; LANG, 1948: 1036.
Moraria poppei meridionalis CHAPPUIS, 1929c: 101; BORUTZKY, 1952: 336.

Localities: Niederösterreich: Obere Ybbs at Landau and Weißenbach (KIEFER 1976), Oberer Seebach, Lunz (KIEFER 1976; V. Kowarc pers. comm.), Lunzer Obersee (KIEFER 1976).

General distribution: Austria: region of Lunz N, springs of Wulka B; **World:** Europe, northern Africa.

Biotope: groundwater, mosses, benthic zone of rivers and brooks, ponds.

Moraria varica (GRAETER, 1911)

Canthocamptus varicus GRAETER, 1911: 18.
Moraria varica CHAPPUIS, 1922: 15.

Localities: no new reports

General distribution: Austria: wells near Lunz N; **World:** Central and western Europe.

Biotope: mainly in groundwater and springs, also in mosses and moist leaf litter.

Genus *Paracamptus* CHAPPUIS, 1929a

Paracamptus schmeili (MRÁZEK, 1893b)

Canthocamptus schmeili MRÁZEK, 1893b: 116.
Paracamptus schmeili CHAPPUIS, 1929a: 477.
Paracamptus schmeili subterraneus STERBA, 1954: 166.

Localities: Niederösterreich: Oberer Seebach, Lunz (KOWARC 1992).

General distribution: Austria: lakes in the Lower Alps and Alps up to 2600m V, S, K, St, N, Oberer Seebach (Lunz), Waldviertel N; **World:** Europe (except the extreme south).

Biotope: moist mosses, littoral and profundal zone of brooks and lakes, mainly in cold and cool running waters of high mountain regions.

Family Parastenocaridae CHAPPUIS 1940

Genus *Parastenocaris* KESSLER, 1913

Parastenocaris austriaca KIEFER, 1976

Parastenocaris (Minutacaris) austriaca KIEFER, 1976: 115.

Localities: Tirol: excavations at Sulzenauer- u. Dresdner Hütte, Stubai (KIEFER 1976).

General distribution: Austria: Alpine groundwater at Stubai (2350m) T; **World:** Austria.

Biotope: interstitial zone of an Alpine clearwater-brook below the glacier (approx. 2350 m).

Parastenocaris brevipes KESSLER, 1913

Parastenocaris brevipes KESSLER, 1913: 514.

Localities: no new reports

General distribution: Austria: Waldviertel (bogs) N; **World:** northern Europe including northern Germany, Austria.

Biotope: in *Sphagnum*, bogs, interstitial zone of running waters.

Parastenocaris fontinalis SCHNITTER & CHAPPUIS, 1915

Parastenocaris fontinalis SCHNITTER & CHAPPUIS, 1915: 291.
Fontinalicaris fontinalis JACOBI, 1972: 139.

Localities: Wien: groundwater at Eberschüttwasser, Lobau (POSPISIL 1994).

General distribution: Austria: groundwater of Lobau W; World: Central and northern Europe.

Biotope: groundwater (stygobiontic; oligohaline until 4 ppm. salinity).

Parastenocaris nolli KIEFER, 1938

Parastenocaris nolli KIEFER, 1938: 144.
Proserpinicaris nolli JACOBI, 1972: 138.

Localities: Obere Ybbs (BREHM 1955; JANETZKY & al. 1996)

General distribution: Austria: Obere Ybbs N; World: Netherlands, Germany, Austria.

Biotope: groundwater (stygobiontic).

Parastenocaris phyllura KIEFER, 1938

Parastenocaris phyllura KIEFER, 1938: 147 (male); KUNZ, 1939: 151 (female); GLATZEL, 1991: 375 (redescription)
Proserpinicaris phyllura JACOBI, 1972: 138.

Localities: Wien: groundwater at Eberschüttwasser, Lobau (POSPISIL 1994).

General distribution: Austria: groundwater of Lobau W; **World:** Central and northern Europe.

Biotope: moist sandy soils, limnic groundwater, coastal groundwater (oligohaline until 5-6 ppm. salinity).

Family Phyllognathopodidae GURNEY, 1928

Genus *Phyllognathopus* MRÁZEK, 1893b

Phyllognathopus viguieri (MAUPAS, 1892)

Belisarius viguieri MAUPAS, 1892: 135.
Phyllognathopus paludosus MRÁZEK, 1893b: 97.
Phyllognathopus viguieri GURNEY, 1932: 8; LANG, 1948: 268.
Viguierella coeca BORUTZKY, 1952: 93.

