Notes

NITELLA GRACILIS (SMITH) AGARDH, AN ELUSIVE CHAROPHYTE NEW TO CARDIGANSHIRE (V.C. 46)

The Slender Stonewort (*Nitella gracilis*) is, globally, a very widespread species, recorded from every continent except Antarctica. At least in Europe, however, it is very sparsely scattered, with only a few localities recorded in each country. This is also true for Britain and Ireland where it has been recorded from just a few, widely scattered sites in Sussex, Essex, Cornwall, Gwynedd, Cumbria, Ayrshire, Sutherland and Co. Wicklow, and not in some of these for over 50 years (Stewart *in litt.)* It is consequently listed in the Stoneworts British and Irish Red Data Book (Stewart & Church 1992), and as a Priority Species in the UK Biodiversity Action Plan (UKBAP; Anon 1995).

The picture has, however, been complicated by a number of misidentifications, particularly for the similar – but more robust – *N. mucronata* (A. Braun) Miq. var. *gracillima* J. Groves & Bull.-Webst.; records from Hampshire, Greater London, Norfolk, Perth, and Co. Dublin are now thought to be doubtful or in error. This has confused the view of these species' ecology, since *Nitella mucronata* var. *gracillima* grows in mesotrophic to eutrophic waters whilst *N. gracilis* appears to be restricted to nutrient-poor water bodies, particularly in the uplands (cf. Stewart & Church 1992).

Most records of *Nitella gracilis* have been from chance captures by grapnels or rare jetsam specimens after stormy weather and many of its sites have only yielded one or two specimens – although this could be due to collecting difficulties, seasonal growth or transient colonisation. Even so, there are good indications that the species has also disappeared from some sites (Stewart *in litt.)* For all these reasons there is little published information about the ecology of *N. gracilis* in Britain and Ireland and this short note aims to add to the current understanding, and to encourage further surveys of likely habitats.

LLYN GYNON (V.C. 46)

At an altitude of 425 m in the Elenydd uplands of Ceredigion and straddling two hectads (SN76–86), Llyn Gynon is probably the richest lake in Cards (v.c. 46). Floating Water-plantain (*Luronium natans*) is locally abundant (Monteith, 1995), as has been Spring Quillwort (*Isoetes echinospora*) in the past, and there is a small colony of Six-stamened Waterwort (*Elatine hexandra*) towards the north-western inflow. In 1964 Brian Seddon also found Pillwort (*Pilularia globulifera*) here at a depth of about 45–60 cm, by grapnelling from a boat, but it has not been refound since, despite diligent grapnel hauls from shore and boat, searches by wading, and searches of driftline debris (A. Chater, pers. comm.).

Each of these species is nationally scarce; *Pilularia* and *Luronium* are priorities in the UKBAP and placed in the IUCN category "Vulnerable" in Europe and *Luronium* has statutory protection in national and international law (Schedule 8 of the Wildlife and Countryside Act; EC Habitats and Species Directive, Annexes IIb & IIv). As a consequence, the Countryside Council for Wales undertook a sample survey of the western side of the lake, on 25 September 1998, to map the distribution of important plant species and to search for deep-water colonies of *Pilularia*. The methodology followed from earlier, largely unpublished surveys for scarce aquatic macrophytes (Lomas *et al*. 1998; Scott 1996 & 1998), and included drysuits, snorkels and sub-aqua equipment.

The survey gave a detailed description of the distribution of *Luronium* and *Elatine* and of their associated species, but did not find any *Pilularia* or *Isoetes echinospora*. Between 1964 and 1989 *I. echinospora* was found abundantly in Llyn Gynon and it seems from these and other observations (A. Chater, pers. comm.) that populations of the species may be subject to sudden and rather mysterious fluctuations. Where *Isoetes lacustris* dominance declined (at about 2·5 m depth) and with occasional plants of *Myriophyllum alternifolium* and *Callitriche hamulata*, vegetative *L. natans* (forma *submersum*) became the most frequent deep-water species (Fig. 1). Individual

