Historical development of nomenclature and taxonomy of *Cyprideis torosa* (Ostracoda)

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Abstract: The historical development of the complex nomenclature and taxonomy of the ostracod species *Cyprideis torosa* (Jones, 1850) is reviewed. Based on published volumes of the Kempf Database Ostracoda, the long span of time in which nomenclatural and taxonomic uncertainty existed is also documented.

Keywords: Ostracoda, *Cyprideis torosa*, nomenclature, taxonomy

Received 24 February 2016; **accepted** 14 March 2016

The scientific literature dealing with research on the ostracod species currently known as *Cyprideis torosa* started with a publication in July 1850. In the many decades since then it has transpired that this species is able to endure a wide range of salinities and temperatures in its aquatic environment. As a consequence, *Cyprideis torosa* is known to be a euryhaline and eurythermal species and especially suited to live in brackish coastal and inland water bodies with their varying characteristics. In these environments this species often dominates the assemblage of Ostracoda or is even the only representative, appearing in very large numbers.

When environmental conditions change towards lower water salinities, the characteristics of the shell of *Cyprideis torosa* may be different. The presence or absence of larger tubercles or nodes especially raised problems that influenced the nomenclature and taxonomy of this species. If present, those tubercles do not just protrude from the shell surface, but entirely deform the valves so that corresponding hollows appear on their insides.

Nomenclatural steps and their meaning

This section provides an overview of the historical development of the different kinds of naming (nomenclature) of the species *torosa* and its meaning (taxonomy).

Candona torosa Jones, 1850

In July 1850, under the binomen *Candona torosa*, the first description of the species was published by Thomas Rupert Jones (Jones 1850). Although he received Recent, though dead, specimens of this interesting species through the kindness of Mr Pickering from ditches at Gravesend, he only described and figured fossil shells from the non-marine Pleistocene deposits of the locality Grays. Detailed information on that type locality and the original specimens is provided by Frogley & Whittaker (2016).

A reason might have been the fact that the fossil valves showed tubercles or nodes while the Recent specimens presumably were smooth. However, it is more likely that Jones confined himself to the study of the fossil specimens and left the Recent material to the zoologists, because later in the great number of studies he published during his lifetime he exclusively described fossil Ostracoda.

Another peculiarity is the assignment of this new species to the genus *Candona*. In his description Jones mentioned the

considerably developed hinge-margin of the valves, a fact that should exclude the species from the genus *Candona*. Until that time, however, no information had been given on the characteristics of the inside of the valves by the author of that genus (Baird 1845, 1846, 1850). We find an answer to Jones's decision in his monograph on the Entomostraca of marine Cretaceous deposits of England (Jones 1849), in which (on p. 5) he mentioned the fossil species of *Candona* from Grays, then thought to be Pliocene in age. As until 1845 there were only two useful genera named within the Recent Ostracoda, *Cypris* (freshwater) and *Cythere* (marine), the genus *Candona* (fresh and brackish waters) was thought by Jones to be ecologically intermediate.

Cyprideis Jones, 1857 (a subgenus?)

Cyprideis torosa (Jones, 1850) Jones, 1857

In his monograph of the Tertiary Entomostraca of England (Jones 1857) the generic-level name *Cyprideis* is coined for the monotypic species *Cyprideis torosa* (Jones, 1850). However, there is some uncertainty regarding the generic assignment. According to a tabular scheme on p. 9, *Cyprideis* is regarded with a question mark as a subgenus of *Candona* within the Cyprididae. But also on p. 9 in a footnote, Jones mentions the possibility that *Cyprideis* could prove to be a fresh- or brackish-water *Cythere*, while on p. 21 he mentions that, according to its hinge, *Cyprideis* closely resembles the marine genus *Cytheridea*. *Cyprideis* was used throughout this publication formally, like the name of a genus. The formal expression *Candona* (*Cyprideis*) is not given, although it was later cited by Sandberg (1964).

Cyprideis Jones, 1857 (a subgenus!)

In a short publication (Brady 1864), living specimens of *Cyprideis torosa* (Jones, 1850) were reported from several places in Britain. A short description of the animal revealed that it differs only very slightly from that of the genus *Cythere*. Characteristics of the valves are reported to be quite variable. Following the description of *Candona albicans*, *Cyprideis* is treated informally as a subgenus.

Cyprideis Jones, 1857 (a genus!)

On p. 49 of his survey of the marine Ostracoda of Norway (Sars 1866), the generic status of *Cyprideis* with clear differentiation from the genus *Cythere* was expressed based on the detailed

description of the animal of the Recent brackish-water *Cyprideis torosa*.

