Notes

BRITISH SPECIES OF *RUBUS* L. (ROSACEAE) IN MAINE AND NORTH BRITTANY, FRANCE

For the latest in a long-running series of cross-Channel forays to investigate how far, if at all, British representatives of the *Rubus fruticosus* aggregate have ranges that extend to the nearer parts of France, two sharply contrasting areas were chosen in 2006.

The last week in June proved ideal timing that season to catch the group in full flower in the largely agricultural belt between Normandy and the Loire, the northern part of which holds the two *départements*, Mayenne and Sarthe, that comprise the administrative region (and former province) of Maine. Extensive study of the *Rubus* flora of the *département* immediately to the south, Maine-et-Loire – roughly coinciding with the former province of Anjou – was undertaken during the first quarter of the twentieth century by one of France's then leading specialists in the group, the Angers-based G. Bouvet; that area above it, however, seems to have been left virtually unexplored. The particular part of it selected on this occasion, approximately midway between the cities of Laval and Le Mans, has large tracts of basic soils, with poor *Rubus* diversity as a consequence; but the primarily Maine-et-Loire speciality that Bouvet named *R. andegavensis* (after Angers) is abundant and conspicuous in the hedges on those, in compensation. Considerable broad-leaved woodland, some clearly of very considerable age, nevertheless provides oases of interest in the more acid parts.

Though at least half the *Rubus* species encountered were ones not known to occur in Britain, three of the commonest – *R. questieri* Lef. & P. J. Mueller, *R. adscitus* Genev. and *R. rubritinctus* W. C. R. Watson – are shared with England, though their range on the north side of the Channel is markedly south-western. To a British batologist they thus give the *Rubus* florula of Maine (and of the regions of France to the east as well) an unexpectedly western tilt. Adding emphasis to that, two species with a more south-eastern range in England, *R. asperidens* (Sudre ex Bouvet) Bouvet and *R. flexuosus* P. J. Mueller & Lef., are less in evidence, and on the whole less plentiful than in comparable habitats across the Channel. Well behind all those in frequency, however, and mostly represented by a single bush at best, are such very widespread English species as *R. bertramii* G. Braun, *R. plicatus* Weihe & Nees, *R. pyramidalis* Kaltenb., *R. cardiophyllus* Lef. & P. J. Mueller and *R. echinatus* Lindley, the last two, seen only in field hedges on the summit of the principal hill, Mont Richard (363 m), probably brought from afar by birds.

That greater affinity with England's south-western *Rubus* florula than its south-eastern one that the brambles of Maine display is all the more obvious, as is only to be expected, on the northern seaboard of Brittany, the other region chosen for investigation – a week later, given that degree of retardation imposed on the *Rubus* flowering period by its more northern position. On a previous visit, in 1999, it had nevertheless come as a surprise how strongly south-western, 'Cornubian' even, that English affinity is along the comparatively sheltered, west-facing stretch of that coastline that is popularly known as the Côte de Granit Rose. Chiefly responsible for that is the prevalence and even local abundance there of *R. hastiformis* W. C. R. Watson. Two further species, up till then similarly believed endemic to the south-west of the British Isles, *R. aequalidens* Newton and *R. peninsulae* Rilstone, were also met with there on that earlier occasion but very much more sparsely (Allen 2002). A wider search, to check the accuracy of that initial impression and in the hope of finding at least one further compatriot of those, was many years overdue.

In the combined list below of the more noteworthy finds in one or other region † indicates a specimen from the locality in question has been seen also by A. Newton and the determination confirmed by him. All voucher material has been lodged in **BM**.

MAINE

R. elegantispinosus (A. Schumach.) H. E. Weber Mayenne: Bois de la Forge, Chammes, colony in a clearing near the south margin. This is now the fourth wood (and fourth *département*) in the general region of the middle Loire in which finds of this species have been made since 1994 (contrary to the statement in Allen 2007), earlier herbarium specimens having been detected from Sarthe (Forét de Pincé, Sablé) and Loire-et-Cher (Forét de Boulogne, nr. Chambord), a solitary clump in each case. This virtually exclusive woodland distribution is sharply at variance with the situation in Britain, where the species is patently a garden escape and more or less confined to waste places in urban areas. The possibility that it is indigenous in that part of France seems to deserve consideration.

R. neomalacus Sudre Mayenne: grassy roadside by south margin of Bois de la Forge; Bois de Bergault. Sarthe: along roadside margin of Forêt de Grande Charnie W. of Étival-en-Charnie. Single clump or patch in each case. These finds back up the two recorded from Maine-et-Loire by Bouvet (1912), suggesting that this region constitutes a 'stepping-stone' between the two strikingly disparate centres otherwise known for this species: the mouth of the Loire and the west half of Surrey, v.c. 17.

R. trichodes W. C. R. Watson Sarthe: margin of broad-leaved woodland by Les Faucheries cross-lanes, Forêt de Grande Charnie †. Third record for France, extending the known Continental range some 300 km south-westwards.

R. botryeros (Focke ex Rogers) Rogers Mayenne: clump in field hedge, summit of Mont Rochard. A strongly western species near its eastern limit here.

R. tamarensis Newton Mayenne: one patch, Bois de la Forge. A semi-western species with isolated outliers southwards from its centre in Normandy's Orne Valley.

R. scaber Weihe Mayenne: one bush, Bois de la Forge. Apparently very rare in N. W. France, in contrast to its frequency in southern England and very incongruous local abundance in the west of Connaught in Ireland.

NORTH BRITTANY

Côte de Granit Rose (*dép*. Côtes-du-Nord):
R. leuchostachys Schleicher ex Sm. Patch among bracken on cliff-top, public footpath between Truzugal and Kerbalanec, N. W. of Louannec – the same unusual habitat for this species in which it occurs, apparently exclusively, in Guernsey and Sark (Allen 2001). Technically the first record for the European mainland, but subsequently a specimen collected by Genevier (Vendée: Mortagne, 1857, sub nom. *R. vestitus*) has come to light in herb. Déséglise in **NMW** (xerox copy in **BM**).

R. aequalidens Newton Locally common 2 km inland in plantations and hedges around Varac'h Château, S. of Louannec; a bush in a *Thuja* hedge 1 km E. of Beg Léguer. (Also common in woodland divided by D786 S. W. of Lanmeur, 8 km into *dép*. Finistère.)

R. peninsulae Rilstone Two populations c. 200 m apart in scrub and full sun, cliff-top public footpath between Truzugal and Kerbalanec; in and around Marais du Quellen (wooded lagoon, now a nature reserve, on N. outskirts of Trébeurden)†; one bush in hedge of house by Beg Léguer viewpoint.

R. venetorum D. E. Allen Though common over most of Brittany, anomalously rare on this stretch of coast: patch among bracken, roadside S. of Marais du Quellen, Trébeurden.