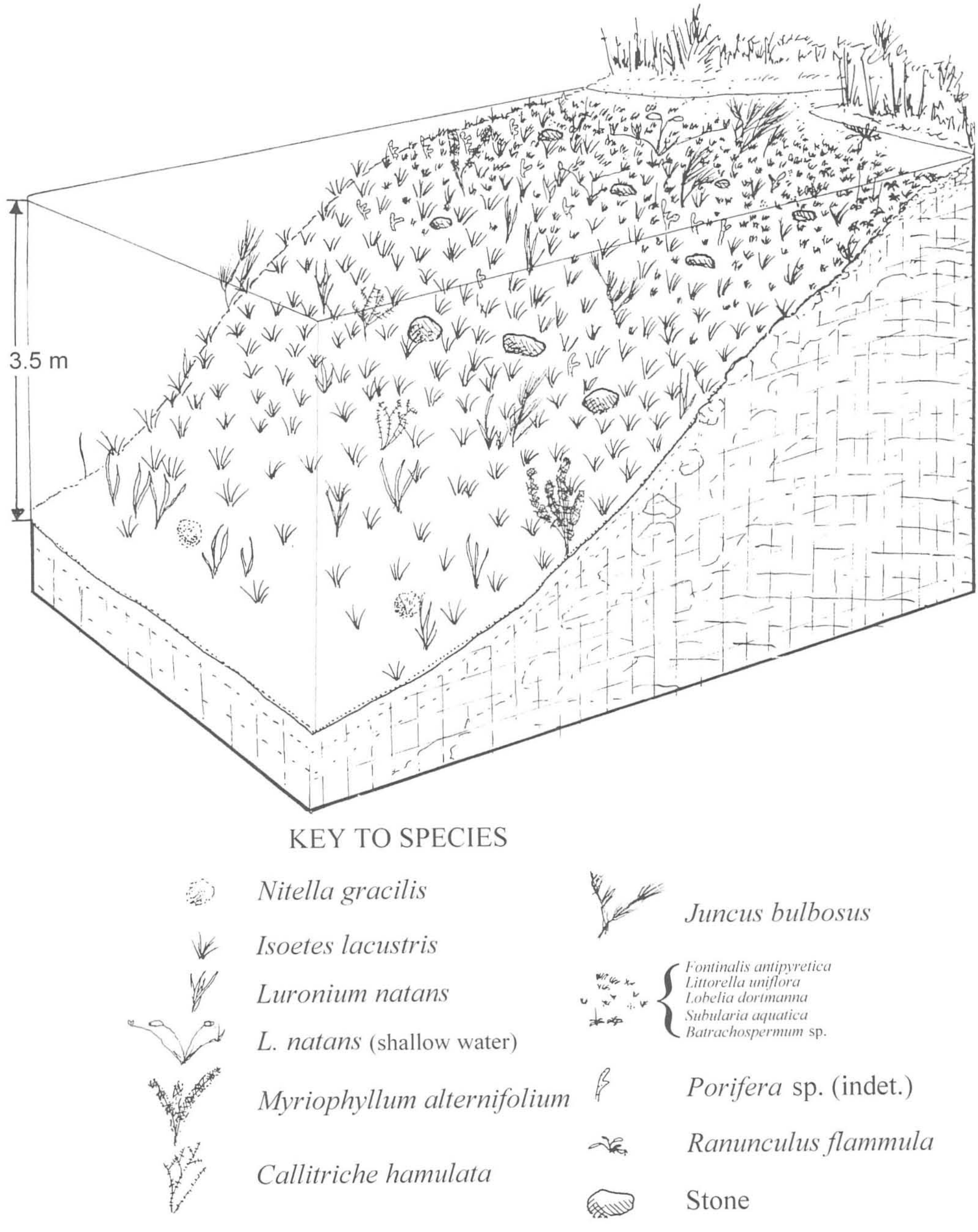

FIGURE 1. Llyn Gynon submerged vegetation. Diagrammatic section (western shore).

rosettes of *L. natans* with leaves 20–30 cm in length were scattered in deep, soft silt at a frequency of 4–10 plants per square metre.

It was this association which yielded occasional plants of a *Nitella* sp., subsequently determined by Arthur Chater & N.F.S as *N. gracilis*. Five plants were noted by R.A.J. in a sample of approximately 30 m of "fringe" vegetation along the western shore of Llyn Gynon, at c. 3·5 m depth. Individual plants were c. 30–40 cm across, domed in profile and, compared to the associated species, notably free of silt deposition. Of the branches from two plants collected for identification, both turned out to have well-formed, orange-coloured oogonia, and both broke up substantially within 24 hours of collection, although the tougher, peat-stained, lower branches on one plant seemed more resilient.

The location of *N. gracilis* in Llyn Gynon at 3·5 m depth on the western shore is distinctly sheltered, but it is not possible to generalise from this without further survey. Similarly, the fertility of plants so late in the year, their stained lower branches and absence of silt cover could all represent seasonal growth patterns (even, perhaps, perennation) but confirmation of this would require at least another visit. Other sources (e.g. John *et al.* 1982) have noted the value of charophytes as invertebrate habitat, and *N. gracilis* might be locally significant in some oligotrophic, acidic lakes for this reason. What can be concluded with confidence, however, is that surface-based methods of sampling (such as grapnel, grabs and bathyscopes) stand a low chance of detecting delicate species growing at such low density and at this depth and distance from the shore (see also Wade & Bowles 1981). This might also explain why attempts to relocate the plant by N.F.S. at its two other Welsh sites in Snowdonia (Llyn Dwythwch and Llynau Mymbyr) in October 1998 by shore grapnel surveys were unsuccessful (Stewart 1999). *Nitella gracilis* is likely to be an overlooked species of nutrient-poor, acidic lakes in Britain and Ireland and it will be located with certainty only by the use of trained divers.

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REFERENCES

ANON (1995). *Biodiversity: the UK Steering Group Report. Volume 2: Action plans.* H.M.S.O., London.