***Cytheridea torosa* (Jones, 1850) Brady, 1867**

On p. 122 of his 'Synopsis of the Recent British Ostracoda' (Brady 1867), the genus *Cyprideis* was considered to be a synonym of the genus *Cytheridea*. That led to a new combination of the species.

***Cytheridea torosa* (Jones, 1850) Brady, 1867**

***Cytheridea lacustris* (Sars, 1863) Brady, 1867**

Some confusion arose through the monograph of the Recent British Ostracoda (Brady 1868) in which detailed information was given for the 1867 combination with the genus *Cytheridea*. As a consequence, the typical freshwater shells of *Cyprideis torosa* with nodes (figured by Jones 1850, but also in 1857 as figs 1a–1i on pl. II) were considered to be synonymous with *Cythere lacustris* of Sars (1863) and referred to as *Cytheridea lacustris*. Only the sexually dimorphic Recent specimens with smooth shells from brackish waters were described under *Cytheridea torosa* (Jones, 1850).

***Cytheridea littoralis* Brady, 1869**

In a publication on the Crustacea of the salt-marshes of Northumberland and Durham (Brady 1869), the new name *Cytheridea littoralis* was introduced for the Recent brackish-water species with smooth shells that Brady had described in his monograph under the name *Cytheridea torosa* (Jones, 1850).

***Cytheridea torosa* (Jones, 1850) Brady, 1867**

***Cytheridea torosa teres* Brady & Robertson, 1870**

The publication on 'The Ostracoda and Foraminifera of tidal rivers' (Brady & Robertson 1870) is of special significance. For the first time, besides the typical smooth forms, shells with nodes were also reported from collections of living specimens of *Cytheridea torosa* from Norfolk and Suffolk. A typical example was figured on plate VIII: 6 and 7. It was further reported, if both forms were found living together, that gradual transitions from smooth to forms with nodes were observable. As a consequence, in footnotes on pp. 21 and 22, Brady withdraws his recently established *Cytheridea littoralis* for the smooth forms and returns to *Cytheridea torosa* (Jones, 1850) of his 1868 monograph, but with the original meaning of T. R. Jones. From now on, the smooth forms should be regarded as variety *teres*. In fact, both *Cytheridea littoralis* as well as *Cytheridea torosa teres* were falling into the synonymy of *Cytheridea torosa* (Jones, 1850).

***Cytheridea torosa torosa* (Jones, 1850) Brady, 1867**

***Cytheridea torosa littoralis* (Brady, 1869) Müller, 1912**

On p. 326 of his manual on Ostracoda (Müller 1912), the freshwater form with nodes described by Jones in the fossil state is listed as *Cytheridea torosa* (Jones, 1850). It is no longer seen as a synonym of *Cythere lacustris* Sars, but vice versa, *Cythere lacustris* Sars is considered to be synonymous with *Cytheridea torosa*. Due to intermediate forms that had become known in the meantime, *Cytheridea littoralis* Brady, 1869 is treated only as a subspecies of *Cytheridea torosa*.

***Cyprideis torosa* (Jones, 1850) Jones, 1857**

***Cyprideis littoralis* (Brady, 1869) Sars, 1925**

***Cytherissa* Sars, 1925**

***Cytherissa lacustris* (Sars, 1863) Sars, 1925**

Within the account of the Crustacea of Norway (Sars 1925), again a description is given of *Cyprideis* as a separate genus, with *Cyprideis torosa* (Jones, 1850) in a restricted sense as the type species. The *Cytheridea littoralis* of Brady is described as a separate species *Cyprideis littoralis* (Brady, 1869). For the monotypic *Cythere lacustris* Sars, 1863 the new genus *Cytherissa* is introduced.

Evidence for the separation of the genera *Cythere*, *Cyprideis*, *Cytherissa* and *Cytheridea* was presented.

Gradual acceptance of the facts

With the publication of Sars (1925), *Cyprideis* finally became confirmed as a genus. In addition, with the detailed statement of Brady in his footnotes in Brady & Robertson (1870), it was also explained as a fact that the specific name *Cyprideis torosa* was valid for both noded and smooth forms of that species. In more recent years, an excellent example of this was studied and figured by Keyser & Aladin (2004).