Continual re-scrutiny of herbarium material collected on previous cross-Channel forays has also resulted in one further addition for mainland Europe:

R. lanaticaulis Edees & Newton Manche: hedge of D122 W. of La Glacerie (village), 3·5 km S. of Cherbourg, 1987 (**BM**)†. A starved example of this common species of western Britain and Ireland long expected to be found in Normandy and/or Brittany.

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THE STATUS OF *RUBUS BABINGTONIANUS* W. C. R. WATSON (ROSACEAE)

Like many *Rubus* species, *R. babingtonianus* has had a chequered history since it was first determined as *R. althaeifolius* of Host. by Babington in Babingtons' British *Rubi* in 1869. Babington assigned a number of sites for it round Cambridge but also gave it a much wider range in England. W. Moyle Rogers does not mention the plant at all in his *Handbook of British Rubi* published in 1900.

W. C. R. Watson gave the plant a new name *R. babingtonianus* in 1946 with the note "*Rubus althaeifolius* Bab 1869 non Host. 1823" However, in *Rubi of Great Britain and Ireland* (1956), Watson gives a distribution covering 14 British vice counties from Kent to South Uist and one Irish v.c.

Edees & Newton (*Brambles of the British Isles* 1988), having sorted the wheat from the chaff, gave the plant local endemic status almost confined to Cambs v.c. 29 with one record just in West Suffolk v.c. 26, and this status remained in place in the *Atlas of British and Irish Brambles* (Newton & Randall 2004) with just one extra hectad dot since the 1988 publication.

The present author had not knowingly seen *Rubus babingtonianus* so was delighted when A. Newton gave him a grid reference for a site between Chippenham and Snailwell in east Cambridgeshire, where he himself had collected specimens.

A visit was made on 6 August 1997, specimens collected and these were duly confirmed by A. Newton.

On 16 July 2001 whilst paying a visit to some 'Breckland rarities', a stop for lunch was made beside a Forest Enterprise plantation at Barton Mills v.c. 26 and, after eating, a stroll down the road revealed a low thicket of brambles that had the appearance of *Rubus babingtonianus*. Once seen, it was found again less than three weeks later whilst plant recording for the Flora of Suffolk on 4 August 2001 in an area at Thetford known as the Horse Meadows (administrative Norfolk but v.c. 26). A third site was found on 20 August 2001, this time at Thompson Common, a Norfolk Wildlife Trust reserve in v.c. 28. All were confirmed by A. Newton.

Since that date, new sites have been found almost annually in v.cc. 25, 26, 27 and 28 as well as a colony found with Dr A. C .Leslie deep in the Fens at Littleport v.c. 29.

The statement in Edees & Newton (1988) that it is a plant of clay soils appears to be not strictly true as the subsequent finds have covered a wide range of soil types; from sandy Breck to chalky clay to peaty fen, though it does seem to like stream banks and the margins of wet ditches and pools.

Once acquainted with *Rubus babingtonianus* it is quite an easy plant to pick out, especially as it grows in areas where other species are limited in diversity. In addition to the regularly lobate leaf margin, the panicle becomes increasingly compound as the season advances and the neat pink flowers can be found from late May to early August when most other *Corylifolii* have long since gone over. It is also remarkably constant throughout its range.

No attempt has yet been made to map all the sites for *Rubus babingtonianus* but in order to confirm its status as a regional rather than a local endemic, there follows a list of exsiccatae to be found in **Herb. A. L. Bull** most of which have been approved by A. Newton.

Vice-county	Date	Location	Grid Ref.
25 East Suffolk	17 06 2006	Wortham Ling	TM0879
	07 08 2004	Hedgerow, Wilby	TM2370
26 West Suffolk	28 07 2004	Castlings Heath, Groton	TL9743
	26 07 2003	Coney Weston Crossroads	TL9438
	16 07 2001	Roadside, Barton Mills	TL7271
	04 08 2001	Horse Meadows, Thetford	TL8483
27 East Norfolk	24 06 2006	Saxlingham Road, Bayfield	TG0340
	31 07 2004	Bylaugh, near Swanton Morley bridges	TG0218
	09 09 2004	Stokesby road Billockby near the Muck Fleet bridge	TG4111
28 West Norfolk	20 08 2001	Thompson Common	TL9396
	11 08 2008	By bridge at Madhouse Plantation Tottington	TL9094

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ELEVEN NEW COMBINATIONS IN THE BRITISH FLORA

Some new combinations are required for forthcoming floristic works.

1. **Ficaria** Schaeff.

Molecular work has confirmed that *Ficaria* Schaeff. should be treated as a separate genus from *Ranunculus* L., so that *R. ficaria* L. should now be known as *F. verna* Huds. Moreover Laegaard (2001) demonstrated that the type of *Ranunculus ficaria* is the tetraploid taxon hither to known as subsp. *bulbilifer* Lambinon, not the fertile diploid as concluded by Sell (1994). The correct subspecific epithets for the tetraploid and diploid respectively are therefore *verna* and *fertilis*. There appears to be no valid combination for the latter:

Ficaria verna Huds. subsp. **fertilis** (Lawralrée ex Laegaard) Stace, **comb. nov.**
Basionym: *Ranunculus ficaria* L. subsp. *fertilis* Lawralrée ex Laegaard, *Nordic J. Bot.* **20**: 526 (2001)

Laegaard (2001) actually gave the authority for his combination as "A. R. Clapham ex Laegaard", but in fact Clapham published his invalid *fertilis* as a variety, not as a subspecies; Lawralrée later published it illegitimately as a subspecies (Sell 1994).

Of the other two subspecies recognised in Britain, the combination *F. verna* subsp. *ficariiformis* (F. W. Schultz) B. Walln. already exists, but subsp. *chrysocephala* requires validation:

Ficaria verna Huds. subsp. **chrysocephala** (P. D. Sell) Stace, **comb. nov**.
Basionym: *Ranunculus ficaria* L. subsp. *chrysocephalus* P. D. Sell, *Bot. J. Linn. Soc.* **106**: 117 (1991).

2. **Dysphania** R. Br.

The glandular species of *Chenopodium* are now generally segregated into the genus *Dysphania*, under which two casual hybrids require combinations:

Dysphania carinata (R. Br.) Mosyakin & Clemants *(C. carinatum* R. Br.) × **D. cristata** (F. Muell.) Mosyakin & Clemants *(C. cristatum* F. Muell.)
= **Dysphania × bontei** (Aellen) Stace, **comb. nov.**
Basionym: *Chenopodium × bontei* Aellen, *Verh. Nat. Ges. Basel* **44**: 317 (1933)

Dysphania pumilio (R. Br.) Mosyakin & Clemants (*C. pumilio* R. Br.) × **D. carinata** (R. Br.) Mosyakin & Clemants *(C. carinatum* R. Br.)
= **Dysphania × christii** (Aellen) Stace, **comb. nov.**
Basionym: *Chenopodium × christii* Aellen, *Verh. Nat. Ges. Basel* **44**: 317 (1933)

3. **Callitriche** L.