JOHN, D. M. , CHAMP, W. S. T. & MOORE, J. A. (1982). The changing status of Characeae in four marl lakes in the Irish Midlands. *Journal of life sciences of the Royal Dublin Society* **4**: 47–71.

LOMAS, E., TEEARU, T. & ROWLANDS, A. (1998). *Survey to determine the status of* Luronium natans *(L.) Raf. in a sample of six mid-Wales lakes.* Unpublished report to the Countryside Council for Wales, Bangor.

MONTEITH, D., ed. (1995). *Integrated classification and assessment of lakes: Phase II – Final report.* Unpublished report to the Countryside Council for Wales, Bangor.

SCOTT, S. (1996). *Action for Pillwort,* Pilularia globulifera. Unpublished report to Scottish Natural Heritage / Plantlife, London.

SCOTT, S. (1998). *Partnership project for Action Plan work on Pillwort,* Pilularia globulifera, *1997–2000.* Annual Report 1997–8. Unpublished report to Scottish Natural Heritage / Plantlife, London.

STEWART, N. F. & CHURCH, J. M. (1992). *Red data books of Britain & Ireland: Stoneworts.* Joint Nature Conservation Committee, Peterborough.

STEWART, N. F. (1999). *Welsh Stoneworts Survey 1998.* Unpublished report to the Countryside Council for Wales, Aberystwyth.

WADE, P. M. & BOWLES, F. (1981). A comparison of the efficiency of freshwater macrophyte surveys carried out from underwater with those from the shore or a boat. *Progress in underwater science* **6**: 7–11.

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COLONISATION BY *COCHLEARIA DANICA* L. ALONG TRUNK ROADS IN CENTRAL SCOTLAND FROM 1996 TO 2000

The spread of halophytes along motorways and trunk roads in England and Wales in the 1980s and early 1990s was widely observed (Scott & Davison 1985; Scott 1985; Leach & Rich 1989; Leach 1994). The factors causing and influencing this spread have been much debated (Leach 1990; Scott 1990; Roper 1994), but it is generally held that coastal roads were colonised first and the halophytes were then dispersed by vehicular traffic along roadside habitats made suitable by road-salting (Scott & Davison 1985). For *Cochlearia danica* (Danish scurvygrass), rates of advance of 10–20 km yr^{-1} were deduced by Leach (1994) from observations on first colonisation.

In Scotland *C. danica* became established on trunk roads much later than in England. The first record according to Leach (1994) was made in 1993 when plants were observed on the A74 in Dumfriesshire (v.c. 72). By this year much of the English motorway system had been colonised, and the species was absent inland in only six English vice-counties (Wight, E. Kent, E. Norfolk, Salop, Derbys, S.E. Yorks) (Leach 1994). As *Cochlearia danica* was frequent along the M6 through Cumberland (v.c. 70) in the early 1990s, it is very likely that the Dumfriesshire colony resulted from northward spread, rather than being a fresh colonisation from the nearby Solway coast. Similarly, the colonies of *C. danica* observed on the A1 in Berwickshire (v.c. 81) in 1993 (Braithwaite 1997) probably arose from dispersal northwards from colonies along the A1 in Northumberland (v.c.c. 67 and 68).

From the mid 1990s onwards, I have made 4–6 journeys each spring between N.W. England and N.E. Scotland using the M74/A74/M73/A80/M80/M9/A9/A90 roads up to Stonehaven (Fig. 1). In 1995 and 1996 *C. danica* became increasingly obvious on the M74 and A74, and I reported what appeared to be its northern limit in 1997 near Hamilton (Welch & Welch 1998), there being a

