

# The use of limestone in horticulture

**SUMMARY** The use of stone to create rock gardens or water features adds to the interest and beauty of a garden. However, in doing so, gardeners and landscape designers should avoid using stone obtained from the natural rock formations known as limestone pavements. This distinctive rock formation supports a unique assemblage of plants and animals that is under threat because of the use of this stone in gardens. The Royal Horticultural Society deplores the removal of limestone pavement stone and recommends the use of alternative, less environmentally sensitive, stone for landscaping purposes in gardens.



Photo: David Woodfall

Lowland limestone pavement.  
Gait Barrows Moor, Lancashire.

## RHS policy statements

- 1 The Royal Horticultural Society supports the efforts being made to protect remaining limestone pavements.
- 2 The RHS no longer sources surface-stripped limestone pavement rock for use in any of its gardens.
- 3 The RHS does not permit the use of surface-stripped limestone pavement rock in exhibits at its flower shows. The RHS disapproves of any activities which promote the use of such rock and recommends the use of alternatives.
- 4 The RHS gives advice on the use of other types of natural stone for the building of rock gardens and landscaping work. Wherever possible, recycled stone should be used.
- 5 The RHS encourages gardeners to be alert to the possibility of damaging effects on the environment which may arise from the acquisition of any type of rock.

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## Introduction

The building of special garden features to imitate mountainsides, streams and rocky outcrops dates from the late 18th century. The evolution of rock gardens as landscape attractions and as a means of cultivating alpine and other rock plants has led to an important branch of horticulture, with both specialist nurseries and general garden centres supplying plants and stone.

Rock gardens and water features can be constructed with sandstone, slate, granite, quarried limestone and other stone, but surface-stripped limestone is a particularly attractive rock. Its colour and appearance is visually pleasing, particularly where the action of water over long periods of time has created natural fissures in the rock. So much of this stone has been taken from limestone pavements for use in gardens that it has become an endangered ecosystem.

## What is limestone pavement?

Limestone is a hard sedimentary rock formed under the sea in ancient times from the shells of small sea creatures. Through movements in the earth's crust, rock formed under the sea can

be uplifted over millions of years and become land. Limestone pavement areas of Britain and Ireland were formed during the last ice age about 12,000 years ago. The movement of ice over the limestone bedrock stripped off the soil and levelled the surface. When the ice age ended, a layer of boulder clay was deposited over the limestone by the retreating glaciers.

Vegetation returned and much of the land was covered by deciduous woodland. The action of acidic rainfall under the soil exploited weaknesses and cracks in the limestone rock to form vertical fissures known as grikes and complex surface patterning called runnels. The large blocks of rock between the grikes are called clints.

When humans recolonised the limestone pavement areas after the ice age, a process of forest clearance for agriculture began that has been maintained by grazing animals. Today much of the limestone pavement has lost its tree cover and soil erosion has exposed some of the underlying rock. However, woodland plants are still able to grow in soil that has accumulated in the grikes where the plants are out of reach of grazing animals and humid, protected conditions are found. Where soil cover remains on top of the clints, a community of dry limestone grassland plants develops.

It is the water-worn features on the surface of the clints that have helped to make limestone pavement so attractive to rock garden enthusiasts, and the demand for water-worn limestone is destroying rare and fragile limestone pavement ecosystems.



Wren (*Troglodytes troglodytes*)

Photo: Nature Photographers Ltd

## Why should limestone pavements be preserved?

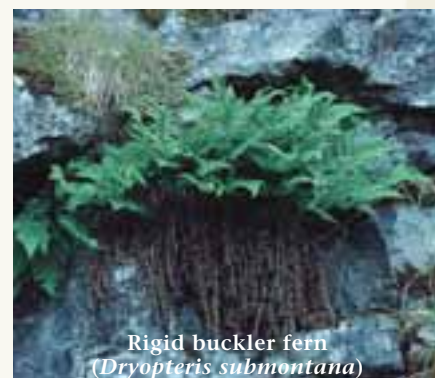
The removal of limestone pavement for the construction of garden features or other uses destroys a remarkable habitat, which cannot be replaced or recreated. The conditions that created limestone pavement and its associated plants and animals have produced over thousands of years a unique ecosystem and landscape feature. This type of rock formation is globally rare and most of the European limestone pavement occurs in Britain and Ireland. In Britain it is mainly found in parts of Cumbria, Lancashire and Yorkshire, with smaller areas in Scotland and Wales. There are also important limestone pavements in Ireland, including the Burren in Counties Clare and Galway.

