THE HEATHER TRUST

Promoting Integrated Moorland Management

Members' Briefing

Bracken Control

In Brief

Bracken is an invasive species which poses a genuine threat to the future of the uplands, not only through its ability to smother and overcome competing vegetation but also due to its tendency to create ideal breeding conditions for dangerous ticks.

There are a number of methods of controlling bracken, but the simplest method on steep or broken ground is the application by helicopter of the banned selective herbicide Asulam (known commercially as Asulox). As of February 26th 2013, Asulam was approved for use as part of an emergency authorisation. More information is forthcoming, but this authorisation will have restrictions and will expire at the end of 2013.

Other methods of control include cutting, bruising and crushing bracken in an attempt to exhaust the plant into submission, but the key to success with any of these methods is persistence in following up treatments in subsequent years.

Introduction

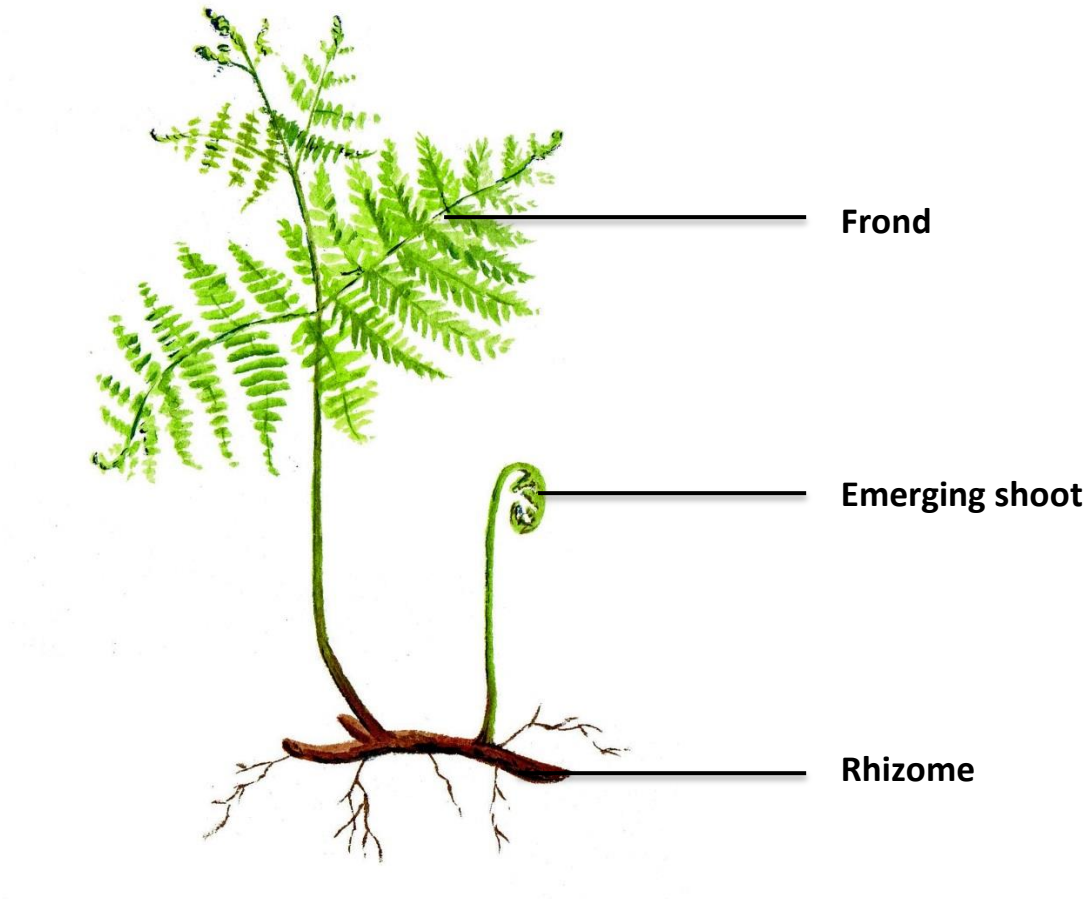
Bracken *Pteridium aquilinum* is an extremely successful plant, owing largely to its physical structure. Deciduous and perennial, bracken shoots emerge in late May or early June, producing plants which can grow several feet in just a few weeks. The small fronds emerge very tightly coiled into a neat spiral, then unfurl as the stem grows longer.