With justification Lansdown (2006) relegated *Callitriche hamulata* to an infraspecific variant of *C. brutia*, on the grounds that the two taxa are not distinguishable unless fruiting in dry or damp (as opposed to aquatic) conditions, when *C. brutia* alone develops fruit-stalks 2–10 mm long. The presence or absence of fruit-stalks is, however, correlated with a striking difference in chromosome number: 2n = 28 in *C. brutia*; 2n = 38 in *C. hamulata*. This correlation has been demonstrated in 29 accessions (6 of *C. brutia*, 23 of *C. hamulata*) according to data in the B.S.B.I. Cytological Database. Accordingly, I consider that subspecific status is more appropriate than the varietal status chosen by Lansdown.

Callitriche brutia Petagna subsp. **hamulata** (Kütz. ex W. D. J. Koch) Stace, **comb. nov.**
Basionym: *C. hamulata* Kütz. ex W. D. J. Koch, *Syn. Fl. Germ.* 246 (1837)
Synonyms: *C. intermedia* Hoffm. subsp. *hamulata* (Kütz. ex W. D. J. Koch) A. R. Clapham, in Clapham, Tutin & E. Warb., *Fl. Brit. Isl.* 622 (1952)
C. brutia var. *hamulata* (Kütz. ex W. D. J. Koch) Lansdown, *Watsonia* **26**: 113 (2006)

4. **Mimulus** L.

The plant described by Clos as a variety of *M. luteus* is better recognised at species level according to Silverside (1994); the combination is made here:

Mimulus nummularius (Clos) Stace, **comb. nov.**
Basionym: *Mimulus luteus* L. var. *nummularius* Clos, in Gay, *Fl. Chil.* **5**: 140 (1849)

5. × **Schedolium** Holub

The three broad-leaved species of *Festuca* L. are now segregated into the genus *Schedonorus* P. Beauv., and their hybrids with species of *Lolium* L. have been allocated to nothogenus × *Schedolium*. Combinations under the latter have already been provided by Holub (1998) and Scholz (2007) for four of the six hybrids between the three species of *Schedonorus* (*S. pratensis*, *S. arundinaceus* and *S. giganteus*) and *Lolium perenne* and *L. multiflorum*; the other two are made here:

Schedonorus pratensis (Huds.) P. Beauv. (*Festuca pratensis* Huds.) × **Lolium multiflorum** Lam.
= × **Schedolium braunii** (K. Richt.) Stace, **comb. nov.**
Basionym: *Festuca* × *braunii* K. Richt., *Pl. Eur.* **1**: 103 (1890)
Synonym: × *Festulolium braunii* (K. Richt.) A. Camus, *Bull. Mus. Hist. Nat. (Paris)*, Sér I, **33**: 538 (1927)

Schedonorus giganteus (L.) Holub (*Festuca gigantea* (L.) Vill.) × **Lolium multiflorum** Lam.
= × **Schedolium nilssonii (**Cugnac & A. Camus) Stace, **comb. nov.**
Basionym: × *Festulolium nilssonii* Cugnac & A. Camus, *Bull. Soc. Bot. France* **91**: 19 (1944)

6. × **Dactylodenia** Garay & H. R. Sweet

When the three British *Gymnadenia* taxa are treated as separate species rather than as subspecies of *G. conopsea* (L.) R. Br. the allocation and synonymy of the binomials for hybrids between them and species of *Dactylorhiza* Necker ex Nevski (= × *Dactylodenia*) have to be reconsidered. Of the ten combinations of × *Dactylodenia* known from the British Isles, five already have a legitimate binomial, four have no epithets that can be applied, and one can be provided with a legitimate binomial by the following new combination:

× **Dactylodenia evansii** (Druce) Stace, **comb. nov.**
Basionym: *Orchis* × *evansii* Druce, *Rep. Bot. Exch. Club Brit. Isles* **2**: 199 (1907)
Synonyms: *Habenaria* × *evansii* (Druce) Druce, *Rep. Bot. Exch. Club Brit. Isles* **8**: 875 (1929)
× *Orchigymnadenia evansii* (Druce) T. & T. A. Stephenson, *J. Bot.* **60**: 35 (1922)
= *Gymnadenia borealis* (Druce) R. M. Bateman, Pridgeon & M. W. Chase × *Dactylorchis maculata* (L.) Soó

The above new combination was previously published invalidly and inaccurately by Averyanov in *Bot. Zhurn. (Moscow & Leningrad)* **71**: 93 (1986). The type of *Orchis* × *evansii* came from Berwickshire, where *G. borealis* rather than *G. conopsea* occurs. The publication of legitimate binomials for the remaining four combinations demands the collection of new material in order to provide type specimens.

7. **Dactylorhiza** Necker ex Nevski

Wilmott's *Orchis kerryensis* remains a distinctive taxon, best recognised as a variety of *Dactylorhiza occidentalis*, for which a new combination is required:

Dactylorhiza occidentalis (Pugsley) P. Delforge var. **kerryensis** (Wilmott) R. M. Bateman & Denholm, **comb. nov**.
Basionym: *Orchis kerryensis* Wilmott, *Proc. Linn. Soc. Lond.* **148**: 126 (1936)

8. × **Anacamptorchis** E.G. Camus

The transfer of *Orchis morio* to *Anacamptis* means that the hybrid *O. mascula* × *O. morio* becomes an intergeneric hybrid under × *Anacamptorchis*, for which the new combination is made:

× **Anacamptorchis morioides** (Brand) Stace, **comb. nov.**
Basionym: *Orchis* × *morioides* Brand, *Syn. Deut. Schweiz. Fl.*, ed. 3, **3**: 2427 (1905)
= *Anacamptis morio* (L.) R. M. Bateman, Pridgeon & M. W. Chase (*O. morio* L.) × *Orchis mascula* (L.) L.

ACKNOWLEDGMENT

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THE RE-DISCOVERY OF *ARENARIA NORVEGICA* SUBSP. *NORVEGICA* IN IRELAND

The only Irish record for *Arenaria norvegica* was made by the late John [Jack] Heslop Harrison in June 1961 during a visit to the Burren, County Clare (H9), with a party of botany students from the University of Birmingham (Heslop Harrison, Wilkins & Green 1961). During their stay they discovered a small colony growing in "shallow crevices and solutions hollows on an area of limestone pavement" at c. 800 ft (244 m) on "the south slope of Gleninagh Mountain overlooking Caher Lower" (Heslop Harrison *et al.* 1961). The precise locality is unclear as Gleninagh Mountain does not have a southern slope, but extends southwards in a long ridge to the east of Caher Lower. A more likely locality occurs on the adjacent mountain of Carnsefin at c. M164092 "or not far away" on a series of south-facing limestone pavements (Webb & Scannell 1983) but despite repeated searches no plants have been found in either locality. This led some botanists to conclude that the plant is either extinct or that the original record was erroneous (Webb & Scannell 1983; Curtis & McGough 1988). There is no doubt, however, as to the identity of Heslop Harrison's specimen: this was shown to Geoffrey Halliday who counted the chromosomes of a plant grown from seed extracted from it ($2n = 80$) (G. Halliday, pers. comm.). This confirmed the presence of *Arenaria norvegica* subsp. *norvegica* for Ireland, a taxon then only known from Scotland, Norway, Sweden and Iceland.

