Notes

CORYNEPHORUS CANESCENS (L.) P. BEAUV. (POACEAE) AT KINVER EDGE, STAFFORDSHIRE: A RE-ASSESSMENT

In his review of the distribution and status of *Corynephorus canescens* (L.) P. Beauv. in Britain, Trist (1998) describes the site at Kinver Edge, Staffordshire, which holds one of the few British inland colonies of this grass, and states that "the population of c. 550 plants has remained fairly constant since 1977." Though his site description is reasonably accurate, Trist's estimate of the population size of *C. canescens* fails to take account of its recent dramatic increase following sympathetic site management. This note, therefore, aims to update Trist's account and trace the effects on the *C. canescens* population of conservation measures taken over the last twelve years.

BACKGROUND HISTORY

C. canescens was discovered on the National Trust's property at Kinver Edge by I. C. Trueman in the 1970s. Following the appointment of one of the authors (M. E. Blunt) as Warden in 1986, the Trust has pursued active measures to conserve and increase this population.

In 1986 *C. canescens* was present on two areas some 300 m apart near the south-eastern boundary of the property, where the dip-slope of the escarpment inclines gently to the south-east. Site 1 consisted of a bowl of bare sand of approximately 200 m^2, heavily trampled by the public; *C. canescens* survived here as a narrow rim around the bowl. Site 2 was a flatter area of about 140 m^2, where the grass was reasonably well established. Trist's (*loc. cit.*) estimate of c. 550 plants is not unreasonable for the size of the population at this date. The two *Corynephorus* sites were bounded on the south-east by a sandy track and fence, beyond which lay a grassy field in private ownership; this field received periodic treatments of fertilizer and was cut for sileage up to 1986 but not thereafter. Professor Trueman (pers. comm.) has stated that a small quantity of *C. canescens* was present in this field when the main colonies were discovered. On its other sides the *C. canescens* locality was surrounded by birch/oak/pine scrub encroaching extensively on lowland *Calluna vulgaris* (L.) Hull heath.

MANAGEMENT SINCE 1986

With *C. canescens* fairly well established on Site 2, priority in 1986 was given to halting the erosion of Site 1 and encouraging the expansion of the species across the eroded area. Initially barriers of pine brashings were constructed around the rim of this site to protect existing plants from trampling; but after three seasons there was no noticeable increase in the size of the *C. canescens* colony. Therefore, in winter 1989/90 pine brashings were spread thinly across the open sand, their branches barely touching to allow good penetration of light. This technique largely eliminated trampling and within a season *C. canescens* seedlings had colonised the entire area of open sand. At this point the pine brashings were removed, the grass continued to flourish, and public pressure on this site has remained light ever since.

The main problem with maintaining *C. canescens* populations at Kinver Edge is the presence of mat-forming *Polytrichum* mosses which rapidly establish themselves on sand stabilised by the grass. *Polytrichum* is followed by a succession of other species, notably *Rumex acetosella* L., *Deschampsia flexuosa* (L.) Trin., *Festuca rubra* L. and *Hypochaeris radicata* L. After some three years seedlings of *Calluna vulgaris* and *Ulex europaeus* appear, and within six the *C. canescens* population shows some deterioration. Therefore, in the mid-1990s an experiment to reverse this succession by ploughing the whole of Site 1 with a Dutch harrow was tried, with successful results. The moss thatch was broken up, fresh sand was turned over and *C. canescens* re-colonised from plants which survived in the gaps between the harrow's blades.

Site 2 has had no direct management since 1986 except for regular light trampling from visitors using the adjacent path, and since 1997 from cattle introduced to graze the surrounding heath. This

trampling sufficiently disturbs the sand to allow a few new plants of *C. canescens* to establish themselves; but on the whole the population of Site 2 is deteriorating slowly and gorse scrub has occupied much of the site.

In 1994 a strip of sandy track c. 30 × 4 m parallel to Site 2 and 3 m from it was fenced off and covered with pine brash as described above. Here, too, *Corynephorus* seedlings covered the entire area within a season and now form a closed sward. This is Site 3 in Table 1 below. In the early 1990s ownership of the field next to the *Corynephorus* sites passed to the National Trust, since when light grazing by sheep and cattle has been introduced to encourage the establishment of heathland communities. By 1997 it was evident that *C. canescens* was spreading in two areas of this field adjacent to Sites 1 and 2: these are Sites 4 and 5 listed in Table 1. Other *C. canescens* populations at Kinver Edge consist of a small area just to the west of Site 1 (numbered Site 6 in Table 1) and individual plants scattered widely along track sides and among the *Calluna* heath near the main populations.

ESTIMATES OF THE CURRENT POPULATION

In 1997 and 1998 counts were made of the whole and parts of the *Corynephorus* sites on Kinver Edge in order to estimate the total population. In summer 1997 M. E. Blunt, assisted by S. Anderson, ran four transect lines across Site 4, finding *C. canescens* up to 13 m into the field at its furthest point of colonisation. Quadrat counts were made at 2 m intervals along the transects.

In July 1998 M. E. Blunt, assisted by S. Fereday, measured the dimensions of all the *Corynephorus* sites and made population estimates from quadrat counts on all sites. In September 1998 the two authors made further estimates of the numbers of plants in the three main populations (Sites 1, 2 and 3) from random quadrats. The results of these counts are shown in Table 1.