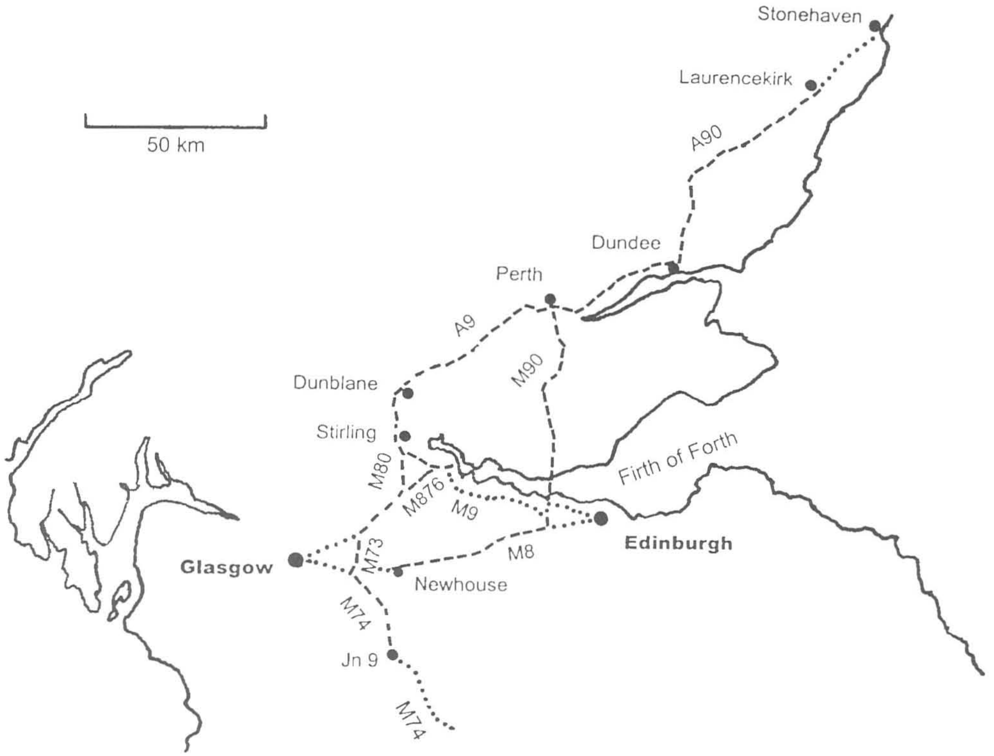

FIGURE 1. Map of Central Scotland, showing the trunk roads monitored (dashed) and other nearby trunk roads (dotted).

sizeable patch on the M74 central reservation by the Atlas Works close to Junction 9 (Table 1). From 1997 onwards I have carefully looked for *Cochlearia* along the whole route north of Junction 9 of the M74, but driving at an average speed of 60–70 mph it is inevitable that small plants and non-flowering colonies will have been missed. In 1997, 1999 and 2000 I also drove along the M90 between Perth and the Forth Bridge (Fig. 1), and in 2000 I made a single traverse of the M876/M9 triangle east of Stirling Services and the M8 from Newbridge to Newhouse.

TABLE 1. LOCATIONS AND SIZE OF COLONIES OF *COCHLEARIA DANICA* ON CENTRAL SCOTTISH TRUNK ROADS

Road	Place	Grid square	Vice county	1997	1998	1999	2000
A90	Laurencekirk	NO77	91	4 ptchs^{V}	-	c. 350 plts in 60 m^{V}	51 plts in 57 m^{V}
A90	Dundee Ring Road	NO33	90	x	x	x	1 patch
A90	1 km E Longforgan	NO33	89	x	x	x	1 patch
A90	1 km W Longforgan	NO22	89	x	1 patch	1 patch (20m long)	1 patch (35m long)
A90	nr Inchture Jn	NO22	89	x	x	x	2 ptchs
A90	nr Inchmichael Jn	NO22	89	x	x	1 patch	3 ptchs
A90	nr Leetown Jn	NO22	89	x	x	x	1 patch
A90	nr Inchyra Jn	NO12	89	x	few ptchs	x	x
M90	around J9	NO11	88	x	-	sev. ptchs	c. 250 m^{V}
M90	1 km N Jn 4	NT19	85	x	-	x	few ptchs^{V}
M90	1 km S Jn 3	NT18	85	x	-	x	1 patch
A90	just N of Forth Bridge	NT18	85	x	-	sev. ptchs	sev. ptchs
A9	nr Findo Gask Jn	NO01	88	x	x	few ptchs	few ptchs
A9	nr B9141 Jn	NN91	88	x	x	few ptchs	few ptchs
A9	Blackford bypass	NN90	87	x	x	x	2 ptchs
A9	3 km W Blackford	NN80	87	x	x	1 patch	1 patch (20 m long)
A9	5 km W Blackford	NN80	87	x	x	x	2 ptchs
M9	Jn 11–Jn10	NS79	87	x	x	few ptchs	occas.
M9	Jn10–Jn9	NS78,79	86	x	x	frequent	frequent
M9	Jn9–Jn7	NS88	86	-	-	-	occas.
M876	Jn8–Jn5	NS88	86	-	-	-	occas.
M876	Jn7–W of Jn3	NS88	86	-	-	-	occas.
M876	near Jn3	NS98	86	-	-	-	few ptchs
M80	Jn9–Jn5	NS88	86	x	x	frequent	frequent
M/A80	Jn5–Jn3	NS77	86	x	few ptchs	frequent	frequent
M73	Jn3–Jn1	NS76,77	77	x	frequent	occas.	occas.
M8	near Jn2	NN17	83	-	-	-	frequent
M8	W of Jn2–Jn3A	NN06,07	84	-	-	-	frequent
M8	Jn3A–Harthill Services	NS96	84	-	-	-	occas.
M74	Jn4–Jn5	NS66,75,76	77	x	x	few ptchs	few ptchs
M74	Jn5–Jn8	NS74,75	77	x	few ptchs	occas.	frequent
M74	Jn8–Jn9	NS74	77	x	few ptchs	occas.	occas.
M74	around Jn9	NS74	77	few ptchs	occas.	frequent	frequent

^{V} = on verge or hard shoulder; other colonies are on the central reservation; - = not searched; x = not seen; Jn = Junction; ptchs = patches; frequent = c. 10% of central reservation occupied; occas. = c. 1% of central reservation occupied; sev. patches = >5 patches observed; few patches = 2–5 patches observed.

