A COMMENTED CHECK-LIST OF THE BALEARIC BRANCHIOPODA (CRUSTACEA)

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ABSTRACT

43 species of branchiopoda have so far been recorded from the Balearic islands, including species mentioned here for the first time. Chorologic grouping shows an important stock of species associated with semiarid regions of continental inland basins, both from fresh and atalassohaline waters. Their biogeographic significance and age is discussed in relation to the neotectonics of the islands and the possible existence of barren conditions in part of the insular landscape in the past.

INTRODUCTION

The Iberian region is noted for its interesting freshwater entomostracan zoogeography, the study of which was originated at the end of the past century, but with its exponential development cooccurring with that of the regional limnosociology in the forties and fifties. The Balearic Islands were not an exception to this rule, and they were one of the areas studied by Margalef (1951b, 1952, 1953a,b), who started the taxonomy and biogeography of the freshwater crustacea of the islands (Margalef, 1948, 1958). Recently work on the subject was recommenced, mainly due to separate situations which have arisen: One, the appearance of botanists and zoologists interested in and centred on the aquatic systems of the Balearic region, which has led to a greater geographic exploration and recognition of aquatic habitats unknown so far; this situation has allowed different authors to collect and study a varied spectrum of crustacean samples (Jaume, 1989; Pretus, 1985, 1987, 1989). Two, the existence of faunistic synthesis on different groups of branchiopoda, from several Mediterranean countries (Gauthier, 1928; Negrea, 1983; Alonso, 1985a, b; Margaritora, 1985; Ramdani, 1986; Thiery, 1987) resulting in an easier and more detailed comparison of new zoologic data. And three, the progressive consolidation of the vicariant evolutionary model for several genera of Chydoridae (Frey, 1982; Alonso, 1987). This model is revolutionising the classic approach which consists of a supposed generalized cosmopolitanism. This change has affected the Balearic area (Alonso & Pretus, 1989). The result of these combined features is to change our view of the Balearic branchiopod biota, to a point at which a first check-list recording the new materials is now possible.

MATERIAL AND METHODS

The study area concerns the four main islands of the Balearic archipelago. The Check-list includes the existing bibliographic data and unpublished data collected by the author. Samples were taken in Majorca during May and June 1987, during January and February 1988 and in March 1989. Ibiza is poorly endowed with freshwater environments. Samples were also taken in both Ibiza and
Formentera in February 1988. Minorca has been studied since 1984, with the largest effort made in fieldwork taking place between March and May 1984, July 1986, from December to April 1987, and in January 1988.

General characteristics of the Balearic regional limnology are compiled in previous works, mainly Margalef’s papers on the hydrobiology of the islands. It is also interesting to comment here that these islands, especially Majorca and Minorca, are furnished in some degree with wetlands, mainly near the coastal areas, connected with rather irregular rushing streams. Temporary muddy and transparent freshwater pools are well developed in the south of Mallorca (Sastre, 1987), and we refer to this as the Lluchmajor area. Ecologically similar aquatic systems, although not so frequent, but nonetheless still of importance, are also present in the west part of Minorca, namely in the Ciutadella area, and at several points near the coast in the same island. Finally, they are also present in Formentera island. Springs are numerous in the mountainous area of Mallorca. Temporary pools and phreatic permanent ponds are developed in the north part of Minorca, where a complex and varied superposition of permeable and impermeable, limestone, dolomitic and silicic sandstone materials, make it a rich area of aquatic diversification. The hyporheic is poor, but well developed locally in Mallorca. No true atalasso-haline lagoons are present.

RESULTS

A commented Check-list follows (see also table 1). Concise descriptive notes are presented for each island separately, because of the distinct sampling timespan spent by different authors on each one. Species cited by previous authors are also incorporated in separate form. Species not followed by references are first records for their corresponding island. First records for overall Balearic islands are shown in comments. Data on localities recorded are accompanied by a reference to date and the observed conductivity rank; accidental extreme high values of conductivity are indicated separately, as placed outside a more or less continuous rank. Marine cladocera are not treated here. The systematic groups at the level of orders are structured following Fryer (1987).