Localities: Burgenland: Neusiedler See (LÖFFLER 1979a), Stooberbach (V. Kowarc, pers.comm.).

General distribution: Austria: bogs at Lungau S, wells at Klosterneuburg, Kaltenbach N, Alte Donau, groundwater of Lobau W, Neusiedler See, Stooberbach B; **World:** cosmopolitan.

Biotope: groundwater, fitotelms, bogs, benthic zone of brooks and lakes.

Notes on general distribution

Among Austrian copepods, the order Calanoida is the best known group (Fig. 1). There is a clear division of species that live in the Alps e.g. *Mixodiaptomus tatricus*, *Acanthodiaptomus denticornis* and *Arctodiaptomus alpinus* and species restricted to the eastern lowland e.g. *Arctodiaptomus spinosus, Arctodiaptomus bacillifer, Mixodiaptomus kupelwieseri* and *Hemidiaptomus amblyodon. Arctodiaptomus alpinus,* known from 5 localities, should have a wider distribution in mountain lakes, comparable to that of *Acanthodiaptomus denticornis. Heterocope saliens,* inhabiting many ponds and small lakes of the Alps, is also known from lakes of the Lower Alps in Kärnten and the

Salzkammergut, but has disappeared in the Weissensee (SAMPL 1971); this is probably a result of fish stocking, although there is not enough evidence for that argument. In the Bodensee, fish and *Cyclops vicinus* were in part responsable for the extinction of *Heterocope borealis* (LÖFFLER 1983). Some species are truly pelagic like *Arctodiaptomus alpinus* and *Eudiaptomus graciloides*. Most of them also live near the littoral zone of lakes and in ponds. In the Danube, two species occur mainly in its backwaters, namely *Eudiaptomus gracilis* and *Eurytemora velox*, the latter preferring protected zones near the littoral and between aquatic plants. *Mixodiaptomus laciniatus* is known from lakes of the Lower Alps, and the species seems to be restricted to lakes with lower trophic conditions. Lake Mondsee suffered increasing eutrophication in the 1960s and that species, inhabitant of the lake in the past, has not been found there since 1971 (NAUWERCK 1988).

Among calanoids, *Eudiaptomus gracilis* is distributed all around the country but commonly below an altitude of 1000 m. Other species are very scarce and restricted to certain areas. *Eudiaptomus vulgaris* has been collected in three small water bodies in the Lower Alps of Tirol, but since 1938 (PESTA 1938) it has not been reported again. It is, however, widespread in Europe, and even reported recently as a new component of the crustacean fauna of the Litzelsee near Konstanz in Germany (EINSLE 1993).

Three other species, *Arctodiaptomus wierzejskii*, *Diaptomus castor* and *Eudiaptomus zachariasi*, are very rare and limited to locations in the south or east of the country.

Arctodiaptomus wierzejskii was collected in two ponds during the 1950s (PESTA 1954; LÖFFLER 1959) and has not been reported again. The pond in the Seewinkel, Szerdaherlyer Lacke (= Schwarzsee Lacke) by Angau, was strongly reduced in its surface, the pond near Schwechat was a temporary waterbody. This species seems to be endangered in Austria.

Diaptomus castor should also be considered as endangered in Austria. This species was found only until 1923 in the Millstättersee by Pesta. The pond in Stadlau where it lived in the 1920s (PESTA 1923), seems not to exist anymore. Although *Diaptomus castor* is a typical inhabitant of periodic ponds, it is able to live in small permanent water bodies. It should be present in the Lobau, but it was not found in any of the nine water bodies studied between 1976 and 1978 (PFAFFENWIMMER 1986). Recently it was collected in the backwaters of the Danube at Klosterneuburg (FORRÓ 1993). PESTA (1923) reported the presence of the species in the Haider See (1450 m.a.s.l. of altitude), which is located in the Italian Alps near the Austrian border.

After its report in 1923 at Graz and Leoben (PESTA 1923), *Eudiaptomus zachariasi* has been found again only in a fish-pond at Güssing in southern Burgenland. The species is very scarce in Central Europe and there is few information about its biology.