The September 1998 estimates were made the day after a severe thunderstorm washed away parts of Site 1, doubtless accounting for the discrepancy between the two estimates for this Site; being on more level ground Sites 2 and 3 were little affected by the storm. The July 1998 estimate for Site 4 was taken over a larger area than that of 1997, since *C. canescens* was found up to 21 m into the field in 1998: the area given in the Table for this site is that calculated in July 1998.

It may be deduced from the Table that the total population of *C. canescens* at Kinver Edge currently lies between 40,000 and 50,000 plants.

CONCLUSIONS

In its Kinver Edge stations, *C. canescens* is the pioneer colonist of open sand; it appears to require a fairly stable surface to establish itself successfully, and seems unable to do so where sand is regularly disturbed, for example by trampling or the activities of rabbits (*Oryctolagus cuniculus)*; though a few plants do establish themselves on the less disturbed edges of rabbit warrens. Once *C. canescens* is established, succession of the habitat to gorse (*Ulex europaeus)* and heather (*Calluna vulgaris)* scrub begins within three years and *C. canescens* populations begin to decline within six years unless there are further exposures of bare sand. In short, at Kinver Edge

TABLE 1: ESTIMATED NUMBERS OF *CORYNEPHORUS CANESCENS* PLANTS ON KINVER EDGE

	Area (m^2)	1997	July 1998	Sept. 1998
Site 1	202	-	19,400	12,700
Site 2	145	-	8,100	8,700
Site 3	129	-	10,900	11,000
Site 4	90	1,400	3,900	-
Site 5	40	-	500	-
Site 6	15	-	3,900	-
Scattered	-	-	1,600	-

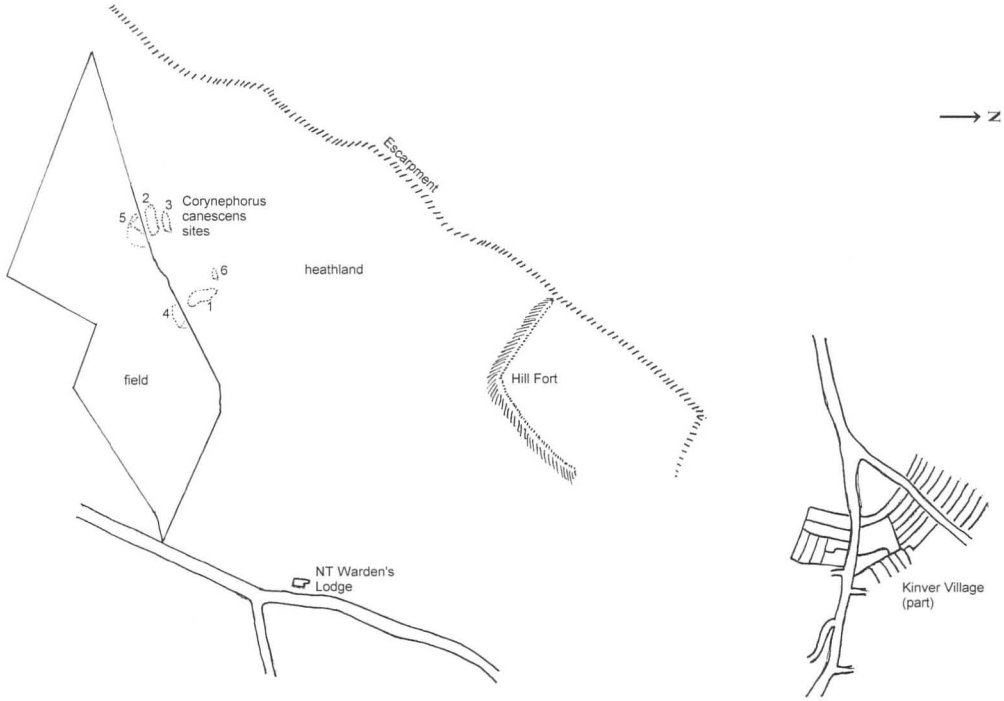

Figure 1. Plan of Kinver Edge, Staffordshire. Scale approx. 1:2500

C. canescens exhibits a narrow niche requirement, viz. periodic disturbance of sand followed by a cessation of disturbance over a cycle of 3–6 years. Current studies suggest that trampling, wind-blow, rainstorms and the activities of rabbits may, depending on their frequency, both create conditions favourable to *C. canescens* and also destroy them. Where conditions remain unfavourable over a period, *C. canescens* seems able to survive as individual plants scattered along the edges of paths, particularly in the lee of overhanging vegetation where they receive little trampling.

Observations further suggest that seed production is overwhelmingly the means whereby *C. canescens* colonises new ground at Kinver Edge; once established, it may continue to propagate itself either from seed or vegetatively. This contrasts with Trist's (*loc. cit.*) studies which suggested vegetative means as the grass's chief method of propagation in Britain. The role of pine brashings in encouraging germination is of interest: besides reducing trampling they may also protect tiny plants from frost and drought, considered by Marshall (1967) as critical factors in seedling survival. Observations also indicate that *C. canescens* is not selectively grazed at Kinver by sheep, cattle or rabbits, and seeds freely at the grazing intensities encountered there.

The authors' studies of the ecology of *C. canescens* at Kinver Edge and its response to various management techniques form part of an ongoing programme. It was, however, felt worthwhile bringing current findings to the attention of those interested in this species and its conservation, as well as updating the published record of what now appears to be a major population of this scarce grass in Britain.

