

Green walls: an introduction to the flora and fauna of walls

Green walls are brick or stone built walls bonded with mortar that have been colonised by lichens, ferns and/or flowering plants. The definition excludes dry stone walls. Green walls are a valuable natural resource in many urban and rural settings, not only for their historic interest, aesthetic appeal and cultural references, but because they may support rare habitats, communities and species that can take many years to establish. The aim of this note is to provide an understanding of the value of green walls and guidance on how to maintain this value. For information on the specialist plants associated with walls see TIN052 *Green walls: specialist and companion plant species*.

History

Walls and stone-faced banks are a common feature of the British Isles. They form the basis of our homes and businesses; mark the boundaries of our land and property; control the wandering of both animals and humans and delineate and describe the contours of our landscapes. They can be temporary structures or stand for hundreds of years. Some appear as informal assemblages of rock and stone whereas others are carefully styled and constructed. The earliest walls in Britain were probably built shortly after the final and successful colonisation of these islands around 12000 BC when early human settlers would use stones and rocks to provide a shelter from the elements.

Visual and traditional values

Walls can say as much about the people who built and own them as they do about the landscapes in which they stand. Old walls bedecked with flowering plants, mosses and lichens generally have a strong visual appeal, particularly in an historical setting. Old walls and ruined buildings colonised by nature provide a sense of the endurance of the natural world that some find comforting in the 21st century. This has been shown by a number of cases where local opposition to the removal of wall plants has

argued for their preservation as an important contribution to the character of a site.



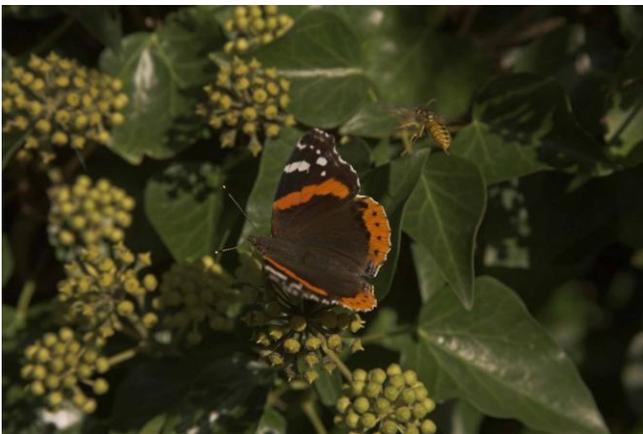
A north-facing wall in Pump Lane, Bury St Edmunds displaying a fine range of specialist wall species.

Wildlife value

Walls are important to our native wildlife because they mimic natural bare stone and rock faces and provide habitat for several groups of fungi; both primitive and flowering plants and havens for invertebrates, birds and small mammals. In a fast-changing environment such as a town or city, walls can provide an island of stability for urban wildlife.

Green walls: an introduction to the flora and fauna of walls

There are other reasons to encourage the colonisation of our man-made structures by wildlife. In areas of mass human population, there can be precious little semi-natural habitat for any form of wildlife. The few species that can adapt to urban conditions have to withstand many un-natural hardships in order to survive. The walls and roofs of our buildings (which to a few specialist plants are simply artificial cliff or rock faces) are often the principle colonisation sites used by our more adaptable species.



Ivy providing some welcome autumn nectar on a wall in Gloucestershire

When early colonisers establish a foothold they will, over time, provide opportunities for others, for example less hardy plants that could not have established themselves on their own. Plants will attract insects and other invertebrates to feed on their nectar, pollen or leaves. These, in turn, attract invertebrate predators such as birds, shrews and spiders. Eventually, one can identify a complete ecosystem existing within a relatively small area of a town or city or even a single isolated site, with the wall community making a substantial contribution.

As well as being the catalyst which allows some higher species to survive in areas where they might otherwise struggle, old walls have also enabled some species to expand their ranges purely because they provide a replica of a natural habitat. Map lichen *Rhizocarpon geographicum*, formerly limited in its range to acid upland rock faces, has spread to new lowland areas by way of churchyards, castle and cathedral walls and town ramparts. It secretes acids that can actually dissolve rock and so

begins the process of forming soil, necessary for many higher plants to gain a foothold. There are probably many other examples like this awaiting discovery: old masonry and stone-built walls remain an comparatively under-studied habitat.

Geological value

Stone-built walls, particularly old ones, have significant geological value. They can reveal a lot about the underlying geology of the places where they occur. Human beings have always sought construction materials from their immediate surroundings, and areas with stone or rock that can be easily recovered and worked have advantages as places to settle. Walls usually provide a useful context and an excellent introduction to the local geology. Many local geology groups use walls as a starting point for talking about geology and as a basis for geology trails.