Figures 2 - 5 show the distribution of cyclopoids. A clear separation of *Cyclops abyssorum tatricus* can be observed from *Cyclops abyssorum prealpinus* and *Cyclops bohater*. The first is distributed in high mountain lakes (eastern Tirol and Vorarlberg, Lunz), in contrast to *Cyclops abyssorum prealpinus* and *Cyclops bohater* in the Lower Alpine lakes (Fig. 3). A fourth species, *Cyclops vicinus*, is a new immigrant in Alpine lakes, as it was mentioned by LÖFFLER (1983). It was reported for the first time in Bodensee in 1954 (KIEFER 1954). The expansion of this species in the northern Lower Alpine lakes ocurred in Germany (EINSLE 1993), but also in Austria. The species lives today in Piburger See (FÜREDER 1995; S. Gaviria, pers. obs. 1996), Mondsee (NAUWERCK 1988), Wallersee (RECKENDORFER 1992) and also in the small lake Ferlacher Badesee in the Lower Alps of Kärnten

(FRESNER 1995). Its expansion was probably caused by increasing eutrophication and fish transfer from one lake to another. It is also common in the Danube river, the lower reaches of its tributaries and its backwaters. Reports of this species in the Danube are known since 1970 (NAIDENOV 1985). *Cyclops vicinus* coexists in the river with *Cyclops strenuus* during summer and autumn, but only the former occurred during spring between 1970 and 1979. No clear explanation can be offered regarding the absence of *Cyclops strenuus* during spring. *Cyclops vicinus* seems to be also a new component of the copepod fauna of several Seewinkel ponds (METZ & FORRÓ 1989), while it was not found during the intensive faunistic survey by LÖFFLER in this region between 1957 and 1960. The only *Cyclops* species found at that time was *C. strenuus*, which is still more common than *C. vicinus* in the Seewinkel (FORRÓ 1992b).

Due to the uncertain taxonomic determination of *Cyclops strenuus,* specially from small lakes of the Alps, its distribution is not quite clear. *Cyclops furcifer* was found by LÖFFLER (1957) in the Neusiedler See, but no further reports seem to exist. Its second known locality, the Salziger See near Tadten (LÖFFLER 1959), has dried up completely in the meantime.

Acanthocyclops vernalis and *Acanthocyclops robustus* were often confused in the past. *Acanthocyclops robustus* seems to be the common and more abundant species in the backwaters of the Danube river (area of Greifenstein, Regelsbrunn, Marchfeldkanal). *Acanthocyclops vernalis* was found at Lobau (Hanselgrund Altarm) (P. Pospisil, pers. comm.), Marchfeldkanal (GAVIRIA 1998) and Donaukanal (DANIELOPOL 1983). "Pans" in Burgenland are inhabited today by *Acanthocyclops robustus* and Hungarian "pans" by *Acanthocyclops vernalis* (FORRÓ 1992b). It is not clear which of the two species lived in the Seewinkel during the 1950s. LÖFFLER (1957, 1959) identified it as *Acanthocyclops vernalis,* probably using taxonomic characters like the spine formula of the thoracopods, but this approach seems not to be valid today. Only one species, *Acanthocyclops robustus*, occurs in the Neusiedler See (HERZIG 1979; LÖFFLER 1979a).

The cosmopolitan species *Eucyclops serrulatus*, *Paracyclops fimbriatus* and *Megacyclops viridis* are found all over the country. *Macrocyclops fuscus* has been reported from all Austrian districts, but it is not so common as the cosmopolitans.

Some planktonic species like *Thermocyclops* spp. prefer warm waters and are distributed outside the Alpine region (Fig. 4). *Thermocyclops crassus* and *Thermocyclops oithonoides* can even live in the same water body, but occupy different niches. The former seems to prefer more eutrophic waters like the Wasser Park at the Alte Donau, while *Thermocyclops oithonoides* lives in the open lake. At Neusiedler See, *Thermocyclops crassus* co-exists with *Thermocyclops dybowsky* in the reedbelt, but in contrast to the latter, *Thermocyclops crassus* can only ocasionally be found in the open lake (LÖFFLER, 1979). Much more common is *Mesocyclops leuckartii,* which is also a warm stenothermic species. It is widely distributed around the country, and forms part of the plankton of many lakes of the Lower Alps until an altitude of 850 m. It also lives near the littoral zone, as in Neusiedler See, and is even able to feed on the bottom, as demostrated by PAPINSKA (1985).

Species of the genus *Metacyclops* (except *Metacyclops varicans*) and *Microcyclops* are rare and restricted to the eastern region of Austria (Fig. 4). Most of them live in benthic habitats; only *Metacyclops gracilis* can be also planktonic.

