A limnological reconnaissance of the Falkland Islands; with particular reference to the waterfleas (Arthropoda: Anomopoda)

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Abstract
Forty-eight freshwater bodies on the Falkland Islands, including 33 lakes and pools, and 12 rivers and streams, were sampled for freshwater invertebrates. This study yielded 129 species of invertebrates (79 Rotifera, 34 Arthropoda, six Platyhelminthes, three Gastrotricha, two Nematoda, two Annelida, two Mollusca, and one Tardigrada) plus two fish species bringing the known Falkland Islands freshwater fauna to more than 170 species. While the presence of fishes, molluscs, amphipods, caddis larvae, waterboatmen, parasitic cercaria, and truly planktonic rotifers make the Falkland Islands fauna markedly richer than any subantarctic, or maritime Antarctic island, it is nevertheless sparse when compared with other temperate and tropical locations.

Keywords: Antarctic, Crustacea, Falkland Islands, freshwater fauna, Rotifera, Scotia Arc

Introduction
This paper describes a limnological survey of the South Atlantic Falkland Islands between 30 January and 10 March 1993. This represents the first “comprehensive” survey of the Falklands simply because many potential workers have been seduced away to the nearby and “more attractive” Antarctic and have made only perfunctory collections on their way through. Furthermore, some published reports are far from encouraging. The Falkland Island field guide (Strange 1992) makes no mention of freshwater invertebrates. The freshwater vegetation section states “although ponds are common to most areas, many appear sterile, supporting little or no animal life and devoid of any form of vegetation”; and although mention is made that “ponds associated with coastal greens and those fed by streams are more fertile, often supporting aquatic vegetation”, the fauna is not mentioned. These statements are at odds with the islands’ aquatic avifauna which includes an impressive list of ducks and waders, and at least two, possibly four, native fishes as well as an introduced species of trout that has successfully colonized many areas.
Whilst this survey can stand alone it also completes the final phase of a project to determine the freshwater fauna of the Scotia Arc islands linking the Antarctic Continent via the Antarctic Peninsula to South America.

The collection sites

The study was based around six primary locations: (1) in and around Stanley, (2) at Mount Pleasant, and (3) along Bodie Creek on East Falkland; at Sea Lion Island (4), on Pebble Island (5) and in and around Fox Bay (6) on West Falkland (Figure 1).

On Stanley Common a series of shallow (<15 cm deep) water bodies including a drainage “ditch”, a “puddle” and the “brown pond” were sampled with plunge-pots or hand nets. All these sites are within a short walking distance of the Agricultural Laboratory where the analysis was carried out. Additional collections were made from Moody Brook, the Felton Stream, and the “duck pond” overlooking Surf Bay alongside the road to Stanley Airport (Figure 2).

Four shallow ponds and a river were sampled at Mount Pleasant close to the road that runs westwards from Stanley to Darwin and Goose Green via Mount Pleasant international airport (Figure 3). The “pond” west of Gull Island Pond has a sandy bottom, and the “unnamed pond” on Fitzroy Ridge has a thin covering of brown mud over a hard bottom. The Swan Inlet River was sampled downstream of the road bridge.

Five ponds and two streams at Bodie Creek alongside the driving track running down from Goose Green to North Arm were sampled (Figure 4). The large and shallow ponds with a sandy or sandy/muddy bottom were sampled with plankton nets, while the <2 m wide and <40 cm deep streams were sampled with hand nets.
Sea Lion Island is the most isolated of the Falklands where samples were taken from the four shallow (<3 m deep) extant ponds (Figure 5). They are acidic (pH 4.9–6.8) and enriched by a variety of water birds.

Twelve water bodies on the eastern half of Pebble Island were sampled (Figure 6). These included one very small (only 8 cm deep and barely 30 cm²) rock pool on a cliff face close by a cormorant colony at Cape Tamar. All the other sampling locations are close to the sea,
indeed most of the lakes have outflow pools and streams that drain through the coastal sand dunes.

Six streams and eight lakes were sampled in and around Fox Bay on West Falkland (Figure 7). Here the principal objective was Lake Sulivan, the largest expanse of freshwater in the Falkland Islands comprising two substantial basins—North and South Lake Sulivan, separated by a low ridge. Although South Lake Sulivan is >6 km long, at the time of sampling it was barely 2 m deep. The lakes and streams at Fox Bay were sampled with plankton and hand nets.

Figure 4. Map showing the location of the collecting sites at Bodie Creek.
Materials and methods

Three different habitat-specific sampling methods were employed. In large lakes plankton nets (53 μm mesh) were thrown into deep water and allowed to sink before being slowly retrieved. In streams and vegetated areas hand nets (53 μm mesh) were swept through the
water and dense vegetation. In very shallow water or highly vegetated sites, plunge pots
(125 ml plastic bottles) were used either as scoops or hand-filled with aquatic plants.
Water pH was measured in the laboratory where samples were then concentrated by
filtration (20 µm mesh) and examined using dissection and compound microscopes.
Drawings were made from (1) live, free-swimming specimens held under slight
compression of a coverslip mounted on petroleum jelly, (2) specimens permanently
mounted in polyvinyl-lactophenol, and (3) preserved specimens. Selected specimens were
preserved in a formaldehyde-based preservative for subsequent specialist examination.

Figure 7. Map showing the location of the collecting sites round Fox Bay, West Falkland.
Results

Platyhelminthes

At least four species of freshwater flatworms (Turbellaria) were observed: (1) a common, eyed vermiform species with a short thin tail; (2) another eyed species without a tail, (possibly two species as those at Fox Bay were particularly large); (3) a small eyeless species (similar to Species No. 3 at South Georgia; Dartnall 2005a); and (4) a larger eyeless species, with a slightly bulbous head. In addition, two types of trematode cercariae were observed—one with a forked tail and one with a single tail. The life cycle of these parasitic flukes involves freshwater snails, fishes, and aquatic birds.

Gastrotricha

Three taxa were recognized: a scaly Leptoderma species; and two Chaetonotus species, including one “short-haired” and one “long-haired”. Although Gastrotrichs are uncommon, represented by only solitary specimens, they are probably ubiquitous.

Tardigrada

Tardigrades were surprisingly uncommon and only one species, a Dactylobiotus sp., was collected (S. McInnes, personal communication). Tardigrades usually occur in benthic sediments or on aquatic vegetation and the failure to secure large numbers of specimens or species may in part be explained by sampling techniques, though plankton nets similarly deployed at South Georgia (Dartnall 2005a) yielded six species from four genera.

Nematoda

Two morphotypes distinguished by size were recognized in the field: a small species with a whip-like action, a ?Monhystera sp., and much larger specimens, probably several genera. Those from Pebble Island have been identified as a Eutobrilus sp. (R. Maslen, personal communication).

Rotifera

Seventy-nine species of rotifer (73 Monogononta and six Bdelloidea) were recognized, all of which are new records for the Falkland Islands. Twenty-three (nearly a third) were represented by single specimens and a further 13 were only found at one of the six sampling regions. Only one species, Notholca squamula, was present at every collecting centre. Keratella heywoodi, a large planktonic rotifer that was also found on South Georgia, is new to science (Dartnall 2005b).

Annelida

A few oligochaete specimens, subsequently identified as Nais variabilis and N. communis (Erséus and Grimm 2002), were found at every sampling location except Sea Lion Island. Although both are common and cosmopolitan neither has been reported from the Falkland Islands before. Their precise Falkland distributions are unknown though Nais variabilis was the more common.
**Mollusca**

Two aquatic pulmonates were collected, *Chilina falklandica* and *Lymnaea diaphana*. Both are intermediate hosts for avian trematodes.

**Arthropoda**

Thirty-four species of arthropod were collected during this survey including 24 crustaceans, eight insects and two mites.

**Crustacea Anomopoda.** Thirteen species, including four new records for the Falkland Islands, were found of which only seven were positively identified in the field with the remaining six, all small cladoceran species, being consigned to two taxa. Thus in the tables the term “*Alona* sp.” may refer to any combination of *Alona affinis*, *A. guttata*, and *A. weinecki*, while “Chydorinae gen. sp.” may refer to any combination of *Chydorus sphaericus*, *Paralona pigra*, and *Pleuroxus scopuliferus*. Wherever these species are named in full they are confirmed as being present at that particular location.

**Alona affinis** (Leydig, 1860)

Several characteristics agree with the known morphology of the species: namely size 0.8 mm, valve height maximal in the middle; ocellus smaller than eye, labium with convex anterior margin; post-abdomen (Figure 8) broad, distally rounded, with 14–15 anal denticles, basal spine of post-abdominal claw with setae on concave margin. The position of the two main head pores clearly distinguishes *A. affinis* from the similar *A. quadrangularis*. This cosmopolitan species has recently been reported from the Falkland Islands (Brooks et al. 2005).

**Alona guttata** Sars, 1862

Vávra (1900) found this species near Stanley but gave no description of his specimens, only stating “Die mir vorliegenden Exemplare stimmen mit der genannten Art überein”. Smith...
and Sayers (1971) and Brooks et al. (2005) have also recorded this species from the Falkland Islands. Smirnov (1974) lists six subspecies, two of which are known from South America, namely *A. guttata tuberculata* whose valves and head are covered with pits, and *A. guttata guttata*, which is supposedly cosmopolitan. Our specimens were of average size, 0.45 mm (slightly larger than European specimens); valves with longitudinal lines; length:height = 1.5; antennules do not reach tip of rostrum; ocellus in the middle between tip of rostrum and eye, smaller than the latter; dorsal margin of post-abdomen variable, more curved than European specimens from Lake Dümmer, Germany (Hollwedel and Poltz 1985), 9–12 denticles with distally increasing length. Several of our specimens were noticeably different. They possessed a distally rounded post-abdomen and additionally bore two to three smaller denticles (Figure 9). These are referred to as *Alona* cf. *guttata*.

**Alona weinecki** Studer, 1878

Originally described from Kerguelen (Studer 1878), Rühe (1914) showed that Ekman’s (1905) Falkland Island record of *Alona bukobensis v. subantarctica* was in fact *A. weinecki*. Similarly, the records of *A. rectangula* from South Georgia and the South Orkney Islands (Dartnall and Heywood 1980) refer to *A. weinecki* (Paggi 1987; Frey 1988). It was then supposed that this species was restricted to the subantarctic islands, but Dumont and Martens (1996) have subsequently recorded it from Easter Island, and South Island, New Zealand. The morphology of the specimens examined in this study, especially the shape and armature of the post-abdomen (Figure 10) and size, 0.5 mm, corroborate that they do belong to this species.

**Bosmina (Neobosmina) chilensis** (Daday, 1902)

Vávra (1900) reported this species (as *Bosmina obtusirostris*) from a locality near Stanley. Deevey and Deevey (1971) and Korinek (1971) considered *B. chilensis* and *B. hagmanni* to be synonyms, but Paggi (1979) concluded that they are different species and documented separate distributions, and the occurrence of *B. chilensis* on the Falkland Islands. It is quite distinct from the other small anomopodans found there (Figure 11). The females averaged 0.6 mm. The position of the lateral head pore (Figure 12) and the serrations on the dorsal side of the mucro are morphological characteristics of the subgenus *Neobosmina* (Lieder 1983; U. Leider, personal communication).