- Bracken fronds are large and triangular, growing up to 1.5 metres long and 1 metre wide.
- It is possible for bracken stems to grow up to 3 metres tall, but it is more usual to find plants which are between 1 and 2 metres high.
- Bracken is only green for around six months of the year. The long fronds begin to turn brown with the first frosts at the end of September or the beginning of October.
- Underground, the plant consolidates the gains it makes each year in a system of rhizomes which spread the growth of the bracken. Runners creep outwards and expand the area occupied by the plant. Although the bracken will appear to be dead during the winter, the rhizomes remain alive underground.
- Rhizomes are sometimes found at considerable depth, and where the soil is deep enough they may be up to two metres down. It is not uncommon for rhizomes to grow outwards along the surface of the soil.

A key aspect of bracken's ability to expand is not only that it shades out and smothers competing plants, but also that the fallen litter forms a deep mat which prevents other plants from becoming established. In addition, the root systems may release chemicals into the soil which inhibit the growth of competing plants.

Bracken is very sensitive to frost, and shoots, fronds and rhizomes are all killed by low temperatures. The layer of dense litter above ground left by growth from previous years helps to insulate shoots and protect them from cold weather.

After three years, a bracken plant is mature enough to reproduce. The fronds release spores from specially adapted structures on the underside of their leaves, and these are released between August and October. It is rare for conditions in this country to allow "sporulation" to take place.



The Damage

There are a number of reasons why bracken requires management and control.

- Bracken contains carcinogens and the fronds contain a number of toxins which are poisonous to animals such as cattle, sheep, pigs and horses when ingested. However, most species and breeds of livestock will usually avoid the plant altogether unless nothing else is available.

- Left unmanaged, bracken quickly shades out all other competing plants. In many cases, bracken creates a sterile monoculture which is hostile to all other plant species.
- In competition with heather, bracken usually emerges dominant.
- A landscape which has been overcome by bracken lacks the biodiversity of well managed moorland. By comparison to heather moorland, extensive stands of bracken are like a desert, of little value to livestock or wildlife.
- Bracken beds are a great place for ticks to proliferate. Young mammals and ground nesting birds can be overwhelmed by ticks, and ticks spread diseases that can affect humans and livestock. See the Members' Briefing on Sheep Ticks for more information.
- It should be remembered that bracken is not an altogether unsuitable environment for wildlife, and it can be of some importance to some species in certain areas, including adders, woodcock, nightjars and certain butterflies.

Like any native species, there is a place for bracken in the future of our uplands, but it must be managed to form part of the overall picture rather than dominating everything.

The majority of bracken encroachment each year is as a result of expanding underground root systems known as "rhizomes"

Control of Bracken

The structure of bracken makes it very difficult to control over a large area. Many established techniques for controlling plants do not apply when it comes to the management of this invasive species.

It is important to remember for all bracken management strategies that the key to long-term success is how well the initial assault is followed up. Bracken is a tenacious plant which has evolved to endure all kinds of persecution. Human intervention may produce instant results, but unless these are consolidated and followed up in subsequent years, bracken is sure to return to its previous levels.