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A. G. BLUNT
University of Wolverhampton, Molineux Street, Wolverhampton WV1 1SB

M. E. BLUNT
Warden's Lodge, Comber Road, Kinver, Stourbridge, West Midlands DY7 6HU

A REANALYSIS OF THE MISTLETOE (*VISCUM ALBUM* L.; LORANTHACEAE) SURVEY DATA FROM THE 1970S AND 1990S

In 1993, the late John Knight and I, exasperated by the Plantlife 1993 Christmas card depicting unseasonal Bluebells, decided to find a more appropriate species for the following year, and had the idea of repeating the 1970s B.S.B.I. Mistletoe (*Viscum album* L.) survey reported by Perring (1973). Independently, Jonathan Briggs had also already been investigating the possibility of repeating the survey. Discussions between the two societies resulted in a joint Plantlife/B.S.B.I. survey in the mid 1990s whose main aim was to determine if Mistletoe was declining. The 1994 Plantlife Christmas card included the Mistletoe survey form.

For the 1969–1972 survey, data on the occurrence of Mistletoe and its hosts were requested from the B.S.B.I., the Northern Horticultural Society and the general public throughout Britain (Perring 1973). For the 1990s survey, records were again collected from throughout Britain by B.S.B.I. and Plantlife members and the general public, and the survey received extensive press coverage (Briggs 1999). When the two surveys were compared, there was large increase in records since the 1970s. Briggs (1999) was unable to draw any conclusions about possible declines or increases because of the uncertainty of whether there had simply been more records sent in for the 1990s survey (i.e. the increase in records was a result of more recording). I had previously had exactly the same problem with the B.S.B.I. Monitoring Scheme data and have spelt it out in some detail (Rich & Woodruff 1990, 1992, 1996).

Fortunately, some further analysis of the data presented by Briggs (1999) is possible. Crucially, the tetrad map for England and Wales (Perring's Fig. 7) had areas marked with hatched lines where Mistletoe had been searched for "intensively but had not been found". By assuming that the areas had indeed been surveyed comprehensively during the 1970s it is possible to assess statistically the probability of any significant increases or decreases in these areas.

METHODS

The number of tetrad records were counted for areas marked with hatched lines in Perring (1973) and for the same areas from the maps in Briggs (1999). The poor reproduction of the map in Perring (1973) meant that determining the limits or exact locations of some hatched areas was very difficult and areas where there was any doubt were rejected. Data for 39 discrete hatched areas which range in size from groups of four tetrads to whole counties representing a total of 2817 tetrads (c. 7% of the tetrads in England and Wales) were available, excluding the large area of Gloucestershire and Herefordshire.

The differences in the number of tetrads were tested for significance using a two-tailed test of equality of the two percentages (Sokal & Rohlf 1969) with 95% confidence limits.

RESULTS

There were 468 tetrad records in the 1970s hatched areas (16·6% of tetrads surveyed intensively), and 562 tetrad records in the same areas in the 1990s (19·95% of tetrads surveyed intensively in

the 1970s). This is a significant increase ($p<0{\cdot}001$). Of the discrete hatched areas marked as intensively recorded in the 1970s, Mistletoe has increased in frequency in 22 areas, showed no change in six areas, and declined in eleven areas.

DISCUSSION

The re-analysis depends on the assumption that the hatched areas marked in Perring (1973) have been surveyed comprehensively. Although Perring indicated areas which had been surveyed sufficiently "intensively" to be reasonably certain that Mistletoe was indeed absent in the 1970s, I have doubts whether hatched areas as large as Surrey were really surveyed thoroughly. Indeed the map of the 1970s survey in Briggs (1999) includes more records showing this to be the case (some from the extension of the survey into 1973). None-the-less, it is reasonable to accept Perring's hatched areas at face value as a reasonably thorough baseline survey. Briggs (1999) rightly makes no claim that any areas had been surveyed intensively.

As it is likely that on average the hatched areas were less intensively recorded in the 1990s than the 1970s, despite the greater number of people participating in the survey, if there was no change or a decline in Mistletoe there should be fewer records. The fact that there are significantly more records despite a less intense survey allows a firmer conclusion to be drawn that there is no evidence for decline for tetrad frequency data in these areas. It is not possible to determine whether Mistletoe has increased or stayed the same because the intensity of the survey in the 1990s compared to that in the 1970s is not known. The inclusion of the Gloucestershire/Herefordshire area, where there is a large apparent decline, may also affect this conclusion.

Assuming that the hatched areas are a representative random sample (they are scattered across the country though with local concentrations), it is possible to extend the conclusion to no evidence of decline at a national level for tetrad frequency data. Rich & Woodruff (1990, 1996) found no statistically significant change in frequency of Mistletoe at a 10-km square level between 1930–1960 and 1987–1988.

A more appropriate form of survey to determine change than an *ad hoc* national survey would have been to re-record the hatched areas intensively. Alternatively, a properly designed sample baseline survey including estimates of recorder effort could have been established against which future changes could have been assessed more accurately. The application of standardised survey techniques, as we have for Ashdown Forest (Rich *et al.* 1996; Rich 1998), would minimise these problems. Once again, the problems of recording bias may have masked real changes in wild plants in the countryside.