As a consequence, from 1925 onwards *Cyprideis torosa* (Jones, 1850) Jones, 1857 should have been accepted and referred to by the community of ostracod researchers. However, looking at the literature dealing with Ostracoda it can be stated that those facts were accepted only gradually. On the contrary, for a very long time the splitting into two species, as published by Sars (1925), was followed. In particular, the many researchers dealing solely with the smooth forms used the name *Cyprideis littoralis* for this species, often using the incorrect subsequent spelling *Cyprideis litoralis*. Based on the Index D publication of the Kempf Database Ostracoda (Kempf 2006), two lists have been prepared to demonstrate this story (Tables 1 and 2). The detailed literature citations may be consulted in the published bibliographies of the Kempf Database Ostracoda, also known earlier as Cologne Database Ostracoda (Kempf 1980b, 1988, 1991, 1994, 1996, 1997, 2002a, b, 2013). Within the two tables, the cited UTIN (Universal Taxonomic Identification Number) Ostracoda, G0147 07714 for *Cyprideis torosa* and G0147 04245 for *Cyprideis littoralis*, is based on the numbering of genera and species in the Index B version of the Kempf Database Ostracoda (Kempf 1980a, and supplements). That numbering system is similar to and may be used universally like the ISSN numbers for journals or publication series. For the c. 80 000 named taxa registered in the Kempf Database Ostracoda such UTINs already exist. This novel UTIN system for the Recent and fossil Ostracoda may serve as a model for other groups of named organisms in the future.

Additional problems

Of course, additional problems exist. Collected specimens of *Cyprideis torosa*, for instance, may have been described under other species names.

An example is *Cytheridea pedaschenkoi* Daday, 1909 from Lake Issyk-Kul, subsequently described as *Cyprideis pedaschenkoi* (Daday, 1909) by Bronstein (1929), but later mostly regarded as synonymous with *Cyprideis torosa*. However, as *Cyprideis torosa pedaschenkoi* (Daday, 1909), questionably first mentioned by Hartmann (1964), there are also tendencies (Akatova 1972; Yankovskaya 1972) to treat those representatives as a subspecies of *Cyprideis torosa*.

A similar example is connected with a species of *Cyprideis* from Lake Qarun in Egypt. In a publication of Abdel-Malek & Ishak (1980), that species was cited as *Cyprideis littoralis*. In other publications with the results of detailed studies (Bassiouni *et al.* 1985, 1986), that species was reported as *Cyprideis sohni* Bassiouni, 1979. In more recent years it could be proved through the investigation of newly collected material from Lake Qarun (Wouters 2002) that *Cyprideis sohni* of Lake Qarun should be regarded as a synonym of *Cyprideis torosa*.

However, there are also opposite cases in which collected specimens were recorded as *Cyprideis torosa*, or under the synonym *Cyprideis littoralis*, but in reality represented different species. Such cases are known from America. Revising studies led to the

Table 1. Enlarged list, not exhaustive, of publications dealing with Recent, mostly living specimens of *Cyprideis littoralis* (Brady, 1869) Sars, 1925, based on non-marine Index D of the Kempf Database Ostracoda