On 25 May 2008 two small colonies of *A. norvegica* subsp. *norvegica* were discovered a few kilometres away from Gleninagh Mountain on the southwest slopes of Carnsefin Mountain overlooking the coast at Fanore. The first colony, of around 10–20 plants, was confined to Carboniferous limestone outcrops in the middle of the "green road" between Morroogh and Black Head. Plants were growing in shallow gravel filled solution hollows extending over 20 m of the track. Only a few other species were growing in the same habitat (*Bellis perennis*, *Minuartia verna*, *Plantago lanceolata*, *Thymus polytrichus*). All other species listed in Table 1 (quadrat 1) were associated with pockets of *Festuca ovina*-*Sesleria caerulea* grassland. The community most closely resembled *Festuca ovina*-*Minuartia verna* grassland (67% fit to *Cladonia* species sub-community, OV37c,) and was almost identical to sites in Yorkshire where *Arenaria norvegica* subsp. *anglica* grows on a green lane on Ingleborough (Walker 2000).

A second larger population was located nearby on limestone exposures at a slightly higher altitude (c. 100 m). Here, around 30 flowering plants extended over 50 m growing in soil and gravel-filled crevices and solution hollows adjacent to *Dryas* heath with abundant *Gentiana verna* and *Helianthemum oelandicum* subsp. *canum*. Again the vegetation was very open with scattered plants of *Arenaria norvegica*, *Agrostis capillaris*, *Asperula cynanchica*, *Carex flacca*, *Festuca ovina*, *Saxifraga tridactylites* and *Thymus polytrichus* (Table 1; quadrats 2 & 3). This community most closely resembled *Festuca ovina*-*Agrostis capillaris*-*Thymus polytrichus* grassland (CG10c; 26 and 34% fit to *Saxifraga aizoides*-*Ditrichum flexicaule* sub-community).

% COVER OF SPECIES GROWING WITH *ARENARIA NORVEGICA* SUBSP. *NORVEGICA* IN THE BURREN, COUNTY CLARE (1 M^2 QUADRATS)

Species	1	2	3	Species	1	2	3
Achillea millefolium	+	+		*Festuca ovina*	20	5	5
Agrostis capillaris		2	5	*Gentiana verna*		+	+
Antennaria dioica		1		*Helianthemum oelandicum*			+
Anthyllis vulneraria		3	+	*Lotus corniculatus*	+	+	+
Arenaria norvegica	**+**	**+**	**+**	***Minuartia verna***	**+**		
Armeria maritima	+			*Plantago lanceolata*	+		
Asperula cynanchica		+		*Plantago maritima*		+	
Bellis perennis	+			*Prunella vulgaris*		+	
Briza media	1			***Saxifraga tridactylites***			**+**
Calluna vulgaris		2		*Sesleria caerulea*	2		
Campanula rotundifolia		+		*Succisa pratensis*		2	+
Carex caryophyllea		+		*Thymus polytrichus*	2	3	1
Carex flacca		2	1	*Viola rivinianna*		+	+
Carex pulicaris		+		Vegetation cover	25	20	15
Dryas octopetala			+	Bare rock, soil and gravel	75	80	85

Species confined to solution hollows are highlighted in **bold**.
Site 1, "ruts" of green road between Morroogh and Black Head, M15091021, alt. 80 m; sites 2 & 3, solution hollows on limestone pavement nearby, M15111059 & M15081060, alt. 100 m.

Irish plants of *Arenaria norvegica* were similar to Scottish subsp. *norvegica* in having small flowers (<10 mm) with 4 styles and obovate leaves (subsp. *anglica* has larger flowers, greater than 11 mm, with 3 styles and narrowly ovate leaves (Stace 1997)). The leaves were characteristically succulent, glossy-green and had an indistinct midrib and a few basal cilia (greater than a third in *A. ciliata* subsp. *hibernica*). However, there were notable differences. Irish plants appear to flower about a month earlier than in Scotland as in May 2008 many capsules already contained seed. The flowers were also noticeably smaller. Although Irish plants displayed the characteristic trailing habit of Scottish subsp. *norvegica* the leaves were noticeably smaller (2·5–4 mm) and more obovate. The reasons for these differences are unclear and would warrant further investigation.

How *Arenaria norvegica* has eluded botanists for so long is a mystery. Heslop Harrison only realised the significance of his find on examining specimens at the end of a long day's botanising and neither he, nor any of his students ever returned to confirm the locality (G. Halliday, pers. comm.). If their recollections of the precise locality were incorrect then subsequent botanists have been looking in the wrong place which is admittedly a very large area that "would take a dozen botanists…a week's hard work to demonstrate conclusively that the plant was absent" (Webb & Scannell 1983).

The 2008 discovery therefore confirms the presence of this rare arctic-montane species for Ireland at its most southerly station in the world (53°N). A more thorough examination of the adjacent slopes is planned and will hopefully reveal a more extensive population.

ACKNOWLEDGMENTS

We would like to thank Geoffrey Halliday for his comments on the original discovery and the botanical group who helped us to survey both populations: Isabel Alonso, Margaret Bradshaw, Carl Borges, Jonathan Cox, David Heaver, Dawn Isaac, Chris Gibson, Phil Horton, Richard Jefferson, Carol Laverick, Mina Patel, Clare Pinches, Jill Sutcliffe, Mike Sutcliffe, Ann Skinner and Chris Walker.

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WATER-BORNE DISPERSAL OF *CARDAMINE BULBIFERA* (L.) CRANTZ (BRASSICACEAE) IN MID-WEST YORKSHIRE (V.C. 64)

In Britain *Cardamine bulbifera* (Coralroot) is a localised perennial herb of ancient woodlands, shady stream-sides and roadside banks in South East England (Showler & Rich 1993). It is classified as Nationally Scarce (Cheffings 2004) and has been recorded as a native in 143 tetrads in 25 10-km squares (Nicholson *et al.* 2004). These populations are concentrated in two main areas: on dry, basic soils in beech woods in the Chilterns (Buckinghamshire, Hertfordshire and Middlesex) and wet, generally acidic woodlands of the High Weald (Kent and Sussex). Elsewhere in the British Isles, it has been recorded as a naturalised alien in a variety of habitats. These include large populations in the ancient Needwood Forest, Staffordshire (v.c. 39) where it was formerly considered to be native (Nicholson *et al.* 2004). The majority of established populations are referable to the alpine forma *ptarmicifolia* (DC) O. E. Schulz which has been confirmed from a number of vice-counties (South & North Devon, North Somerset, South Essex, Salop, Mid-west Yorks, Westmorland, Dumfries, Kincardinshire, County Dublin). This form, which originates from the mountains of Central and Eastern Europe, is often grown in gardens, where it can become invasive, and is easily distinguished from native plants (forma *bulbifera*) by the shape of the leaves, which are more ovate and asymmetrical in outline and with broadly serrate margins (see figures in Showler & Rich 1993; Rich & Jermy 1998). It is also taller with larger, browner bulbils produced in the leaf axils. This purpose of this note is to document the water-borne spread of this uncommon alien along one river valley near to Harrogate, Mid-west Yorks (v.c. 64) where it's range is increasing rapidly via the dispersal of bulbils during floods.