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T. C. G. RICH

Dept. of Biodiversity and Systematic Biology, National Museum & Gallery, Cardiff CF10 3NP

THREE NEW BRITISH SITES FOR *CAREX DEPAUPERATA* WITH. (CYPERACEAE) REPRESENTED IN THE IRISH NATIONAL HERBARIUM, GLASNEVIN

In the Irish National Herbarium at Glasnevin Botanic Garden, Dublin (**DBN**), there are four herbarium specimens of *Carex depauperata* from previously unreported localities in Britain, one of which is of doubtful origin.

V.C. 17 SURREY

The first specimen is labelled 'near Farnham, Surrey, August 1846, ex herb. W. McIvor'. William Graham McIvor (?–1876) collected a number of plants in Surrey, but does not seem to have communicated the records to the Surrey botanists of the time (e.g. J. D. Salmon or J. A. Brewer). There is plenty of suitable woodland on calcareous soils in this area (e.g. Hog's Back), not far from the well-known Godalming sites, and this record is accepted.

The second specimen is more problematic. It is labelled 'Leith Hill, Surrey, 30.6.1890, per J. Leitch'. The fact that the label is not in Leitch's hand-writing, the potential for confusion of the popularly-known 'Leith Hill' with the well-known *C. depauperata* locality at Frith Hill, Godalming, and the predominantly acidic nature of soils on Leith Hill, suggests the specimen may be mislabelled. John Leitch (1849–1896) appears to have collected widely in Kent and Cumbria, but there are few Surrey specimens. His herbarium at Carlisle (**CLE**) contains two sheets cultivated at Bournemouth on 21 June 1890 (presumably by E. F. Linton), and another from the Royal Botanic Gardens, Edinburgh, June 1871. This record is not accepted.

V.C. 83 EDINBURGH

A third specimen is labelled 'Wood above Bonelly (ex. herb. W. R. McNab)'. We interpret the locality as Bonally (sometimes spelt Bonaly), near Edinburgh, grid reference c. NT/21.67, now partly a country park. Dr William Ramsay McNab was born in Edinburgh in 1844. He worked at the Royal Botanic Garden, Edinburgh, lectured in botany in Dumfries in 1869 and in Cirencester from 1870, and became the Scientific Supervisor at the Glasnevin Botanic Gardens in 1880, where there are many of his specimens (Nelson 1990; in press). He died in Dublin in 1889. The handwriting on the herbarium sheet is different to other McNab specimens and it may not have been collected by him, but his local Edinburgh connection reinforces our interpretation of the site. This record is accepted, though it is conceivable there may be links between Bonally, McNab and material grown in Edinburgh (cf. above).

V.C. 90 FORFAR

The final specimen is labelled 'Forfarshire, T. McFarlane (ex herb. Rev. H. G. Carroll)' but is undated. We have been unable to trace anything about T. McFarlane to give us any more direct clues about its origin. However, the Rev. Henry George Carroll was an Irish botanist born in c. 1810 and died in 1902, so the specimen was probably collected sometime before 1900. Carroll had obtained other notable specimens from a range of collectors and his herbarium sheets, with their characteristic taxonomic headings and handwriting, represent a significant component of **DBN**. We would like to know more about his possible connections with Scottish botanists.

The specimen also casts new light on the record in Hooker (1821) 'Woods near Forfar, G. Don', accepted by Gardiner (1848) but rejected as doubtful by Ingram & Noltie (1981) as it could have originated from Don's garden (the source of several other confusing records). We believe this apparently independently-collected specimen establishes *C. depauperata* as a Forfarshire species.

There are no other specimens collected in Scotland in **ABD, DEE, E, GLAM** or **PTH**.

This now brings the total number of sites for *C. depauperata* in the British Isles to 14. Although the British collections in **DBN** are relatively poorly known, it is none-the-less surprising that at least three new records should turn up in the same herbarium folder. We hope that these specimens lead to further information and, above all, to the rediscovery of *C. depauperata* in these sites.

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T. C. G. RICH
Dept. of Biodiversity and Systematic Biology, National Museum & Gallery, Cardiff CF10 3NP

R. A. JONES
Countryside Council for Wales, Plas Gogerddan, Aberystwyth, Dyfed SY23 3EE

M. JEBB
Herbarium, National Botanic Gardens, Glasnevin, Dublin 9, Ireland

ELEOCHARIS PARVULA DISCOVERED IN SCOTLAND

On 29 July 1999 we visited the Cromarty Firth S.E. of Pitglassie, Dingwall, E. Ross (v.c. 106), where the River Conon flows in a number of channels separated by low-lying islands with marshes and pools. The marshes and pools contain some species characteristic of fresh water and others which typically occur in more brackish conditions. When we arrived at high tide the channels were full, but as we left we could see that the tide had gone out to reveal extensive mud banks beside them. It was while looking at one of these banks, at grid reference NH/553572, that we noticed a small *Eleocharis* which turned out on further examination to be *E. parvula* (Roem. & Schult.) Link ex Bluff, Nees & Schauer. This species has hitherto been recorded in Britain on the coasts of southern England (Devon, Dorset, S. Hampshire) and North Wales (Merioneth, Caernarvonshire). The occurrence on the Cromarty Firth therefore represents the first record for Scotland and an extension of its British range some 500 km northwards. The identification has been confirmed by S.M. Walters and voucher specimens have been deposited in **CGE** and **E**.