Order Anostraca Sars
Family Branchinectidae Daday

Branchinecta ferox (Milne-Edwards, 1840)

Minorca: Temporary muddy pool in Ciutadella (11/01/88); 316 μS/cm (Pretus, 1989).

Family Chirocephalidae Daday

Chirocephalus diaphanus Prévost, 1803

Minorca: Small humic temporary pool in Fornells (13/01/84); very rare (Pretus, 1985).

Family Artemiidae Grochowski

Artemia salina (L., 1758)

Majorca: Salt marsh in Campos (25/05/87); 265 μS/cm (De Buen, 1916; Margalef, 1953a, b). Ibiza: (De Buen, 1916; Margalef, 1951b, 1953a). Formentera: Estany Pudent and Salines (13/02/88); 136 μS/cm (De Buen, 1916; Margalef, 1953a).

Family Branchipodidae Daday

Branchipus schaefferi Fischer, 1834

Majorca: Temporary pools, common in Lluchmajor; January and February; 18 localities; 161 to 528 μS/cm (Margalef, 1953b, 1958; Jaume, 1989). Minorca: Common in temporary freshwater pools over all the island; December to March, and up to July occasionally; 21 localities; 216 to 1157 μS/cm, and up to 2770 μS/cm (Pretus, 1985, 1987). Ibiza: (Margalef, 1951b, 1953a). Formentera: Temporary pools in Ses Fontanelles and Port Saler; February; 450 and 490 μS/cm.

Order Spinicaudata Linder
Family Cycizidae Barnard

Cyzicus bucheti (Daday, 1914)

Minorca: Muddy pool at north of Ciutadella; May and June; 540 μS/cm (Pretus, 1989).

Family Leptestheriidae (Stebbing)

Leptestheria mayeti Simon, 1885

Majorca: Temporary pools in Lluchmajor; January and February; 5 localities; 199 to 451 μS/cm (Mayol, 1977; Alonso, 1985a, 1986; Jaume, 1989). Minorca: Temporary muddy pool in Mola de Fornells (14/03/87); 1157 μS/cm (Pretus, 1989).
Order ANOMOPoda Sars
Family Daphniidae (Straus)

Daphnia (Ctenodaphnia) magna Straus, 1820
Majorca: Brackish waters near Albufera de Alcudia (5102188); Temporary hiper-eutrophic pools in Lluchmajor (25101188); 3 localities; 264 \( \mu \text{S/cm} \) to 17.3 \( \mu \text{S/cm} \) (MARGALEF, 1953a; b; JAUME, 1989).
Minorca: Common in the northeast of the island, rare elsewhere; strongly mineralized waters, although absent in brackish waters in contact with the sea; November to July; 15 localities; 206 \( \mu \text{S/cm} \) to 18.1 \( \mu \text{S/cm} \) (MARGALEF, 1952, 1953a; PRETUS, 1985, 1987).

Daphnia (Ctenodaphnia) mediterranea Alonso, 1985
Majorca: (MARGALEF, 1952, 1953a; b; JAUME, 1989).
Minorca: Doubtful form with intermediate morphology, in a muddy pool in Ciutadella (06102188); 4 localities; 200 to 789 \( \mu \text{S/cm} \).

Daphnia (Ctenodaphnia) atkinsoni Baird, 1859
Majorca: Muddy pools in Lluchmajor (28101188); 256 \( \mu \text{S/cm} \); 2 localities. First record for Balearic Islands.

Daphnia (Ctenodaphnia) bolivari Richard, 1888
Majorca: Temporary muddy pool in Lluchmajor (25101188); 199 \( \mu \text{S/cm} \) (ALONSO, 1986; JAUME, 1989). Minorca: Doubtful form with intermediate nape morphology, in a muddy pool in Ciutadella (11101188).

Daphnia (Daphnia) obtusa Kurz, 1874
Majorca: Muddy pools in Lluchmajor (January), and basin in a spring in Banyalbufar (05106187); 4 localities; 200 to 789 \( \mu \text{S/cm} \) (JAUME, 1989).

Daphnia (Daphnia) pulex Leydig, 1860
Majorca: (MARGALEF, 1953a, b). Formentera: Artificial covered pond (13102188); 368 \( \mu \text{S/cm} \).