Figure 9. *Alona* cf. *guttata*, female, post-abdomen. Scale bar: 0.5 mm.
Camptocercus aloniceps Ekman, 1900

Originally reported from Patagonia (Ekman 1900), this species has also been recorded from South Georgia (Pesta 1928; Dartnall 2005a) so its presence on the Falkland Islands is not surprising. Our female specimens (0.6 mm) conform with Ekman’s description exhibiting the main characteristics that separate C. aloniceps from the other congeners: head keel and denticles on the postero-ventral corner of the valve absent, dots between longitudinal lines of the valves, concave side of post-abdominal claw with a basal spine and a row of small spines with a long one nearly in the middle of the claw (Figure 13).

Figure 10. Alona weinecki, female, post-abdomen.

Figure 11. Bosmina (Neobosmina) chilensis, female.
Although *Ceriodaphnia dubia* is regarded as a cosmopolitan (Alonso 1996) or polytypic species (Flössner 2000), it has not been previously reported from the Falkland Islands nor indeed from any of the subantarctic islands. The species is closely related to *C. quadrangula*, with which it has often been confused (Flössner 1972).

Female: size of adults 0.7–0.85 mm, valves broad oval, head separated by deep notch, post-abdomen before anal teeth slightly concave. The distinctive feature is a row of small spines, one-third of which are longer, on the concave margin of the post-abdominal claw, visible under high magnification on most of our specimens. The specimens from Pebble Island represent a polymorph population, have a proximal pecten comprising 13–14 denticles twice the length of the spines and becoming shorter distally (Figure 14). The variability of this characteristic has been confirmed (D. Berner, personal communication).

Male: size 0.55 mm, valves dorsally not oval, posterior-dorsal angle pointed, antennulae rather long, post-abdomen similar to female, claw with setules, but no pecten.

*Chydorus sphaericus* (O. F. Müller, 1785)

This species is supposedly cosmopolitan (Smirnov 1996) but is most probably a species group. It has been recorded from the Falkland Islands (Vávra 1900; Ekman 1905) and from
several of the subantarctic islands (Frey 1993). Dartnall and Heywood (1980) recorded *C. sphaericoides* Sars, 1909 from the Falklands, a species name that Frey (1993) ascribed to *C. sphaericus*, whereas Smirnov (1996) believes it to be a synonym of *C. patagonicus* Ekman, 1900, a species recently reported from Macquarie Island (Dartnall et al. 2005). Our specimens are most probably *C. sphaericus* as suggested by the variable labral plate which in some specimens has an elongated and rounded tip, while in those from the Brown Pond are bent posteriorly. The post-abdomen is short and broad with 9–11 denticles, though two specimens from Moody Brook has 13 denticles. Ekman (1905) noted several similarities between the females of *C. sphaericus* and *C. patagonicus*. We did not find any males in the samples that would enable us to verify the diagnosis. Both *C. sphaericoides* and *C. sphaericus* have been reported from the Falkland Islands by Smith and Sayers (1971).

*Daphnia (Ctenodaphnia) dadayana* Paggi, 1999

*Daphnia dadayana* is restricted to non-tropical South America where it is regarded as endemic (Villalobos 1994), and has not been previously recorded from the Falkland Islands.

Adult female: 2.5–3.25 mm; valves oval with a depression between head and dorsal margin. The latter and posterior half of ventral margin with small denticles, the central third of inner ventral margin with a row of longer setae directed inward and posteriorly. Shell spine short or completely reduced. Head high, anterior rounded, ventral margin straight or slightly concave; rostrum pointed, antennulae do not reach the tip of rostrum; ocellus extremely small. First abdominal process double the length of the second, the former curved anteriorly and covered with setules, the latter curved posteriorly and thinly covered with setules, the third and fourth processes are small protruberances. Post-abdomen (Figure 15) long and broad, narrowing distally, dorsal margin slightly concave with 16–19 post-anal denticles, post-abdominal claw stout with two pectens, a proximal one with seven to nine smaller denticles, and a distal one with 9–12 longer denticles (Figure 16).

Juvenile female: ventral margin of valves broadly rounded, the whole length covered with denticles, dorsal margin straight, and denticulate, passing over a dorsally directed shell spine, nearly as long as body. Ventral margin of head equally convex, no rostrum, eye near
the margin, ocellus not visible; head bearing a rounded horn directed obliquely backward (Figure 17), as in Daday de Dées’s illustration (1902, Table 12, Figure 9) and Paggi’s drawing (1999, p. 32, Figure 45). Villalobos (1994) mentions that some of her juvenile specimens from South America have “a little helmet”. A similar horn seems to occur in other species. Rane (1986) describes and illustrates juveniles of *Daphnia sarojae* Rane with a helmet that is similar to the Falkland *D. dadayana*, but note that Sharma and Sharma (1990) believe *Daphnia sarojae* to be a helmeted morphotype of *D. lumholtsi*.

**Daphnia pulex** Leydig, 1860

Although Ekman (1905) emphasized the similarities between the specimens he found on the Falkland Islands with *Daphnia obtusa* from Tierra del Fuego by Vávra (1900), our specimens are definitely *D. pulex*, not *D. obtusa*. 

Figure 15. *Daphnia (Ctenodaphnia) dadayana*, female, post-abdomen.

Figure 16. *Daphnia (Ctenodaphnia) dadayana*, female, post-abdominal claw.
Female: 1.42–1.65 mm, valves broad and oval, dorsal and ventral margin with denticles, inner ventral margin without setae, shell spine short or absent, all juveniles with spines; ventral margin of head concave; antennulae do not reach tip of rostrum. Post-abdominal claw with a pecten of eight to nine denticles.

Juvenile male: 0.62–0.95 mm; anterior ventral margin with long spines; rostrum short; antennulae nearly as long as flagellum, not on a curved projection. Second abdominal projection relatively short, not reaching the root of abdominal setae; dorsal margin of post-abdomen straight as in *D. obtusa*. *Daphnia pulex* was reported from the Falkland Islands by both Smith and Sayers (1971) and Brooks et al. (2005). According to Benzie (2005) the occurrence of *D. pulex* in South America is doubtful, suggesting our specimens may belong to a different species. This needs clarification.

*Ilyocryptus brevidentatus* Ekman, 1905

Originally described from the Falkland Islands and South Georgia (Ekman 1905), this species has subsequently been recorded many times from South Georgia (Sars 1909; Dartnall and Heywood 1980; Hansson et al. 1996; Dartnall 2005a) as well as from the South Orkney Islands (Heywood 1967, 1970; Heywood et al. 1979; McInnes and Ellis-Evans 1990). Kotov et al. (2002) published a redescription of the species, recording it from the southern-most portion of Argentina and Chile. The specific name refers to the short denticles of the secondary armament of the post-anal section of the post-abdomen. In our specimens these denticles are slightly longer than those of both Ekman’s and Sars’ illustrations, with their tip reaching beyond the post-abdominal margin (Figure 18), as shown by Kotov et al. (2002, Figures 41–43). They are of different lengths, proximally four small ones curved proximally, followed by two groups of 5 + 3 long ones; between these and the post-abdominal claw is a row of setae. The preanal section of the post-abdomen bears 19 denticles; the first three proximal ones are somewhat longer, the next 11 are of medium size followed by five long ones, the last three of which are the shortest, post-anal portion with two short and seven long denticles. Adult females are 0.65 mm long. Although Verkhov (1993) states *I. brevidentatus* is an inhabitant of the southern circum-polar district, Green (1981) lists it from tropical South America.

![Figure 17. Daphnia (Ctenodaphnia) dadayana, juvenile, head with horn.](image-url)
Macrothrix hirsuticornis  Norman and Brady, 1867

Recorded from the Falkland Islands as M. ciliata by Vávra (1900), and M. propinqua by Ekman (1905) and Sars (1909). We regularly encountered juvenile and fertile females. Our specimens averaged 0.62 mm, a similar size to that reported by Vávra but only half that of specimens from German islands in the southern North Sea (Hollwedel and Scharf 1988). Ekman’s (1905) specimen range was 0.85–0.92 mm. Sars (1909) points out that his M. propinqua (1.14 mm) from South Georgia has less curved antennae which are “less densely hirsute”, with a smaller ocellus nearer to the tip of the rostral projection. Both characteristics are found in our specimens (Figure 19). Smirnov (1992) states that no other distinctive differences are known and claims that those “features correspond with the present-day understanding of M. hirsuticornis”. The late David Frey considered all Antarctic identifications of Macrothrix hirsuticornis to be dubious as this is a boreal northern hemisphere species. A. A. Kotov (personal communication) thinks that the Falkland Island

Figure 18. Ilyocryptus brevidentatus, female, post-abdomen.

Figure 19. Macrothrix hirsuticornis, female, antennae.
Macrothrix is Vávra’s M. ciliata, but it must be checked against Ekman’s Patagonian species M. oviformis to see which has priority as both species were described in 1900.

Paralona pigra (Sars, 1861)

This cosmopolitan species has been reported from the Falkland Islands (Brooks et al. 2005). It is identified by the long setae on the postero-ventral angle of the valves and the long denticles at the distal end of the post-abdomen (Figures 20, 21).

Pleuroxus scopuliferus Ekman, 1900

This species, described from South America (Ekman 1900), was only found on Pebble Island. Kotov and Gololobova (2005) found Ekman’s (1900) type material in the Swedish Museum of Natural History and selected the lectotype of P. scopuliferus. Thanks to Frey's

Figure 20. Paralona pigra, female, valve posterior-ventral angle with long setae.

Figure 21. Paralona pigra, female, post-abdomen.
(1993) study on *Pleuroxus* from the subantarctic islands we could easily identify our juvenile and parthenogenetic female specimens.

Female: 0.6 mm, brown colour, valve with ridge, one denticle at the postero-ventral angle, rostrum longer than labrum, tip of rostrum rounded, anal and post-anal segments of post-abdomen equally long (Figure 22), but both longer than pre-anal region, post-abdominal claw stout with two basal spines, the longer one nearly as long as width of claw, shorter one half as long.

*Copepoda*: we found three calanoid, and three cyclopoid copepods. The calanoids include *Parabroteas sarsi* and two *Boeckella* spp., *B. michaelseni* and *B. poppei*, which were familiar from earlier studies on South Georgia (Dartnall 2005a) and the South Orkney Islands (Heywood et al. 1979, 1980). *Parabroteas sarsi* is a powerful swimmer that can avoid plankton nets and is probably more widespread on the Falkland Islands than suggested here.

The specimens of *Boeckella poppei*, though “exceptionally variable so that one might suspect at least two species” are in fact conspecifics (Hessen et al. 1989; G. Boxshall, personal communication).

Two cyclopoid copepods were identified in the field. One of these, a stream-dwelling species from Fox Bay, thought to be *Tropocyclops meriodionalis*, is sometimes treated as a subspecies of *T. prasinus* (G. Boxshall, personal communication). The other cyclopoid was subsequently determined to be two species including a larger *Acanthocyclops michaelseni* and a smaller *Diacyclops* sp. possibly *D. (Acanthocyclops) mirnyi* (G. Boxshall, personal communication, who considers the original descriptions of both taxa inadequate and in need of revision).