The importance of mortar

The type of stone from which a wall is built has little influence on the species of plant that colonise it. The biggest factor is the mortar used to bond the stone or brick, or the soil that may fill the cracks in the structure. Mortar encourages lime-loving species, even if the stones themselves are of non-calcareous origin such as slate or granite. The other important factor is time. Mosses and lichens can colonise bare stone or brickwork as soon as it is exposed, but it can take as much as 80 years for weathering to produce soil and enough nutrients for higher plants to appear.

From medieval times up to around the late 19th century, mortar for bonding stone and brick was made from a mixture of lime, sand and, especially in early walls, soil and animal dung. This produced a mortar much softer than the modern product, which weathered faster and retained more water. Walls bonded with this traditional mortar have become less common and several species of moss associated with it have seriously declined as a result. From the mid-1800s, a new, harder mortar containing cement was produced which not only gradually replaced the earlier type in new buildings but was also used to repoint many older structures. This has led to many old walls that have been

Green walls: an introduction to the flora and fauna of walls

repointed exhibiting a succession of colonisation stages, whilst newer structures tend to take longer in providing a suitable habitat for plants to take hold. In fact, it can take as long for a wall to become well-colonised as it does for some trees to reach maturity. This makes wall plant communities both valuable and vulnerable to damage or loss.



Part of the 14th century Abbey walls at Bury St Edmunds being colonised by wallflowers.

Colonisation

The means by which plants colonise a wall varies: wind-borne seeds constitute the majority of colonists, including the spores of lichens and

mosses and seeds with plumes, such as those of the dandelion family and red valerian. Some seeds are distributed by animals. Some are bird-sown, including berry-producing species, while others may be distributed by ants that are attracted to the seeds of plants that bear an edible waxy or oily coat.

Climate, light, orientation and inclination

The British Isles has a climate dominated by a warm westerly Atlantic influence and, as a result, we enjoy relatively mild, wet winters. These conditions favour many species of specialised wall-growing plants although their frequency and assemblages depend greatly on local variations in micro-climate, management and the surrounding environment.

Figure 1 shows a map of north-west Europe divided into zones that reflect the degree of oceanicity and the richness of the wall flora. The most luxuriant vegetation occurs along the Atlantic seaboard (zone 1), it decreases sharply through zones 2 – 4.

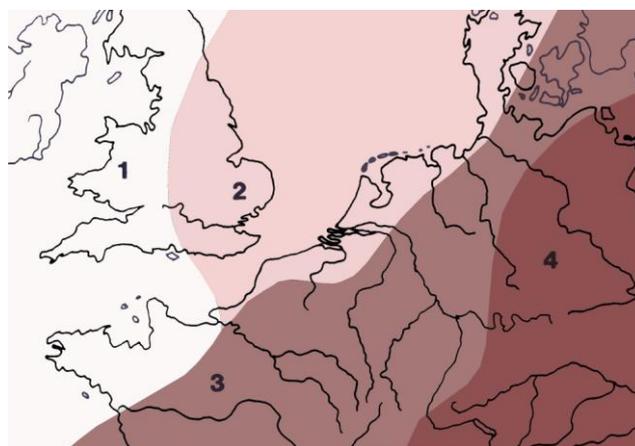


Figure 1

Climate

The warm Atlantic current that influences much of the UK's weather is also a significant factor in determining the vegetation on a wall. In general, wall vegetation displays less richness when it occurs east of a curved line that encloses most of Yorkshire, Derbyshire, the West Midlands, Oxfordshire, Buckinghamshire and much of Hampshire (see zone 2 figure 1).

Green walls: an introduction to the flora and fauna of walls

Orientation

The orientation of a wall also determines the richness and diversity of species it supports. Generally, a south-facing wall will exhibit less luxuriant vegetation than walls facing in other directions, although this is not always evident in Zone 1. North- and east-facing sides usually sport a greater number of ferns, mosses and flowering species and usually display larger leaves or fronds than those on the south- or west-facing sides.

In Zone 2, some ferns will only grow on north- or east-facing walls and the general tendency is for walls to support more drought-tolerant plants such as sedums and stonecrops.

Light

Light availability is another important factor, and walls that are heavily shaded will not support a widely diverse range of species. Walls that are overgrown also receive less rainfall: for example, the broadly evergreen hedging plants that are a feature of many suburban developments are highly efficient at intercepting rainfall.

