British & Irish Botany 5(1): 93-100, 2023

Can the distribution patterns of plants used by humans as food give clues as to whether they are native or introduced?

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This pdf constitutes the Version of Record published on 14th February 2023

Abstract
The discovery that *Arbutus unedo* (Strawberry Tree) was probably introduced to Ireland and Wales by pre-Bronze Age copper miners about 2,400 BC (Sheehy Skeffington & Scott, 2021) has led me to consider whether the distributions of other British and Irish plants might have been extended by the activities of early humans, including hunter-gatherers. Three species have been chosen for study, *Blitum bonus-henricus* (L.) Rchb. (Good-King-Henry), *Bistorta officinalis* Delarbre (Common Bistort) and *Lathyrus sylvestris* L. (Narrow-leaved Everlasting-pea). These have contrasting distributions. The tetrad distributions of the three species were examined for areas where the distribution is coherent, suggesting native status, or broadly random, suggesting introductions. Individual localities were studied for a sample of vice-counties. Natural dispersal methods were also studied as were the likely uses by humans. It was concluded that the *Blitum* is an archaeophyte that had been introduced as a vegetable by early farmers in the Neolithic or Bronze Age. The *Bistorta* is a native species that survived the woodland invasion following the Ice Age in refugia in the north of England and, when woodland cover was reduced by man in the Neolithic and Bronze Age, recolonised only limited areas where it came to be used as a vegetable. It was later widely introduced elsewhere as a medicinal plant. The *Lathyrus* is a native species that had probably been harvested as a vegetable by man in the Mesolithic Age, and cultivated from the Neolithic or Bronze Age. Introductions from other sources were also probable.

Key Words: Hunter-gatherers; Mesolithic; Neolithic; *Blitum bonus-henricus; Bistorta officinalis; Lathyrus sylvestris*

Introduction

Ray Mears and Professor Gordon Hillman co-presented a BBC television series *Wild Food*, which led to a publication of the same name (Mears & Hillman, 2007). It included the simplified outcomes of ten years ongoing field research into a selection of plants in the British flora that could have been used by British hunter-gatherers before the introduction of farming in the Neolithic period, but for which archaeological evidence was lacking. In contrast to *Food for Free* (Mabey, 1972) and *Flora Britannica* (Mabey, 1996), they were particularly interested in plants that could have been cooked and used as staple foods without pots or pans, and they learned

how to cook such vegetables on heated stones in covered pits by observing traditional methods being used in the Australian outback. Hillman was a respected archaeobotanist whose professional career had been in Turkey and other parts of the Middle East. Sadly, a projected fuller account of this research was not completed before Hillman's death in 2018. My decision to include *Lathyrus sylvestris* in this study derives from their work.

Archaeologists have great difficulty in identifying vegetable material in their excavations. While hazel nuts and seeds, including cereal grains, can be well preserved, vegetables are seldom preserved well enough for identification to be possible, let alone achievable. Camilla and Jim Dickson reviewed the subject in their *Plants & People in Ancient Scotland* (Dickson & Dickson, 2000). They had identified seeds and cereal grains together with minute fragments of the seed coats of *Lens culinaris* (Lentil) and *Vicia faba* (Field Bean) in their work on the sewers at Bearsden Roman fort, Dunbartonshire. They referred to excavations at York that had also found traces of the same pulses from the Roman period. A thesis from the Czech Republic on *Hunter-gatherer archaeobotany: Central European Mesolithic* (Divišová, 2014) found similar constraints. Pending advances in archaeology, indirect methods must be sought to gain insight into the vegetable diet of early Britons.

Meanwhile botanical recording at tetrad scale, or finer, has reached a degree of coverage in BSBI's Distribution Database (https://database.bsbi.org/) that enables a perspective to be gained on the British and Irish flora that was not available at the time '*The New Atlas*' was published (Preston *et al.*, 2002). If, in a particular habitat, a species is so frequent at tetrad scale that most of its occupied tetrads are contiguous, it can be said to have a coherent distribution. A distinction can then be drawn between areas where the distribution is coherent, suggesting native status, or broadly random, suggesting introductions.