The direct route between Junction 9 of the M74 and Laurencekirk on the A90 is 225 km long, and *C. danica* colonised most of this between 1996 and 2000 (Table 1). In 1998 and 1999 *Cochlearia* was much more frequent along the southernmost 80 km of this route up to Dunblane than on the next 80 km from Dunblane to Dundee, and its abundance on the M73 in 1998 suggested it had been overlooked there in 1997. However, Macpherson & Macpherson (1999), recording *C. danica* along Lanarkshire (v.c. 77) roads on a 1-km square basis, also made many new records in 1998, three of their total of 17 records being from the M73 and ten from the M74.

Important factors affecting the presence and visibility of *C. danica* along roads are the laying of gravel, the spraying of herbicides, and competition from dense grass swards. Fresh gravel laid along the M73 central reservation in 1996 or 1997 probably contributed to the abundance of *Cochlearia* there in 1998, whereas its apparent depletion in 1999 (Table 1) may have been related to grass and coarse plants spreading. Herbicide treatment along most of the route across central Scotland up to Dundee in spring 1999, which became obvious in mid May, much reduced grasses and weeds, but had only short-term impact on *C. danica* judging from its distribution and frequency in spring 2000.

It has been suggested that *C. danica* is actually introduced to inland roads in the gravel and hard core used in their construction (Coombe 1994; Lansdown & Pankhurst 1995), and this is a possible explanation for the phenomenal increase of the species in central Scotland. A pinky-red gravel has been placed in the central reservation on many sections of the M73, the A80, the M80, the M876, the M9 and the M90, and possibly this gravel contained *Cochlearia* seeds. However, I doubt this explanation because there are long sections of red gravel with no *Cochlearia* plants visible especially between Stirling and Dundee (Fig. 1). Also the colony on the M90 near the Inchyra junction (Table 1) was lost when a dressing of red gravel was laid in summer 1998 after the erection of a crash barrier.

The Laurencekirk colony of *C. danica* on the A90 at the far north of the monitored roads perhaps did not arise from colonisation produced by vehicles sweeping seeds along the carriageways. The four small patches observed in 1997 actually occurred on the nearside verges of the two carriageways about 3 km apart, and could have resulted from introduction in road-making materials besides transport on vehicles. Similarly, the colony of *C. danica* observed on a roadside at Flemington (v.c. 77) in 1989 (Macpherson & Macpherson 1999) would seem not to be part of the trunk-road invasion.

The potential rate of increase of *C. danica* was shown at the Laurencekirk colony between 1997 and 1999 (Table 1). Two patches of c. 400 cm^2 on the southbound verge in 1997 had become c. 350 scattered plants in 1999 over a 60 m section of verge extending 0–3 m from the road kerb. Some disturbance appears to have occurred, as some stiff red clay was exposed in spring 1999, perhaps from skimming during grass-cutting in the previous summers. However, drain digging during 1999 c. 4 m from the kerb, and intermittent parking, compacted the verge soil and damaged the plants, and by spring 2000 the colony was reduced to 51 plants along a 57 m length 0–2 m from the road kerb. Also, the two patches observed on the northbound verge could not be refound in 1999 or 2000, nor any plants of *Cochlearia* in the 200 m of verge around their position.

The rate of spread of *C. danica* across central Scotland, calculated on the basis of strong highly visual patches at the north ends of fairly continuous colonisation (Atlas Works on M74 in 1997, J10 on M9 in 1999), is 40 km yr^{-1}. This is considerably greater than Leach`s estimate of 10–20 km yr^{-1}, and perhaps the 1997 start point was actually further north than the Atlas Works. This would in turn mean an advance north up the A74/M74 from 1993 to 1997 at more than 20 km yr^{-1}.

Why *C. danica* was so slow to colonise Scottish motorways and trunk roads is puzzling. The suggestion that less salt was being used in Scotland than northern England in the 1980s (Scott 1985; Scott & Davison 1985) is unlikely, given the climate; the success of *C. danica* in the last few years indicates that roadside conditions had become very suitable by the 1990s. I believe that for successful colonisation the quantity of seeds being dispersed has to be great, which needs both large fruiting colonies and much traffic moving seeds along, and also the receiving habitat has to be extensive and fairly continuous. Probably other local establishments, like the Laurencekirk colony, have occurred unnoticed in Scotland, and have not produced enough seed for nearby suitable habitat to be colonised before becoming extinct due to grass competition, road works, herbicide treatment, etc. The great build-up of *C. danica* on the trunk roads leading into Scotland by the early 1990s, the increased traffic density compared to the 1980s, and the greater extent of suitable habitat in the central reservation (bare gravel now being preferred to grass because maintenance is easier), have combined to produce sufficient seed dispersal to create the present spectacular carpets of pale pink flowers across central Scotland in spring.

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REFERENCES

BRAITHWAITE, M. E. (1997). Maritime plants on roads in the Scottish Borders. *B.S.B.I. Scottish newsletter* **19**: 15.

COOMBE, D. E. (1994). "Maritime" plants of roads in Cambridgeshire (v.c. 29). *Nature in Cambridgeshire* **36**: 37–60.