A		B	C	D	E	F	G
G0147	04245	Sars	1925	Norway, Lake Engervand	NA	00572	155
G0147	04245	Sars	1927	Caspian Sea	NC	11729	329
G0147	04245	Bronstein	1928	Persia, Caucasus	NA	01524	102
G0147	04245	Klie	1929	Germany, Baltic Sea, North Sea	NA	01686	271
G0147	04245	Bronstein	1929	Kyrgyzstan, Lake Issyk-Kul	NA	02024	1
G0147	04245	Bronstein	1929	Kazakhstan, Lake Shalkar	NB	02025	64
G0147	04245	Klie	1929	Germany, Baltic Sea, North Sea	MB	02074	17
G0147	04245	Klie	1932	Germany, Baltic Sea Coast	NB	02764	611
G0147	04245	Stammer	1932	Italy, Timavo River	NA	10459	589
G0147	04245	Klie	1933	Germany, Holstein, inland lake	NA	01226	1
G0147	04245	Sick	1933	Germany, Kiel Bay, Pools	NF	13239	70
G0147	04245	Klie	1935	Egypt, Alexandria	NA	02508	7
G0147	04245	Schwabe	1936	Germany, Kiel Bay	NA	01310	292
G0147	04245	Redeke	1936	Netherlands, Zuiderzee	NA	01801	102
G0147	04245	Klie	1937	Bulgaria, Black Sea	NA	00614	7
G0147	04245	Remane	1937	Germany, Baltic Sea, Schlei	NB	10913	218
G0147	04245	Klie	1938	Germany, Baltic Sea, North Sea	NB	00585	156
G0147	04245	Seifert	1938	Germany, Greifswald Bodden	NF	13205	234
G0147	04245	Poulsen	1939	Iceland	NB	01240	39
G0147	04245	Klie	1939	Africa, Kenia, Lake Rudolf	NA	01700	156
G0147	04245	Meuche	1939	Germany, Holstein lakes	NB	01750	460
G0147	04245	Redeke & Den Dulk	1940	Netherlands	NB	01802	144
G0147	04245	Triebel	1941	Croatia, Palu	NA	00596	354
G0147	04245	Elofson	1941	Sweden, Skagerrak	MA	00752	256
G0147	04245	Elofson	1943	Sweden, coasts	MA	00666	7
G0147	04245	Bronstein	1947	Soviet Union	NA	01526	296
G0147	04245	Tressler & Smith	1948	USA, Maryland, Solomons Island	MA	01880	7
G0147	04245	Liperovskaya	1948	Special information	NB	01982	125
G0147	04245	Stephanides	1948	Greece, Corfu	NB	02458	91
G0147	04245	Margalef	1950	Spain	NB	10051	136
G0147	04245	Akatova	1950	Russia, Volga River Delta	NA	12012	106
G0147	04245	Caspers	1951	Bulgaria, Black Sea Coast	NB	01030	63
G0147	04245	Herbst	1951	Germany, River Eider	NA	01312	405
G0147	04245	Margalef	1951	Spain, Ibiza island	NB	10729	64
G0147	04245	Puscariu	1951	Romania	NB	11066	667
G0147	04245	Ruggieri	1952	Italy, Adriatic coast	MA	01944	60
G0147	04245	Margalef	1952	Spain, Menorca island	NB	10730	104
G0147	04245	Hartmann	1953	France, Mediterranean coast	MA	01599	709
G0147	04245	Schaefer	1953	Germany, coastal areas	NB	02134	365
G0147	04245	Margalef	1953	Spain	NA	02451	165
G0147	04245	Margalef	1954	Italy, Romagna area	NB	10458	150
G0147	04245	Swain	1955	USA, Texas, San Antonio Bay	NA	00864	615
G0147	04245	Harding	1955	Egypt, Siwa Oasis	NA	11956	65
G0147	04245	Rome	1956	France, Pas-De-Calais	MA	00845	2
G0147	04245	Hartmann	1957	Germany, Baltic Sea, North Sea	MA	01605	105
G0147	04245	Cvetkov	1957	Bulgaria, Lake Beloslav	NB	10548	391
G0147	04245	Hartmann	1958	France, Mediterranean coast	MA	01606	226
G0147	04245	Remane	1958	General information	NB	10346	TAB5
G0147	04245	Caraion	1958	Romania, Black Sea	MB	10475	90
G0147	04245	Cvetkov	1958	Bulgaria, Black Sea coast	NB	10549	225
G0147	04245	Margalef	1958	Spain, North Africa	NA	10640	55
G0147	04245	Cvetkov	1959	Bulgaria	NB	02459	194
G0147	04245	Kaestner	1959	General information	NB	10349	761
G0147	04245	Loeffler	1959	Iran, Lake Niriz	NA	12036	250
G0147	04245	Weygoldt	1960	Special information	NB	01402	369
G0147	04245	Hartmann	1960	France, Banyuls-Sur-Mer	MA	01609	418
G0147	04245	Jaervekuelg	1960	Estonia, Pärnu Bay	NB	10641	200
G0147	04245	Schornikov	1961	Russia, Kuban Delta	NA	02797	140
G0147	04245	Jaervekuelg	1961	Latvia, Gulf of Riga	NB	10642	218
G0147	04245	Loeffler	1961	Iran	NA	10770	329
G0147	04245	Hartmann	1963	General information	NB	02130	68
G0147	04245	Renaud-Debyser	1963	France, Arcachon Basin	MD	11392	79
G0147	04245	Renaud-Debyser	1963	France, Arcachon Basin	ND	11586	36
G0147	04245	Hartmann	1964	Egypt, Red Sea	MA	00340	46

(continued)

Table 1. (Continued)