Blitum bonus-henricus

Blitum bonus-henricus (L.) Rchb. (Good-King-Henry) was classed as an archaeophyte in *'The New Atlas'*. Despite the lack of archaeological evidence, it is widely supposed that this species, which thrives in nitrogen-rich soils, was introduced to Britain by early farmers in the late Neolithic or Bronze Age. It was grown in cottage 'cabbage patches' ('kail yards' in Scotland) and later thrown out to survive in road verges near habitation and on tips. It makes a very acceptable green vegetable when cooked.

The tetrad distribution of *Blitum* is broadly random (Fig. 1). There is no concentration of records anywhere that might indicate fully naturalised or native populations. However, exceptionally, I have noted it naturalised down the river gravels of a ten-kilometre stretch of the Leader Water in Berwickshire (Braithwaite, 2014). It reproduces by seed, but its colonies, though long-lived, only spread freely in partly-open habitats like tips. The tetrad distribution supports the classification of *Blitum* as an archaeophyte.

Bistorta officinalis

While *Bistorta officinalis* Delarbre (Common Bistort) is usually thought of as being a more lowland species than *Bistorta vivipara* (Alpine Bistort), this ignores the fact that it is a montane species in much of its European range (Polunin, 1969). While it is true that only *B. officinalis* is found at low altitude in Britain, the tetrad distribution

strongly suggests that it is a species that survived the woodland invasion following the Ice Age in the same refugia as the montane species which are often known as 'The Teesdale rarities' (Clapham, 1978) in Teesdale and similar limestone outcrops in the Lake District where woodland cover was never complete. When woodland cover was reduced by man, it recolonised, but to a limited extent only. If this is so, the native distribution of *B. officinalis* is limited to the Lake District, the Yorkshire Dales (including Teesdale) and other parts of the Pennines where it has a coherent distribution at tetrad scale and is a member of a characteristic community of the wet sub-montane meadows that are a feature of the area. In the rest of England and Scotland the distribution is almost random at a tetrad scale, suggesting that it is an introduction there (Fig. 2).

Figure 1. Part of the tetrad distribution of *Blitum bonus-henricus* (records from BSBI Distribution database, accessed in December 2022)

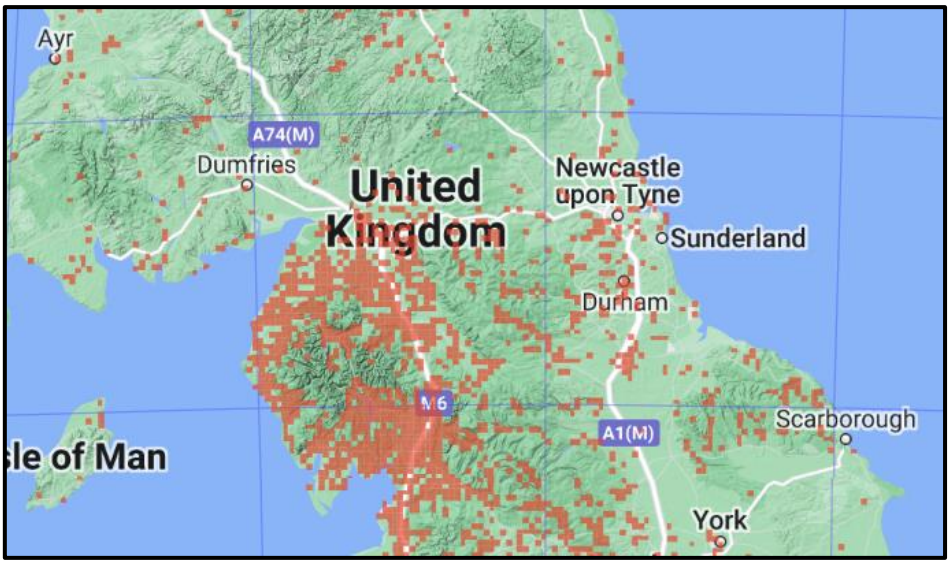

Figure 2. Part of the tetrad distribution of *Bistorta officinalis* (records from BSBI Distribution database, accessed in December 2022)