*Harpacticoida*: a few small specimens were observed. These have been assigned to two (unidentified) Canthocamptidae one of which was also present at South Georgia (G. Boxshall, personal communication). *Attheyella trigonura* (Ekman) has been reported from the Falkland Islands (Ekman 1905; Pugh et al. 2002).

*Ostracoda*: only one species, *Newnhamia patagonica*, a new record for the Falkland Islands, was observed.

*Amphipoda*: freshwater amphipods were regularly encountered and were present at every location except Mount Pleasant. According to Stock and Platvoet (1991) four species are

![Figure 22. *Pleuroxus scopuliferus*, post-abdomen.](image-url)
known from the Falkland Islands. Both *Falklandella obtusa* Schellenberg and *Praefalklandella cuspidata* (Schellenberg) are eyeless, colourless species and may be emergent-subterranean species though the former has been found in Moody Brook (Stock and Platvoet 1991). There are also two eyed species, *Hyalella curvispina* Shoemaker and *Hyalella neomoma* Stock and Platvoet. All specimens found in this survey were brown and eyed and thus ascribed to the genus *Hyalella*.

*Hexapoda. Diptera:* unidentified specimens of a larval midge (Chironomidae) were regularly encountered from all locations except Sea Lion Island. A second species was recognized in the field from three Fox Bay locations. Weller (1975) recorded four families in his survey of Falkland Island ponds, while Brooks et al. (2005) consider there to be at least 15 species present from 12 taxa, though none were identified to species. These include carnivorous genera *Ablabesia*, *Macropelopia*, and *Apsectrotanypus; Parochlus, Podonomus, Podonomopsis*, and *Rheotanytarsus* from cool water, the blood worms *Chironomus, Phaenopsectra*, and *Parapsectrocladius*, along with two *Tanytarsini* spp. and three *Cricotopus*.

*Trichoptera:* two types of caddis fly larvae were recognized in the field: (1) those that make their protective tubes from reeds and other detritus pieces, and (2) a smaller larva with a transparent flattened cone-shaped tube, open at both ends. The reed-cased specimens comprise two *Magellomyia* spp., including *M. appendiculata* (Ulmer), with a uniformly coloured head and a slightly curved tube, and *Magellomyia stenoptera* Schmid, which has a banded head and straight tube. This distinction was not known at the time of the collection when specimens were pooled. The transparent-cased caddis is an *Oxyethira* spp. probably *O. bidentata* Mosely though both *O. andina* Kelley and/or *O. vipera* Kelley, known from southern Chile and Argentina, are also potential contenders (I. Wallace, P. Barnard and O. S. Flint Jr, personal communication). No caddis larvae were found on either Sea Lion or Pebble Islands.

*Coleoptera:* two species of diving beetle were found, *Lancetes falklandicus* and a much smaller bidessine (G. Foster, personal communication). Both are powerful swimmers able to avoid slowly trawled plankton nets but were collected in hand nets and are probably more widespread than indicated.

*Hemiptera:* unidentified specimens of waterboatman were observed at both Pebble Island and Fox Bay. These powerful swimmers can avoid nets and are probably more widespread than indicated. These records represent the first report of waterboatmen from the Falkland Islands.

*Chelicerata. Acarina:* only two specimens were found, in the Felton Stream near Stanley and in a stream by the Hawk’s Nest Shanty pond. They have been identified as *Soldanellonyx monardi* Walter and *Mucronothrus nasalis* (Willmann), both of which are “cosmopolitan” freshwater species (P. J. A. Pugh, personal communication).

*Vertebrata*

Two species of fish were found in this survey, the Falkland Island minnow *Galaxias maculates* (Jenyns) and the Falkland Island trout *Aplochiton zebra* Jenyns. Both are diadromous though landlocked populations are known (McDowall et al. 2001). Neither was particularly common and solitary individuals were usually obtained in hand net sweeps but were noticeably absent from the very small water bodies around Stanley and from Sea Lion Island.
Table I. Occurrence of the freshwater fauna in the ponds and streams near Stanley.

|         | puddle (pH 4.6) | Felton Stream (pH 4.8–5.5) | Moody Brook (pH 5.1–5.2) | brown pond (pH 6.3) | Duck pond (pH 6.5–6.7) | drainage ditch (pH 9) |
|---------|-----------------|-----------------------------|---------------------------|---------------------|-----------------------|----------------------|
| Platyhelminthes |                 |                             |                           |                     |                       |                      |
| No. 1—common eyed sp. with a short thin tail | –              | –                            | +                        | +                   | +                     | +                    |
| No. 3—eyeless sp. with bulbous head          | –              | +                            | –                        | –                   | –                     | –                    |
| Gastrotricha                                |                 |                             |                           |                     |                       |                      |
| *Chaetonotus* “long-haired” sp.             | –              | +                            | +                        | –                   | –                     | –                    |
| Nematoda                                    |                 |                             |                           |                     |                       |                      |
| *Monhystera* sp.                           | –              | +                            | +                        | –                   | –                     | –                    |
| Large nematode                              | –              | +                            | –                        | –                   | –                     | –                    |
| Rotifera                                    |                 |                             |                           |                     |                       |                      |
| Monogononta                                  |                 |                             |                           |                     |                       |                      |
| *Bryceela tenella* (Bryce)                  | –              | +                            | +                        | –                   | –                     | –                    |
| *Cephalodella auriculata* (O. F. Müller)    | –              | –                            | +                        | –                   | –                     | –                    |
| *Cephalodella delicata* Wulfert             | –              | –                            | –                        | –                   | –                     | –                    |
| *Cephalodella forficata* (Ehrenberg)        | –              | –                            | +                        | –                   | –                     | –                    |
| *Cephalodella forficula* (Ehrenberg)        | –              | +                            | –                        | –                   | –                     | –                    |
| *Cephalodella gibba* (Ehrenberg)            | –              | +                            | +                        | –                   | –                     | –                    |
| *Cephalodella mucronata* Harring and Myres  | –              | –                            | +                        | –                   | –                     | –                    |
| *Cephalodella* sp.                          | –              | –                            | +                        | –                   | –                     | –                    |
| *Collotheca edentata* (Collins)             | –              | –                            | +                        | –                   | –                     | –                    |
| *Collotheca gracilipes* Edmondson           | –              | –                            | +                        | –                   | –                     | –                    |
| *Colurella hindenbergi* Steinbeck            | –              | +                            | +                        | –                   | +                     | –                    |
| *Encentrum uncinatum* (Milne)               | –              | +                            | –                        | –                   | –                     | –                    |
| *Encentrum* sp. A                           | –              | –                            | +                        | –                   | –                     | –                    |
| *Eosphora najas* Ehrenberg                  | –              | –                            | –                        | –                   | –                     | –                    |
| *Epiphanes senta* (O. F. Müller)            | –              | –                            | –                        | +                   | –                     | –                    |
| *Euchlanis dilatata* Ehrenberg              | –              | –                            | –                        | +                   | –                     | –                    |
| *Euchlanis dilatata parva* Rousselet        | –              | –                            | +                        | –                   | –                     | –                    |
| *Gastropus minor* (Rousselet)               | –              | –                            | +                        | –                   | –                     | –                    |
| *Itura aurita* (Ehrenberg)                  | –              | –                            | –                        | +                   | –                     | –                    |
| *Lecane flexilis* (Gosse)                   | –              | –                            | –                        | +                   | –                     | –                    |
| *Lecane closterocerca* (Schmarda)           | –              | –                            | +                        | –                   | +                     | –                    |
| *Lecane lunaris* (Ehrenberg)                | –              | +                            | +                        | –                   | –                     | –                    |
| *Lepadella ovalis* (O. F. Müller)           | –              | –                            | –                        | +                   | –                     | –                    |
| *Lepadella patella* (O. F. Müller)          | –              | –                            | +                        | –                   | –                     | –                    |
|                              | puddle (pH 4.6) | Felton Stream (pH 4.8–5.5) | Moody Brook (pH 5.1–5.2) | brown pond (pH 6.3) | Duck pond (pH 6.5–6.7) | drainage ditch (pH 9) |
|------------------------------|-----------------|---------------------------|-------------------------|------------------|------------------------|----------------------|
| *Lepadella* sp.              | –               | –                         | –                       | +                | –                      | –                    |
| *Lindia torulosa* Dujardin  | –               | –                         | +                       | –                | +                      | –                    |
| *Monommata* sp.              | –               | –                         | +                       | –                | +                      | –                    |
| *Notholca labis* Gosse       | –               | +                         | –                       | –                | –                      | –                    |
| *Notholca squamula* (O. F. Müller) | +           | –                         | +                       | +                | –                      | +                    |
| *Notommata cyrtopus* Gosse   | –               | –                         | +                       | –                | –                      | –                    |
| *Parencentrum plicatum* Eyf  | –               | –                         | –                       | +                | –                      | –                    |
| *Pleosoma truncatum* (Levender) | –           | –                         | +                       | –                | –                      | –                    |
| *Proales* sp.                | –               | –                         | +                       | –                | –                      | –                    |
| *Squatina rostrum* (Schmarda) | –               | +                         | –                       | –                | –                      | –                    |
| *Trichocerca brachyura* (Gosse) | +            | –                         | +                       | –                | –                      | +                    |
| *Trichocerca longiseta* (Schrank) | –             | –                         | +                       | –                | –                      | –                    |
| *Trichoria tetractis* (Ehrenberg) | –           | –                         | +                       | –                | –                      | –                    |
| **Bdelloidea**               |                 |                           |                         |                  |                        |                      |
| *Adineta barbata* Jason      |                 |                           |                         |                  |                        |                      |
| *Philodina* sp. A            |                 |                           |                         |                  |                        |                      |
| *Rotaria* sp.                | –               | +                         | +                       | –                | –                      | –                    |
| **Unidentified bdelloid spp.** | +            | –                         | +                       | –                | –                      | +                    |
| **Annelida**                 |                 |                           |                         |                  |                        |                      |
| *Nais variabilis* Piguet and/or *N. communis* Piguet | –               | –                         | –                       | +                | –                      | –                    |
| **Arthropoda**               |                 |                           |                         |                  |                        |                      |
| **Crustacea**                |                 |                           |                         |                  |                        |                      |
| **Anomopoda**                |                 |                           |                         |                  |                        |                      |
| *Alona affinis* (Leydig)     | –               | –                         | +                       | –                | –                      | –                    |
| *Alona guttata* Sars         | –               | –                         | +                       | –                | –                      | +                    |
| *Alona* cf. *guttata*        | –               | –                         | –                       | +                | –                      | –                    |
| “*Alona* sp.”                | –               | –                         | +                       | +                | –                      | –                    |
| **Camptocercus aloniceps** Ekman | –             | –                         | –                       | +                | +                      | –                    |
| **Ceriodaphnia dubia** Richard | –             | –                         | –                       | +                | –                      | –                    |
| **Chydorus sphaericus** (O. F. Müller) | –         | +                         | +                       | +                | +                      | –                    |
| “**Chydornae gen. sp.”**     | +               | –                         | –                       | –                | –                      | +                    |
| **Daphnia dadayana** Paggi   | –               | +                         | –                       | +                | +                      | –                    |
| **Daphnia pulex** Leydig     | –               | –                         | +                       | +                | –                      | –                    |
| **Byocryptus brevidentatus** Ekman | –       | +                         | –                       | +                | +                      | –                    |
|                        | puddle (pH 4.6) | Felton Stream (pH 4.8–5.5) | Moody Brook (pH 5.1–5.2) | brown pond (pH 6.3) | Duck pond (pH 6.5–6.7) | drainage ditch (pH 9) |
|------------------------|----------------|----------------------------|--------------------------|----------------------|------------------------|----------------------|
| *Macrothrix hirsuticornis* Norman and Brady | + | + | – | + | + | + |
| *Paralona pigra* (Sars) | – | – | + | – | – | – |
| Cyclopoida              |               |                           |                          |                      |                        |                      |
| *Acanthocyclops michaelsoni* Mrázek and/or | + | + | + | + | + | + |
| *Diacyclops mirnyi* (Borutsky and Vinogradov) |               |                           |                          |                      |                        |                      |
| Calanoida               |               |                           |                          |                      |                        |                      |
| *Boeckella michaelseni* Mrázek | – | – | + | + | + | – |
| Nauplii                 | + | + | – | + | – | – |
| Harpacticoida           |               |                           |                          |                      |                        |                      |
| Canthocamptidae spp.    | – | + | + | + | – | – |
| Amphipoda               |               |                           |                          |                      |                        |                      |
| *Hyalella curvispina* Shoemaker and/or *Hyalella neomoma* Stock and Platvoet | – | – | – | – | + | – |
| Hexapoda                |               |                           |                          |                      |                        |                      |
| Coleoptera              |               |                           |                          |                      |                        |                      |
| *Lancastes falklandicus* Riha | – | – | + | – | + | – |
| Unidentified bidessine  | – | – | + | – | – | – |
| Trichoptera             |               |                           |                          |                      |                        |                      |
| *Magellomyia appendiculata* (Ulmer) and/or | + | – | + | – | – | + |
| *Magellomyia stenoptera* Schmid |               |                           |                          |                      |                        |                      |
| Diptera                 |               |                           |                          |                      |                        |                      |
| Midge larvae            | – | + | + | + | – | – |
| Chelicerata             |               |                           |                          |                      |                        |                      |
| Acarina                 |               |                           |                          |                      |                        |                      |
| Either *Soldanellonyx monardi* Walter or *Mucronothrus nasalis* (Willmann) | – | + | – | – | – | – |
| Mollusca                |               |                           |                          |                      |                        |                      |
| *Lymnea diaphana* King  | – | – | – | – | + | – |