LANSDOWN, R. & PANKHURST, T. (1995). Coastal gravel as a source of *Cochlearia danica* on inland roadsides. *BSBI news* **69**: 17–18.

LEACH, S. J. (1990). *Cochlearia danica* on inland roadsides. *BSBI news* **56**: 20–21.

LEACH, S. J. (1994). *Cochlearia danica* on inland roadsides – an update. *BSBI news* **65**: 12–13.

LEACH, S. J. & RICH, T. (1989). Scurvy-grasses take to the road. *BSBI news* **52**: 15–16.

MACPHERSON, P. & MACPHERSON, A. C. (1999). Danish scurvygrass – another seaside-roadside plant in Lanarkshire. *B.S.B.I. Scottish newsletter* **21**: 11.

ROPER, P. (1994). Motorway scurvygrass. *BSBI news* **65**: 13.

SCOTT, N. E. (1985). The updated distribution of maritime species on British roadsides. *Watsonia* **15**: 381–386.

SCOTT, N. E. (1990). *Cochlearia danica* on inland roadsides – source of seed? *BSBI news* **56**: 11–12.

SCOTT, N. E. & DAVISON, A. W. (1985). The distribution and ecology of coastal species on roadsides. *Vegetatio* **62**: 433–440.

WELCH, D. & WELCH, M. J. (1998). Colonisation by *Cochlearia officinalis* L. and other halophytes on the Aberdeen – Montrose main road in North-east Scotland. *Watsonia* **22**: 190–193.

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ALCHEMILLA GLAUCESCENS WALLR. IN V.C. 81 BERWICKSHIRE

Alchemilla glaucescens has its headquarters in Britain on the limestone of the Ingleborough district of Yorkshire but has small disjunct populations in Northern Scotland and Ireland. It is a Red Data Book species. Two populations have now been found in Berwickshire.

LAMBERTON

On 18 September 1999 M.E.B. was studying *Rosa* in scrub on the steep sea braes at Hilton Bay NT9659 within the Lamberton Coast S.S.S.I. An unexpected open area was reached which carries a limestone flora with several species of note. An interesting *Alchemilla* was collected in fruit, suspected to be *A. glaucescens*. The site was revisited by M.E.B. with P. S. Lusby on 16 October 1999 and again by M.E.B. on 1 May 2000 when the *Alchemilla* was in full flower. P. S. Lusby and Dr S. M. Walters confirmed the determination from the autumn plants, but with mild reservations. The spring growth allowed fresh specimens to be presented to P. S. Lusby whose reservations were dispelled.

The *Alchemilla* is closely associated with *Sanguisorba minor* subsp. *minor, Primula veris* and *Leontodon saxatilis*. The grassland is also notable for large populations of *Carlina vulgaris* and *Catapodium rigidum*. Other associates include *Anthyllis vulneraria*, *Carex flacca*, *Leontodon hispidus*, *Linum catharticum*, *Ononis repens* and *Viola hirta*. The *Alchemilla* certainly seems to be native, though, with the railway adjacent, introduction cannot be wholly discounted. The population is estimated at 500 plants.

The site has gradual erosion that keeps the vegetation open to some degree. The substratum of Hilton Bay is Carboniferous limestone and sandstone but there are also igneous porphyritic dykes near the site (Greig 1988).

Although the bay is secluded and not overgrazed there is one major threat. The very erosion that the existence of the vegetation community depends on is a threat to the main North-South railway nearby. British Rail (now Railtrack) have fairly recently carried out works to halt the erosion as much as possible. Concrete structures have been erected at the edge of the beach and plastic mesh has been dug into the slopes above. The concrete has holes in it and these have colonised splendidly with such species as *Carlina* and *Catapodium*. However, the area with the mesh is now covered by quite coarse vegetation and if any of the rarities were formerly present there they have probably been lost. It should be noted that large areas of the braes are not strongly calciferous and are covered naturally by coarse vegetation - indeed that is partly why these open communities have not been discovered before - it is not obvious that this is the most interesting part of the braes.

Adjacent coastline was searched for the plant on 27 September 1999, 16 October 1999 and 1 May 2000 but no further colonies have been found.

CHIRNSIDE

Alchemilla glaucescens had earlier been discovered by M.E.B. in 1982 in a disused railway cutting near Oldcastles, Chirnside, NT8558. It was described by him in 'The Botanist in Berwickshire', (Braithwaite & Long 1990), as growing "on ballast" and treated as an introduction. This statement is not accurate. The site was visited by M.E.B., P. F. Braithwaite and L. Gaskell on 6 June 1998. The *Alchemilla* grows on a bank that appears to be part of the original hillside and to have been preserved by being enclosed within the former railway fence. The cutting as such is below. The plants are not growing on ballast and there is no evidence of ballast being used in the drainage of that particular section of cutting. There is no reference to ballast in M.E.B.'s field notes in 1982. M.E.B. had found interesting communities on ballast-drained railway cuttings in Roxburghshire (Braithwaite 1976).