Bistorta officinalis has been used by man in two ways: the leaves have been used as a vegetable and the roots as a medicinal herb. The relevant web-page of the herb garden of Bolton Castle (Carter, 2022) summarises the medicinal properties of the root-stock as 'rich in tannin, it was one of the strongest astringents available to medieval herbalists and was used for the treatment of infectious diseases, small burns and wounds and to stop bleeding.' Most treatments used an extract of the roots applied externally. There is a much more comprehensive article on *Bistorta* in the online *A Modern Herbal* (Grieve, 2022).

The use of the *Bistorta* as a vegetable seems to have been largely confined to the area where I suggest it is native and where, in addition to natural dispersal, its roots may well have been planted near habitation. It was cooked for use as a green vegetable and used to make the 'Easter Ledges Pudding' that has a wide literature, perhaps out of proportion to the use made of the recipe in the past. Its use as a vegetable in this area may well date back to the Mesolithic period, though there is no archaeological evidence to support this.

I have considered the history of *B. officinalis* in Scotland (Braithwaite, 2021) and concluded that it is an archaeophyte there. It is a mystery why its colonisation north after the Ice Age was curtailed at the Scottish Border as there appears to have been suitable habitat. Perhaps there was just not enough time after the Lake District had been recolonised to low altitudes. In the Scottish Borders and North Northumberland, it is notably absent from wet sub-montane meadows but present in discrete colonies strongly associated with medieval castles and towers (usually ruined). The situation in the rest of England is more complex. While most postglacial colonies will have been overcome by the advance of woodland and tall-herb vegetation, a few might have survived where tree cover was never complete. However, introduction as a medicinal plant (and, arguably, as a vegetable) could well account for much of the present distribution. A review of a sample of the underlying records did not lead to a conclusive result, though a proportion of colonies in southern England are, or were, found in wet meadows, rather than directly linked to habitation.

There are garden varieties of *B. officinalis* that are propagated by pieces of root-stock and such pieces would have offered early farmers a convenient means by which to make introductions. The seed might be dispersed naturally by finches or by being carried in mud on the feet of animals, especially domestic cattle.

While the tetrad distribution of *B. officinalis* confirms its native status in northern England, its distribution elsewhere suggests a much more complex history.

Lathyrus sylvestris

The seeds of the *Fabaceae* were widely harvested in ancient times in southern Europe and cooked as pulses. Britain and Ireland are strikingly short of suitable native species in this family. While most species of *Lathyrus* and *Vicia* have edible seeds, it is difficult to gather enough to feed a family. *Lathyrus linifolius* (Bitter-vetch) has edible tubers that are strongly aniseed-flavoured, but they are difficult to uproot and could only have been used as a flavouring.

Hillman (Mears & Hillman, 2007) has drawn attention to *Lathyrus sylvestris* L. (Narrow-leaved Everlasting-pea) as a possible staple food. In suitable sun-baked habitat it can fruit profusely in late summer and the pods are large with many seeds. Hillman discovered that the seeds are edible as long as the pods and their seeds are

green. During ripening bitter toxins are formed, making the seeds inedible. The toxins might be a defence against predators and also a stratagem for dispersal. For example, a Rock Dove that had been enjoying the green seeds, might find itself with a crop full of toxic ones. It would surely regurgitate them wherever it happened to be.

Figure 3. Part of the tetrad distribution of *Lathyrus sylvestris* (records from BSBI Distribution database, accessed in December 2022)

The tetrad distribution of *L. sylvestris* is perplexing (Fig. 3). There is a core distribution along the south coast of England where it is frequent. The preferred habitat is south-facing cliffs and scree together with associated gullies and cliff-top scrub, though it is sometimes found on sand dunes. The distribution continues into the Bristol Channel and along the south Welsh coast. After major discontinuities, it is found along parts of the west coast of Wales, on the Cumbrian coast and across the Solway Firth. There have been coastal outliers on the south tip of Arran, Caithness, Angus, St Cyrus (Kincardineshire) and Berwickshire. Rare dispersal events over the millennia are conjectured to be by birds, perhaps especially Rock Doves, and by sea. Long stems could be blown from coastal cliffs to the sea, be transported by wind and currents and at length washed up on a distant shore. There they might dry and be blown to sand dunes or cliffs, or be picked over by Herring Gulls who might carry them to a cliff ledge for further inspection. Man could have played a part in the dispersal of coastal populations, but this seems less likely than natural dispersal.