Benthic species such as *Tropocyclops prasinus, Paracyclops affinis*, *Eucyclops denticulatus* and *Ectocyclops phaleratus* are very rare. *Macrocyclops distinctus* is known only from the Bodensee.

There is a different distribution of *Eucyclops macrurus* and *Eucyclops macruroides* (Fig. 5). Both of them are adapted to the littoral zone of water bodies. While *Eucyclops macrurus* lives in lakes of the Lower Alps, *Eucyclops macruroides* (with exception of a pond in Tirol and the Lunzer Obersee?) is restricted to the backwaters of the eastern stretch of the Danube. *Eucyclops speratus* has a similar distribution as *Eucyclops macruroides*, but it has also been found in groundwaters of the Salzburg basin.

Species of *Diacyclops* (Fig. 2) show the following distribution: *Diacyclops bicuspidatus* is very common in the basin of Wien, eastern Niederösterreich and Burgenland, being absent in the rest of the country. Although it is known elsewhere as a species of surface waters, it has been collected in groundwater in Wien (Lobau) too. In contrast, *Diacyclops bisetosus*, a species known from surface and groundwaters, is with the exception of the Seewinkel, limited to subterranean waters in Austria. It is distributed in the eastern part of the country with a single record from Salzburg in the west. It is not known from the south (Kärnten). *Diacyclops languidoides* and *Diacyclops crassicaudis* are typical cold-stenothermic forms that live in surface waters of high mountains and in groundwater habitats in lower plains of the east.

Although EINSLE (1993) affirmed that *Megacyclops gigas* lives in most of the lakes of the Lower Alps, in Austria the species is only known from Bodensee. Additionally it has been recorded from two localities near Wien. As a common inhabitant of the profundal zone of lakes and of small ponds, it is expected to be found at much more sites.

Nine cyclopoid species are restricted to groundwaters (stygobiontic species): *Austriocyclops vindobonae*, *Eucyclops graeteri*, *Speocyclops cerberus*, *Graeteriella laisi*, *Graeteriella unisetigera*, *Acanthocyclops gmeineri*, *Acanthocyclops kieferi*, *Acanthocyclops sensitivus* and *Acanthocyclops rhenanus*. *Acanthocyclops sensitivus* is widely distributed (Fig. 2), while the others are known mostly from 2 sites (Fig. 2 and 5). Despite intensive groundwater survey in Burgenland in the past, *Acanthocyclops sensitivus* has not been found in that region. With exception of *Speocyclops cerberus* and *Graeteriella laisi*, these species are distributed in the eastern lowlands. Wide areas of the country have not been studied with respect to groundwater cyclopoids (e.g. Kärnten and great part of Steiermark).

The distribution of harpacticoids in Austria was investigated by LÖFFLER & NEUHUBER (1970). Since that time, eight species have been added to the Austrian fauna. *Bryocamptus laccophilus, Bryocamptus abnobensis* and *Maraenobiotus vejdovskyi zschokkei* were collected in high mountain water bodies in Tirol. Two species are known from interstitial waters of Alpine brooks, namely *Parastenocaris nolli* from Niederösterreich (BREHM 1955) (not included in the 1970 inventory) and *Parastenocaris austriaca* described from a brook in Tirol (KIEFER 1996). The remaining three are typical groundwater species. *Parastenocaris fontinalis* and *Parastenocaris phyllura* are inhabitants of the Lobau (POSPISIL 1994); *Elaphoidella plesai* was described recently from a cave in the Steiermark (PESCE & GALASSI 1994).

New reports of already known species have been made based on surveys done mainly at the Ötztaler Alps, in bed sediments of the rivers Leitha, Lafnitz and Nellingsbach in eastern Austria (V. Kowarc, unpublished data), from wells of the National Park Kalk-

alpen in Oberösterreich (WEIGAND & TOCKNER 1995) and in groundwater habitats in Wien and surroundings (DANIELOPOL 1983; POSPISIL 1989, 1994).

It should be noted that within cyclopoids inhabiting groundwater, the genus *Diacyclops* (complex *languidus / languidoides*) seems to occur in more than two different forms. Moreover, individuals of *Megacyclops* collected by the author from wells and limnocrens in Niederösterreich, did not fit with descriptions of the known species. Groundwater harpacticoids have received less attention compared to cyclopoids in the last 30 years. Additional species of *Parastenocaris*, *Nitocrella, Moraria* and possibly of *Elaphoidella* may be found.

Surveys of the meiofauna of bed sediments of rivers and the profundal benthos of lakes should increase the present inventory.

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