A		B	C	D	E	F	G
G0147	04245	Hartmann	1964	Italy, Lake Trasimeno	NB	00829	60
G0147	04245	McKenzie	1964	Italy, Lake Patria	NB	12138	7
G0147	04245	Caraion	1964	Romania, Black Sea coast	NA	12656	225
G0147	04245	Hagerman	1965	Sweden, Öresund area	MB	02587	52
G0147	04245	Faradzhev	1966	Azerbaijan, Caspian Sea	NB	10398	63
G0147	04245	Du Saar	1967	Netherlands, inland lakes	NB	01452	151
G0147	04245	Muus	1967	Denmark, estuaries, lagoons	NB	10885	63
G0147	04245	Hagerman	1967	Finland, Tvärminne area	NB	10898	5
G0147	04245	Naydina	1968	Caspian Sea	ND	11469	191
G0147	04245	Tagliasacchi	1969	Italy, Sardinia, Cagliari area	NB	11513	353
G0147	04245	Remane	1971	General information	NB	12278	112
G0147	04245	Heip	1971	Belgium, Pond Dievengat	NF	13201	193
G0147	04245	Vesper	1972	General information	NB	12194	80
G0147	04245	Tagliasacchi	1972	Italy, Sardinia	NB	12210	70
G0147	04245	Rasmussen	1973	Denmark, Isefjord	MD	13086	133
G0147	04245	Arndt	1973	General information	ND	20163	243
G0147	04245	Heip	1976	Belgium, Pond Dievengat	NB	20782	229
G0147	04245	Kovalenko & Ivan	1977	Russia, Dnester Estuary	ND	26349	94
G0147	04245	Steger	1979	France, Camargue	NB	22865	165
G0147	04245	Abdel-Malek & Is	1980	Egypt, Lake Qarun	ND	24261	204
G0147	04245	Scharf	1981	Germany, Maar Lakes	NB	21013	198
G0147	04245	Walmsley & Moser	1981	France, Camargue	NB	22049	102
G0147	04245	Dobrokhotova	1981	Kazakhstan, Kurgaldzhin Lakes	NB	24142	22
G0147	04245	Dobrokhotova	1981	Kazakhstan, water reservoirs	NB	24143	108
G0147	04245	Bell	1982	General information	ND	12923	259
G0147	04245	Zaninetti & Teta	1982	France, Mediterranean coast	MB	23348	474
G0147	04245	Ramdani	1982	Morocco, Merja Sidi Bou Ghaba	ND	24963	107
G0147	04245	Tetart	1983	General information	NB	22820	221
G0147	04245	Koehler & Arlt	1984	Germany, Baltic Sea, Darss area	NB	23136	418
G0147	04245	Dobrokhotova	1984	Kazakhstan, water reservoirs	NB	24099	150
G0147	04245	Bubikjan	1984	Armenia, Lake Sevan	NC	25622	20
G0147	04245	Savolainen & Val	1984	Finland, Gulf of Bothnia	ND	25626	71
G0147	04245	Guelen	1985	Turkey, Anatolia	NB	24127	84
G0147	04245	Semenova	1993	Russia, Volga Basin	NC	25909	113

A, UTIN (Universal Taxonomic Identification Number) Ostracoda; B, author(s); C, year; D, geographical location or other information; E, kind of bibliography (e.g. NA, Non-marine Bibliography A; MB, Marine Bibliography B); F, code number of the publication within the bibliographies; G, page number of the publication.

Table 2. Enlarged list, not exhaustive, of publications dealing with Recent, mostly living specimens of *Cyprideis torosa* (Jones, 1850) Jones, 1857, based on non-marine Index D of the Kempf Database Ostracoda

A		B	C	D	E	F	G
G0147	07714	Brady	1862	England, Northumberland	NB	01492	454
G0147	07714	Norman	1862	England, Durham, Sedgfield	NA	01778	44
G0147	07714	Brady	1864	England, Northumberland	NA	00623	62
G0147	07714	Sars	1866	England	NA	01821	51
G0147	07714	Brady	1869	England, Durham, Northumberland	NA	01496	125
G0147	07714	Norman & Brady	1909	England, Durham, Northumberland	NC	01781	353
G0147	07714	Sars	1925	England	NA	00572	155
G0147	07714	Bronstein	1929	Kazakhstan, Lake Chalkhar	NB	02025	64
G0147	07714	Redeke & Den Dulk	1940	Netherlands	NB	01802	144
G0147	07714	Bronstein	1947	Soviet Union	NA	01526	298
G0147	07714	Akatova	1950	Kazakhstan, Lake Charkhal	NA	12012	107
G0147	07714	Ruggieri	1952	Italy, Adriatic Sea coast	MA	01944	60
G0147	07714	Lindroth	1953	Africa, inland waters	NA	01733	109
G0147	07714	Swain	1955	USA, Texas, San Antonio Bay	NA	00864	616
G0147	07714	Triebel	1958	Methods	NB	10038	210
G0147	07714	Cvetkov	1958	Bulgaria, Black Sea, lakes	NB	10549	231
G0147	07714	Cvetkov	1959	Bulgaria	NB	02459	194
G0147	07714	Wagner	1960	Netherlands, Ems Estuary	MB	02497	222
G0147	07714	Jaervekuelg	1960	Estonia, Pärnu Bay	NB	10641	200
G0147	07714	Swain	1961	Treatise volume	NA	00591	276
G0147	07714	Schornikov	1961	Russia, Kuban River Delta	NA	02797	140
G0147	07714	Jaervekuelg	1961	Latvia, Gulf of Riga	NB	10642	219

(continued)

Table 2. (Continued)

