

Sands of Forvie

The Sands of Forvie is a National Nature Reserve just north of Newburgh, on the Ythan estuary, c. 16 miles from Aberdeen. It is the fifth largest sand dune system in the UK, and is the least disturbed by human activity. There are a wide range of habitats at the site, including mobile and fixed sand dunes, dune slacks, and lowland heath, which demonstrate clearly the effects of primary succession from bare sand to coastal heath.

Getting there

Bus: The number 63 bus will take you to Newburgh, and may be able to drop you off at the Sands of Forvie if you ask. Alternatively, upon arriving in Newburgh, walk north along Main Street, continuing out of town until you cross the bridge over the Ythan. Just across the bridge on the left is the entrance to Sands of Forvie.

Bicycle: The best route to cycle to Newburgh avoids the busy A90 except for a short (100m) stretch. Cycle across the Don, turning left at the roundabout just before the A90 begins. Turn right and right again, and head north through Potterton and then Belhelvie. Turn left in Belhelvie, and continue north until you reach the end of the road. Turn right, cross the A90 and follow the signs for Newburgh. Continue north through Newburgh until you reach Forvie.

Car: Head north out of Aberdeen along Ellon Road. Continue along the A90, following signs to Newburgh. Turn onto the A975, and continue on through Newburgh and across the Ythan until you arrive at Forvie, there is a car park on right at reserve entrance.

Where to go once there

Walk up the path through the forest, and follow until the path forks. Take the left fork and continue on, passing through a gate. Continuing further, you will come to a set of fire beaters next to some degenerate heathland (NK 01133 26968). This area contains most of the species in the dwarf shrub key. Set off south across the dunes, behind which are a series of dune slacks (NK01198 26647). A good route to take across these dunes and slacks is to head toward the hut circle (NK01071 26322), which should allow all the species on these sheets to be found.



Plant keys for Forvie

Keys are available for **dwarf shrubs** and **mosses** at Forvie.

It should be noted that these keys are informal and designed to be used at Forvie. They cover a range of species that are common and easily found at the site, and which illustrate the key features needed to identify plants. They do not cover the entire range of species present at the site – you will find species that have not been included.

The plant keys for Forvie were produced by Jim Downie, funded by a University of Aberdeen College of Life Sciences and Medicine and Development Trust summer studentship and a field work support grant from the Botanical Society of Scotland (BSS). Students with an interest in botany are encouraged to join the BSS <http://www.botanical-society-scotland.org.uk/>



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Identifying dwarf shrubs at Forvie

Dwarf shrubs are an important component of a number of habitats, such as heathlands and some woodland undercanopies. Dwarf shrubs in Scotland are mostly in the family Ericaceae. This family includes the heathers, *Calluna* and *Erica spp.*, as well as the cranberry and blueberry genus *Vaccinium*, and a range of other groups including the *Rhododendron*. Typical characters of Ericaceous species are:

- Evergreen
- Leaves arranged in whorls (a circle around the stem) or oppositely (next to each other on opposite sides of the stem)
- Petals fused together, forming a bell-shaped flower

There are a few other dwarf shrub groups that commonly occur in Scotland: the Empetraceae and the Salicaceae.

- The Empetraceae look similar to Ericaceous plants and are sometimes grouped within that family; however, they differ by having leaves arranged alternately on the stem and flowers with petals that are not fused.
- The Salicaceae (willows) have catkin-like flowers with males and female flowers on separate inflorescences. They are deciduous; leaves are typically larger than those of other dwarf shrubs and hairy.

Guide to dwarf shrubs

1. Medium to large dwarf shrub; can range from 10 cm tall when young to 60 cm when old. Leaves opposite, reduced to tiny (1-3 mm) scales in 4 vertical rows. Flowers tiny (1-3 mm), usually pinkish purple, in long, dense inflorescences 3-15 cm long. Heather, Ling (*Calluna vulgaris*) (A, B)



2. Medium to large dwarf shrub; can range from 10 cm tall when young to 30-40 cm when old. Leaves needle-like, in whorls of three, 5-7 mm long, dark green, hairless. Flowers dark purplish red, 4-6 mm long. Bell heather (*Erica cinerea*) (C)



3. Medium dwarf shrub (to 30 cm, though often shorter), with many quite unbranched, upright stems. Leaves needle-like, in whorls of 4, 2-4 mm long, grey-green, hairy. Flowers pale pink, 6-7 mm long, held at the apex of upright stems in dense clusters. Typical of wetter patches. Cross leaved heath (*Erica tetralix*) (D)

4. Small to medium dwarf shrub (to 30cm, often shorter). Leaves needle-like, arranged alternately, with edges curled back toward the underside, giving the leaves an inflated appearance. The leaves can be differentiated from (2) by the presence of a white stripe on the underside. Flowers are pink, with unfused petals (3 petals, 3 sepals); the fruit is a dark purple berry. Crowberry (*Empetrum nigrum*) (E)



