



Calypogeia suecica in Britain and Ireland

Rory Whytock updates our knowledge of a hitherto under-recorded liverwort

C*alypogeia suecica* (Arnell & J.Perss.) Müll. Frib. is a Nationally Scarce species of liverwort in Britain (Pescott, 2016) that grows on dead wood and, more rarely, on decomposed peat substrates. Within Britain and Ireland, the species is currently recorded from Scotland, the Republic of Ireland and Northern Ireland (Blockeel *et al.*, 2021). Recent targeted recording of *Calypogeia suecica* in Scotland has revealed new records for the species and has extended its known range to the eastern highlands of Scotland. This article aims to encourage better awareness of a somewhat overlooked species, to provide an updated distribution map and to highlight where else it is likely to occur.

△ Figure 1. *Calypogeia suecica* on a large, rotten *Pinus sylvestris* log, Loch Garten RSPB Nature Reserve, vc 96. All photos by Rory Whytock

Known distribution before the current survey

The most recent distribution map of *Calypogeia suecica* in Britain and Ireland (Blockeel *et al.*, 2014) shows a marked western trend, with most of the historical records occurring in Scotland west of the Great Glen fault (broadly from Inverness south to Fort William) and in western locations in Ireland. This distribution does not reflect its categorisation by Hill & Preston (1998) as a European Boreal-montane species. In Scotland it seems to have been largely overlooked in well-worked boreal areas such as the Cairngorms National Park.

While I have stated that there are no records for *C. suecica* for Scotland east of the Great Glen fault, the *Liverwort Flora of the British Isles* (Paton, 1999) mentions *C. suecica* as an associate of *Lophozia guttulata* (as *L. longiflora*) near Loch Morlich (vc 96). Unfortunately, this record does not appear in the BBS or any other dataset, but it may well occur in the original *L. guttulata* collection (BBSUK).

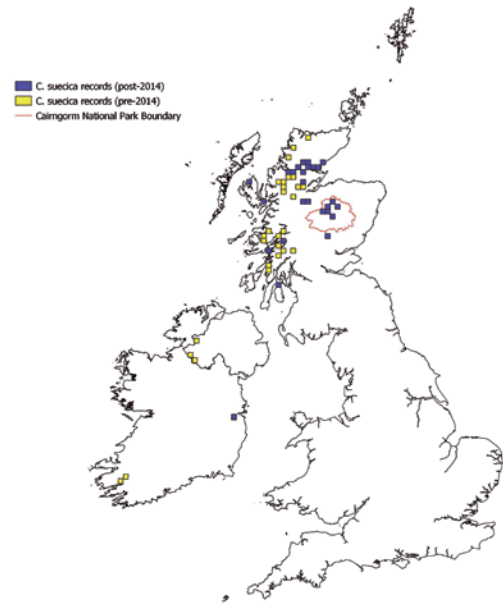
Updated distribution

A dedicated attempt to survey the species by the author in boreal areas of Scotland has revealed many new populations of *Calypogeia suecica*. A significant number of these records are found in the Cairngorms National Park, where it has recently been confirmed from East Perth (vc 89), S. Aberdeenshire (vc 92), Banffshire (vc 94) and Morayshire (vc 95). Other notable additional records made since the last atlas (Blockeel *et al.*, 2014) include a suite of records by Des Callaghan to the north of Inverness, where there were few previous records, and a new vc record from the Isle of Arran (vc 100) by Gordon Rothero (Hodgetts, 2019).

In Ireland, where it was considered Regionally Extinct by Lockhart *et al.* (2012a, b), there have been two recent records since the publication of the last atlas, including in the eastern region of the country in Co. Dublin. A distribution map compiled from the most recent records held in the BBS database and the author's own observations (now submitted to the database) can be seen in Fig. 2.

Habitat

In Scotland *Calypogeia suecica* has primarily been recorded in coniferous, deciduous and mixed stands of woodland, where it is most frequent within ancient semi-natural woodlands but can also occur in commercial plantations where dead



△ Figure 2. Updated distribution of *Calypogeia suecica*.

wood is freely available.

One of the key requirements for the species appears to be the frequency and availability of decorticated coniferous or deciduous logs which are sufficiently rotted so that the wood has become soft to the touch. As the species occurs primarily on well-rotted logs, it is not always straightforward to identify the log/tree to species level, but it has been recorded from Downy birch *Betula pubescens*, Scots pine *Pinus sylvestris* and Sitka spruce *Picea sitchensis*. The largest populations are found on logs that are typically large in size (>15 cm in diameter). It can also occur on degraded peat, but this seems to be a less favourable substrate, at least in Scotland. The species occurs most abundantly in areas of woodland with at least moderate canopy coverage from trees or shrubs, although the amount of woodland cover varies significantly. *C. suecica* can occur in areas near the edges of woodland where canopy cover is sparse. Indeed,



△ Figure 3. Typical habitat of *Calypogeia suecica* in Caledonian pine forest with an understory of *Betula pubescens*, Loch Garten RSPB Nature Reserve, vc 96.

