THE OCCURRENCE OF *ASELLUS COMMUNIS* SAY, 1818 (CRUSTACEA, ISOPODA) AT BOLAM LAKE, NORTHUMBERLAND

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INTRODUCTION

Unfamiliar specimens of a freshwater isopod were found at Bolam Lake (NGR: NZ(45) 080818) in Northumberland by D.W.Sutcliffe as early as 1962. These later proved to be the North American species *Asellus communis* Say, 1818 (Sutcliffe, 1972, Williams, 1972). Williams (1972) and Gledhill *et al.* (1993) describe and illustrate the species from material collected at Bolam Lake. Although the species has been studied in North America, little is known about its occurrence in Britain. Moon and Harding (1981) summarised the information on this species available at that time, but *A. communis* has probably not been recorded in Britain since the late 1960s (D.W.Sutcliffe, pers.comm.). In an attempt to re-find the species, we visited Bolam Lake Country Park during the course of the BMIG annual meeting at Durham in April 2005.

OCCURRENCE IN NORTH AMERICA

Asellus communis appears to be native and widespread in North America, with records from Canada (Nova Scotia, Ontario) and the USA (from West Virginia to Maine in the east, plus Colorado and Washington State) (Williams, 1970). In the same paper, Williams gives a detailed illustrated description of *A. communis* from North American material. Magnin and Leconte (1971, 1973) describe its life cycle in North America, and Kaushik and Hynes (1971) state that it feeds avidly on the decaying leaves of a range of broadleaved trees.

BOLAM LAKE

Origins

In common with many lakes in Northumberland, Bolam Lake is man-made. Beginning in 1816, Bolam Lake was created by deepening and damming a boggy area (Bolam Bog), which was fed by small streams and springs. Formerly part of Lord Decies' Bolam Estate, Bolam Lake Country Park has been owned and managed since 1972 by Northumberland County Council as an area for informal countryside recreation. The total area of the Country Park is some 40 hectares of which the lake and reedbeds are about 10 hectares, the remainder being woodland and grassland, with broad paths. The dam at the eastern end of the lake incorporates a spillway feeding the outfall stream, a tributary of the River Blyth.

Description

The geology underlying Bolam Lake is Carboniferous Limestone series, overlain with glacial drift and post-glacial downwash. The lake is shallow with a substrate of fine mud and decaying vegetation, especially leaves from woodlands surrounding the lake. Most of the banks of the lake are overhung by trees and shrubs, including oaks, alders and rhododendrons, except at the western end where there is a reedbed. Access to the lake shore is restricted by trees and shrubs, but at several points, such as around fishing piers and stands, the dam and a slipway near the Pheasant Field, access is possible to the shore and, from the piers, several metres out from the shore. The lake was included by Sutcliffe (1972) in his survey of the chemistry and fauna of water-bodies in Northumberland.

SURVEY (2ND APRIL 2005)

Bolam Lake

We (GMC & PTH) set out, in opposite directions around the lake, independently sampling with water nets at accessible points along the lake shore. GMC sampled mainly on the northern shore, PTH sampled around the dam and the eastern shore, and at the few accessible points along the southern shore. The shore at the western end was inaccessible, except for a fishing pier near the West Wood car park.

Specimens of *A. communis* were collected at several points, most plentifully in slightly deeper water (about 1 metre) with a fine gravel substrate, around the fishing pier in Low House Wood. Not all specimens seen were collected, but those that were all proved to be *A. communis*. Sutcliffe (1972) had noted that native species of *Asellus* (*A. aquaticus* and *A. meridianus*) were not recorded at Bolam Lake in the 1960s and we confirmed their apparent absence.

The habitat in which *A. communis* was collected was similar to that described by Sutcliffe (1972): in generally clear water with a substrate of mud or fine gravel and decaying leaves. Waterplants, such as Canadian waterweed (*Elodea canadensis*), another introduced North American species, were present but not abundant. Other fauna observed in samples included leeches, molluscs and amphipods, including *Crangonyx pseudogracilis*, a North American species that is now widespread in Britain and parts of Ireland.

Measurements

Because we were struck by the large size of the specimens of *A. communis* relative to typical specimens of *A. aquaticus* and *A. meridianus*, we measured the body length (head to telson, to nearest mm) of intact specimens (Table 1). *A. communis* is a distinctively large and 'floppy' looking species, unlike the normally smaller and more compact native species.