Table I. (Continued).
Table II. Occurrence of the freshwater fauna in the small ponds and a river at Mount Pleasant.

|                        | Swan Inlet pond northerly one (pH 7.6) | Swan Inlet river (pH 6.2) | West of Gull Island pond (pH 8.1) | Gull Island pond (pH 6.9) | Fitzroy Ridge pond (pH 5.2) |
|------------------------|----------------------------------------|---------------------------|----------------------------------|--------------------------|-----------------------------|
| **Platyhelminthes**     |                                        |                           |                                  |                          |                             |
| No. 1—common eyed sp. with a short thin tail | -                          | +                         | -                                | -                        | -                           |
| **Tardigrada**          |                                        |                           |                                  |                          |                             |
| Dactylobiotus sp.       |                                        |                           |                                  |                          |                             |
| **Nematoda**            |                                        |                           |                                  |                          |                             |
| ?Monhystera sp.         |                                        |                           |                                  |                          |                             |
| Large nematode          |                                        |                           |                                  |                          |                             |
| **Rotifer**             |                                        |                           |                                  |                          |                             |
| **Monogononta**         |                                        |                           |                                  |                          |                             |
| Brachionus calyciflorus Pallas | +                                      | -                         | -                                | +                        | -                           |
| Brachionus calyciflorus anuraeiformis (Ehrenberg) | -                                      | -                         | +                                | -                        | -                           |
| Brachionus quadridentatus miribilis? (Daday) | -                                      | -                         | +                                | -                        | -                           |
| Cephalodella sp.        |                                        |                           |                                  |                          |                             |
| Collotheca ornata (Ehrenberg) | +                                     | -                         | +                                | +                        | -                           |
| Colurella hindenburgi Steinecke | +                                     | -                         | -                                | +                        | -                           |
| Eosphora najas Ehrenberg | -                                      | +                         | -                                | -                        | -                           |
| Euchlanis incisa Carlin | -                                      | +                         | -                                | -                        | -                           |
| Euchlanis meneta Myres  | -                                      | +                         | -                                | -                        | -                           |
| Filinia terminalis (Plate) | +                                      | -                         | +                                | +                        | -                           |
| Gastropus minor (Rousselet) | +                                      | +                         | -                                | -                        | -                           |
| Keratella cochlearis Gosse | +                                     | -                         | -                                | +                        | +                           |
| Keratella cochlearis tecta (Lauterborn) | -                                      | +                         | -                                | -                        | -                           |
| Keratella heywoodi Dartnall | -                                      | -                         | +                                | -                        | -                           |
| Lecane lunaris (Ehrenberg) | +                                      | -                         | +                                | -                        | -                           |
| Lecane flexilis (Gosse) | +                                      | +                         | -                                | +                        | +                           |
| Lepadella patella (O. F. Müller) | -                                      | -                         | +                                | -                        | -                           |
| Lepadella patella oblonga (Ehrenberg) | +                                      | -                         | +                                | +                        | -                           |
| Notholca labis (Gosse)  | -                                      | -                         | -                                | +                        | -                           |
| Notholca squamula (O. F. Müller) | -                                      | -                         | -                                | +                        | -                           |
| Notholca walterkostei de Paggi | +                                      | -                         | +                                | +                        | +                           |
| Synchaeta pectinata (Ehrenberg) | -                                      | -                         | +                                | -                        | -                           |
| Trichocerca brachyura (Gosse) | -                                      | -                         | +                                | -                        | -                           |
Table II. (Continued).

|                          | Swan Inlet pond northerly one (pH 7.6) | Swan Inlet river (pH 6.2) | West of Gull Island pond (pH 8.1) | Gull Island pond (pH 6.9) | Fitzroy Ridge pond (pH 5.2) |
|--------------------------|---------------------------------------|--------------------------|----------------------------------|--------------------------|-----------------------------|
| Trichocerca tigris (O. F. Müller) | -                                     | +                        | -                                | -                        | -                           |
| Bdelloidea               |                                       |                          |                                  |                          |                             |
| Unidentified bdelloid sp. | +                                     | -                        | -                                | -                        | -                           |
| Annelida                 |                                       |                          |                                  |                          |                             |
| Nais variabilis Pinguet and/or N. communis Pinguet | -                                     | +                        | -                                | +                        | -                           |
| Arthropoda               |                                       |                          |                                  |                          |                             |
| Crustacea                |                                       |                          |                                  |                          |                             |
| Anomopoda                |                                       |                          |                                  |                          |                             |
| “Alona sp.”              |                                       |                          |                                  |                          |                             |
| Bosmina (Neobosmina) chilensis (Daday) | +                                     | +                        | +                                | -                        | +                           |
| Chydorinae gen. sp.      |                                       |                          |                                  |                          |                             |
| Macrothrix hirsuticornis Norman and Brady | -                                     | -                        | +                                | -                        | +                           |
| Calanoida                |                                       |                          |                                  |                          |                             |
| Boeckella michaelseni (Mrázek) | +                                     | -                        | +                                | +                        | +                           |
| Boeckella poppei (Mrázek) |                                       |                          |                                  |                          |                             |
| Cyclopoida               |                                       |                          |                                  |                          |                             |
| Acanthocyclops michaelseni Mrázek and/or Diacyclops mirnyi (Borutsky and Vinogradov) | +                                     | -                        | -                                | +                        | -                           |
| Hexapoda                 |                                       |                          |                                  |                          |                             |
| Diptera                  |                                       |                          |                                  |                          |                             |
| Midge larvae             |                                       |                          |                                  |                          |                             |
| Trichoptera              |                                       |                          |                                  |                          |                             |
| Oxyethira bidentata? Mosely |                                       |                          |                                  |                          |                             |
### Table III. Occurrence of the freshwater fauna in the ponds and streams of Bodie Creek.