Herbicides

- Every shoot emerges from the rhizome in duplicate; there is a main shoot and a dormant bud which is ready to grow if the first one is damaged or broken. If it is not needed, the dormant bud will become the active bud for the following year. This simple mechanism forms the basis of bracken's resistance to many herbicides. Most herbicides kill the established shoot, but the rhizome is already preparing for the following year.
- Asulam is currently the only selective herbicide which can be sprayed from a helicopter, making it suitable for the control of bracken on a wide scale.
- Asulam is sprayed towards the end of the summer shortly before the bracken fronds first start to turn brown. As the plant begins to shut down for winter, it withdraws vital nutrients and carbohydrates down into the rhizome for storage. When Asulam is sprayed onto the plant, the chemical is absorbed into the fronds and is translocated with these nutrients down into the rhizome. Within the rhizome, the chemical attacks the dormant buds so that

they do not grow in the following year. Asulam's ability to enter the bracken plant and destroy it from the inside makes it an extremely effective method of bracken control.

- Correctly used, Asulam will kill 95% of bracken plants.
- Asulam is different to other herbicides in that it is highly selective. The chemical will have any impact on members of the fern family, which makes it suitable for widespread use. A careful examination of the area due to be sprayed should be carried out in advance of the first treatment to identify if any harmless or protected fern species are present.
- The selective nature of Asulam makes it very easy to apply, and large areas of bracken can be easily sprayed by helicopters. When authorised, it can also be applied by other means such as tractor and ATV mounted sprayers, by knapsack sprayer or by drift applicators, such as the ULVA produced by Micron Sprayers.
- As of February 2013, it is now possible to use Asulam only under the terms of an Emergency Authorisation. More information will soon be forthcoming.
- The Heather Trust is coordinating a Bracken Control Group that amongst other issues is responding to the ban on Asulam products. See the Bracken Control Group website (http://www.brackencontrol.co.uk) for more information.

Mechanical control

- Bracken can be cut, flailed or bruised, and this is usually carried out when the shoots are fresh and young. However, the nature of the dormant buds means that the process may have to be carried out more than once each year and for many years afterwards. Persistence is key for this management technique.
- In many upland areas, bracken was traditionally managed and cut to provide bedding for winter livestock.
- Given that bracken favours steep, well drained hillsides, access for mechanical vehicles may not always be an option.
- An advantage of mechanical control can be that the mat of dead trash left after previous years of growth is broken up by heavy machinery, drying it out and making it more suitable for recolonisation by other plants.

Bracken can serve an important conservation purpose if it is correctly managed. In particular, bracken which has been over-planted with scrub woodland can provide suitable habitat for blackgame.

Other options

- In some areas, pigs have been used to control bracken with a great deal of success. This is not as simple as letting the pigs loose into bracken, but depends upon careful rotation and management. If this is not done carefully, the pigs may die through an induced thimine deficiency.
- Altered stocking of land dominated by bracken can result in young stems being trampled and the mat of dead trash being broken up. This is a surrogate cutting treatment.

- Hand pulling of bracken plants can be an option where time and labour are available. Again, this will depend upon a concerted application of effort over an extended period of time.

Conservation

It is worth remembering that in areas where bracken is so well established that there is no other plant life whatsoever, total eradication of the plant may cause erosion. This is particularly relevant on steep hillsides, and in extreme cases it may be more useful to plant these areas with trees and forget about their viability as open moorland.

Black grouse frequently favour stands of scrub birch, rowan and willow with an understorey of bracken, particularly on the boundaries of heather moorland, so it may be that in some situations the bracken can serve a useful conservation purpose in itself. Swineside

Further information

Bracken Control Group Website: www.brackencontrol.co.uk

SNH Guidance Document: http://www.snh.org.uk/pdfs/publications/SEARS/brackencontrol.pdf

Liverpool University's Institute of Applied Vegetation Dynamics:
http://www.liv.ac.uk/researchintelligence/issue24/brackencontrol.html

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This is one of a series of guides that have been produced by the Heather Trust to provide an overview on a range of topics that are relevant to people with an interest in the management of moorland or through visiting these areas.

These guides are not intended to be definitive but aim to provide some useful background. We are only too aware that every bit of moorland is different and the Trust will be pleased to provide more detailed advice about how this guidance could be relevant to a particular area of moorland. Please see the contact details above.

Available for download from the HT website