Daphnia (Daphnia) curvirostris Eylmann, 1887
Minorca: Permanent waters in S’Albufera (Mercadal) and temporary dystrophic pools of the island; January to April; 8 localities; 1700 to 4400 \( \mu \text{S/cm} \) (PRETUS, 1985).

Daphnia (Daphnia) longispina O.F. Müller, 1785
Majorca: Pool with vegetation in Lluchmajor (06102188); reservoirs of Gorg Blau and Cuber (05106187); 4 localities; 204-318 \( \mu \text{S/cm} \) to 17.4 and 160 \( \mu \text{S/cm} \); 3 localities. First record for Balearic Islands.

Table 1: Distribution of the species of Branchiopoda on the Balearic islands (M, Majorca; m, Minorca; I, Ibiza; F, Formentera); +, doubtful morphology.

| Species                                | M | m | I | F |
|----------------------------------------|---|---|---|---|
| Branchinecta ferox (Milne-Edwards, 1840) | + | + | + | + |
| Chirocephalus diaphanus Prévost, 1803   | + | + | + | + |
| Artemia salina (L., 1758)               | + | + | + | + |
| Branchipus schaefferi Fischer, 1834    | + | + | + | + |
| Ctenodaphnia mediterranea Alonso, 1985 | + | + | + | + |
| Ctenodaphnia atkinsoni Baird, 1859     | + | + | + | + |
| Ctenodaphnia bolivari Richard, 1888    | + | + | + | + |
| Ctenodaphnia obtusa Kurz, 1874         | + | + | + | + |
| Ctenodaphnia pulex Leydig, 1860        | + | + | + | + |
| Ctenodaphnia curvirostris Eylmann, 1887| + | + | + | + |
| Ctenodaphnia longispina O.F. Müller, 1785| + | + | + | + |
| Ctenodaphnia magna Straus, 1820        | + | + | + | + |
| Daphnia longispina O.F. Müller, 1785   | + | + | + | + |
| Daphnia obtusa Kurz, 1874              | + | + | + | + |
| Daphnia pulex Leydig, 1860             | + | + | + | + |
| Daphnia curvirostris Eylmann, 1887     | + | + | + | + |
| Daphnia longispina O.F. Müller, 1785   | + | + | + | + |
| Daphnia obtusa Kurz, 1874              | + | + | + | + |
| Daphnia pulex Leydig, 1860             | + | + | + | + |
| Daphnia curvirostris Eylmann, 1887     | + | + | + | + |
| Daphnia longispina O.F. Müller, 1785   | + | + | + | + |
| Daphnia obtusa Kurz, 1874              | + | + | + | + |
| Daphnia pulex Leydig, 1860             | + | + | + | + |
| Daphnia curvirostris Eylmann, 1887     | + | + | + | + |
| Daphnia longispina O.F. Müller, 1785   | + | + | + | + |
(June, 347 μS/cm); phreatic freshwater pools in Sa Calobra (May): 4 localities. Minorca: Common in the north of the island, in mineralized permanent or semitemporary waters, with vegetation, some strongly rich in humic substances; November to May, accidentally in August; 16 localities; 497 to 3710 μS/cm, and up to 13.1 mS/cm (PRETUS, 1985; ALONSO & PRETUS, 1989).

**Simoccephalus vetulus** (O.F. Müller, 1776)

**Majorca:** (Margalef, 1953a, b). Minorca: Very common in mineralized waters of all the island; all the year; 64 localities; 709 to 8620 μS/cm (Margalef, 1952, 1953a; Pretus, 1985, 1987; Alonso & Pretus, 1989). Ibiza: Artificial irrigation ponds (09102188); 3 localities; 693 to 704 μS/cm (Margalef, 1951b, 1953a).

**Simoccephalus exspinus** (Koch, 1841)

Minorca: Localized in the northeast of the island, in mineralized semitemporary waters; 10 localities; 1651 to 9800 μS/cm (Pretus, 1985).

**Ceriodyaphnia reticulata** (Jurine, 1820)

**Majorca:** Phreatic pools in Sa Calobra, Torrent Sollerich, Torrent Fondo (February, June); 470 to 3460 μS/cm (Margalef, 1953a, b). Minorca: Very common in stagnate and slightly running waters, all over the island; November to July; 36 localities; 706 to 5390 μS/cm, up to 9800 μS/cm (Margalef, 1952, 1953a; Pretus, 1984; Alonso & Pretus, 1989). Ibiza: Artificial irrigation ponds (09102188); 3 localities; 693 to 704 μS/cm (Margalef, 1951b, 1953a).