|                      | Cheroogs Pond (pH 8.1) | lake 2 (pH 8.2) | freshwater stream 1 (pH 8.2) | lake 4 (pH 8.5) | freshwater stream 2 (pH 7.2) | Bodie Creek South (pH 7.1) | Bodie Creek North (pH 7.3) |
|----------------------|------------------------|-----------------|-----------------------------|----------------|-----------------------------|---------------------------|---------------------------|
| **Platyhelminthes**  |                        |                 |                             |                |                             |                           |                           |
| **Turbellaria**      |                        |                 |                             |                |                             |                           |                           |
| No. 1—common eyed sp. with a short thin tail | – | + | + | – | + | – | – |
| **Trematoda**        |                        |                 |                             |                |                             |                           |                           |
| Cercaria with single tail | – | – | + | – | – | – | – |
| Cercaria with forked tail | – | – | + | – | + | – | – |
| **Gastrotricha**     |                        |                 |                             |                |                             |                           |                           |
| Chaetonotus “short-haired” sp. | – | – | + | – | + | – | – |
| Chaetonotus “long-haired” sp. | + | – | – | – | – | – | – |
| **Nematoda**         |                        |                 |                             |                |                             |                           |                           |
| Large nematode       | – | + | + | – | – | – | – |
| **Rotifera**         |                        |                 |                             |                |                             |                           |                           |
| **Monogononta**      |                        |                 |                             |                |                             |                           |                           |
| Asplanchna sieboldi (Leydig) | + | – | – | – | – | – | – |
| Coliotheca gracilipes Edmondson | – | – | – | – | – | – | + |
| Coliotheca ornata (Ehrenberg) | – | – | – | – | – | – | + |
| Euchlanis dilatata lucksiana (Hauer) | – | – | + | – | – | – | – |
| Filinia terminalis (Plate) | + | – | – | + | – | + | + |
| Keratella cochlearis Gosse | – | – | – | + | – | – | + |
| Keratella heywoodi Dartnall | – | – | – | – | – | + | + |
| Lecane clustrocerca (Schmarda) | – | – | + | – | – | – | – |
| Lecane lunaris (Ehrenberg) | – | – | + | – | + | – | – |
| Lepadella ovalis (O. F. Müller) | – | + | + | + | – | + | + |
| Lepadella sp.         | + | ? | ? | – | + | – | – |
| Monomantia sp.        | – | – | – | – | – | – | + |
| Notholca caudata Carlin | + | – | – | – | – | – | + |
| Notholca labis (Gosse) | + | – | – | – | – | + | – |
| Notholca squamula (O. F. Müller) | – | + | – | + | – | – | – |
| Proales daphnicola Thompson | – | – | – | – | – | – | + |
| Trichocerca brachyura (Gosse) | – | – | – | + | + | – | – |
| Trichocerca similis (Wierzejski) | + | – | – | – | – | – | + |
| Trichocerca tigris equal toes | – | – | – | – | – | – | – |
| Trichotria tetractis (Ehrenberg) | – | + | + | – | – | – | – |
| **Bdelloidea**       |                        |                 |                             |                |                             |                           |                           |
| Philodina sp. A      | – | + | – | – | – | – | – |
| Table III. (Continued). |
|-------------------------|
|                         | Cheroogs Pond (pH 8.1) | lake 2 (pH 8.2) | freshwater stream 1 (pH 8.2) | lake 4 (pH 8.5) | freshwater stream 2 (pH 7.2) | Bodie Creek South (pH 7.1) | Bodie Creek North (pH 7.3) |
| **Annelida**             |                         |                 |                             |                 |                             |                           |                           |
| *Nais variabilis* Pinguet and/or *N. communis* Piguet | – | – | + | – | – | – | – |
| **Arthropoda**           |                         |                 |                             |                 |                             |                           |                           |
| **Crustacea**            |                         |                 |                             |                 |                             |                           |                           |
| **Anomopoda**            |                         |                 |                             |                 |                             |                           |                           |
| *Alona guttata* Sars     | – | – | + | – | – | + | – |
| *Chydorus sphaericus* (O. F. Müller) | – | – | + | – | – | – | – |
| *Bosmina (Neobosmina) chilensis* (Daday) | + | – | – | – | – | – | – |
| *Daphnia dadayana* Paggi | – | – | – | – | – | + | + |
| **Cyclopoida**           |                         |                 |                             |                 |                             |                           |                           |
| *Acanthocyclops michaelseni* (Mrázek) and/or *Diacyclops mirnyi* (Borutsky and Vinogradov) | + | – | + | – | – | – | – |
| **Calanoida**            |                         |                 |                             |                 |                             |                           |                           |
| *Boeckella michaelesi* (Mrázek) | + | + | – | + | – | + | + |
| *Boeckella poppei* (Mrázek) | – | – | – | – | – | + | + |
| *Parabroteas sarsi* Daday de Dées | – | – | – | – | – | + | + |
| **Harpacticoida**        |                         |                 |                             |                 |                             |                           |                           |
| *Canthocamptidae* spp.  | + | – | – | + | + | – | – |
| **Ostracoda**            |                         |                 |                             |                 |                             |                           |                           |
| *Newnham patagonica* (Vavra) | – | + | – | – | – | – | – |
| **Amphipoda**            |                         |                 |                             |                 |                             |                           |                           |
| *Hyalella curvispina* Shoemaker and/or *Hyalella neomoma* Stock and Platvoet | – | + | – | + | – | + | + |
| **Hexapoda**             |                         |                 |                             |                 |                             |                           |                           |
| **Diptera**              |                         |                 |                             |                 |                             |                           |                           |
| Midge larvae             | + | – | – | + | + | – | – |
| **Trichoptera**          |                         |                 |                             |                 |                             |                           |                           |
| *Magellomyia appendiculata* (Ulmer) and/or *Magellomyia stenopecta* Schmid | – | – | + | – | – | – | – |
| **Mollusca**             |                         |                 |                             |                 |                             |                           |                           |
| *Chilina falklandica* Cooper and Preston | – | – | + | – | – | – | – |
| *Lymnaea diaphana* King | – | – | + | – | – | – | – |
| **Vertebrata**           |                         |                 |                             |                 |                             |                           |                           |
| *Aplochiton zebra* Jenyns | – | – | + | – | – | + | – |
Discussion

Locations

The occurrences of the various aquatic taxa found on the Falkland Islands are summarized in Tables I–VI. No real significance is attached to the observation that the streams and ponds around Stanley (Table I) contained a greater variety of rotifer species, as these sites were sampled most frequently and more intensely. The Moody Brook with its series of dammed pools was particularly productive in this context, being slightly acidic whilst lacking both predatory fish and arthropod competitors. This was confirmed at Duck Pond which was teeming with anomopodans virtually to the exclusion of the other groups. Small and temporary puddles, including the very alkaline roadside drainage ditch on Stanley Common, appear to be very poor habitats.

The fauna of the Mount Pleasant ponds and small river were all very similar (Table II), comprising ubiquitous species. Bodie Creek (Table III) was notable for the presence of two pulmonates and accompanying free-swimming cercaria. *Chilina falklandica*, which generally inhabits streams, is known to be a host for a forked-tailed cercaria so it is tempting to assign the straight-tailed cercaria to the other Falkland snail, *Lymnaea diaphana*. Both schistosome cercaria are likely avian parasites.

The small ponds on Sea Lion Island were shallow and appear ephemeral, which may explain their limited diversity (Table IV). Long Pond was the most productive with large numbers of anomopodans. Fishes, oligochaetes, gastropods, amphipods, corixidae, and dipteran larvae were notably absent and this may reflect the relative isolation of this island. Most major taxa (caddis flies excepted) are present in the larger and deeper ponds on Pebble Island (Table V) which supported large numbers of planktonic rotifers. The Cape Tamar rock-pool fauna was very limited, comprising a marine harpacticoid and two rotifer species including *Colurella colurus compressa* which is usually associated with brackish water.

Fox Bay harboured all major Falkland freshwater taxa but in low numbers (Table VI). Planktonic rotifers and crustaceans were scarce with both *Daphnia dadayana* and *D. pulex* notably absent. Clearly the West Falkland water bodies are less productive than their East Falkland counterparts.

Additional records

While 129 species of aquatic invertebrates and two species of fish were recorded in this survey, a number of additional species are known from the islands, including one hirudinean, six Mollusca, nine Crustacea, 16 insects (including the 15 diptera already mentioned), and possibly three species of fish. This is in addition to the two species of eyeless amphipods (Weller 1975; Stock and Platvoet 1991; Brooks et al. 2005).

These “missing” species include an unidentified leech and the anostracan *Branchinecta gaini* Daday (Weller 1975), and the amphipod *Orchestia scutigerula* Dana (Pugh et al. 2002) which occurs amongst tidal debris and may be a brackish water species. Six freshwater mollusca are known from the Falkland Islands including *Lymnaea brunneoflavida* Cooper and Preston, *L. patagonica* Strebel, *Lymnobulla peculiaris* (Hubendick), and *Hydrobia* sp. (Pulmonata: Gastropoda); and *Sphaerium vallentintianum* Melvill and Staden and *Pisidium* sp. (Bivalvia) (Pugh and Scott 2002; Brooks et al. 2005).

The 2001 Falkland Islands—Biodiversity Research in Lakes project (FI-BRIL) (Brooks et al. 2005) examined 28 lakes and streams on the two main islands. It focused on cladocerans (anomopodans), chironomids, and copepods and is complementary to our
Table IV. Occurrence of the freshwater fauna in the ponds on Sea Lion Island.