The *Alchemilla* is associated with depauperate base-rich grassland and is closely associated with *Trifolium medium*. Other associates are *Crepis capillaris, Fragaria vesca, Luzula multiflora, Primula vulgaris, Succisa pratensis and Vicia sativa* subsp. *nigra*. *Linum catharticum* and *Trisetum flavescens* were recorded in 1982. This site must now be reconsidered. The *Alchemilla* is in all probability native here also.

The *Alchemilla* population is healthy with about 100 plants, the determination of which has been checked by Dr S. M. Walters in 1982, and P. S. Lusby in 1999.

The substratum is "unusually coarse-grained red sandstone" of the Upper Old Red Sandstone (Greig 1988).

The vegetation is kept open by cattle grazing, which appears to be beneficial. Nevertheless the site is so small that the future of the *Alchemilla* is most doubtful.

DISCUSSION

The locally scarce limestone species with which the *Alchemilla* is associated at Hilton Bay can all be presumed to have reached the Scottish Borders by a fairly clear-cut path from the limestone areas of Northumberland where they are more frequent (Swan 1993). Some of them have other stations in the Scottish Borders on the Silurian and on the Old Red Sandstone where there are lime-rich pockets. There is no reason why the *Alchemilla* should not have colonised by a similar route but, if so, no ready explanation can be offered as to why it is not found between Berwickshire and the Ingleborough area today. It seems therefore as likely that it is a chance introduction in the distant past, perhaps by bird-borne seed from Scandinavia, as the site is very much on a bird migration route. However, *Tofieldia pusilla* was found near Berwick by John Ray in 1671 (Ray 1677), probably within two km of the Hilton Bay site, and it is possible that the former moorland of this area held, in limestone pockets, refugia for a specialised post-glacial community that included the *Alchemilla* and *Tofieldia*.

REFERENCES

BRAITHWAITE, M. E. (1976) *A Railway Flora of Teviotdale*. Hawick

BRAITHWAITE, M. E. & LONG, D. G. (1990) *The Botanist in Berwickshire.* The Berwickshire Naturalists Club, Buccleuch Printers, Hawick.

GREIG, D. C. (1988) *Geology of the Eyemouth District*. British Geological Survey, H.M.S.O. London.
RAY, J. (1677) *Catalogus Plantarum Angliae* (2nd ed.). London.
SWAN, G. A. (1993) *Flora of Northumberland*. The Natural History Society of Northumberland, Newcastle upon Tyne.

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GERANIUM ROBERTIANUM L. VAR. *MARITIMUM* (GERANIACEAE): AN EARLIER AUTHOR

For a century and a half the authorship of this name for the prostrate and often glabrous coastal ecotype of *G. robertianum* has been attributed to Babington, who first published it in the third edition (1851) of his *Manual of British botany*. It has, however, been overlooked that the same epithet was validly published for the very same plant by Cooper (1834), whose authorship has priority.

Cooper cited only the one locality: Cockbush Common, Shoreham (W. Sussex, v.c. 13). There is a specimen of the plant in **CGE** collected at Cockbush Common the previous year by G. E. Smith, by whom and, even more, Borrer (the two leading Sussex botanists of that period) the inexperienced Cooper was provided with most of the localised records that featured in his list – a fact which Cooper concealed from the public, to the lasting indignation of Borrer (1851; Allen 1979). It is thus probable that the name was a manuscript one already in use by one or other of those two. Babington may well have been apprised of it later by Borrer, who may by then have forgotten (or wanted to forget) that it had appeared in print already.

Baker (1956) considered that the rather distinctive plant at Shoreham (which was also the type locality of Babington's taxon) represented just one extreme in a cline of hairiness, allowing all the prostrate plants of shingle beaches to be grouped together under a single name. Because these have a wide geographical distribution and he had detected in cultivation a physiological difference in addition to a loose cluster of external characters, he felt justified in promoting the variety to subspecific rank. In this he has been followed by subsequent authors, though it might perhaps be questioned whether an ecotype with, as pointed out by Stace (1991), only one constant external character really merits such an elevated rank.

REFERENCES

ALLEN, D. E. (1979). The plagiarisms of Thomas Henry Cooper. *Journal of the Society for the Bibliography of Natural History* **9**: 275–279.
BAKER, H. G. (1956). *Geranium purpureum* Vill. and *G. robertianum* L. in the British flora. II. *Geranium robertianum. Watsonia* **3**: 270–279.
BORRER, W. (1851). Botanical memoranda. *Botanical gazette* **3**: 98.
COOPER, T. H. (1834). *The botany of the county of Sussex.* Sussex Press, Lewes. (Preprint of Cooper in HORSFIELD, T. W. (1835). *The history, antiquities and topography of the county of Sussex*, **2**: 5–22).
STACE, C. A. (1991). *New Flora of the British Isles.* Cambridge University Press, Cambridge.