A		B	C	D	E	F	G
G0147	07714	Hartmann	1964	Italy, Lake Trasimeno	NB	00829	59
G0147	07714	Sandberg	1964	Detailed information	NA	00848	91
G0147	07714	McKenzie	1964	Italy, Patria Lake	NB	11958	13
G0147	07714	Wagner	1965	Netherlands, estuaries	MB	02351	483
G0147	07714?	Kornicker	1965	USA, Texas, Redfish Bay	MA	02230	57
G0147	07714	Sywula	1966	Poland, Gdansk Bay	NB	10347	289
G0147	07714	Sywula	1966	Poland, inland saline areas	NB	10419	54
G0147	07714	Theisen	1966	Denmark, brackish water	NB	20570	215
G0147	07714	Hagerman	1967	Finland, Gulf of Finland	NB	10898	5
G0147	07714?	Grossman	1967	USA, North Carolina, Pamlico	MA	10699	64
G0147	07714	Sywula	1968	Bulgaria	NA	10418	15
G0147	07714	Lerner-Seggev	1968	Israel, Lake Tiberias	NA	11171	133
G0147	07714	Naydina	1968	Caspian Sea	ND	11469	192
G0147	07714	Masoli	1968	Italy, Adriatic Sea coast	MA	11903	33
G0147	07714	Bonaduce & Masoli	1968	Tunisia	MB	11907	466
G0147	07714	Por	1968	Israel, Lake Tiberias	NB	12304	61
G0147	07714	Kilenyi	1969	England, Thames Estuary	NB	10829	261
G0147	07714	Yassini	1969	France, Arcachon Bay	MA	10842	65
G0147	07714	Remane	1969	General information	NB	10879	18
G0147	07714	Hagerman	1969	Sweden, Salvién Bay	MB	11509	94
G0147	07714	King & Kornicker	1970	USA, Texas Bays	NB	11926	28
G0147	07714	Por & Eitan	1970	Israel, Lake Tiberias	NB	12305	126
G0147	07714	Kilenyi	1971	Special information	NB	11858	36
G0147	07714	Barbeito-Gonza	1971	Greece, Naxos Island	NC	11973	288
G0147	07714	Sywula	1971	Poland	NA	12069	667
G0147	07714	Kilenyi	1972	Special information	NB	12071	52
G0147	07714	Vesper	1972	Germany, Baltic Sea, Schlei	NB	12134	21
G0147	07714	Vesper	1972	Germany, Baltic Sea, Schlei	NB	12194	79
G0147	07714	Lerner-Seggev	1972	Egypt, Suez Canal	MA	12515	247
G0147	07714	Uffenorde	1972	Croatia, Lim Bay	MA	12670	59
G0147	07714	Schornikov	1973	Kazakhstan, Aral Sea	NC	12806	1305
G0147	07714	Carbonel	1973	France, Gironde Estuary	ND	20160	77
G0147	07714	Kilenyi & Whitta	1974	England, etc. fossil lectotype	NB	12733	21
G0147	07714	Carbonel & Pujos	1974	France, Gironde estuary	MD	12873	388
G0147	07714	Schornikov	1974	Kazakhstan, Aral Sea	ND	12882	189
G0147	07714	Bonaduce & Ma & M	1974	Italy, lagoons Marano, Grado	MD	20037	46
G0147	07714	Sywula	1974	Poland	NA	20629	256
G0147	07714	Vesper	1975	Germany, Baltic Sea, Schlei	NB	20119	205
G0147	07714	Schulz	1975	Special information	NB	20135	590
G0147	07714	Van Harten	1975	Netherlands, coastal ponds	NB	20371	35
G0147	07714	Usskilat	1975	Germany, Baltic Sea	NB	20391	163
G0147	07714	Bonaduce & Pugli	1976	Libya	MA	20386	131
G0147	07714	Bonaduce & Ci & M	1976	Italy, Adriatic Sea	MA	20414	61
G0147	07714	Heip	1976	Belgium, Pond Dievengat	NB	20498	179
G0147	07714	Schulz	1976	Special information	NB	20571	120
G0147	07714	Heip	1976	Belgium, Pond Dievengat	NB	20782	229
G0147	07714	Yassini & Ghahre	1977	Iran, Pahlavi Lagoon	NB	20574	179
G0147	07714	Rosenfeld & Vesp	1977	Germany, Israel	NB	20760	55
G0147	07714	Kovalenko & Ivan	1977	Russia, Dnester Estuary	ND	26349	94
G0147	07714	Whittaker	1978	England, tidal creeks	MA	21339	149
G0147	07714	Oh & Carbonel	1978	France, Eyre delta	MB	22480	129
G0147	07714	Rosenfeld	1979	Germany, Lake Schlendorf	NB	20900	354
G0147	07714	Danielopol	1979	General information	NC	21709	107
G0147	07714	David & Carbonnel	1979	Special information	NB	22339	250
G0147	07714	Carbonel	1980	General information	MD	13096	93
G0147	07714	Keyser	1980	Special information	NB	20920	188
G0147	07714	Kiss	1980	General information	NB	22234	367
G0147	07714	Yassini	1980	Algeria, Bou-Ismaïl Bay	MD	26078	382
G0147	07714	Whittaker	1981	England, Christchurch Harbour	MD	13139	302
G0147	07714	Keyser	1981	Special information	MB	21036	606
G0147	07714	Ghetti & McKenzie	1981	Italy	NB	21103	30
G0147	07714	Dobrokhotova	1981	Kazakhstan, Kurgaldzhin lakes	NB	24142	22
G0147	07714	Dobrokhotova	1981	Kazakhstan, water reservoirs	NB	24143	108
G0147	07714	Delling	1981	Germany, oligohaline waters	ND	25038	104