ORIGIN

Cardamine bulbifera has been known from the banks of the Oak Beck (SE25), a small tributary of the River Nidd, to the west of Harrogate, since at least 1998 (Manson, 2003; Wallace, 2005). This population was thought to have originated from the Royal Horticultural Society's gardens at Harlow Carr through which a small tributary of the Oak Beck stream flows. This was confirmed in April 2007 when 1000s of plants were found along the rear perimeter fence of the gardens and in an adjacent area of woodland next to this stream. Here *C. bulbifera* was the dominant species over approximately 50 × 30 m area growing with a number of other garden plants that have also become established along the lower reaches of the stream (e.g. *Cardamine raphanifolia*, *Doronicum pardalianches*, *Lysichiton americanus*, *Petastites japponicus*, *Ranunculus aconitifolius*, *Tellima grandiflora*, *Symphytum grandiflorum*). The origin of the Coralroot was thought to be in peat brought with lily bulbs from Essex sometime in the 1980s (Manson 2003). It soon became invasive in the garden borders, where it still survives despite excessive weeding.

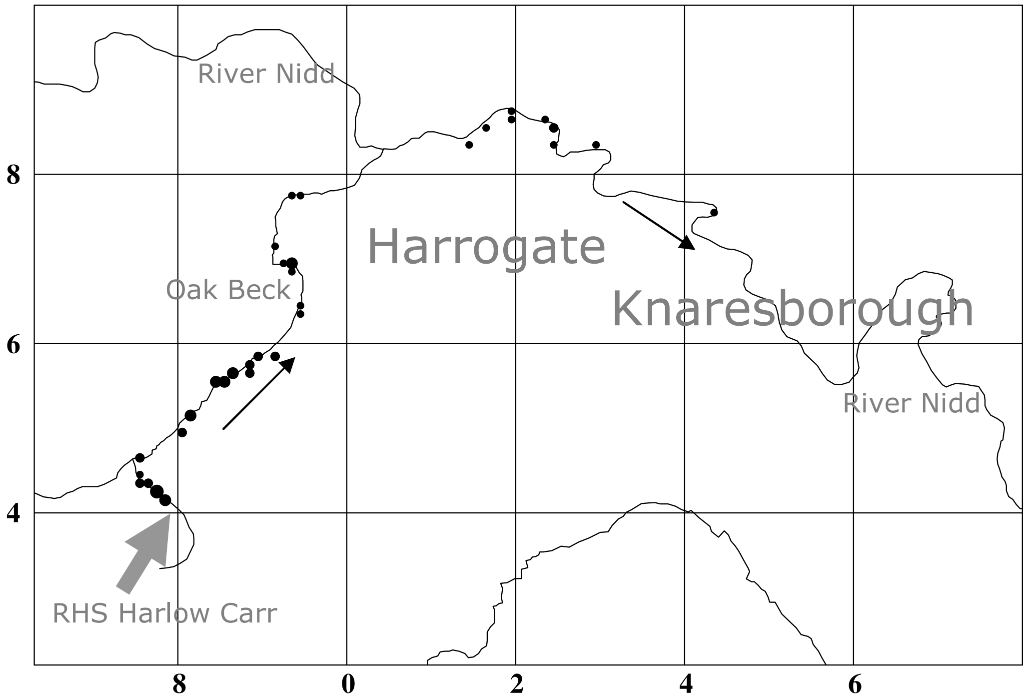

FIGURE 1. The distribution of *Cardamine bulbifera* along Oak Beck and the River Nidd in v.c. 64. Arrows denote the direction of river flow and the size of circles the size of populations.

DISTRIBUTION AND SPREAD

A survey of the entire course of the Oak Beck and River Nidd, as far east as Knaresborough, was carried out by the author in April 2007 (Fig. 1). This showed *C. bulbifera* to be present along c. 5 km of the Oak Beck from its confluence with the Harlow Carr stream up to where it meets the River Nidd. It also occurs sporadically on both banks of the Nidd up to c. 6 km downstream from the Oak Beck as far as Knaresborough. Plants are more or less continuously encountered along the upper stretches of the Oak Beck where extensive patches, in a few cases with 1000s of stems, occur on the shaded, sandy banks, islands or in damp woodland in the adjacent flood zone. In a few places the plant also grows above the flood zone as well as in grassland bordering a residential estate. The species is much less common along the River Nidd where small populations occur in similar habitats, but also on sandy river banks with no tree cover. The reason for this may be the greater 'scouring' of the riverbanks during winter rains (Wallace 2005) but also because these colonies have had less time to become established than on the Oak Beck; it will be interesting to observe the behaviour of these small populations over the coming years.

HABITATS AND ECOLOGY

These established populations are almost exclusively confined to sandy soils within the narrow flood zone of the two main watercourses. These areas are subject to frequent 'scouring' and re-deposition of sand/silt during short floods which occur throughout the year. Consequently the habitats often show signs of disturbance with large areas often covered in deposited sand and tree litter. The ground flora is relatively uniform along both rivers, and is typical of *Allium ursinum* sub-community of *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland (W8f; Rodwell 1991). Stands with *C. bulbifera* are usually shaded and dominated by a dense carpet of *Allium ursinum*, with *Galium aparine*, *Geum urbanum*, *Ranunculus ficaria* and *Urtica dioica*. The canopy is usually a mixture of *Acer pseudoplatanus*,

TABLE 1. VASCULAR PLANT SPECIES RECORDED WITH *CARDAMINE BULBIFERA* IN 2 × 2 M QUADRATS IN MID-WEST YORKSHIRE (*N* = 11)

Species	% sites	Species	% sites
Canopy		*Circaea lutetiana*	18
Acer pseudoplatanus	18	*Deschampsia cespitosa*	27
Alnus glutinosa	36	*Galium aparine*	64
Corylus avellana	9	*Geranium robertianum*	36
Crataegus monogyna	18	*Geum urbanum*	55
Fagus sylvatica	9	*Hedera helix*	18
		Heracleum sphondylium	27
Ground flora		*Hyacinthoides non-scripta*	45
Aegopodium podagraria	45	*Impatiens glandulifera*	64
Allium ursinum	**100**	*Luzula sylvatica*	45
Anemone nemorosa	45	*Mercurialis perennis*	27
Angelica sylvatica	18	*Oxalis acetosella*	27
Anthriscus sylvestris	45	***Ranunculus ficaria***	**100**
Brachypodium sylvaticum	27	*Rubus* spp.	45
Cardamine flexuosa	27	*Silene dioica*	36
Carex pendula	27	*Urtica dioica*	55