Inclination

The last critical determining factor influencing vegetation is the inclination of the wall itself. Even if the wall is tilted or has been built only slightly off-vertical, it can allow the establishment of plants from other habitats - often those associated with waste places. These can include substantial species such as various grasses, fat hen and even those with woody stems like buddleia. These and other vigorous types will crowd out vertical wall specialists, especially if there is a nearby source of propagules such as a building site or urban garden.

Protecting the structure of the wall

Old or overgrown walls are vulnerable to over-zealous management by their custodians and many have lost their plant communities through herbicide use, manual weeding or inappropriate repointing. This may be as a result of genuine concerns for public safety, a desire to preserve the ancient and historic fabric of the site or just through a lack of appreciation. It takes considerable time for a wall to colonise naturally and there are few plants which, if they take up

residence on a wall, cause damage to its fabric. Where plant or lichen colonisation of a wall has become established, the wall itself deserves to be monitored and managed in a way that enhances the site.

Ideally old walls and ruined buildings should be managed in order to preserve both them and their historic value. This often takes the form of careful resetting and repointing of stones and masonry. To preserve the character of more ancient structures, the work is often carried out with mortars similar to the original soft lime-based compounds used when the walls were first built. Not only does this maintain a structure's antiquated appearance, it appears to offer greater protection from the elements (according to a recent study by English Heritage), and it also suits the continued colonisation by plants.

Unfortunately, maintenance is sometimes concerned purely with the preservation of masonry: wall vegetation is often regarded as an 'untidy' nuisance that must be cleared away or, much worse, something that will damage a historic building.



An 18th century wall in Bury St Edmunds that has been cleared of most of its vegetation.

While more research is needed to ascertain just how much damage to walls is caused by different plant species, there are some cases where the potential for damage is not only well-known but obvious. Large species with woody stems or trunks - such as ivy and buddleia - can, if they establish themselves on masonry, force their roots and stems between layers of brick or

Green walls: an introduction to the flora and fauna of walls

stone, causing mortar to crumble or even precipitate a catastrophic collapse. This is costly in terms of ancient building conservation and highly undesirable in places frequented by the public.



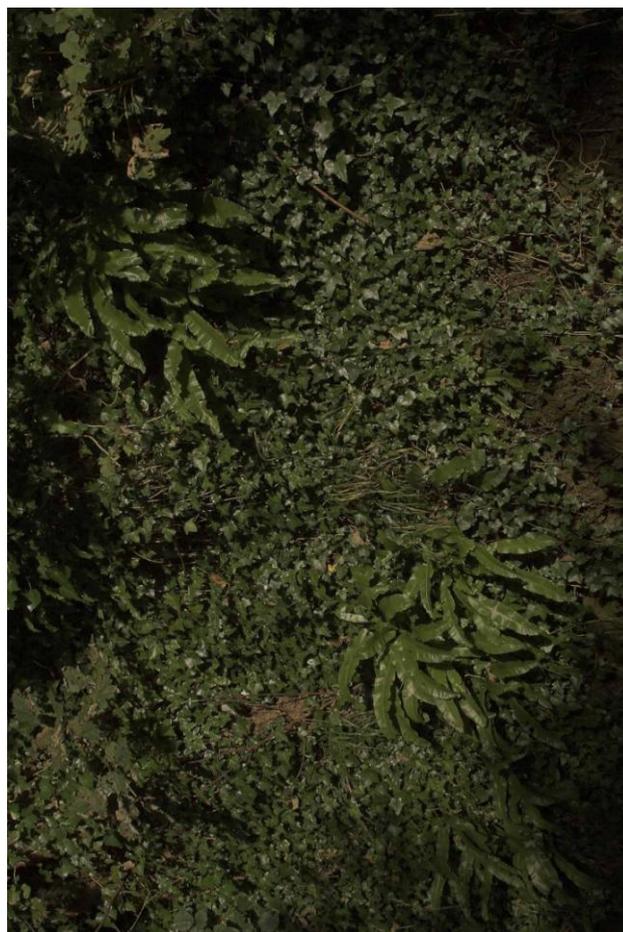
A young Monterey pine growing on the walls of the Abbey Gardens in Bury St Edmunds, Suffolk. If it is not removed the roots will force apart the stone and flint masonry.

Other examples of potentially damaging species are red valerian and wallflower. These plants are perennials and have woody rootstocks that, over time, can penetrate stonework, especially structures composed of smaller blocks or pebbles bound with mortar. In these cases a decision might be made to remove these showy plants based on regular checks for any damage they may be causing.

Some plants can even help preserve a wall by binding bricks or stones together with a network of roots or stems. In these circumstances, more

damage may be caused by removing the plants. Smaller species such as the stonecrops, ivy-leaved toadflax and yellow corydalis do little if no damage to a wall or building. The worse they do is conceal interesting detail but they cannot, on their own, cause a wall to collapse.