TABLE 1
Length measurements of intact specimens of *Asellus communis* from Bolam Lake.

	Male	Female (gravid)	Female (non-gravid)
Number of individuals	18	5	4
Lengths (mm): mean	11	8	7
minimum	8	7	5
maximum	15	10	9

Outfall stream from Bolam Lake

Water flows out of Bolam Lake over a spillway in the dam at the eastern end of the lake. This outflow enters a culvert under a road and emerges in a pasture field after some 50 m (NZ084818), to form a small stream running in a narrow channel through the field. This stream eventually joins Little How Burn, a minor tributary of the River Blythe. At the time of our visit, there was a fairly rapid flow of water through the culvert and ditch. One specimen of *A. communis* was captured in a net held over the outlet of the culvert into the ditch. Two more specimens were captured in the first 85m or so of the stream. We sampled this stream for some 300m further downstream, but no additional specimens were found. Approximately 4 km downstream from the Bolam Lake outfall, we sampled near the confluence of Little How Burn and How Burn, near East Whiteside Bridge (NZ803808 to NZ805807), but no specimens of *Asellus* species were seen.

Putative record from the Wirral, Cheshire

Subsequent to our visit to Bolam Lake we found another published record for *A. communis* in the UK, in the form of an online distribution map on the website of rECOrd, the biodiversity record centre for vice county 58 (http://www.consult-eco.ndirect.co.uk/lrc/). On investigation we learned that this record, together with records of *Dytiscus marginalis*, *Notonecta glauca*, and *Planorbis corneus*, had originated in a survey of Hooton Wood and Grassland, the Wirral (NGR: SJ(33)350788) on 11 August 1994. However, the recorder is reported not to have identified *Asellus* to species, so this record has been withdrawn (S.J.McWilliam via J.P.Guest, pers. comm.).

Importance as a non-native species

As a non-native species, established as a breeding population in Britain, the status of *A. communis* has attracted attention as a potentially invasive species. The species is listed in a reply to a parliamentary question regarding established breeding populations of non-native animals (*Hansard* for 14 December 1995: Written answers to questions, columns 722-723). It was classified in 2004 as having an *Unknown Impact* on native habitats and biota, under the Environment Agency's River Basin Classification Project, part of the Water Framework Directive Programme. The Joint Nature Conservancy Council, through the UK Biodiversity Research Advisory Group, included *A. communis* in a consultative list of non-native species, which considers the status and threats posed by non-native species. A recent report (Hill *et al.*, 2005) includes *A. communis* in the most comprehensive list of non-native species yet compiled for England. In the underlying database for this review, the data for *A. communis* were incomplete and the species was erroneously listed from the Lake District, but this error will be corrected in a subsequent version of the database (Mark Hill and Gavin Broad, pers. comm.)

DISCUSSION

Asellus communis is known to have been established in Bolam Lake, apparently as a self-maintaining population, since at least 1962. Other than in the nearest 100m of the small outflow stream from the lake, it is not known to occur anywhere else in Britain. How it arrived at Bolam Lake is unknown and why it has apparently not spread is a mystery. Although the park at Bolam Lake was not used as a military base during the 1939-45 war, it has been suggested that *A. communis* may have been introduced in association with the presence of American troops in the area west of Morpeth. However, we know of no evidence to support this suggestion.

It is particularly interesting that an introduced species: a) has been present at the same site for over 40 years (and possibly much longer); b) appears to be thriving and c) apparently has not spread to other sites. Possible explanations for the somewhat anomalous occurrence and survival of *A. communis* at Bolam Lake could be sought in the complex interaction of freshwater amphipods and isopods in waterbodies subject to organic pollution and levels of cyanide in waters, as reviewed by MacNeil *et al.* (1997). The water chemistry of Bolam Lake is clearly influenced by its surroundings, including the neutral/acidic soils of the catchment area and the heavy leaf fall of deciduous and evergreen trees and shrubs around the lake.

Interest in *A. communis* as an established non-native species has increased recently.
As Bolam Lake is used by anglers, it would be reasonable to expect that live specimens of *A. communis* could get caught-up in landing- and keep-nets and inadvertently be transported to other water-bodies. Although there is no evidence that this has happened, targeted surveys are needed of other popular lakes for coarse-angling in Northumberland and Durham, to search for this species. As angling at Bolam Lake is by permit only, it would theoretically be possible to trace the movements of individual anglers, from Bolam Lake to other water-bodies, thereby identifying waterbodies to be surveyed.

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