The *Eleocharis parvula* population at Pitglassie grew on both sides of the channel in a substrate of fine mud, or in predominantly stony areas with mud in the interstices of the stones. On the date of our visit it would have been submerged under 50–75 cm of water at high tide. In places it grew under a very sparse stand of *Bolboschoenus maritimus*, but the most frequent associate was *Callitriche stagnalis*, which grew as small, prostrate, fruiting plants which were abundant on the mud banks but did not form a complete cover. Other associates were very occasional plants of *Armeria maritima*, *Cochlearia officinalis* and *Triglochin maritimum*. In late July we could find only vegetative stems, and there was still no sign of flowering when Stewart Angus, Ro Scott and Peter Wortham revisited the site on 31 August 1999, when Peter Wortham returned on 30 September or when Ro Scott went again on 22 October 1999. Even in July the characteristic white turions of *E. parvula* were present, albeit sparingly, on the slender rhizomes. By the end of September the plants were described as yellowing.

The habitat of *Eleocharis parvula* at its English and Welsh sites has recently been described by Byfield (1999). As in the Cromarty Firth, it grows "in large tidal rivers ... on firm bare muddy substrates ... close to the upper limits of tidal influence, avoiding the strongly saline conditions associated with many saltmarshes." However, the occurrence of *E. parvula* with frequent *Callitriche stagnalis* does not appear to have described elsewhere in Britain: no *Callitriche* species are recorded with *Eleocharis parvula* by Rhind & Jones (1994) in their account of the *E. parvula* saltmarsh community at Glaslyn Marsh, Merioneth, for example. Indeed, we have not traced any description in the standard British sources of tidal mud bank communities dominated by *Callitriche* species. Our very limited experience suggests that these are a feature of the large estuaries in N.E. Scotland: on 2 August 1999 we visited the River Beauly E.S.E. of Tomich House,

NH/54.47., where *C. stagnalis* formed an abundant green sward on the sloppy mud banks and flats alongside the large single channel of the river. Rodwell (1995) does not describe these communities, though he mentions the occurrence of *Callitriche* stands in temporarily or seasonally flooded sites such as tracks or woodland rides, the edges of fluctuating ponds or the summer-dry upper reaches of chalk streams. C.D.P. was similarly unaware of the tidal mud communities when preparing the habitat descriptions for *Callitriche* species in Preston & Croft (1997). However, R. M. Burton (in litt., 1999) has since told us that he has seen *C. stagnalis* on estuarine mud sheltered by eyots by the River Thames in west London.

The absence of flowers in the Scottish population of *E. parvula* in 1999 is consistent with its behaviour elsewhere in Britain and Ireland: Byfield (1999) notes that "in many localities the plant flowers and fruits very poorly", and this certainly appears to be true of the more northerly populations: "the plant rarely flowers in Wales" (Rhind & Jones 1994) and the population by the River Bann in Co. Londonderry "apparently does not flower" (Praeger & Megaw 1938).

Although the discovery of *E. parvula* in northern Scotland would not have been predicted from its known British distribution, it is not surprising when viewed in a wider, European perspective. It is perhaps most frequent in Europe around the coast of southern Sweden and the Baltic Sea, including the Gulf of Finland and the southern part of the Gulf of Bothnia, where it grows at higher latitudes than the recently discovered Scottish site (Hultén & Fries 1986; Mossberg 1997). Indeed, its northernmost sites are further north than Shetland. It is, as Byfield (1999) writes, "an inconspicuous plant that usually grows in an uninviting habitat" and it may well have been overlooked elsewhere in Scotland.

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T. D. DINES
Rhyd y Fuwch, near Bethel, Caernarfon, Gwynedd, LL55 3PS

C. D. PRESTON
Institute of Terrestrial Ecology, Monks Wood, Abbots Ripton, Huntingdon, Cambs. PE28 2LS

SUAEDA VERA FORSSK. EX J. F. GMEL. (CHENOPODIACEAE), SHRUBBY SEA-BLITE, PRESENT IN ANGLESEY (V.C. 52), WALES

On the B.S.B.I. field meeting of 13 June 1999, T. C. G. Rich, M. and. J. Davidson and J. A. Green discovered a new locality for *Suaeda vera* Forssk. ex J. F. Gmel., Shrubby Sea-blite, on Anglesey (v.c. 52). Four large plants were found at the high water mark at the top of a stony beach on the north side of the eastern end of Black Creek on the Bodior Estate, Rhoscolyn, Holy Island (grid reference SH/293.757). The plants were to c. 1·3 m tall, were much branched at the base and evidently old, and were just coming into flower and hermaphrodite. They were tucked into a very sheltered rocky corner opposite a small stone fisherman's hut and under low cliffs. It is no surprise that they have not been seen before as they are hidden from view except in the immediate vicinity and the site is on a private estate away from public footpaths. No further plants were found during additional searches of the coastline in this area in June and August. A side branch was collected as a voucher and has been deposited in the National Museum of Wales (**NMW**).

Suaeda vera is generally regarded as native around the coasts of South-east England from Lincolnshire to Dorset, with occasional introductions with ships ballast in North-east England and South Wales (for a recent map, see Stewart *et al.* 1994). The Anglesey locality is highly disjunct from these other sites, but the information available to date does not suggest it was deliberately introduced by man. Other typical saltmarsh species occurred nearby including *Juncus maritimus* Lam. var. *atlanticus* J. W. White and *Zostera angustifolia* (Hornem.) Rchb., and no introduced species other than *Spartina anglica* C. E. Hubb. were present in this pristine area. There are no records of planting by the estate. No ripe seed was found even in August, and it is possible that the four plants have originated by layering (cf. Chapman 1947). We thus regard this locality as the first native site in Wales.