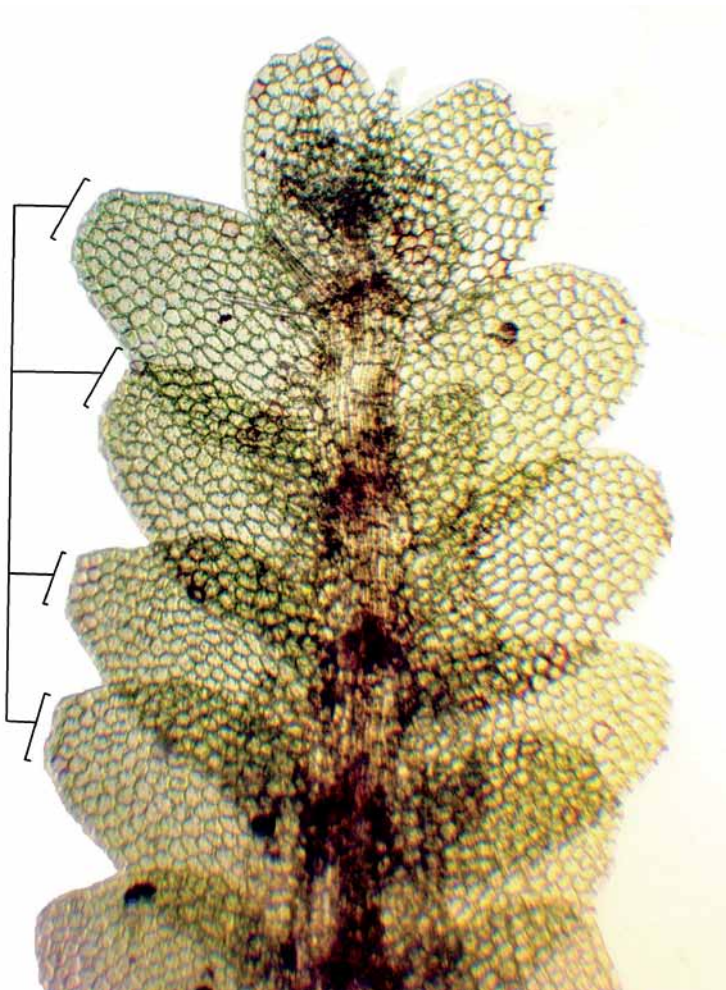
many early Irish records for the species are from degraded peat habitats that are not in woodland, though dwarf shrubs will offer some degree of protection from the elements. Recent records from Ireland, however, are from the more typical rotting wood substrates (R. Hodd, pers. comm.) A typical habitat is shown in Fig. 3.

The most common associates include *Cephalozia curvifolia*, *Lepidozia reptans*, *Riccardia palmata* and *Scapania umbrosa*. Indeed, the latter species seems to be a good indicator of the presence of *Calypogeia suecica* within the Cairngorms National Park. *C. suecica* also commonly occurs with *Buxbaumia viridis* and *Anastrophyllum hellerianum*, which are generally scarcer in their distribution, although within the Cairngorms National Park these species often occur with *C. suecica* as an associate. Indeed, where the substrate is suitable for *A. hellerianum*, *C. suecica* is ubiquitously present alongside it in the National Park.

Identification

While this article does not aim to provide a full account of the identification of *Calypogeia suecica*, a brief overview of the specific facies of the species will hopefully allow other bryologists to select suitable candidates for microscopic examination.

At first glance, *C. suecica* is rather nondescript in appearance and resembles many of our other *Calypogeia* species. It is most likely to be confused with *Calypogeia* species that commonly occur on rotting logs such as *C. fissa*, *C. muelleriana*, *C. neesiana* and *C. integristipula*. In the field, well-rotted logs with *Cephalozia curvifolia*, *Lepidozia reptans* and *Scapania umbrosa* should be searched for small (<2 mm wide) *Calypogeia* shoots. Within the core range, the species often forms extensive, almost pure mats (Fig. 1), although it can also be frequently found as scattered shoots growing through a mix of other species. One of the easiest features in the field that helps to

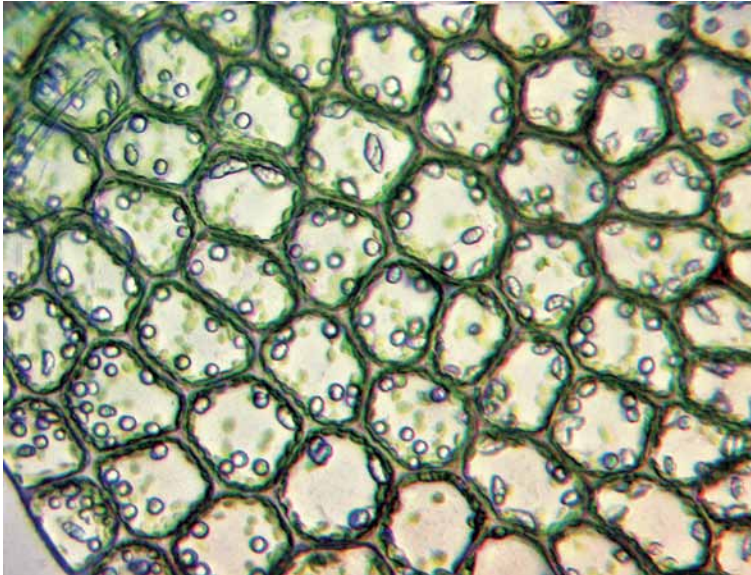


◁ Figure 4. *Calypogeia suecica* shoot showing the typically truncate leaf lobes.