The deep fissures or grikes between the rocks are often 1-2 metres deep and provide a refuge for plants that are relics of the area's woodland past. Partly protected from grazing animals, such as sheep, deer and



Dark red helleborine (*Epipactis atrorubens*)

Photo: Nature Photographers Ltd



Rigid buckler fern (*Dryopteris submontana*)

Photo: Nature Photographers Ltd

rabbits, these plants survive in the soil and moisture available in the grikes. Common woodland plants found on limestone pavement include honeysuckle, ash, hawthorn, yew, blackthorn and dog's mercury. The damp shady conditions provided by the grikes is also ideal for a wide range of ferns. Limestone pavement has many nationally scarce plants, including dark-red helleborine, angular Solomon's seal, herb Paris, mountain avens, downy currant, lily-of-the-valley, fingered sedge, pale St John's-wort, bloody cranesbill, lesser meadow rue, narrow-leaved bittercress and rigid buckler fern. This fern is strongly associated with limestone pavement in Britain, with about 85% of the UK population being found in that habitat. Where a thin layer of soil occurs over the limestone, plants characteristic of dry grassland occur, such as wild thyme, hairy violet, flea sedge, fescues and blue moor grass. Wet areas can occur in poorly drained pans and these places support plants such as common yellow sedge, articulated rush, butterwort and bird's-eye primrose. Associated with this diverse flora is a wide range of animal life. Among the many insects found are butterflies, including some of the uncommon fritillaries, such as the high brown, pearl-bordered, and the Duke of Burgundy. The Burren, in Eire, is the only locality in the British Isles for a moth known as the Burren green.

### What are the alternatives?

Gardeners should make use of other types of rock that can be supplied from quarries where the environmental consequences of extraction have less impact. The interests of plant specialists, gardeners and landscapers need not



High brown fritillary (*Argynnis adippe*)

Photo: Nature Photographers Ltd

suffer. In addition to the alternatives of sandstone, slate and granite supplied from reputable sources, limestone can be obtained from legitimate quarrying in the Cotswolds, Oxfordshire, the Pennines and Mendip Hills. These sources often yield a product bearing many of the interesting features of limestone pavements.

There is scope for the commercial manufacture of simulated limestone pavement stone using fragments and dust from quarry waste. It is possible to produce artificial rocks on a garden scale from a mix of 2 parts sharp sand, 2 parts coir and 1 part Portland cement, to which a colouring powder is added. This mix is worked into moulds formed from polythene-lined holes excavated in the soil.

Manufacture of decorative stone is not a new idea. A technique was invented by James Pulham (1820-98) with the production of 'Pulhamite' stone, formed from cement, clinker and stones. Examples of this conservation foresight can be found in London in Battersea Park and the

Pelican Islands in St James' Park.

Stone should be recycled from existing gardens that are undergoing redevelopment wherever possible.

### The legal status

In England most limestone pavement is now protected from further damage by Limestone Pavement Orders made under the 1981 Wildlife and Countryside Act. Scotland and Wales have the powers to make LPOs but have not made any; this is currently under review in Wales. The importance of the geology, as well as the plant and animal life, of limestone pavements is recognised by many of them being designated as Sites of Special Scientific Interest (SSSI). Some are candidate Special Areas of Conservation, a European level of protection stronger than SSSI designation. No limestone pavement in England now has permission for removal but there is still some illegal removal. Increased concern over the destruction of limestone pavements in Britain has led suppliers to look to Ireland for this type of rock. Limestone pavement rock may be



offered for sale under a variety of names. These include water-worn limestone, Westmorland stone, Cumberland stone, Irish water stone and Irish limestone. Gardeners should avoid these types of stone in favour of stone from less environmentally sensitive sources.

### RHS Gardens and Flower Shows

The RHS Gardens at Wisley in Surrey, Hyde Hall in Essex and Rosemoor in Devon do not use limestone pavement rock. When the Northern Horticultural Society merged with the Royal Horticultural Society in 2001, the RHS acquired the NHS's garden at Harlow Carr, near Harrogate, Yorkshire. This garden has a rock garden constructed of limestone pavement. It was originally constructed in the 1960s in another Yorkshire garden. When that garden was going to be demolished for redevelopment, the stones were donated to the NHS for its garden at Harlow Carr. This rock garden has been retained by the RHS for educational purposes and has some information boards produced with the assistance of the Limestone Pavement Action Group. The RHS does not permit exhibitors at its shows to sell or display stone from limestone pavements.

### Some useful contacts

**The Limestone Pavement Action Group**, c/o Cumbria Wildlife Trust, Plumgarths, Crook Road, Kendal, LA8 8LX  
Tel 01539 816300  
[www.limestone-pavements.org.uk](http://www.limestone-pavements.org.uk)

**The Countryside Agency**, John Dower House, Crescent Place, Cheltenham, GL50 3RA  
Tel 01242 521381  
[www.countryside.gov.uk](http://www.countryside.gov.uk)

**English Nature**, Northminster House, Peterborough, PE1 1UA  
Tel 01733 455000  
[www.englishnature.org.uk](http://www.englishnature.org.uk)

**Countryside Council for Wales**, Maes-y-Ffynnon, Penrhosgarnedd, Bangor, LL57 2DW  
Tel 0845 1306229  
[www.ccw.gov.uk](http://www.ccw.gov.uk)

**Scottish Natural Heritage**, 12 Hope Terrace, Edinburgh, EH9 2AS,  
Tel 0131 4474784  
[www.shn.org.uk](http://www.shn.org.uk)

**National Parks & Wildlife Service**, 7 Ely Place, Dublin 2, Eire,  
Tel +353-1 6472300  
[www.heritagedata.ie/en/ParksAndWildlife](http://www.heritagedata.ie/en/ParksAndWildlife)



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