Only species recorded in 15% or more of sites are included; additional species recorded are listed below: *Agrostis capillaris*, *Alliaria petiolata*, *Blechnum spicant*, *Cardamine raphanifolia*, *Cardamine* sp., *Conopodium majus*, *Doronicum pardalianches*, *Epilobium* sp., *Filipendula ulmaria*, *Geranium* sp., *Juncus effusus*, *Lysichiton americanus*, *Narcissus* sp., *Petasites hybridus*, *Phyllitis scolopendrium*, *Poa trivialis*, *Pteridium aquilinum*, *Ranunculus acris*, *R. repens*, *Ribes nigrum*, *Rosa canina*, *Sanicula europaea*, *Stellaria holostea*, *Taraxacum officinale*, *Ulmus* sp., *Valeriana dioica*, *Veronica beccabunga*, *V. chamaedrys*, *V. montana*, *Vicia sepium.*

Fraxinus excelsior with *Alnus glutinosa* confined to the edge of the watercourses (Table 1). The riverbanks also support large populations of *Impatiens glandulifera* which are present as seedlings during the flowering period of *C. bulbifera*. Other frequent associates are *Aegopodium podagraria*, *Anemone nemorosa*, *Anthriscus sylvestris*, *Hyacinthoides non-scripta*, *Luzula sylvatica* and *Rubus fruticosus* agg. *C. bulbifera* also occurs in *Carex remota-Cirsium palustre* sub-community of *Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland (W7b) but in these stands many of the NVC constants are absent. Many other neophytes originating from Harlow Carr grow with *C. bulbifera* including *Cardamine raphanifolia*, *Doronicum pardalianches*, *Lathraea clandestina*, *Lysichiton americanus*, *Ranunculus aconitifolius*, *Tellima grandiflora* and *Symphytum grandiflorum*.

C. bulbifera is a vernal woodland-gap species which, like many shade-loving plants, completes its reproductive cycle before ground flora vegetation has reached its full extent in July. In Harrogate leaves of *C. bulbifera* are clearly visible in February and by early March these have extended well above the surrounding leaves of *Allium ursinum.* Flowering is usually in full force by early April and completed by mid-June after when the leaves rapidly senesce to leave bare, withered stems in situ (these persist through the winter). In Harrogate a variety of insects have been observed visiting flowers, mostly notably Orange-tip (*Anthocharis cardamines* L.) and Green-veined White (*Pieris napi* L.) butterflies (the former mainly visiting *C. amara*). However, most flowers fail to set seed. Almost uniquely for a British woodland plant dispersal is therefore primarily by bulbils. These are produced very early in the leaf-axils and are dislodged by physical movement of the stems from late April onwards. Plants in Harrogate produce around twice as many bulbils as flowers: the average for 20 plants measured in 2008 was 12·8 (± 0·7) bulbils (range 7–18) versus 6·4 (± 0·5) flowers (range 2–10). Patches of say 500 stems, which are not uncommon on riverbanks, therefore produce anywhere between 3500 and 9000 bulbils annually. Individual bulbils vary in size but are relatively heavy weighing around 0·15 g. The majority therefore probably fall close to the parent plant. Secondary dispersal probably occurs in a number of ways. Hegi (1958) reports dispersal by ants in continental Europe but Showler & Rich (1993), in noting that localities in Kent and Sussex are on, or close to river-banks and ditches, favour water-borne dispersal, presumably via groundwash into streams and then physical movement by the current. Rose (1966) also suggested this as the main mechanism accounting for the micro-distribution of *C. bulbifera* in the Weald. Physical transport in the soil (as in this case of bulbils being introduced to Harlow Carr in peat) is likely to be less common (e.g. on boots, paws, hooves) but may account for the occurrence of isolated patches tens of metres above the flood zone.

CONCLUSION

The garden form of the Biodiversity Action Plan species *C. bulbifera* is now well naturalised along the River Nidd in v.c. 64 where it is undergoing a dramatic expansion in range, via water-borne dispersal of bulbils, into disturbed, sandy niches within the flood zone. Over the last decade tens of thousands of plants have become established and it has spread over 10 km downstream from its point of origin. It will be interesting to observe the behaviour of these populations, especially the rate and extent to which they expand along the River Nidd into the Vale of York over the next ten years.

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CIRSIUM × *SEMIDECURRENS* H. RICHTER IN GLAMORGAN

The distinctive hybrid between *Cirsium tuberosum* (L.) All. and *C. palustre* (L.) Scop. (*C.* × *semidecurrens* H. Richter) has been recorded from three sites in Britain growing amongst large stands of *C. tuberosum* in mosaics of scrub and calcareous grassland on moderate N- to NW-facing slopes with *C. palustre* growing nearby. This hybrid was first reported in Britain in 1932 by J. L. Bruce and J. S. L. Gilmour "…in the well-known locality for *C. tuberosum* near Nash Point" (**BM**) Glamorgan, although there is an earlier 1928 specimen in **NMW** collected by S. L. Bruce (Gilmour 1933). In 1947 Donald Grose discovered a single plant in South Wiltshire (v.c. 8) whilst searching for *C. tuberosum* close to where it was originally discovered by A. B. Lambert in 1812 although the site was subsequently ploughed-up (Grose 1942, 1949, 1953, 1957). A second specimen from this site (Great Ridge), collected in 1939 and mis-labelled as *Cirsium tuberosum*, was re-determined as *C.* × *semidecurrens* (**RNG**; conf. W. A. Sledge). In 1986 a further plant was discovered nearby (Stockton Down, **K**, Everett 1993). The record for Montgomeryshire (v.c. 47) given in Stace *et al.* (2003) is an error and it has not been recorded in North Wiltshire (v.c. 7) despite both parents growing together in rank *Bromopsis erectus* grassland on Salisbury Plain. On the continent it has been recorded in France, Germany, Switzerland and Italy.

FIGURE 1. *Cirsium* × *semidecurrens* growing at Cwm Nash, Glamorgan, August 2001.

Cirsium × *semidecurrens* was refound at Cwm Nash in Glamorgan (v.c. 41) by the author in August 2001 (Fig. 1) presumably growing very close to where it was originally discovered by Bruce over 70 years ago. A specimen was collected and verified by Clive Stace (**NMW**). This is the fifth British record (Appendix) and the first for Glamorgan since 1932 although botanists have noted putative hybrids in the Nash Point area in recent years (J. Woodman and Q. Kay, pers. comm.). Indeed, Kay & John (1995) cultivated a specimen of "*C. tuberosum*" from Cwm Nash which was morphologically unlike its seed parent with a tall branching flowering stem suggesting that it may have been an inter-specific hybrid, most likely with *C. palustre*, although other characters were more typical of *C. tuberosum*. In addition, achenes collected from a plant of *C. tuberosum* at Cwm Marcross, Glamorgan in 1994 also turned out to be this hybrid (Kay & John 1995).