(continued)

Table 2. (Continued)

A		B	C	D	E	F	G
G0147	07714	Waterston	1981	Scotland, Outer Hebrides	ND	25608	230
G0147	07714	Carbonel & Pujos	1982	Tunisia, lake of Tunis	ND	12926	80
G0147	07714	Rosenfeld	1982	Special information	NB	21397	373
G0147	07714	Rosenfeld	1982	Special information	NB	22883	14
G0147	07714	Herman & Heip	1982	Belgium, Pond Dievengat	NB	23058	300
G0147	07714	Sywula	1982	Poland, Baltic Sea	NB	23693	57
G0147	07714	Aladin	1983	Caspian Sea, Aral Sea	NB	22193	53
G0147	07714	Aladin	1983	Caspian Sea, Aral Sea	NB	22194	690
G0147	07714	Carbonnel	1983	Spain, Santa Pola Salines	NB	22282	211
G0147	07714	Van Harten	1983	Special information	NB	22898	568
G0147	07714	Paulo & Moutinho	1983	Portugal	NB	22911	21
G0147	07714	Herman & Heip & Vr	1983	Belgium, Pond Dievengat	NB	23125	326
G0147	07714	Martens	1984	Africa, inland waters	NC	21830	29
G0147	07714	Dobrokhotova	1984	Kazakhstan, water reservoirs	NB	24099	150
G0147	07714	Gerdes & Spi & Di	1985	Egypt, Solar Lake, Sabkha	NF	13223	334
G0147	07714	Carbonel & Pujos	1985	Tunisia, lake of Tunis	NB	22669	129
G0147	07714	Por & Dimentman	1985	Mediterranean Sea	NB	22927	548
G0147	07714	Guillaume & P & T	1985	France, Gironde	NB	23134	342
G0147	07714	Hollwedel & Scha	1988	Germany, Mellum, Memmert Island	NB	23318	348
G0147	07714	Aladin	1988	Special information	NB	23322	974
G0147	07714	Carbonel	1988	Special information	MB	23636	160
G0147	07714	Danielopol	1988	General information	NB	24186	415
G0147	07714	Olenska & Sywula	1988	Poland, Gulf of Gdansk	ND	25651	448
G0147	07714?	Carbonel & Toeld	1988	Special information	NB	23275	343
G0147	07714	Aladin	1989	Caspian Sea, Aral Sea	NB	23535	15
G0147	07714	Athersuch & Ho & W	1989	UK	MC	24059	114
G0147	07714	Wouters	1989	Belgium	NC	24460	154
G0147	07714	Aladin	1989	USSR, various seas	NC	24640	40
G0147	07714	Sheader & Bamber	1989	England, Suffolk, lagoons	ND	26236	82
G0147	07714	Meisch & Wou & Ma	1990	France	NC	23603	44
G0147	07714	Keyser	1990	Special information	NB	23830	406
G0147	07714	Trier	1990	UK, Wales	MB	23845	574
G0147	07714	Danielopol & Tet	1990	Special information	NB	24065	63
G0147	07714	Wendling & Scharf	1992	Germany, Eifel Maar lakes	NC	25471	254
G0147	07714	Marmonier & Creu	1992	France, Rhone River	ND	26286	697
G0147	07714	Aladin & Al	1993	Kazakhstan, Aral Sea	ND	13020	28
G0147	07714	Witte	1993	West Africa, Senegal	MC	24604	13
G0147	07714	Colin	1993	France, Gironde, Landes	ND	25420	119
G0147	07714	Baltanas & Garcia	1993	Spain, Canary Islands	ND	25594	231
G0147	07714	Semenova	1993	Russia, Volga Basin	NC	25909	113
G0147	07714	Boomer	1993	Kazakhstan, Aral Sea	ND	26035	141
G0147	07714	Külköylioglu & Al	1993	Turkey, lake	ND	26634	23
G0147	07714	Hollwedel & Scha	1994	Germany, Baltic Sea Islands	ND	25483	27
G0147	07714	Keyser	1995	Special Information	ND	25704	5
G0147	07714	Slack & Kont & St	1995	Egypt, Lake Mansala	ND	25742	337
G0147	07714	Sywula & Al	1995	Special Information	ND	25794	647
G0147	07714	Rieradevall & Ro	1995	Spain, Lake Banyoles	ND	26198	189
G0147	07714	Altinsacil & Yil	1995	Turkey, Lake Terkos	NE	26312	210
G0147	07714	Külköylioglu & Al	1995	Turkey, lake	ND	26317	253
G0147	07714	Baltanas & Al	1996	Spain	NC	02818	3
G0147	07714	Boomer & Wh & Key	1996	Special Information	ND	02973	163
G0147	07714	Van Harten	1996	Netherlands, coastal pond	ND	02978	191
G0147	07714	Frenzel	1996	Germany, southern Baltic Sea	ND	03048	15
G0147	07714	Jahn & Gam & Thee	1996	Special information	ND	03051	215
G0147	07714	Acosta & Reyes De	1996	Colombia, Baru Island	ND	03089	93
G0147	07714	Aladin	1996	Special information	ND	03500	12
G0147	07714	Jahn	1997	Special information	ND	03531	17
G0147	07714	Wansard & De & Ju	1998	Special information	ND	03250	44
G0147	07714	Horne & Dan & Mar	1998	Special information	ND	03610	158
G0147	07714	Mezquita & Ta & R	1999	Spain	ND	03683	69
G0147	07714	Martens & Ortal	1999	Israel, inland waters	NE	03860	161
G0147	07714	Horne & Boomer	2000	England, saltmarshes	MD	03718	199
G0147	07714	Van Harten	2000	Special information	ND	03739	131
G0147	07714	Slack & Kae & Kon	2000	Special information	ND	03743	181