|                          | Beaver Pond (pH 5.1) | Tussock Pond (pH 4.9) | Long Pond (pH 6.8) | Small Pond (pH 5.5) |
|--------------------------|----------------------|-----------------------|-------------------|---------------------|
| Platyhelminthes          |                      |                       |                   |                     |
| Turbellaria              |                      |                       |                   |                     |
| No. 1—common eyed sp. with a short thin tail | – | – | + | – |
| Gastrotricha             |                      |                       |                   |                     |
| *Leptodera* “scaly” sp. | –                    | +                     | +                 | +                   |
| Tardigrada               |                      |                       |                   |                     |
| *Dactylobiotus* sp.      | –                    | –                     | +                 | –                   |
| Nematoda                 |                      |                       |                   |                     |
| ?*Monhystera* sp.        | –                    | +                     | –                 | –                   |
| Large nematode           | –                    | –                     | +                 | –                   |
| Rotifera                 |                      |                       |                   |                     |
| Monogononta              |                      |                       |                   |                     |
| *Cephalodella forficula* (Ehrenberg) | – | – | + | – |
| *Filinia terminalis* (Plate) | – | – | + | – |
| *Filinia terminalis kergueleniensis* Lair and Koste | – | – | + | – |
| *Keratella cochlearis* Gosse | + | – | + | + |
| *Keratella cochlearis robusta* (Lauterborn) | – | – | + | – |
| *Keratella haywoodi* Dartnall | – | – | + | – |
| *Notholca caudata* Carlin | + | – | + | – |
| *Notholca squamula* (O. F. Müller) | + | – | – | – |
| *Parencentrum plicatum* Eyf | – | – | + | – |
| *Trichocerca rattus globosa* Dartnall and Hollowday | + | – | + | – |
| *Trichocerca tigris* (O. F. Müller) | – | + | – | – |
| Bdelloidea               |                      |                       |                   |                     |
| Unidentified bdelloid sp. | – | – | + | – |
| Arthropoda               |                      |                       |                   |                     |
| Crustacea                |                      |                       |                   |                     |
| Anomopoda                |                      |                       |                   |                     |
| *Alona* weinecki Studer | – | – | – | + |
| *Bosmina* (Neobosmina) *chilensis* (Daday) | + | + | – | + |
| *Chyadorus sphaericus* (O. F. Müller) | + | + | – | – |
| *Daphnia* dadayana Paggi | + | + | + | + |
| *Ilyocryptus brevidentatus* Ekman | – | – | + | – |
| *Macrothrix hirsuticornis* Norman and Brady | – | – | + | – |
| Calanoida                |                      |                       |                   |                     |
| *Boeckella michaelseni* (Mrázek) | + | + | + | + |
| *Boeckella poppei* (Mrázek) | – | – | + | – |
| Cyclopoida               |                      |                       |                   |                     |
| *Acanthocyclops michaelseni* Mrázek and/or | + | – | – | + |
| *Diacyclops miryi* (Borutsky and Vinogradov) | + | – | – | + |
| Harpacticoida            |                      |                       |                   |                     |
| Canthocamptidae spp.     | +                    | +                     | +                 | +                   |
| Ostracoda                |                      |                       |                   |                     |
| *Neovhamia patagonica* (Vavra) | – | – | + | – |
| Amphipoda                |                      |                       |                   |                     |
| *Hyalella curvispina* Shoemaker and/or *Hyalella neomoma* Stock and Platvoet | – | – | + | + |
| Hexapoda                 |                      |                       |                   |                     |
| Coleoptera               |                      |                       |                   |                     |
| *Lancetes falklandicus* Řiha | – | – | + | – |
| Waterbody                          | stream between Big Pond and Long Pond (pH 5.9) | Long Pond (pH 6.3) | pool above second long pond (pH 6.5) | second long pond (pH 6.4) | outflow pool from second long pond (pH 7.8) | Quawk Pond (pH 6.8) | Betts Pond (pH 7.7) | Swan Pond (pH 9.4) | Green Pond (pH 9.7) | Cape Tamar rock pool (pH 7.6) |
|-----------------------------------|-----------------------------------------------|-------------------|-------------------------------------|--------------------------|---------------------------------------------|-------------------|-------------------|------------------|------------------|--------------------------|
| **Table V. Occurrence of the freshwater fauna in the ponds and streams of Pebble Island.** |                                               |                   |                                     |                          |                                             |                   |                   |                  |                  |                          |
| Platyhelminthes                   |                                               |                   |                                     |                          |                                             |                   |                   |                  |                  |                          |
| No. 1—common eyed sp. with a short thin tail | –                               | –                 | –                                   | +                        | –                                           | –                 | –                 | –                | –                | –                        |
| No. 2—larger eyed sp. no tail    | +                               | –                 | –                                   | –                        | –                                           | +                 | –                 | –                | –                | –                        |
| **Tardigrada**                   |                                               |                   |                                     |                          |                                             |                   |                   |                  |                  |                          |
| *Dactylobius* sp.                |                                               |                   |                                     |                          |                                             |                   |                   |                  |                  |                          |
| **Nematoda**                     |                                               |                   |                                     |                          |                                             |                   |                   |                  |                  |                          |
| Large nematode                   | –                               | –                 | +                                   | +                        | –                                           | –                 | +                 | –                | –                | +                        |
| **Rotifera**                     |                                               |                   |                                     |                          |                                             |                   |                   |                  |                  |                          |
| **Monogononta**                  |                                               |                   |                                     |                          |                                             |                   |                   |                  |                  |                          |
| *Asplanchna sieboldi* (Leydig)   | –                               | –                 | –                                   | –                        | –                                           | –                 | –                 | –                | –                | –                        |
| *Asplanchna silvestris* (Daday)  | –                               | +                 | –                                   | –                        | +                                           | –                 | –                 | –                | –                | –                        |
| *Brachionus calycifloris* Pallas | +                               | –                 | +                                   | –                        | –                                           | –                 | –                 | –                | –                | –                        |
| *Cephalodella catellina* (O. F. Müller) | –                               | –                 | –                                   | +                        | –                                           | –                 | –                 | –                | +                | –                        |
| *Colurella colorus compressa* Lucks | –                               | –                 | –                                   | –                        | +                                           | –                 | –                 | –                | –                | +                        |
| *Conochilus unicornis* Rousselet | –                               | –                 | –                                   | –                        | +                                           | –                 | –                 | –                | –                | –                        |
| *Encentrum* sp. B                | +                               | –                 | –                                   | –                        | –                                           | –                 | –                 | –                | –                | –                        |
| *Eosophora najas* Ehrenberg      | –                               | –                 | –                                   | –                        | +                                           | –                 | –                 | –                | –                | –                        |
| *Euchlanis incisa* Carlin        | +                               | –                 | –                                   | –                        | –                                           | +                 | –                 | –                | +                | –                        |
| *Filinia terminalis* (Plate)     | –                               | –                 | +                                   | +                        | +                                           | –                 | –                 | –                | –                | –                        |
| *Filinia terminalis kergueleniensis* Lair and Koste | +                               | –                 | –                                   | –                        | –                                           | –                 | –                 | –                | –                | –                        |
| *Gastropus minor* (Rousselet)    | –                               | –                 | +                                   | +                        | +                                           | –                 | –                 | –                | –                | –                        |
| *Itura aurita* (Ehrenberg)       | –                               | –                 | –                                   | –                        | +                                           | –                 | –                 | –                | –                | –                        |
| *Keratella cochlearis* Gosse     | –                               | –                 | –                                   | –                        | +                                           | –                 | –                 | –                | +                | –                        |
| *Keratella cochlearis tecta* (Lauterborn) | –                               | +                 | +                                   | +                        | +                                           | –                 | –                 | –                | –                | –                        |
| *Keratella heywoodi* Dartnall    | –                               | –                 | +                                   | –                        | +                                           | –                 | –                 | –                | –                | –                        |
| *Keratella tropica* (Apstein)    | +                               | –                 | –                                   | –                        | +                                           | +                 | –                 | –                | +                | –                        |
| *Lecane papuana* Murray          | –                               | –                 | +                                   | –                        | –                                           | –                 | –                 | –                | –                | –                        |
| *Lepadella patella* (O. F. Müller) | –                               | –                 | –                                   | –                        | +                                           | –                 | –                 | –                | –                | –                        |
| *Lepadella rhomboides* (Gosse)   | –                               | –                 | –                                   | –                        | +                                           | –                 | –                 | –                | –                | –                        |
### Table V. (Continued).

|                     | Little Pond (pH 8.3) | Big Pond (pH 7.2) | Long Pond and (pH 5.9) | Long Pond (pH 6.3) | Pool above second long pond (pH 6.5) | Second long pond (pH 6.4) | Outflow pool from second long pond (pH 7.8) | Quawk Pond (pH 6.8) | Betts Pond (pH 7.7) | Swan Pond (pH 9.4) | Green Pond (pH 9.7) | Cape Tamar rock pool (pH 7.6) |
|---------------------|----------------------|-------------------|------------------------|--------------------|--------------------------------------|--------------------------|---------------------------------------------|---------------------|-------------------|-------------------|-------------------|-------------------|
| **Lepadella triptera** (Ehrenberg) | -                    | -                 | -                      | -                  | -                                    | -                        | +                                                | -                   | -                 | -                 | -                 | -                 |
| **Mytilina mucronata** (O. F. Müller) | -                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Notholca labis** (Gosse) | -                    | -                 | +                      | -                  | +                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Notholca squamula** (O. F. Müller) | -                    | -                 | +                      | -                  | +                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Notholca walterkosteii de Paggi** | -                    | +                 | +                      | -                  | +                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Pleosoma truncatum** (Levander) | -                    | -                 | -                      | +                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Polyarthra dolichoptera** Idelson | -                    | +                 | -                      | +                  | +                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Pygura** sp. | -                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Synchaeta pectinata** (Ehrenberg) | -                    | -                 | -                      | +                  | +                                    | +                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Trichocerca brachyura** (Gosse) | -                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Trichocerca longiseta** (Schrank) | -                    | -                 | -                      | -                  | +                                    | -                        | -                                                | +                   | -                 | -                 | -                 | -                 |
| **Trichocerca similis** (Wierzejski) | -                    | -                 | -                      | +                  | +                                    | +                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Bdelloidea** | -                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Philodina** sp. | -                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Rotaria** sp. | -                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Annelida** | -                    | -                 | +                      | +                  | +                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Nais viriabilis** Pinguet and/or *N. communis* Piguet | -                    | -                 | +                      | +                  | +                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Arthropoda** | -                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Crustacea** | -                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Anomopoda** | -                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Alona guttata** Sars | -                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Alona cf. guttata** | -                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **“Alona sp.”** | -                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Bosmina (Neobosmina) chilensis** (Daday) | -                    | +                 | -                      | +                  | +                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Ceriodaphnia dubia** Richard | +                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Chydorus sphaericus** (O. F. Müller) | -                    | +                 | -                      | -                  | +                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Daphnia dadayana** Paggi | +                    | -                 | -                      | -                  | -                                    | -                        | -                                                | -                   | -                 | -                 | -                 | -                 |
| **Macrothrix hirsuticornis** Norman and Brady | -                    | -                 | -                      | +                  | -                                    | -                        | -                                                | +                   | +                 | -                 | -                 | -                 |
Table V. (Continued).

|                        | little pond (pH 8.3) | Big Pond (pH 7.2) | Long Pond and Long Pond (pH 5.9) | Long Pond (pH 6.3) | second long pond (pH 6.5) | second long pond (pH 6.4) | outflow pool from second long pond (pH 7.8) | Quawk Pond (pH 6.8) | Betts Pond (pH 7.7) | Swan Pond (pH 9.4) | Green Pond (pH 9.7) | Cape Tamar rock pool (pH 7.6) |
|------------------------|----------------------|-------------------|----------------------------------|-------------------|--------------------------|--------------------------|--------------------------------------------|-------------------|-------------------|------------------|------------------|-----------------------------|
| **Pleuroxus scopuliferus** Ekman | –                    | –                  | –                                | –                 | –                        | –                        | –                                           | –                 | +                 | –                | –                | +                           |
| **Calanoida**          |                      |                    |                                  |                   |                          |                          | +                                           | –                 | –                 | –                | –                | –                           |
| **Boeckella michaelseni** (Mrázek) | –                    | +                  | –                                | –                 | –                        | +                        | +                                           | +                 | –                 | –                | –                | –                           |
| **Boeckella poppei** (Mrázek) | +                    | –                  | –                                | –                 | –                        | +                        | –                                           | +                 | –                 | –                | –                | –                           |
| **Cyclopoida**         |                      |                    |                                  |                   |                          |                          | –                                           | –                 | –                 | –                | –                | –                           |
| *Acanthocyclops michaelseni* Mrázek and/or *Diacyclops mirnyi* (Borutsky and Vinogradov) | +                    | +                  | –                                | +                 | +                        | +                        | +                                           | –                 | –                 | –                | –                | +                           |
| **Harpacticoida**      |                      |                    |                                  |                   |                          |                          | –                                           | –                 | +                 | –                | +                | –                           |
| Canthocamptidae spp.   | –                    | –                  | –                                | +                 | +                        | –                        | –                                           | –                 | +                 | +                | +                | +                           |
| Marine harpacticoid    | –                    | –                  | +                                | –                 | –                        | +                        | –                                           | –                 | –                 | –                | +                | –                           |
| **Ostracoda**          |                      |                    |                                  |                   |                          |                          | +                                           | –                 | +                 | –                | –                | +                           |
| *Newnhamia patagonica* (Vavra) | +                    | –                  | –                                | –                 | –                        | –                        | +                                           | +                 | +                 | –                | –                | –                           |
| **Amphipoda**          |                      |                    |                                  |                   |                          |                          | +                                           | +                 | –                 | –                | –                | –                           |
| *Hyalella curvispina* Shoemaker and/or *Hyalella neomona* Stock and Platvoet | +                    | +                  | –                                | –                 | +                        | –                        | +                                           | –                 | –                 | –                | +                | –                           |
| **Hexapoda**           |                      |                    |                                  |                   |                          |                          | –                                           | –                 | +                 | –                | +                | –                           |
| **Coleoptera**         |                      |                    |                                  |                   |                          |                          | –                                           | –                 | –                 | –                | +                | –                           |
| *Lancetes falklandicus* Řiha | +                    | –                  | –                                | –                 | –                        | –                        | +                                           | –                 | –                 | –                | –                | +                           |
| **Hemiptera**          |                      |                    |                                  |                   |                          |                          | –                                           | +                 | –                 | +                | –                | –                           |
| **Water boatman**       | –                    | –                  | –                                | +                 | –                        | –                        | +                                           | +                 | –                 | +                | –                | +                           |
| **Diptera**            |                      |                    |                                  |                   |                          |                          | +                                           | –                 | +                 | +                | +                | +                           |
| *Midge larvae*         | –                    | –                  | +                                | –                 | –                        | +                        | –                                           | –                 | –                 | +                | –                | +                           |
| **Mollusca**           |                      |                    |                                  |                   |                          |                          | –                                           | –                 | +                 | –                | –                | +                           |
| *Lymnaea diaphana* King | –                    | +                  | –                                | +                 | +                        | –                        | –                                           | –                 | +                 | –                | –                | +                           |
| **Vertebrata**         |                      |                    |                                  |                   |                          |                          | –                                           | –                 | –                 | –                | –                | –                           |
| *Galaxias maculates* (Jenyns) | –                    | +                  | –                                | +                 | +                        | –                        | –                                           | –                 | –                 | –                | –                | –                           |
survey which also includes micro-invertebrates. Both surveys identified crustaceans, and while the copepods are essentially identical (FI-BRIL notes one calanoid copepod, Boeckella gracilipes Daday, in Lake Arthur which we did not sample), there is considerable disagreement over the anomopodans.