**Ceriodyaphnia quadrangula** (O.F. Müller, 1785)

**Majorca:** Pools in Lluchmajor (January); 4 localities; 223 to 356 μS/cm. Minorca: Common, even in small waterbodies in stone; November to August; 16 localities; 204 to 3010 μS/cm, and up to 8700 μS/cm (Margalef, 1952, 1953a; Pretus, 1985, 1987). Ibiza: (Margalef, 1951b, 1953a).

**Ceriodyaphnia dubia** Richard, 1894

**Majorca:** Artificial ponds in Puigpunyent and Massanella (01102188 and 02/02/88); 514 and 675 μS/cm. Minorca: Transparent pool with vegetation (15105184); 709 μS/cm (Alonso & Pretus, 1989).

**Ceriodyaphnia laticaudata** P.E. Müller, 1867

**Majorca:** Common in temporary pools in Lluchmajor (January to February); 7 localities; 346 to 650 μS/cm (Jaume, 1989). Minorca: Mineralized waters in summer (21107186 and 27107186); 2 localities; 1670 to 6830 μS/cm. Ibiza: Transparent pools (February); 3 localities; 733 to 1335 μS/cm.

Formentera: Common in small temporary pools (February); 5 localities; 280 to 1132 μS/cm.

**Scapholeberis rammoseri** Dumont & Pensaert, 1983

Minorca: Rich in vegetation wetlands, transparent pools; November to July; 11 localities; 709 to 3230 μS/cm, and up to 5390 μS/cm (Margalef, 1952, 1953a; Pretus, 1985; Alonso & Pretus, 1989).

Family Moinidae Goulden

**Moina brachiata** (Jurine, 1820)

Minorca: Semitemporary muddy pools in Ciutadella; February and April-May; 3 localities: 200 to 427 μS/cm. First record for Baleares.

**Moina micrura** Kurz, 1874

Minorca: Watering place in the centre of the island (22107186). First record for Balearic Islands.

**Moina salina** Daday, 1888

**Majorca:** Salt marsh in Campos (25105187 and 29/01/88); 255 and 80 μS/cm respectively. First record for Balearic Islands.

Family Macrothricidae Norman & Brady

**Macrothrix hirsuticornis** Norman & Brady, 1867

**Majorca:** Hipereutrophic temporary pool in Lluchmajor (25101188); 264 μS/cm. Minorca: Temporary muddy pools; January to May; 6 localities; 228 to 776 μS/cm. First record for Balearic Islands.

**Macrothrix laticornis** (Jurine, 1820)

**Majorca:** Reservoir of Gorg Blau (06106187); 347 μS/cm. First record for Balearic Islands.

Family Bosminidae (Baird, 1845)

**Bosmina longirostris** (O.F. Müller, 1785)

**Majorca:** Reservoirs of Cuber and Gorg Blau, planktonic (06106187); 250 and 347 μS/cm. First record for Balearic Islands.

Family Chydoridae Stebbing

**Pleuroxus letourneuxi** (Richard, 1888)

**Majorca:** Very common in temporary pools in Lluchmajor (January and February); 13 localities; 150 to 890 μS/cm (Jaume, 1989). Minorca: Temporary pools in the east, northeast, and west of the island; December to March; 10 localities; 259 to 1701 μS/cm. Formentera: Temporary pools (February); 5 localities; 417 to 1132 μS/cm.
**Pleuroxus aduncus** (Jurine, 1820)

Majorca: Running waters, springs and artificial irrigation ponds (January, February, but mainly in June); 11 localities; 356 to 1230 μS/cm (**MARGALEF, 1953b**; **JAUME, 1989**). Minorca: Running waters, springs and artificial irrigation ponds all over the island; April to July, scarce in winter; 555 to 3710 μS/cm, and up to 5200 μS/cm; 36 localities; (**MARGALEF, 1952, 1953a**; **PRETUS, 1985**). Ibiza: Irrigation ponds, phreatic waters (February); 5 localities: 300 to 2800 μS/cm (**MARGALEF, 1951b, 1953a**).