We presume that the plants have either arisen from long distance dispersal by sea water or wildfowl, or are relict from a previously wider, more continuous distribution (it is certainly widely distributed in Europe, Asia, Africa, and in Atlantic islands such as Madeira, Canaries and St Helena, on the coast as well as inland). Ridley (1930) states that *Suaeda* seeds appear to sink very speedily, but quotes no data for *S. vera*. To provide more information on seed floatation, 30 ripe seeds were collected from bushes on Chesil Beach, Portland in September 1999 and placed in a beaker of sea water, with or without calyces depending on how they had fallen off the plants. After stirring to simulate wave action, the number of seeds floating were recorded at intervals for one month (Table 1). Most seeds sank within 5 days, but one seed floated for at least one month. No germination occurred in sea water. To test that the seeds were still viable after immersion in sea water for a month, they were rinsed in fresh water and placed on damp tissue paper in a petri dish and left to germinate. Five seeds (17%) germinated within two weeks but none thereafter. The poor flotation time suggests that plants are unlikely to have arrived at this site directly by sea water transport, and are more likely to have been brought by wildfowl which regularly winter on Anglesey.

A number of other essentially maritime species with disjunct distributions also reach their northern limit on Anglesey including *Juncus capitatus* Weigel, *Asparagus officinalis* L. subsp. *prostratus* (Dumort.) Corb. and *Rumex rupestris* Le Gall. *Frankenia laevis* L., another south-

TABLE 1. NUMBER OF SEEDS OF *SUAEDA VERA* FLOATING IN SEA WATER WITH TIME (N = 30).

Days	Number floating (%)
0	30 (100%)
3	20 (67%)
4	8 (27%)
5	5 (17%)
6	4 (13%)
10	1 (3%)
30	1 (3%)

eastern species of saltmarshes and rocks with a virtually identical distribution to *S. vera*, was found nearby on Anglesey in 1965 (Roberts 1975); the discovery of the *Suaeda* suggests it could also be native.

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T. C. G. RICH
Dept. of Biodiversity and Systematic Biology, National Museum & Gallery, Cardiff CF10 3NP

N. BROWN
Treborth Botanic Garden, University College of North Wales, Treborth, Bangor, Gwynedd LL572RQ

A PROBABLY NATIVE AND REGENERATING POPULATION OF *TILIA PLATYPHYLLOS* SCOP. IN BEDFORDSHIRE

Evidence that *Tilia platyphyllos* is native in scattered localities in England and Wales was reviewed by Pigott (1981), where most of the sites discussed are on cliffs or steep slopes of hard limestone or volcanic rocks in the Welsh borders, Derbyshire and Yorkshire and where annual rainfall exceeds 800 mm. Since 1981 as many as 23 localities have been discovered on the chalk of the South Downs in west Sussex and Hampshire (Abraham & Rose; unpublished report 1998). These populations are usually of large old trees, or a mixture with younger trees, but there is almost no regeneration. Quite characteristically in this drier part of England the sites are at the foot of the north-facing escarpment of the South Downs where the trees grow close to the spring-line, often at the head of coombes and along their flanks.

In 1993 Graham Bellamy, manager of the Barton Hills National Nature Reserve in Bedfordshire, told me that there were three large lime-trees in Leat Wood on the steep east-facing slope of the chalk coombe south of Barton-le-Clay (51°57'N 0°25'W; GR 52/08.29). Shoots were obtained from the emergent crowns by climbing the trees, and proved to be of typical *Tilia platyphyllos* Scop. subsp. *cordifolia* (Besser) Schneider.

The upper part of Leat Wood is dominated by beech (*Fagus silvatica*), which was probably planted about 1830, but the steep slope is occupied by a mixture of ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*) and horse chestnut (*Aesculus hippocastanum*). There is patchy regeneration of ash, beech and sycamore with scattered saplings of lime. The largest lime had a basal diameter of almost 3·0 m. As an indication of its age it may be noted that this is as large as the tree of *T. platyphyllos* which was planted in 1565 in the open and in a more fertile site at Burghley House, Northamptonshire, and was therefore 450 years old in 1995. Leat Wood was shown on the OS. map (1:10560 sheet 30NW) of 1891 (surveyed in 1880–81) and also on the pre-enclosure map of 1778, where it is called 'The Lead'.

Below Leat Wood, a stream flows northwards down the valley. Its source is two vigorous springs at the head of the lower coombe at 52/089.295, and beside them grows a tree of *T platyphyllos* in a typical natural habitat for the species. The tree originally had two trunks but in 1995 one was a stump and the other 18 m tall with a diameter at 1·3 m above the ground (dbh) of 1·09 m. A section cut from the stump gave a ring count of 173 but the outer 70 mm was decayed.

From the average ring width in the adjacent wood this represents another 30 years, to give an approximate age of 203 years. Having two trunks, the tree had probably been cut and regrown and was therefore older.

Above the spring is the most remarkable feature of the site which is perhaps unique in Britain. On the steep north-east facing slope at 52/088.294 is an area of woodland containing 32 trees of *T platyphyllos,* mixed with ash and beech of similar size. Most of the trees are maidens (with a single stem) and variation in diameter (dbh) is approximately normal with a mean of 0·31 m, SD ± 0·09 m (March 1995). The immediate impression was that the trees were of one age and might therefore have been planted.