At Cwm Nash *Cirsium* × *semidecurrens* grows amongst an apparently pure colony of *C. tuberosum* on the moderately steep (30°) NW-facing slope of a small valley running down to the sea. The site overlies Jurassic limestone and is c. 2 km to the NW of the main Glamorgan colony of *C. tuberosum* at Nash Point Lighthouse. Cattle grazing has been re-introduced to the site recently (J. Woodman, pers. comm.)

TABLE 1. FREQUENCY AND ABUNDANCE OF SPECIES GROWING WITH *CIRSIUM TUBEROSUM* AND *C.* × *SEMIDECURRENS* AT CWM NASH, GLAMORGAN

Species	Frequency	%	Species	Frequency	%
Agrostis capillaris	3	13	*Koeleria macrantha*	1	+
Anthoxanthum odoratum	1	+	*Leontodon hispidus*	1	+
Brachypodium sylvaticum	1	2	*Linum catharticum*	1	+
Briza media	1	+	*Lolium perenne*	2	+
Campanula glomerata	1	+	*Lotus corniculatus*	3	1
Carex flacca	3	1	*Phleum pratense*	1	+
Centaurea nigra	3	7	*Plantago lanceolata*	3	3
Cirsium arvense	2	+	*Potentilla erecta*	1	+
Cirsium tuberosum	3	12	*Potentilla reptans*	1	+
Cirsium* × *semidecurrens	**1**	**2**	*Primula veris*	1	+
Cynosurus cristatus	1	+	*Prunella vulgaris*	3	+
Dactylis glomerata	3	2	*Ranunculus bulbosus*	1	+
Daucus carota	2	+	*Sanguisorba minor*	3	4
Festuca rubra	3	40	*Serratula tinctoria*	1	1
Galium verum	3	+	*Stachys officinalis*	3	+
Holcus lanatus	3	3	*Succisa pratensis*	2	4
Hypochaeris radicata	2	+	*Trifolium pratense*	1	+

(Recorded in three 1 × 1m quadrats). Species with average abundance < 1% are denoted by a "+".

and this has created a relatively short (c. 17 cm), species-rich sward (22 species m^{-2}) dominated by *Festuca rubra*, with abundant *Agrostis capillaris*, *Centaurea nigra*, *Cirsium tuberosum*, *Sanguisorba minor* and *Succisa pratensis* and frequent *Carex flacca*, *Galium verum*, *Lotus corniculatus* and *Stachys officinalis* (Table 1). The grassland most closely resembles *Galium verum* sub-community of *Cynosurus cristatus-Centaurea nigra* mesotrohic grassland (55% fit to MG5b) but with affinities to *Festuca rubra-Holcus lanatus* maritime grassland (MC9). Over 60 patches of *Cirsium tuberosum* are scattered across the slope as well as a single patch of the hybrid between *C. tuberosum* and *C. acaule* (*C.* × *medium*) which has been known from this locality since 1935 (Bruce & Vachell 1935). *Cirsium palustre* does not occur on the same slope but is present by the stream at the bottom of the valley.

The stems of the hybrid were tall (to 60 cm) and branched, with a mixture of arachnoid and jointed hairs especially towards the apex, and shortly decurrent, spinous wings extending for a few centimetres below the leaf bases (not present on all stems). The stems were topped with very lax racemose clusters of up to four capitula (as in Wiltshire) on relatively short (1–10 cm) densely felted peduncles. The capitula were intermediate in size and shape, being narrower and shorter (mean 11 × 12 mm) than

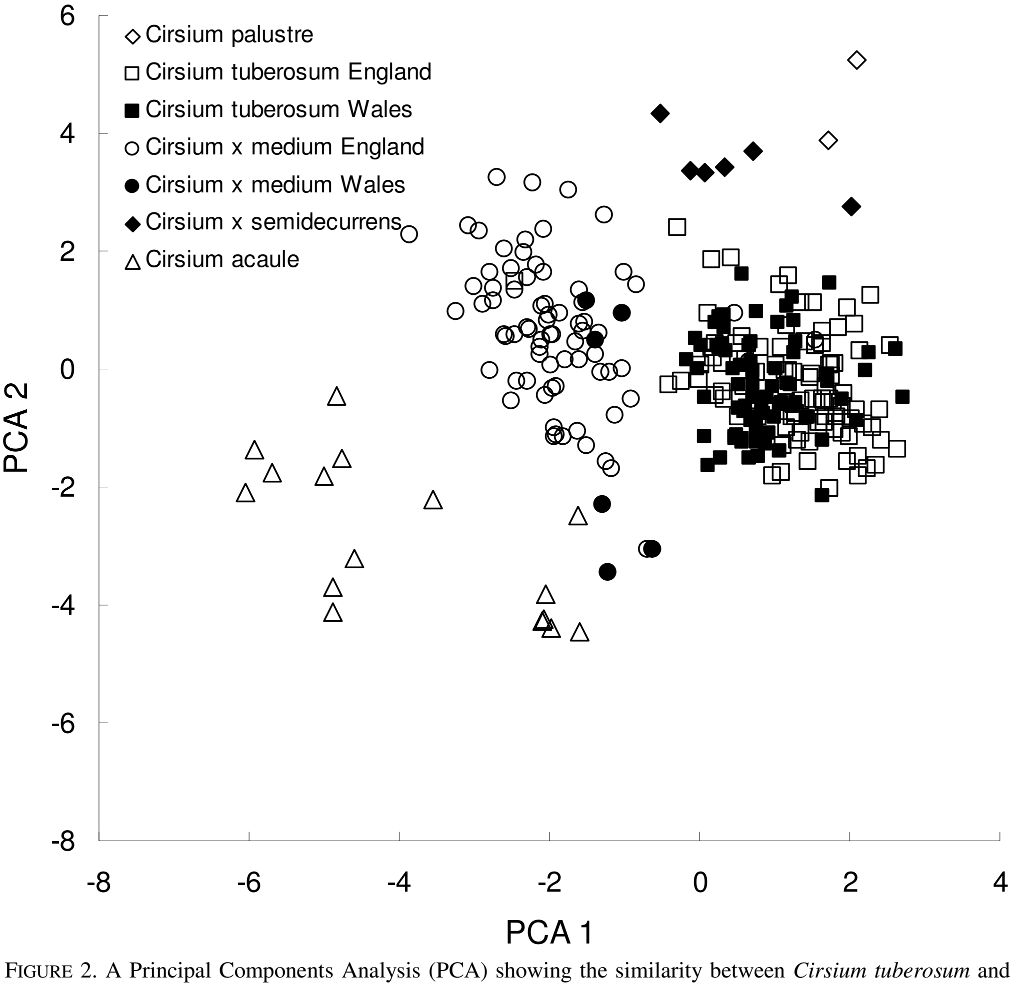

FIGURE 2. A Principal Components Analysis (PCA) showing the similarity between *Cirsium tuberosum* and British hybrids (*C.* × *semidecurrens* and *C* × *medium*) and parental species (*C. acaule*, *C. tuberosum*, *C. palustre*) based on morphological characters. English and Welsh plants of *C. tuberosum* and *C.* × *medium* are shown with different symbols.