separate it from similar species is the noticeably truncate (rather square-ended) leaf apex (Fig. 4). The colour is often a golden yellow but can be a dingier yellow/olive green. Gemmiferous shoots are frequent, but not always present. The small nature of the individual shoots makes examining underleaves a rather tricky task, but, with practice, these can be seen to be noticeably wide both in relation to stem and to overall shoot width. The underleaves near the shoot tip often have four well-defined lobes or have two lobes with the outer edges forming distinct 'shoulders'.

Under the microscope, the underleaves are noticeably (if sometimes shortly) decurrent. Checking this latter feature often involves stripping some of the leaves and underleaves from sections of the shoot to allow clear views of the leaf bases, which can be difficult to see as they are often obscured by the surrounding leaves.

Oil bodies should be checked microscopically on fresh material. They are transparent to slightly greyish in colour and occur in all leaf and stem cells. Averaging between 2–8 per cell, there is a combination of simple, unsegmented spherical



◁ Figure 5. Oil bodies in leaf cells are a mixture two different types, simple (unsegmented) and spherical in shape, and segmented and more or less pyriform.

oil bodies and more or less pyriform, segmented oil bodies (Fig. 5).

Separation from similar species

Separating *C. suecica* from *C. neesiana* and *C. integristipula* is often quite straightforward as the latter two species are rather opaque in colour and have rounded (often unlobed) underleaves, features not exhibited in *C. suecica*. Species that show obviously bidentate leaves, including *C. arguta*, *C. fissa* and *C. azurea*, can also be discounted fairly rapidly, as although *C. suecica* has noticeably truncate (square-ended) tips to the leaves, they are rarely bidentate (or if they are, then the leaf tips are at best obtuse and never sharply bidentate as is characteristic of other species).

Small forms of *C. muelleriana* are what *C. suecica* is most likely to be confused with in the field. Identification is best judged by the truncate leaves which *C. muelleriana* rarely shows. However, care should be taken here as, although it is an obvious feature in *C. suecica*, some forms of *C. muelleriana* can sometimes

persuade the observer that its leaves are (almost) truncate. However, this is never obvious or consistent throughout the length of the shoot or population. Such examples are best separated under the microscope until one is confident with the identification of the species.

The best current identification reference for the species is Paton (1999). There are two further useful characters given in Frey *et al.* (2006) and other literature. The first is the distance between the underleaves, which are usually imbricate and overlapping in *C. suecica*. The second is the number of cells between the sinus and the rhizoid area of the underleaves. In *C. suecica*, there are 2–4 rows of cells in this area, whereas other species have more than 4 rows (e.g. *C. muelleriana* has 4–6 rows of cells).

The taxonomic situation regarding *C. suecica* may be more complex than is currently understood. A recent paper (Šlipiko *et al.*, 2020) found two distinct genetic lineages in European material, so we may be dealing with more than one species within the current taxonomic treatment of *C. suecica*.

Predicted distribution

The present results show a modest extension for *Calypogeia suecica* in Scotland. However, it is still unclear what the distribution is in the rest of the Britain and Ireland. In Scotland, it is likely that the core species range will remain within the Highland region as, although the majority of my time has been spent searching areas within the Cairngorms National Park Authority boundaries, I have made limited attempts at searching for the species in central and southern Scotland with no success. Although the survey methods use a rather *ad hoc* approach, it does seem to indicate that if the species is present within these regions, it is likely to be scarce or rare.

In Ireland it is likely that, although *C. suecica* is almost certainly overlooked, it is genuinely rare and not widespread. Although it has not been seen in Northern Ireland since 1961, the fact that it was recorded on multiple occasions from three sites in Fermanagh and Tyrone between 1957 and 1961 by J.W. Fitzgerald suggests that this species is likely to still occur and has been overlooked in that area in the intervening years. The record from Co. Dublin may be a chance transient occurrence or perhaps be indicative that the distribution of *C. suecica* in Ireland is wider than previously assumed (R. Hodd, pers. comm.).

There are currently no records for the species in England and Wales. As it has previously been overlooked in well-recorded regions in Scotland, and it is known to occur in Ireland, it is not unreasonable to speculate that the species may well occur in England and Wales. Obvious locations to target *C. suecica* would be any areas of ancient semi-natural woodland where other Boreal-montane species occur. The best predictor for areas to search would be places where *Anastrophyllum hellerianum* has previously been recorded, such as the woodlands in the

Lake District National Park in England and similar locations across Wales.

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