**Alona rectangula** (Fischer, 1854)

Majorca: (**MARGALEF, 1953b**).

**Dunhevedia crassa** King, 1853

Majorca: Pools in Lluchmajor (January and February); 158 to 346 μS/cm (in Albufera of Alcudia up to 15 mS/cm); 6 localities; (**MARGALEF, 1953b**; **JAUME, 1989**). Minorca: Transparent or muddy pools with vegetation; November, March to June; 9 localities; 312 to 2270 μS/cm, up to 7700 μS/cm (**PRETUS, 1985**; **ALONSO & PRETUS, 1989**).

**Chydorus sphaericus** (O.F. Müller, 1776)

Majorca: Indistinctly stagnant and running waters (January, February and June); 15 localities; 158 to 1009 μS/cm (**MARGALEF, 1953a, b**). Minorca: Indistinctly stagnant and running waters; November to February, abundant from March to June; 123 localities; 216 to 9800 μS/cm (**MARGALEF, 1952, 1953a; PRETUS, 1985**). Ibiza: Spring of Atzaró (12102187); 792 μS/cm (**MARGALEF, 1951b**).

**Ephemeropus phintonicus** (**Margaritora**, 1969)

Majorca: (**JAUME, 1989**). Minorca: Muddy pool in Sa Mesquida (1411186); 776 μS/cm.

**Alona guttata** Sars, 1862

Majorca: Torrent Sant Miquel, running waters (10106187); 710 μS/cm (**MARGALEF, 1953b**). Minorca: Torrent Son Fideu, running waters (05103187). Ibiza: (**MARGALEF, 1951b, 1953a**).

**Alona rectangula** Sars, 1862

Majorca: Reservoir of Gorg Blau (06.06.87); 347 μS/cm; pool near Alcudia (05/02/88) (**MARGALEF, 1953b**). Minorca: Frequent in mineralized pools in the north and northeast of the island, rare in the rest; November to June; 20 localities; 709 to 6510 μS/cm, and up to 18.1 mS/cm (**MARGALEF, 1952, 1953a**; **PRETUS, 1985**; **ALONSO & PRETUS, 1989**).

**Alona elegans** Kurz, 1875

Majorca: Common in temporary pools in Lluchmajor (January and February); 7 localities; 170 to 1200 μS/cm (**JAUME, 1989**). Minorca: Temporary muddy pools; January to April, July; 204 to 670 μS/cm, up to 5390 μS/cm; 8 localities. **Formentera**: Temporary pools; February; 3 localities; 417 and 1132 μS/cm.

**Alona iberica** Alonso & Pretus, 1989

Minorca: Transparent pools over silicic rocky substrates, rich in vegetation and coloured water by humic substances. April and May; 2 localities; 312 and 1500 μS/cm (**PRETUS, 1985**; **ALONSO, 1986, 1987**; **ALONSO & PRETUS, 1989**).

**Alona azorica** Frenzel & Alonso, 1988

Minorca: Temporary pools with vegetation, mineralized; November to April; 3 localities; 776 to 1500 μS/cm, up to 4510 μS/cm; the populations are morphologically very close to a taxon described as **Alona estepatica** Alonso, 1985 (**ALONSO & PRETUS, 1989**).

**Alona affinis** (Leydig, 1860)

Minorca: clean waters at the north of the island: January and April; 6 localities; 1048 to 3350 μS/cm. First record for Balearic Islands.

**Leydigia acanthocercoides** (Fischer, 1854)

Majorca: Common in pools in Lluchmajor; January and February; 8 localities; 266 to 451 μS/cm (**JAUME, 1989**). Minorca: Common in both, temporary muddy waters or clean with vegetation; December to May; 13 localities; 311 to 2660 μS/cm, up to 4500 μS/cm (**PRETUS, 1985**; **ALONSO & PRETUS, 1989**).