On the pre-enclosure map of 1778 the area was south of the boundary of Leat Wood and shown as 'common pasture'. On the O.S. map it was in 1880–81 still treeless and shown as rough pasture. In Dony (1953) a photograph (plate 20), which was probably taken about 1945, shows large trees around the spring and all the slopes above are downland, while the particular slope has sparse scrub above and below the prominent footpath.

The hills were part of the estate of Hexton Manor and the present owner Mr J. A. Cooper told me that before World War 2 the hillsides were grazed by sheep, which were later confined to the east of the sharp boundary of the scrub in Dony's photograph. Parts of the scrub were cut but at no time this century were trees planted on the slope.

Cores were taken in March 1995 with a Pressler corer from close to the base of the trunk of a sample of lime trees. Ring counts showed that the trees were, in fact, of several ages. The oldest trees (dbh 0·40–0·49 m) had 51–55 rings and therefore date from 1939–43, several trees (dbh 0·22–0·35 m) had 41–45 rings and date from 1949–1953, which is before the demise of rabbits following myxomatosis, and the youngest tree sampled (dbh 0·14 m) dated from 1966. One of several large hawthorns (*Crataegus monogyna*) dying beneath the limes dated from 1942. The field-layer under the limes was sparse and included species from the original downland (*Primula veris*) but consisted predominantly of woodland species dispersed by birds and mammals (*Arum maculatum, Geum urbanum, Hedera helix, Sanicula europaea*). *Mercurialis perennis,* which was abundant in Leat Wood and near the spring was conspicuously absent from most of the new woodland.

The evidence that *T. platyphyllos* is native at Barton is circumstantial and is essentially the age of the oldest trees and their presence at a spring-head site. It must, however, be recognised that *T. platyphyllos* sets plentiful fertile seeds and in most years seedlings are common in England, so that it has the potential to regenerate and to be dispersed. Indeed, at Barton the colonisation of ungrazed downland and the ability to spread and become established in suitable habitats is dramatically demonstrated.

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C. D. PIGOTT
Greenbank, Cartmel, Grange-over-Sands, Cumbria LA11 7SQ

FURTHER BRITISH SPECIES OF *RUBUS* L. (ROSACEAE) IN NORTH-WEST FRANCE

Following the discovery in the Cotentin Peninsula of west Normandy of eight *Rubus* species previously unknown outside the British Isles (Allen 1966), wider exploration of north-west France as well as further study of material already collected have resulted in the detection of several more. A number of British species already known there have also been found to occur more widely.

In this second list first published records for mainland Europe are highlighted by an asterisk, as before. Determinations assented to by A. Newton are indicated by an obelisk (†) against the locality in question. For *départements* renamed in recent years the previous name is adhered to, for the sake of consistency with earlier records – by analogy with the British Isles vice-county system. My specimens have all been lodged in **BM**.

R. nobilissimus (W. C. R. Watson) Pearsall Calvados: Bois de St.-André, Falaise†. New to France, but collected in Belgium in 1970 by H. Vannerom, det. Newton (Vannerom 1998).

R. oxyanchus Sudre Calvados: a colony in wood at west end of Rochers des Parcs, Clécy. This trans-Channel species seems much rarer in France than in England.

**R. plymensis* (Focke) Edees & Newton Manche: margin of heath, La Pernelle, near Quettehou†. This Cornubian species has also recently been found in Guernsey.

R. pyramidalis Kalt. Extends westwards at least to central Brittany (Ille-et-Vilaine: Forêt de Paimpont).

**R. riparius* W. C. Barton ex Newton Calvados: abundant both in heathy scrub at west end of Rochers des Parcs† and in Bois de St.-Clair, Clécy†. Only recently recognised in south Wessex, before which it was believed endemic to north-west Wales.

**R. viridescens* (Rogers) T. A. W. Davis Loire-Inférieure: patch in a boggy ditch, wood on west side of Herbignac, det. Newton.

R. rubritinctus W. C. R. Watson Locally common in Cotês-du-Nord, where Rogers turns out to have collected it in 1897 (**BM**). Very local in central Normandy.

R. hylophilus Rip. ex Genev. Rare. Calvados: foot of Rochers de Brisevieille, Cossesseville; Bois de St.-André, Falaise. Cotês-du-Nord: Lande de Fréhel. Single bushes or patches in each case.

R. neomalacus Sudre One of the commonest species of the region at the mouth of the Loire, its French headquarters, yet, puzzlingly, in Britain virtually confined to Surrey.

R. stenopetalus Lef. & P. J. Mueller Calvados: Bois de St.-André, Falaise.

R. adscitus Genev. Mostly thinly distributed. Seen in plenty only in certain woods and plantations in Calvados, Sarthe, Maine-et-Loire and Côtes-du-Nord.

**R. thurstonii* Rilstone Manche: Mont du Roule, Cherbourg, locally frequent on lower slopes†. Collected by Newton in 1984 near Quettehou, in the north-east of the Cotentin Peninsula.

R. vestitus Weihe Orne: Château d'Or plantation, Montrée, on clay. The nearest this basicole seems to come to the granite massif covering most of north-west France.

**R. coombensis* Rilstone Manche: Mont du Roule, Cherbourg, locally common in heathy scrub†; wood margin, La Glacerie Église, near Cherbourg†.