Although each survey recorded 13 anomopodans only six were common to both: Alona affinis, Alona guttata, Chydorus sphaericus (=Chydorus sp. in FI-BRIL list), Daphnia pulex, Macrothrix hirsuticornis (=Macrothrix ciliata) and Paralona pigra (=Chydorus piger). Notable FI-BRIL “absentees” include Alona weinecki, and Ilyocryptus brevidentatus, both of which have been previously reported from the Falkland Islands (Smith and Sayers 1971), and Bosmina chilensis, Ceriodaphnia dubia, and Daphnia dadayana, of which we found large numbers.

Likewise, we did not observe a number of FI-BRIL taxa including Bosmina longirostris, previously reported from the Falklands (Smith and Sayers 1971), Bosmina kessleri (Uljanin), Ceriodaphnia rotunda Sars, Daphnia longispina O. F. Müller, Eubosmina longispina Leydig, Leptodora kindti (Focke), and Kurzia latissima (O. F. Müller). These were a considerable surprise to us and while “several taxa were not identified confidently”, thereby leaving some room for taxonomic realignment, it is difficult to see how, for example, the large distinctive predator Leptodora kindti, can be questioned.

Brooks et al. (2005) suggested that some of their anomopodans had very limited distributions and indeed only four water bodies, Swan Inlet Pond, Bodie Creek, Lake Sullivan, and Hawk’s Nest Pond, were sampled by both surveys. This is clearly an area for further investigation. We suspect that many of these extra species have inadvertently been introduced with the brown trout and have subsequently become established on the island.

The review by Pugh et al. (2002) lists two species of anomopodans, Ceriodaphnia silvestrii Daday and Macrothrix laticornis (Fischer), and three copepods Acanthocyclops lobulosus (Ekman), A. skottsbergi Lindberg, and Boeckella vallentini (Scott) not found by either FI-BRIL or us that also require clarification. Other previously recorded species not found in this survey include two species of ostracod, Candonopsis falklandica Va´vra and Chlamydotheca symmetrica Va´vra (K. Martens, personal communication). Note that the FI-BRIL survey lists Candona spp. and other ostracods from non-acid environments (Simpson and Nolan 1994). McLellan (2001) described two species of stoneflies (Plecoptera) from the Falkland Islands, one Falklandoperla kelper McLellan, with an aquatic nymph, and an other which is probably terrestrial. The FI-BRIL survey also reported rare mosquito larvae and pupae, but no adults from Dan’s Shanty Pond, a small peaty pool on East Falkland. They also reported mayflies from near the Hawk’s Nest Pond (R. M. McDowell, personal communication) but consider they may have been imported on the sampling equipment.

Finally, three additional fish species, two native species and an introduced one, should be discussed. The pouched lamprey Geotria australis Gray has been recorded at sea to the south of the Falkland Islands (Potter et al. 1979), and although there has been one mainland sighting (Gorham 1977) it is considered to be marine. The record for the other native fish, Galaxias platei Steindachner, originally described as G. smithii (Regan 1905), is of questionable provenance (McDowell 2002). Finally the brown trout, Salmo trutta L., has been stocked in the Falkland Island lakes and rivers on a number of occasions since the 1940s and so must be included as part of the freshwater fauna even though it was not observed in this survey. This fish is now widespread, and specimens of <10 kg are known from major estuaries, which we did not sample.
Table VI. Occurrence of the freshwater fauna in the lakes and streams of Fox Bay, West Falkland.

|                          | Hawk's Nest pond (pH 8.3) | Hawk's Nest Stream (pH 7.8) | Sandy pond by Blue Mountain Stream (pH 7.0) | Home Flock Gate Stream (pH 7.0) | Doctor's Bottomless Pond (pH 7.6) | Sandy Mount Sullivan pond (pH 7.8) | Mount Sullivan Lake (pH 7.2) | Unnamed lake alongside Mt Sullivan Stream (pH 7.3) | Side pond alongside Malo Stream (pH 7.3) | Malo Stream (pH 8.1) |
|--------------------------|---------------------------|-----------------------------|---------------------------------------------|----------------------------------|-----------------------------------|-----------------------------------|---------------------------------|---------------------------------------------|---------------------------------------------|---------------------|
| Platyhelminthes          |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| Turbellaria              |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| No. 1                    | –                         | –                           | +                                            | –                                | –                                 | +                                 | –                               | +                                           | +                                           | +                   |
| No. 2                    | –                         | –                           | –                                            | –                                | –                                 | –                                 | –                               | –                                           | –                                           | +                   |
| No. 4                    | –                         | –                           | –                                            | –                                | –                                 | –                                 | –                               | –                                           | –                                           | –                   |
| Trematoda                |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| Cercaria                 |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| Gastrotrichia            |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| Leptodermia              |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| "scaly" sp.              |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| Tardigrada               |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| Dactylobiotus sp.        | –                         | –                           | –                                            | –                                | –                                 | –                                 | –                               | +                                           | +                                           | –                   |
| Nematoda                 |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| ?Monhystera sp.          | –                         | +                           | +                                            | –                                | –                                 | –                                 | –                               | +                                           | +                                           | –                   |
| Large nematode           | +                         | +                           | +                                            | –                                | –                                 | +                                 | –                               | +                                           | –                                           | +                   |
| Rotifera                 |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| Monogononta              |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| Brachionus               | –                         | –                           | +                                            | –                                | –                                 | –                                 | –                               | +                                           | –                                           | +                   |
| calyceiflorus Pallas     |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| Cephalodella             |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| forficata (Ehrenberg)    | –                         | +                           | –                                            | –                                | –                                 | –                                 | –                               | +                                           | –                                           | +                   |
| Cephalodella sp.         | –                         | +                           | –                                            | –                                | –                                 | –                                 | –                               | +                                           | –                                           | +                   |
| Collotheca ornata (Ehrenberg) | –     | –                          | –                                            | –                                | –                                 | –                                 | –                               | +                                           | –                                           | +                   |
| Conochilus               |                           |                             |                                             |                                  |                                   |                                   |                                 |                                             |                                             |                     |
| unicornis Rousselet      | –                         | –                           | –                                            | –                                | –                                 | –                                 | –                               | +                                           | +                                           | +                   |
| Eosphoras najas Ehrenberg | –                      | –                           | –                                            | –                                | –                                 | –                                 | –                               | +                                           | –                                           | –                   |
| Location                      | Hawk's Nest Pond (pH 8.3) | Hawk's Nest Stream (pH 7.8) | Stream by Bull Stream (pH 6.2) | Sandy Pond by Blue Mountain (pH 7.0) | Home Flock Gate Creek (pH 7.6) | Doctor's Bottomless Pond (pH 7.2) | Stream by sand Mount Sullivan (pH 7.8) | Stream by Lake Sullivan (pH 6.9) | Unnamed Lake alongside Mt Sullivan (pH 6.7) | Malo Stream side pond (pH 7.3) | Malo Stream (pH 8.1) |
|-------------------------------|---------------------------|----------------------------|-------------------------------|-------------------------------------|-------------------------------|-----------------------------------|--------------------------------------|----------------------------------|------------------------------------------|-------------------------------|-------------------|
| **Euchlanis dilatata**        | -                         | +                          | -                             | -                                   | -                             | +                                 | -                                    | -                                | -                                        | -                             | +                 |
| **Euchlanis incisa**          | -                         | +                          | -                             | +                                   | +                             | +                                 | +                                    | -                                | -                                        | -                             | +                 |
| **Euchlanis pyriformis**       | -                         | -                          | -                             | -                                   | -                             | +                                 | +                                    | -                                | -                                        | -                             | +                 |
| **Felinia terminalis**         | +                         | -                          | +                             | +                                   | -                             | -                                 | -                                    | +                                | +                                        | +                             | +                 |
| **Gastropus minor**           | -                         | -                          | +                             | -                                   | +                             | -                                 | +                                    | -                                | +                                        | +                             | +                 |
| **Keratella cochlearis**       | -                         | -                          | -                             | -                                   | -                             | -                                 | -                                    | +                                | -                                        | +                             | +                 |
| **Lecane flexilis**            | -                         | -                          | +                             | -                                   | -                             | -                                 | -                                    | -                                | +                                        | +                             | +                 |
| **Lecane closterocerca**       | +                         | -                          | -                             | -                                   | -                             | -                                 | +                                    | -                                | -                                        | +                             | -                 |
| **Lecane sp.**                 | +                         | -                          | -                             | -                                   | -                             | -                                 | -                                    | -                                | -                                        | -                             | -                 |
| **Lecane lunaris**             | -                         | -                          | +                             | -                                   | -                             | -                                 | -                                    | -                                | -                                        | +                             | -                 |
| **Lepadella ovalis**           | -                         | -                          | -                             | -                                   | +                             | -                                 | -                                    | -                                | -                                        | -                             | -                 |
| **Lepadella rhomboides**       | -                         | -                          | -                             | -                                   | -                             | +                                 | +                                    | -                                | -                                        | +                             | -                 |
Table VI. (Continued).