**Tretcephala ambigua** (Lilljeborg, 1900)

Majorca: Pools in Lluchmajor (06102188) and Banyalbufar (05106187); 715 μS/cm (**JAUME, 1989**). Minorca: Common at the north of the island, in clean semitemporary waters with vegetation; November, January, April to July; 8 localities; 365 to 2660 μS/cm (**ALONSO & PRETUS, 1989**). Ibiza: Phreatic waters in Cala Xerraca and Font Torres; February; 1335 and 1690 μS/cm.

**Oxyurella tanicaudis** (Sars, 1862)

Minorca: Permanent waters in S’Albufera (Mercadal), and a clean mineralized pool in Sa Mesquida; November. January, June, July; 2 localities; 1350 to 5390 μS/cm. Ibiza: (**MARGALEF, 1951b, 1953a**).
**Order NOTOSTRACA (Sars)**

**Family Triopsidae Keilhack**

Triops cancriformis (Bosc, 1801)

Majorca: Temporary muddy pools in Lluchmajor: January and February, up to May; 4 localities; 199 to 528 μS/cm (Margalef, 1953b; Mayol, 1977; Jaume, 1989). Minorca: Temporary muddy pools in Ciutadella; May and June; 2 localities; 1858 μS/cm (Margalef, 1948, 1951a, 1952, 1953a; Pretus, 1985; Alonso, 1985a; Pretus, 1989).

**DISCUSSION**

43 species of Branchiopoda have been recorded in Balearic Islands: 4 Anostraca, 2 Spinicaudata, 36 Anomopoda and 1 Notostraca. One part of the species belongs to a group of generalized forms in the Mediterranean-European area: Simocephalus, Scapholeberis, several Ceriodaphnia, Daphnia subgenus Daphnia, Alonella excisa, Alona affinis, A. guttata, or A. rectangula. Nevertheless, an important sector is a part of a chorologic grouping inhabiting steppic areas in inland zones: Branchinecta ferox, Cyzicus buchetti, Leptestheria mayeti, Daphnia atkinsoni, D. bolivari, or chydorids as Alona cf. esteparica, Alona iberica, or Ephe- meroporus phintonicus. On the other hand, at least two species from continental atalassohaline waters occur in the hiperhaline coastal marshes of Majorca: Daphnia mediterranea and Moina salina. New records in hyperhaline coastal marshes of Majorca, in accordance with the distribution of the semiarid zones in the islands. The presence of steppic species amongst the Iberian fauna may be due to the persistence since the Tertiary of appropriate conditions, despite the Quaternary climatic oscillations. On the other hand, more recent col-

onizations could have occurred as the result of passive migrations from dispersal areas situated in North Africa. The value of either hypothesis is difficult to measure precisely (Margalef, 1947, 1983; Alonso, 1985a; Jaume, 1989). In the case of the Balearic islands, the persisting Quaternary argument is hardly defensible in a preliminary consideration, mainly due to the inherent ecologic instability of small areas, such as limited areas inside the islands. This instability is derived from changes in the local hydrography due to the neotectonics, and is favoured by the climatic oscillations. The known biota could have arrived at the islands by means of the present active dispersal mechanisms thought to exist, as discussed by Jaume (1989) for Leptestheria mayeti in Majorca, and this can be extended to the minorcan population of this species, known from a tectonically emerging area in the north littoral.

Minorcan pools where the rarest species occur (the Ciutadella area), are placed on a stable western platform weakly affected by the neotectonics since the late Miocene (Bourrouilh, 1983). Here appears Branchinecta ferox, an extended but not frequent steppic species in the Western Palaearctic region, and Cyzicus buchetti, one locality in Sardinia and common in Morocco (Thiery, 1987), where it is found in the «dayas», mainly in the flats of the Atlantic region. Alona iberica, a recently described chydorid from Minorca and SW of Iberia, is also found in this area.