(continued)

Table 2. (Continued)

A		B	C	D	E	F	G
G0147	07714	Meisch	2000	Europe, Western and Central	NE	03930	459
G0147	07714	Rosenfeld & O & H	2000	Israel	ND	03934	176
G0147	07714	Samir	2000	Egypt, lagoons	ND	04079	91
G0147	07714	Külköylioglu	2001	Turkey, lakes	ND	04165	36
G0147	07714	Keyser	2001	Special information	ND	04167	38
G0147	07714	Aladin & Plotnik	2001	Kazakhstan, Aral Sea	ND	04177	49
G0147	07714	Altinsacali	2001	Turkey, lakes	ND	04233	348
G0147	07714	Kilic	2001	Turkey, Black Sea coast	ND	04254	381
G0147	07714	Frogley & Gri & H	2001	Greece, Lake Pamvotis	NF	04452	748
G0147	07714	Wouters	2002	Africa, Seychelles	NF	04377	131
G0147	07714	Altinsacali & Gri	2002	Turkey, Izmir, etc.	NE	04482	63
G0147	07714	Mostafawi	2003	Iran, Persian Gulf	ME	04546	59
G0147	07714	Wouters	2003	South Africa	NF	04578	161
G0147	07714	Hollwedel & Scha	2003	Germany, southern North Sea	NF	04587	48
G0147	07714	Keyser & Walter	2004	Special information	NF	04709	3
G0147	07714	Keyser & Aladin	2004	Germany, Baltic Sea, Schlei	NF	04754	19
G0147	07714	Corbari & Car & M	2004	Special information	MF	04761	4416
G0147	07714	Altinsacali	2004	Turkey, wetlands	NF	04780	2133
G0147	07714	Frenzel & Al	2005	Germany, Baltic Sea coast	NF	04841	8
G0147	07714	Keyser	2005	Special information	NF	04848	95

A, UTIN (Universal Taxonomic Identification Number) Ostracoda; B, author(s); C, year; D, geographical location or other information; E, kind of bibliography (e.g. NA, Non-marine Bibliography A; MB, Marine Bibliography B); F, code number of the publication within the bibliographies; G, page number of the publication.

establishment of *Cyprideis castus* Benson, 1959 and *Cyprideis salebroza* van den Bold, 1963.

Acknowledgements and Funding

My cordial thanks go to Alan Lord for his careful and improving review of the manuscript.

Scientific editing by Alan Lord

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