5. Short dwarf shrub usually <15 cm, but occasionally larger. Often present as many short, young plants with just a few branches. Leaves oval shaped, alternate, 1-3 cm in length, with a pointed tip and finely serrated margins. Stems green, 4-angled. Flowers white, 4-6 mm, petals fused; fruit a berry, dark purple. (*Vaccinium myrtillus*) (F)

6. Large dwarf shrub, to c. 50 cm. Leaves oval shaped, alternate, 1-3.5 cm long, margins slightly curled under, with silky hairs at least on the underside; twigs also silky hairy when young. Flowers held in unisexual catkins. (*Salix repens*) (G)



Shrub photo credits

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Erica cinerea (C) - <https://secure.flickr.com/photos/treehouse1977/558347155>

Erica tetralix (D) - <https://secure.flickr.com/photos/42244964@N03/3945421516>

Vaccinium myrtillus (F) - <https://secure.flickr.com/photos/windytan/9266716067>

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Identifying mosses at Forvie

Mosses (Bryophyta) are one of the oldest groups of land plants, and lack many features that define more advanced plant groups, including a vascular system (in most cases), seeds, flowers, and complex leaves. However, they have an array of features that allow them to be identified just as easily, including:

- Growth habit: Mosses are either acrocarpous or pleurocarpous.
 - Acrocarpous mosses have upright, un-branched (or little-branched) stems and often grow in a 'cushion'.
 - Pleurocarpous mosses are many-branched and extend horizontally, often forming highly-interwoven mats across the surface.
- Branching pattern (regular, irregular) and the size and shape of the branches.
- Leaf shape and arrangement around the stem
- Stem colour
- The size and shape of the capsule arising from the apex (in acrocarpous mosses) or from the sides of the main stem (in pleurocarpous mosses). However, capsules are often not present.

Handy hint: Many moss characters are seen most clearly when the moss is wet, as they are distorted when dry. It is useful to carry a bottle of water to wet dry mosses when examining them in the field.

Moss photo credits

Photos by Jim Downie, other than the following:

Polytrichum piliferum - James Lindsey <https://commons.wikimedia.org/wiki/File:Polytrichum.piliferum.jpg>

Hylocomium splendens - Jason Hollinger https://commons.wikimedia.org/wiki/File:Step_Moss_%285038410258%29.jpg

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Guide to mosses

1. Moss acrocarpous (2)

Moss pleurocarpous (4)

2. Leaves thin and translucent; leaves yellow-green to dark green, 4.5-7.5 mm long, shaped like a narrow spearhead, tapering to a long fine point. *Dicranum scoparium* (A)



Leaves somewhat thicker, not translucent, narrow-spearhead shaped. Stems tough, wiry, ranging from short (3 cm) to long (upwards of 20 cm) (3)

3. A tall moss, usually c. 10-15 cm at this site. Leaves 8-12 mm long, spreading out or strongly curved away from the stem, giving it a star-shaped appearance from above. *Polytrichum commune* (B)

Moss much shorter, to c. 4 cm. Leaves 10 mm long, with a distinct red-brown tip, evenly spaced on reddish stems. *Polytrichum juniperinum* (C)

Short moss, 2-4 cm tall. Leaves c. 3 mm long, with the tip ending with a long white hair point, densely clustered around the shoot tip, leaving the rest of the stem somewhat bare. *Polytrichum piliferum* (D)

(pictures on next page)



4. Moss with green stems (scrape away some leaves with your thumbnail to check) (5)

Moss with red stems (6)

5. Small, fine moss, with leaves <2 mm in size, all curving toward the underside of the moss; shoots 2-3 cm long. Mats of this moss have apparent whitish 'spots' when looked at from above. *Hypnum jutlandicum* (E)

Robust moss with +/- regular branches, giving it a 'fern-like' appearance. Stems to 10 cm long, yellow-green, branches appearing quite 'fat'. Leaves strongly overlapping, only slightly longer than wide, 2 mm long. *Pseudoscleropodium purum* (F)



6. Moss growing in 'flight of steps' habit, with new growth emerging from just behind the previous year's shoot tips. Regularly, highly branched, 'fern-like', with leaves 2.5-3 mm long on main stem and 1 mm on branches. *Hylocomium splendens* (G)

Moss loosely, somewhat irregularly branched, 'fern-like', with shoots several cm long; stem invisible when moss dry. Like *Pseudoscleropodium purum* (5) but with red stems and narrower. *Pleurozium schreberi* (H)



Mosses with irregularly to little branched red stems, lacking a 'fern-like' appearance, with highly pointed leaves:

- Leaves long (c. 6 mm); moss 'chunky', with a chaffy feeling when dry; leaves stick out in all directions *Rhytidiadelphus triquetrus* (I)

- Leaves shorter (2-2.5 mm), curving backwards at tips, spreading in a star like manner. Moss slender. *Rhytidiadelphus squarrosus* (J)