The Berwickshire population is unusual. It is 10 km inland at Harper Heugh on a south-facing cliff by the Whiteadder Water (Figs. 4 & 5), where a large colony has been known since 1833 (Johnston, 1853; Braithwaite, 2014). It can be speculated to

have arisen by seed transported by birds from a now-extinct coastal site, but it could have been introduced by man.

All these coastal populations appear to be native. It is the inland populations that are perplexing. These are rather randomly scattered across Britain. The few clusters of localities are in artificial habitats. The tow path of the Montgomery Canal in Wales is quite extensively colonised and there are colonies on railway ballast and railway bankings, perhaps where ballast has been used to line drainage channels. A few quarries are colonised. Most of the remaining populations lack habitat detail, but many are close to habitation. It is quite possible that all inland populations have arisen from plants cultivated in gardens at various dates, but a mixture of origins is perhaps more likely, especially for the minority that are not far from the sea.

Figure 4. View northwest across Whiteadder Water to south-facing cliff at Harper Heugh, 28 April 1984

I have been surprised to find no records suggestive of the introduction of *L. sylvestris* as a seed impurity. *Medicago sativa* (Lucerne) was grown near the Berwickshire site of *L. sylvestris* at much the same time as *L. sylvestris* was first recorded, but any connection is pure speculation. *Weeds and Aliens* (Salisbury, 1961) does not include *L. sylvestris* in the lists of crop seed impurities.

It is unusual for *L. sylvestris* to be cultivated today. *L. latifolius* (Broad-leaved Everlasting-pea) is cultivated instead. This species appears to have been introduced to Britain in the early Middle Ages, perhaps to monastery herb gardens. It is much more colourful than *L. sylvestris* and would be an obvious replacement for it. I have cultivated *L. sylvestris* in my garden for 20 years from seed collected in Berwickshire. It climbs 2 m up an Egremont Russet apple tree. There is a lush growth of foliage every year, but flowering and fruiting is erratic. I have never observed a seedling. It seems my Roxburghshire location is too exposed. It might well flourish here if grown against a south-facing wall.

So, there is a case for surmising that at least the main coastal populations of *L. sylvestris* were harvested for food by Mesolithic man and that at least some of the

inland populations were introduced by man in the Neolithic or Bronze Age to grow in cottage 'cabbage patches' as a source of food, and that plants have been passed around or have naturalised narrowly ever since.

Figure 5. Arthur Smith photographing *Lathyrus sylvestris* at Harper Heugh with Scottish Wildlife Trust party, 1984

Discussion

The concept of using clustering in the tetrad distributions of plants in the British Flora to gain insight into their history has yielded intriguing results when combined with other evidence. Just how much reliance can be placed on the results is debateable, but they do at least provide a starting point for further research. The results for the three species may be summarised as follows:

1. The tetrad distribution of *Blitum bonus-henricus* confirms that is an archaeophyte strongly associated with habitation, where its introduction was probably deliberate.
2. The tetrad distribution of *Bistorta officinalis* confirms that it is a native species, but indicates a very strong association with man. It seems to have been used as a vegetable in a fairly well-defined native area and to have been introduced much more widely as a medicinal plant.
3. The tetrad distribution of *Lathyrus sylvestris* confirms that it is a native species with a distinctive coastal habitat that is warm and sheltered. The origin of the scattered inland populations is obscure, but many may have originated from deliberate introductions as a vegetable.

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ISSN: 2632-4970

https://doi.org/10.33928/bib.2023.05.093