Maintenance policy can be influenced by factors such as accessibility, and just how close one can get machinery to a wall. A modern vehicle-mounted 'cherry-picker' elevated platform may weigh several tonnes and old foundations adjacent to a wall or building may not bear the weight of the equipment. In addition, the vehicle's stabilisers can concentrate the entire weight of a vehicle on to a small area of ground.



A Gloucestershire wall completely hidden behind a mass of ivy and hart's-tongue fern.

Where structures are considered at risk from woody species, it may be possible to perform remedial treatment by using a registered climber, also licensed to carry out spraying or

Green walls: an introduction to the flora and fauna of walls

spot-treatment using herbicides. In these circumstances a balance has to be struck that takes into account the risk posed by natural colonisation by plants of an ancient wall and the Health and Environmental impacts of actually carrying out the work.

Some local authorities maintain a seasonal management regime, removing potentially damaging species during the winter months, but leaving bryophytes and lichens in situ. However, where plants or shrubs can be shown to have little or no detrimental effect on the structure they can be left. Indeed, some plants have acquired something of a celebrity status, for example, at Chepstow where a wild fig tree grows on the town's Port Wall.

Management considerations

Although it is often undesirable to remove wall-growing plants altogether, they should not be left to completely obscure historical sites. Management should aim to maintain a site's natural interest as well as its historical/ archaeological/ geological interest. A programme of management might include the following:

- **An ecological survey to assess both the flora and fauna value of the walls.**
- **Treating wall vegetation as an asset with both conservation and historical/educational value.** Many plants have a long history of use by humans and incorporating 'plant-lore' into information sheets adds to a place's sense of time (eg biting stonecrop was once used widely as a medicinal herb and was believed in some areas to ward off thunderstorms if planted on a roof). Consider incorporating the living plants into interpretive information panels for visitors.
- **Actively promoting a site's wall plants.** This could serve two purposes: it encourages visitors to look above pavement level, and could engender a wider understanding of the importance of all plants to wildlife.
- **Limiting any herbicide use to those species of plant that could cause damage or obscure historically significant features.** In most circumstances, spraying around the base of a structure will not harm its flora/fauna.
- **Bryophyte and lichen control should only be carried out under exceptional circumstances and after consultation with a specialist.** Mosses and lichens are often the pioneer species that begin the initial colonisation of bare stone and brick. They are usually slow-growing but, aside from obscuring inscriptions, cause little damage to the structure. Many too, have extremely specific requirements: needless alterations to their environment (such as straightening a small structure or exposing a wall to sunshine) could result in the loss of some species from an important site.
- **Removing woody-stemmed species, apart from plants of exceptional amenity value.** For more information see TIN052 *Green walls: specialist and companion plant species*.
- **Where walls have been badly overgrown, restoration work should aim to leave a balanced and 'naturally soft' look to the structures, and not to remove all vegetation completely.** Where a wall or other structure has become completely obscured more drastic measures will have to be employed although this should not happen very often. Whether this entails the complete removal of the offending vegetation depends on the plants involved. Under these circumstances conservators may have no choice but to carefully remove the offending plants and stabilise the wall. If the problem plant is ivy, assess whether it can be re-positioned on a less important support and try to avoid all management during the bird-nesting season. Where less invasive plants have colonised the structure, consideration should be given to whether some or even all of them can be left in situ without compromising the historical value of the site but retaining something of its spirit of place.
- **Any repointing or similar maintenance work should be carried out sympathetically.** Preferably with 'historically correct' mortar where safe and feasible, whilst retaining or replacing harmless wall plants.
- **Replacing plants lost to previous maintenance.** This could be by propagating seeds or using plant plugs that can be inserted into crevices.

Green walls: an introduction to the flora and fauna of walls

Further information

Natural England Technical Information Notes are available to download from the Natural England website: www.naturalengland.org.uk. In particular see:

- TIN052 *Green walls: specialist and companion plant species*

For enquiries please contact the Natural England Helpline on 0845 600 3078 or email enquiries@naturalengland.org.uk.

Agri-environment agreement holders can contact their local Natural England adviser, who can request support of their Regional Historic Environment Adviser.

Further advice is also available from English Heritage at www.english-heritage.org.uk. Tel: 0870 333 1181 or email enquiries to customers@english-heritage.org.uk.

Authors and contributors

This note was developed by Paul Lacey using source material from *Rooted in stone* by Oliver Gilbert, Department of Landscape Architecture, Sheffield University, published in 1992/1996 by English Nature. Editor Susie Smith. Photographs by Paul Lacey.