R. echinatus Lindl. Rare or absent north of the Loire valley, where it becomes plentiful from Angers eastwards.

R. leightonii Lees ex Leighton Though seemingly absent from the Cotentin Peninsula proper, locally common in Calvados, Côtes-du-Nord, Maine-et-Loire and Indre-et-Loire.

R. bloxamii (Bab.) Lees Increases southwards to become locally comon in Orne and Mayenne, but apparently absent from Brittany.

R. botryeros (Focke ex Rogers) Rogers The supposed first record from the European mainland (Allen 1996), near Cherbourg in Manche, turns out to have been anticipated by Rogers in 1897 at Dinan in Côtes-du-Nord†(**BM**).

**R. cantianus* (W. C. R. Watson) Edees & Newton Manche: Bois du Mont du Roc, near Cherbourg†. A surprising occurrence in this strongly Atlantic florula of this otherwise south-east England species, unknown west of Wiltshire.

R. flexuosus P. J. Mueller & Lef. Not seen outside the Cotentin Peninsula.

R. insectifolius Lef. & P. J. Mueller Calvados: locally common on gorse-covered hillside, Rochers des Parcs, Clécy. Apparently rare in north-west France,

R. asperidens Sudre ex Bouvet Calvados: one clump at east end of Rochers des Parcs, Clécy. Apparently very rare in Normandy and absent from Brittany, coming in quantity only in Anjou.

**R. rilstonei* W. C. Barton & Riddelsd. Morbihan: Lanmeur, 1969, H. Vannerom, det. Newton. Côtes-du-Nord: common on heath margins, Lande de Fréhel†.

**R. tamarensis* Newton Calvados: in three places near Clécy – locally common on north bank of R. Orne at foot of Rochers de Brisevielle, Cossesseville†, Bois de St.-Clair, Meslay†; hedge bottom by La Vigne, Culey-le-Patry.

R. tumulorum Rilstone Manche: Bois de Pépinvast, Val de Saire†. Second record for the Cotentin and mainland Europe.

R. scaber Weihe Ille-et-Vilaine: Forêt de Paimpont, one patch (new to Brittany?).

R. nemorosus Hayne ex Willd. Penetrates west to the Loire mouth, where it is common in the fens of the Parc des Brières.

R. transmarinus D. E. Allen The wider distribution claimed by Rogers, earlier doubted (Allen 1994), has proved to be the case after all: thinly distributed in Calvados, this is also the prevailing member of Sect. *Corylifolii* in the coastal parts of Côtes-du-Nord (where it may be the plant collected by Coilliot at Le Val-André which Sudre described as *R.* × *namneticus*).

Of the 208 species included in the monograph by Edees & Newton (1988) that were believed at that time to be endemic to the British Isles, no fewer than 36 have now been detected on the European mainland. Of these, 17 have been found as yet only in France and 14 in the Low Countries (cf. Vannerom 1988). A further seven are also now known to extend to the Channel Islands, which belong to the mainland geographically rather than to Britain.

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D. E. ALLEN
Lesney Cottage, Middle Road, Winchester, Hampshire, SO22 5EJ

RUBUS ANGUSTICUSPIS SUDRE (ROSACEAE) IN SCILLY

In a recent revision (Allen 1997) of *Rubus fruticosus* agg. in the Isles of Scilly, v.c. 1a, the granite archipelago 45 km south-west of Land's End, 18 morphotypes were listed as occurring, of which five appeared to be undescribed. Two of the latter, both members of ser. *Hystrix* Focke, are locally

abundant. One of these, already known to be widespread in Brittany, has subsequently been described as *R. venetorum* (Allen 1998); the other has now belatedly been recognised as an unusually robust version of *R. angusticuspis* Sudre, a British endemic hitherto recorded only from the southern end of the Welsh Marches, North Somerset, v.c. 6, and one wood in the Isle of Wight, v.c. 10.

The discovery of this species in Scilly is of interest for three reasons apart from the major extension to its known range that this represents. For a start, its local profusion on the two largest islands, St. Mary's and Tresco, and the robustness of its growth, in full sun no less than light shade and despite the thinness of the soil and exposure to strong westerly winds, would seem to indicate that it finds here conditions conducive to its optimal development. The other English and Welsh populations thus have to be regarded as for the most part depauperate by comparison. The Scilly plants, however, differ from the generality of those not only in dimensions - the terminal leaflet of the stem leaves ranges up to 11 × 6 cm as against 8 × 5 cm given as the limit in Edees & Newton (1988) – but also in two qualitative characters: in the specimens examined the styles were noted as yellowish, not "red-based", and the petals instead of being "bright pink" are uniformly more or less white. In this last respect *R. angusticuspis* in Scilly parallels *R. mollissimus* Rogers, another of the islands' *Rubus* species with a much more easterly range in Britain. It may be that the high actinic content of the sunlight for which the islands are noted places pink flowers at a selective disadvantage there.

A third point worthy of note is the coexistence in quantity in this comparatively remote island group of members of three quite different *Rubus* florulas: *R. iricus* Rogers, otherwise all but confined to the western half of Ireland, *R. venetorum* D. E. Allen, a species predominantly of Brittany and *R. angusticuspis*, a member of the Severn Bay Florula (Newton 1980). This is one further illustration of the value of *Rubus* for the finer discrimination of phytogeographical affinities than most other biota are able to provide.

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D. E. ALLEN
Lesney Cottage, Middle Road, Winchester, Hampshire, SO22 5EJ