The hypothesis of ancient biota cannot be rejected a priori, since arguments concerning Balearic ecological aspects are also favourable. The arguments emerge from sedimentologic and paleontologic data. A synthesis on the Quaternary of the islands (Cuerda, 1975) shows that glacial periods, owing to the effect of glacioeustatic regressions, are registered along most of the coast by eolic dunes, sometimes intercalated with red soils. Although the age of these soils is yet uncertain, their formation requires the existence of a dry season, which is necessary to explain the reddening due to iron hydroxide that furnishes characteristic terra rossa soils. These eolic formations are known from probably the ancient Plioquaternary to the greater part of the Pleistocene. The geographic extension involved is not only that which is close to the littoral, but also includes far off inland areas. With respect to Minorca, this latter situation precisely
defines the stable Ciutadella region, mentioned here because of its outstanding steppic freshwater communities. This area had probably more continental characteristics before a great part of lands at the north disappeared in recent subsidence (BOURROUILH, 1983). Moreover, the disharmonic mammal composition of Majorca and Minorca during the Pleistocene, dominated by the Balearic dwarf goral (Myotragus spp.), expanding and evolving in the absence of mammal predators, must have aided the development of a particular landscape. Part of the hypothetic impact should concern local barren conditions and the consolidation of temporary pools, in some instances because of the effect of winds, which are considerable as shown by the presence of inland dunes. Similarly, connections between the appearance of the Balearic endemic flora and the evolution of the specific functional anatomy of the Myotragus have previously been pointed out by several authors (see ALCOVER et al., 1981). The fact that Myotragus ossiferous deposits are ubiquitous in Majorca and Minorca, and are not only located in mountainous areas, shows the possible extension involved. The progressive evolution of the Balearic dwarf goral over 6 million years is assumed by paleontologists to be in cause-effect relationship with the denudation of the vegetation due to successive demographic explosions, which at the same time created specific insular selection pressures to the isolated artiodactyles (op. cit.). If the phenomenon is admitted, its repercussion on the landscape, and particularly on the persistence of temporary ponds, must have been only a question of degree. According to all the arguments expressed here all the present steppic fauna is not necessarily a postglacial (holocenic) introduction. In other words, the point made is that recent colonizations are still not necessarily the only explanation to a part of the biotic composition of the isles. Some species, once more widely distributed, may have persisted under a local geologic stability due to weak neotectonics, and under assumed barren conditions originated by climatic events and the disharmonic vertebrate biota.

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RESUMEN

LISTA COMENTADA DE LOS BRANQUIÓPODOS BALEÁRICOS (CRUSTACEA)

Se presenta un catálogo de los branquiópodos encontrados hasta el presente en las Baleares con aportaciones inéditas. Se conocen en total 43 especies, de las cuales 9 son nuevas para el archipiélago: Daphnia mediterranea, D. atkinsoni, Moina brachiata, M. micrura, M. salina, Macrothrix hirsuticornis, M. laticornis, Bosmina longirostris y Alona affinis. El total de especies por islas es: 31 en Mallorca, 35 en Menorca, 11 en Eivissa y 6 Formentera. El significado corológico del poblamiento balear ha cambiado notablemente, por la existencia de un grupo de especies propio de territorios con clima marcadamente continental, árido o semiárido que aparece en el sur de Mallorca, y el oeste y litoral de Menorca. A grandes rasgos, este grupo de especies refleja con fidelidad la repartición de las áreas de mayor índice de aridez de las islas más extensas y heterogéneas. En las aguas salobres y salinas litorales de Mallorca aparecen especies descritas en las lagunas atafasohalinas continentales. Por otra parte, los embalses de Mallorca han sido colonizados por especies que son comunes en los embalses españoles.

Se discute el sentido biogeográfico de la riqueza insular en especies típicamente esteparias. La sugerencia de que puede haber persistido parte de la fauna de branquiópodos desde períodos preglaciales se sustenta por: 1) La presencia de especies raras, con disyunciones en sentido este-oeste, difícilmente explicadas por efecto de la ornitocoria, como el quidórido Alona iberica; o bien del conoestrácéo Cyzicus bucheti, presente en Cerdeña, pero más característico de los llanos. 2) La estabilidad neotectónica descrita sobre un área más o menos coincidente con las
localidades donde se registran las nuevas citas de eufilópodos y quidóridos cuyas distribuciones mundiales son más restringidas o disyuntas. 3) Las características sedimentarias del Cuaternario en parte del área insular, con areniscas eólicas intercaladas con carbonatos rojos, indicadores de aridez. 4) La trascendencia que el supuesto efecto de las vastaduras sobre la vegetación por parte de los rumiantes endémicos del Pliopleistoceno de las Baleares, exentos de depredadores importantes, pudo tener en el mantenimiento de los enclaves esteparios.

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