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EPILOBIUM × *KITCHENERI* McKEAN (ONAGRACEAE) IN EAST CORNWALL

The hybrid between *Epilobium pedunculare* A. Cunn. and *E. montanum* L. has hitherto been reported only as a single plant found in West Perth (v.c. 87) in 1996, from which it was named as *E.* × *kitcheneri* by McKean (1999). This is the sole report from the British Isles of a hybrid involving the alien Rockery Willowherb *E. pedunculare* from New Zealand, which is only locally established in the wild in the British Isles, whereas the Broad-leaved Willowherb *E. montanum* is a widespread native plant that forms hybrids with numerous congeners (Stace 1997; Kitchener & McKean 1998).

In 1996 Mary and Tony Atkinson discovered that *E. pedunculare* was naturalised in abundance alongside tracks through Hancock's Wood, a coniferous plantation on the northern side of the Glynn Valley, East Cornwall (v.c. 2) (Murphy 1998). During 1999 we searched independently for possible hybrid *Epilobium* in the vicinity of the naturalised *E. pedunculare* in the Glynn Valley. These searches resulted in the discovery of two plants of *E.* × *kitcheneri*, providing the second and third records for this hybrid and the first reports of it outside Scotland.

The first find of the hybrid in East Cornwall was made on 9 July 1999 by D.T.H., in woodland north-east of Trago Mills, grid reference SX182648; specimen in **herb. D.T.H.** The single plant was growing on the rocky edge of a track in a coniferous plantation, close to *E. ciliatum* Raf., *E. montanum*, *E. obscurum* Schreb. and *E. pedunculare*, the last of these species being naturalised along c. 150 m of the track edges. The hybrid had two main stems, the longest of them 28 cm tall and stiffly erect above its procumbent base, the other stem 27 cm tall with two shorter branches, both stem and branches being erect throughout. The specimen accords well with the Scottish type material of *E.* × *kitcheneri* in having leaf shape midway between the orbicular leaves of *E. pedunculare* and the ovate leaves of *E. montanum*, the influence of *E. pedunculare* apparent in strongly toothed leaf margins and the leaves bronzed on the underside, and the influence of *E. montanum* apparent in the presence of a shallowly four-lobed stigma.

The second find of the hybrid in East Cornwall was made a month later, at Hancock's Wood just over 1 km away (SX171649). It was found by Ian Bennallick in company with Mary and Tony Atkinson and G.D.K. The hybrid plant was also found at the edge of a woodland track with the same *Epilobium* associates as the first find. It consisted of three closely associated, separately rooted stems, 41 cm, 35 cm and 20 cm long. These may have been separate plants or the results of layering of one original plant which may have overwintered. Subsequent cultivation by G.D.K. has demonstrated that overwintering can take place, with rooting from the nodes.

The north side of the Glynn Valley in East Cornwall apparently has the most extensive naturalised colonies of *E. pedunculare* in the British Isles. The species extends in quantity along more than a kilometre of forestry tracks in Hancock's Wood and Cross Plantation. The means by which it was originally introduced there is uncertain, although the adjoining woodlands have some exotic plantings, including a bamboo. There is evidence that forestry operations have contributed to its subsequent spread along tracks.

In the Glynn Valley *E. pedunculare* mostly grows in damp, shaded situations alongside woodland tracks, including ditches and moist banks shaded by coniferous trees. In August 1999 it was noticed that it was often dried up and perished where it was growing in the more open parts of tracks in Hancock's Wood and Cross Plantation. This preference for moist shaded sites shown by *E. pedunculare* in Cornwall corresponds to its predilection for moist shaded banks in *Nothofagus* forests in New Zealand (Raven & Raven 1976).

Although *E. pedunculare* is extensively naturalised in the Glynn Valley and it often grows alongside native *Epilobium* species there, a thorough search revealed only one other putative, but unidentifiable, hybrid with *E. pedunculare* parentage. The species grow intermixed on track edges with partial shade, but the damp and shade favoured by *E. pedunculare* are circumstances which have been found to delay opening of the flowers in *Epilobium* (Brockie 1959). This increases the likelihood of self-fertilisation, and therefore diminishes the opportunities for hybridisation.

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REFERENCES

BROCKIE, W.B. (1959). Breeding systems in New Zealand species of *Epilobium* L. *Transactions of the Royal Society of New Zealand* **87**: 189–194.

KITCHENER, G. D. & MCKEAN, D. R. (1998). Hybrids of *Epilobium brunnescens* (Cockayne) Raven & Engelhorn (Onagraceae) and their occurrence in the British Isles. *Watsonia* **22**: 49–60.

MCKEAN, D. R. (1999). A new *Epilobium* hybrid from Scotland, *E. pedunculare* A. Cunn. × *E. montanum* L. *Watsonia* **22**: 417–419.

MURPHY, R. J. (1998). Plant notes and records. *Botanical Cornwall* **8**: 47–86.

RAVEN, P. H. & RAVEN, T. E. (1976). The Genus *Epilobium* (Onagraceae) in Australasia: a systematic and evolutionary study. *New Zealand Department of Scientific and Industrial Research Bulletin* **216**, Christchurch, New Zealand.

STACE, C. A. (1997). *New Flora of the British Isles*. 2nd ed. Cambridge University Press, Cambridge.

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