|                | Hawk's Nest pond (pH 8.3) | Hawk's Nest pond (pH 7.8) | pool adjacent to Bull Stream (pH 6.2) | Bull Stream (pH 7.0) | Sandy pond by Blue Mountain (pH 7.0) | Sandy pond by Blue Mountain (pH 7.6) | Home Flock Gate Pond (pH 7.2) | Doctor's Creek Pond (pH 7.9) | Bottomless Pond (pH 7.9) | Stream by sand pond (pH 7.8) | Stream by sand pond (pH 7.8) | Mount Sullivan Lake (pH 6.9) | Lake Sullivan (pH 6.2) | unnamed lake alongside Mt Sullivan (pH 6.7) | Malo Stream (pH 7.3) | Malo Stream (pH 8.1) |
|----------------|--------------------------|---------------------------|---------------------------------------|---------------------|-------------------------------------|--------------------------------------|-----------------------------|-----------------------------|----------------------|-----------------------------|-----------------------------|---------------------------|------------------|------------------------------------------------|------------------|------------------|
| Monommatidae   |                          |                           |                                       |                     |                                     |                                      |                             |                            |                      |                             |                             |                           |                  |                                                               |                  |                  |
| Notholca sp.   | –                        | +                         | –                                     | –                   | +                                   | –                                    | –                           | –                           | –                    | –                           | –                           | –                        | +                | –                                                            | –                |                  |
| +              | –                        | –                         | –                                     | –                   | +                                   | –                                    | –                           | –                           | –                    | –                           | –                           | +                        | –                | –                                                            | –                |                  |
| squamula (O. F. Müller) |              |                           |                                       |                     |                                     |                                      |                             |                            |                      |                             |                             |                           |                  |                                                               |                  |                  |
| Parencentrum plicatum Eyf | –             | –                         | +                                     | –                   | –                                   | –                                    | –                           | –                           | –                    | –                           | –                           | +                        | –                | –                                                            | –                |                  |
| Polyarthra delicoptera Idelson | –         | –                         | +                                     | –                   | +                                   | +                                    | –                           | –                           | –                    | –                           | –                           | +                        | +                | +                                                            | +                |                  |
| Synchaeta pectinata Ehrenberg | –          | –                         | +                                     | –                   | –                                   | –                                    | –                           | –                           | –                    | –                           | –                           | +                        | –                | –                                                            | –                |                  |
| Trichocerca brachyura (Gosse) | –          | +                         | –                                     | –                   | –                                   | –                                    | –                           | –                           | –                    | –                           | –                           | +                        | +                | +                                                            | +                |                  |
| Trichocerca longiseta (Schrank) | +          | –                         | –                                     | +                   | +                                   | +                                    | –                           | –                           | +                    | –                           | –                           | +                        | –                | –                                                            | –                |                  |
| Trichocerca similis (Wierzejski) | –          | –                         | +                                     | +                   | –                                   | –                                    | –                           | –                           | –                    | +                           | –                           | +                        | –                | –                                                            | –                |                  |
| Trichocerca tigris (O. F. Müller) | –          | –                         | +                                     | –                   | –                                   | –                                    | –                           | –                           | –                    | –                           | –                           | +                        | –                | –                                                            | –                |                  |
| Unidentified bdelloid spp. | –          | +                         | –                                     | –                   | –                                   | –                                    | –                           | –                           | –                    | –                           | +                           | +                        | –                | –                                                            | –                |                  |
| Annelida       |                          |                           |                                       |                     |                                     |                                      |                             |                            |                      |                             |                             |                           |                  |                                                               |                  |                  |
| Nais variabilis Piguet and/or N. communis Piguet | –          | +                         | –                                     | –                   | –                                   | +                                    | –                           | –                           | –                    | –                           | –                           | +                        | –                | –                                                            | –                |                  |
Table VI. (Continued).

| Arthropoda | Crustacea | Anomopoda |
|------------|-----------|-----------|
|            |           | Haw'Nest  |
|            |           | pond (pH 8.3) |
|            |           | Hawk's    |
|            |           | stream (pH 7.8) |
|            |           | Stream    |
|            |           | Bull      |
|            |           | Blue      |
|            |           | Mountain  |
|            |           | Flock     |
|            |           | Gate      |
|            |           | Doctor's  |
|            |           | Creek     |
|            |           | Bottomless|
|            |           | Pond      |
|            |           | stream by |
|            |           | stream    |
|            |           | Bull      |
|            |           | Stream    |
|            |           | Sandy     |
|            |           | Pond (pH 7.8) |
|            |           | Mount     |
|            |           | Sullivan  |
|            |           | Lake      |
|            |           | Sullivan  |
|            |           | Mt Sullivan|
|            |           | Malo      |
|            |           | Stream    |
|            |           | Sandy     |
|            |           | pond (pH 7.8) |
|            |           | Mount     |
|            |           | Sulivan   |
|            |           | Lake      |
|            |           | Sullivan  |
|            |           | Mt Sullivan|
|            |           | Malo      |
|            |           | Malo      |
|            |           | Stream    |
|            |           | Bottomless|
|            |           | Pond      |
|            |           | stream by |
|            |           | stream    |
|            |           | Bull      |
|            |           | Stream    |
|            |           | Sandy     |
|            |           | Pond (pH 7.8) |
|            |           | Mount     |
|            |           | Sullivan  |
|            |           | Lake      |
|            |           | Sullivan  |
|            |           | Mt Sullivan|
|            |           | Malo      |
|            |           | Malo      |
|            |           | Stream    |
| Arthropoda |
| Crustacea |
| Anomopoda |
| "Alona sp." |
| + |
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|                        | Hawk's Nest pond (pH 8.3) | Hawk's Nest stream (pH 7.8) | pool adjacent to Bull Stream (pH 6.2) | sandy pond by Bull Stream (pH 7.0) | large lake opposite Blue Mountain (pH 7.0) | Home Flock Gate (pH 7.6) | Doctor's Creek Pond (pH 7.2) | Bottomless Pond (pH 7.9) | stream by sand Mount Sullivan (pH 6.9) | stream Mount Sullivan (pH 6.2) | Lake Mt Sullivan (pH 6.7) | unnamed lake alongside Malo Stream (pH 7.3) | Malo Stream (pH 8.1) |
|-----------------------|---------------------------|-----------------------------|---------------------------------------|----------------------------------|------------------------------------------|-------------------------|---------------------------|--------------------------|----------------------------------------|--------------------------|---------------------------|------------------------------------------|-------------------------|
| **Cyclopoida**         |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| Acanthocyclops        |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| michaelesi            | +                         | +                           | +                                     | ?                                |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| Mrázek and/or          |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| Diacyclops mirnyi      |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| (Borutsky and Vinogradov) |                        |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| Tropocyclops          |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| prasinus Fisher        | –                         | +                           | –                                     | –                                |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| **Harpactoida**        |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| Canthocamptidae        |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| spp.                   | +                         | –                           | +                                     | +                                |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| **Amphipoda**          |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| Hyalella               |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| curvispina Shoemaker and/or Hyalella neomoma Stock and Platvoet |   |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
|                        | –                         | +                           | –                                     | –                                |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| Hexapoda               |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| Coleoptera             |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| Lancetes               |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| falklandicus Řiha      | –                         | –                           | –                                     | –                                |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| Hemiptera              |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| Water boatman          |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| Trichoptera            |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
| Magellomyia appendiculata (Ulmer) and/or Magellomyia stenoptera Schmid |                           |                             |                                       |                                  |                                          |                         |                           |                          |                                        |                          |                           |                                          |                         |
Table VI. (Continued).

|                        | Hawk's Nest pond (pH 8.3) | Hawk's Nest pond by Bull Stream (pH 7.8) | sandy pond by Blue Mountain Flock Gate (pH 7.0) | large lake opposite Doctor's Bottomless Creek Pond (pH 7.2) | Home stream by stream sand Mount Sullivan Pond (pH 7.8) | unnamed lake along side Malo Stream (pH 6.7) | side pond along side Malo Stream (pH 7.3) |
|------------------------|---------------------------|------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------|------------------------------------------|
| **Oxyethira bidentata Mosely** | -                         | -                                        | -                                             | +                                                            | +                                                          | -                                           | -                                        |
| **Diptera**            |                           |                                          |                                               |                                                              |                                                            |                                             |                                          |
| Midge larvae           | -                         | -                                        | -                                             | +                                                            | +                                                          | -                                           | +                                       |
| Other larvae           | -                         | -                                        | -                                             | -                                                            | +                                                          | +                                           | -                                        |
| **Chelicera**          |                           |                                          |                                               |                                                              |                                                            |                                             |                                          |
| Either                 | -                         | +                                        | -                                             | -                                                            | -                                                          | -                                           | -                                        |
| Soldanellonyx monardi Walter                            |                           |                                          |                                               |                                                              |                                                            |                                             |                                          |
| or Mucronothrus nasalis (Willmann)                      |                           |                                          |                                               |                                                              |                                                            |                                             |                                          |
| **Mollusca**           |                           |                                          |                                               |                                                              |                                                            |                                             |                                          |
| Lymnaea diaphana King                                        | +                         | -                                        | -                                             | -                                                            | -                                                          | +                                           | -                                        |
| **Vertebrata**         |                           |                                          |                                               |                                                              |                                                            |                                             |                                          |
| Galaxias maculates Jenyns                                     | -                         | -                                        | -                                             | -                                                            | +                                                          | +                                           | -                                        |

Limnological reconnaissance of the Falkland Islands
Cladoceran dispersal

Cladocera produce small resting eggs, which can be transported by wind and birds. In recent years passive dispersal may have been increased by tourism and military activities, as the ephippia can adhere to boots, clothes, and equipment and thus get into new water bodies. The Falkland Islands, which are only 600 km from South America, are inhabited by a number of common neotropical species including *Alona affinis*, *A. guttata*, *Ceriodaphnia dubia*, *Daphnia pulex*, and *Paralona pigra*, which do not occur on any of the south Atlantic islands. Only two neotropical species have been dispersed farther eastward, *Camptocercus aloniceps* to South Georgia, and *Ilyocryptus brevidentatus* to South Georgia and Signy Island, while three, *Bosmina chilensis*, *Daphnia dadayana*, and *Pleuroxus scopuliferus*, are restricted to the Falkland Islands and South America.

Most of our Falkland records relate to species originally described from Europe and are supposedly cosmopolitan. Further study, including detailed comparative anatomy and molecular methods, will be necessary to verify if these are truly cosmopolitan or part of larger species groups.

The Scotia Arc

This survey is the final phase of a long-term project that set out to determine the freshwater fauna of the Scotia Arc islands that link the Antarctic Continent via the Antarctic Peninsula to South America. Earlier investigations have shown a diversity decrease with increasing latitude (Dartnall and Heywood 1980; Dartnall 2005a), a trend noted in other non-marine invertebrates. The Falkland Islands’ fauna includes fishes, molluscs, hemipterans, amphipods, planktonic rotifers, and helminths that do not occur further south. The fauna lacks many insects with aquatic larvae including dragonflies and damselflies (Odonata), stoneflies (Plecoptera) and mayflies (Ephemeroptera), as well as amphibians and a wide range of fishes that typically occur in temperate and tropical freshwaters, reinforcing this premise.

The freshwater fauna of the Antarctic region is primarily benthic and planktonic species are generally uncommon (Dartnall 2005b). The Falkland Islands’ fauna includes a considerable number of planktonic rotifers including *Asplanchna*, *Brachionus*, *Filinia*, *Keratella*, *Polyarthra*, and *Synchaeta* spp. that are either absent or poorly represented further south. Parasitic species with their complicated life cycles are unknown in Antarctic and subantarctic freshwaters but two cercariae and a freshwater leech are present on the Falkland Islands. Of particular interest is the distribution of the copepod *Diacyclops mirni* which is absent on all of the Scotia Arc islands but present on the Antarctic continent, where it was originally described from the Bunger Hills (Borutski and Vinogradov 1957) and subsequently found in the Vestfold Hills (Korotkevich 1958; Borutski 1962; Dartnall 2000), and Larsemann Hills (Dartnall 1995).

Further surveys on the Falkland Islands will undoubtedly increase the species tally, particularly for tardigrades and nematodes, though both groups are poorly documented in Antarctic freshwaters. The Falkland fauna has greater affinities with that of South America than that of South Georgia and the islands of the Maritime Antarctic.

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