those of *C. tuberosum* (mean 13 × 14 mm), and with more-or-less adpressed, sparsely arachnoid outer phyllaries with the purple callosity indicative of *C. palustre*. The plant therefore differed from *C. tuberosum* in having almost twice as many capitula on each branch, shortly-decurrent, spinious wings and a mixture of arachnoid and jointed hairs on the stem, smaller, narrower involucres (Fig. 1), and ± adpressed, sparsely arachnoid outer phyllaries. A Principal Components Analysis of a range of morphological characters measured on British hybrids and the parental species (*C. acaule*, *C. palustre* and *C. tuberosum*) is shown in Figure 2. These data show a clear separation between *C. acaule*, *C.* × *medium* and *C. tuberosum* on the first axis and between these species and *C. palustre* and *C.* × *semidecurrens* on the second (Fig. 2).

Although originally thought to be sterile (Gilmour 1933, Grose 1949), a small sample of hybrid fruits collected from the Glamorgan plant showed 50% germination (2 of 4 seeds). These were presumably backcrosses with *C. tuberosum* and in cultivation these hybrids continued to flower and produce a small number of viable achenes for over four years. *C. palustre* appears to hybridise readily with other thistles and is a parent to half of the natural thistle hybrids including the two most frequently recorded in the British Isles, *C.* × *forsteri* and *C.* × *celakovskianum*. The reason for this is unknown but may be due to its wider ecological range and the nectar being more readily accessible, and therefore more regularly visited by insects, than in other species of *Cirsium*. *C.* × *semidecurrens* is one of the rarest, presumably because of the rarity of *C. tuberosum*, but also because *C. palustre* is confined to moister mesotrophic and/or shaded habitats (e.g. colluvium, scrub edge) on calcareous soils where *C. tuberosum* is abundant. Cross-pollination is therefore likely to be limited in such habitats. Successive backcrossing and introgression with one or more parents has been reported for a few *Cirsium* hybrids, most notably between *C.* × *medium* and *C. tuberosum* on heavily grazed downland in Wiltshire where pure *C. tuberosum* is now very uncommon. This is also likely to occur at Cwm Nash where presumably all the seed produced by the hybrid will be back-crossed with *C. tuberosum* as the male parent. The Cwm Nash plant appears to be long-lived and, like *C. tuberosum*, may be spreading indefinitely via its large underground tubers. It will be interesting to see how long the plant survives and the extent to which backcrossing occurs in the future.

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APPENDIX

Confirmed records of *Cirsium* × *semidecurrens* in the British Isles:

SS96, GLAMORGAN, V.C. 41:

With both parents at St. Donat's Cliff [Cwm Nash], near Nash Point, J. L. Bruce & J. S. L. Gilmour, August 1932 (Gilmour 1933), **BM**.

Cwm Nash, near Nash Point, single plant growing amongst colony of *Cirsium tuberosum*, SS905699, K. J. Walker, 7 August 2001, **NMW**.

ST93, SOUTH WILTSHIRE, V.C. 8:
Great Ridge, J. D. Grose, 7 August, 1939, **RNG** [specimen labelled *C. tuberosum* but later re-determined as *C.* × *semidecurrens* by W. A. Sledge, det. 10 August, 1951].
Great Ridge, growing with *C. tuberosum* on a N-facing dowland in A. B. Lambert's original 1812 station, J. D. Grose, July 1947 (Grose 1942), det. W. A. Sledge.
Stockton Down near Great Ridge, single plant growing with *C. tuberosum* on edge of scrub, ST975358, S. Everett, 30 July 1986 (Everett 1993), **K** [the specimen could not be traced but there is a photocopy of the specimen in Everett (1988)].

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VASCULAR PLANTS FROM SWANSEA UNIVERSITY HERBARIUM (UCSA) NOW INCORPORATED INTO THE WELSH NATIONAL HERBARIUM (NMW)

In 2006, the vascular plants component of the Swansea University herbarium (**UCSA**) were donated to the National Museum of Wales (**NMW**). The bryophyte collection has been retained at Swansea. The collection consisted of about 5000 vascular plant specimens, but after curation consisted of 4256 specimens as material which had been seriously damaged by insects or was inadequately labelled was discarded. The material has all been remounted on conservation grade mounting card, and documented on the museum's collection management system.

Swansea University was founded in 1920, and the herbarium probably dates from about that time with 586 specimens collected from 1920 to 1949. Most of the material was collected after 1950 (3290 specimens) coincident with expansion of the school of Biological Sciences. Some historic material was also acquired, an interesting undated and anonymous collection from about the 1830s centred around Monmouthshire.

As might be expected from a university herbarium compiled by staff and students, about half of the material was collected in South Wales. The following vice-counties were represented: 1–31, 33–46, 48–50, 52–59, 61–66, 69–70, 72–73, 78, 83–85, 88–94, 96–97, 100, 103–105, 107–108, 110–112, H1–H3, H9, H15–H16, H24, H27–H28, H38 and the Channel Islands. Material had also been collected on university field trips or whilst attending conferences in Greece (423 specimens), Spain (395), Iceland (212), Norway (114), India (88), France (46), Sweden (41), Austria (35) and Kenya (23), with small amounts of material from Australia, Belgium, Bulgaria, Denmark, Germany, Greenland, Italy, Malawi, Netherlands, New Zealand, Portugal, Switzerland, Tanzania, West Indies and Zaire.

There was a broad taxonomic coverage, but notable was the relatively large Poaceae collection (1100 specimens compared with the three top other families Asteraceae (329), Cyperaceae (306) and Fabaceae (274)) which included a collection which had formerly belonged to C. Bucknall. The only significant research collections were of Q. O. N. Kay (mainly Asteraceae, unfortunately badly damaged) and some *Melampyrum* material from A. J. E. Smith.

The main collectors are Q. O. N. Kay (1224 specimens collected between 1959 and 1990), A. J. E. Smith (982 specimens 1956–1963), J. Hayward (226 specimens, 1950–1962), C. R. Hipkin (176 specimens, 1962–1984, mostly collected with H. Hipkin), R. Webb (128 specimens, 1954–1970) and M. L. Page (108 specimens, 1975).

The data from the collection will be made available on the National Museum of Wales website, or can be requested from T. Rich.

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