

Wild bees of Scotland

Identification guide



Introduction

There are over 200 species of bee in the British Isles alone, and identifying most of them requires a hand lens with a minimum of x 10 magnification; some need a good binocular microscope. But with a bit of practice and care, it is possible to accurately identify some of our bees with the naked eye.

This guide uses a combination of size, colour pattern and biological information to provide an identification key of 14 fairly distinctive species of solitary bees known from Scotland. The key applies to female bees only: their male counterparts are often much harder to identify and are not discussed.

Most of the bees in the key should also be identifiable from good close-up photographs as long as their critical features are visible.

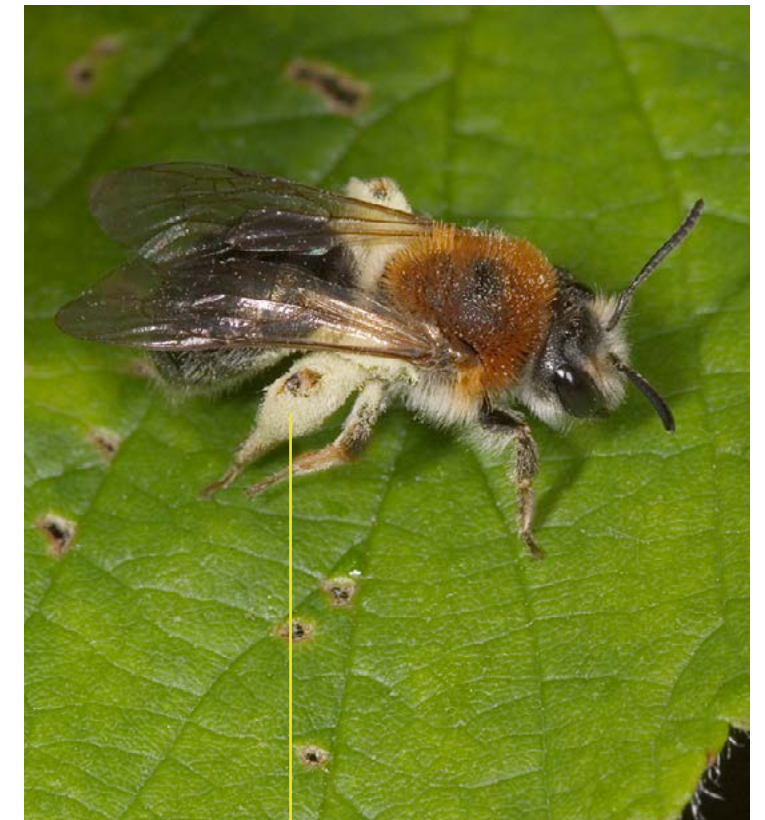
Specimens for identification should be clean and dry, as their hairs (which are important characters) mat together when wet. Colour is not necessarily a good tool in identification; people often expect to tell bumblebees apart by their brightly coloured patterns, but in fact they can be the hardest of the bees to identify as colours can fade in the sun as the bee goes about its life.

Most wild bees have only a short flight period and many of them are strongly associated with flowers from a particular plant family. The time of year you saw it and which kind of flowers it was visiting can also be helpful information when trying to put a name to a bee.

Pollen-collecting is a good first step for identification; honey bees and bumblebees collect pollen and store it wet on the hind legs, and the pollen balls are easily recognisable. Wild bees (other than bumblebees) collect their pollen dry. Most species hold it in a brush of hairs either on the back legs or under the abdomen.



Apis mellifera, the honey bee



Mining bee

Pollen

Bombus, bumblebees



Megachilid, mason and leafcutter bee



Some bees are cuckoos (they lay their eggs in the nests of other bee species and do not collect pollen at all). Three of the larger and more distinctive ones (genus *Nomada*) are included here. These often look like social wasps at first glance, but do not have wings that fold at rest and the abdomen is less angular (pointed) at the end; see the following photos.

Several cuckoo bees and solitary wasps are yellow with brown stripes, and some of the smaller ones are red with black abdomens, which emphasises that colour alone can be confusing.

Bee collections are important sources of information that contribute to their conservation. However, killing of specimens should be limited to the minimum necessary. Please always follow the "Code of conduct for collecting insects and other invertebrates" (British Journal of Entomology and Natural History 15: 1–6), available at www.royensoc.co.uk



(Left) *Nomada* cuckoo bee. Compare the shape of the abdomen with that of a social wasp.

(Below) Social wasp. The right hand wing of this pinned specimen is folded. When the insect is not flying both wings rest like this.



Bees of Britain

The families of bees in Great Britain are listed below.

Family	Genus	Notes
Andrenidae	<i>Andrena</i>	Mining bees, solitary. A very large genus, many species in Scotland.
	<i>Panurgus</i>	Mining bees, solitary. Two species, none in Scotland.
Apidae	<i>Anthophora</i>	Mining bees, solitary. Four species, one in Scotland.
	<i>Apis</i>	The honeybee. A single social species, kept by beekeepers and wild (probably escaped).
	<i>Bombus</i>	Bumblebees, social and cuckoo species. Number of species is uncertain; most are in Scotland.
	<i>Ceratina</i>	Carpenter bee, solitary. One species, not in Scotland.
	<i>Epeolus</i>	Cuckoo bees. Two species, none in Scotland.
	<i>Eucera</i>	Mining bees, solitary. Two species, none in Scotland.
	<i>Melecta</i>	Cuckoo bees. Two species, none in Scotland.
	<i>Nomada</i>	Cuckoo bees. A large genus, many species in Scotland.
	<i>Xylocopa</i>	Carpenter bee, solitary. One species, not in Scotland.
Colletidae	<i>Colletes</i>	Mining bees, solitary. Nine species, four in Scotland.
	<i>Hylaeus</i>	Yellow-faced bees, solitary. Twelve species, four in Scotland.

Family	Genus	Notes
Halictidae	<i>Dufourea</i>	Mining bees, solitary. Two species, none in Scotland.
	<i>Halictus</i>	Mining bees, solitary and social. Seven species, two in Scotland.
	<i>Lasioglossum</i>	Mining bees, solitary and social. A large genus, many species in Scotland.
	<i>Rophites</i>	Mining bee, solitary. One species, not in Scotland.
Megachilidae	<i>Sphecodes</i>	Cuckoo bees. A fairly large genus, many in Scotland.
	<i>Heriades</i>	Mason bees, solitary. Two species, none in Scotland.
	<i>Hoplitis</i>	Mason bees, solitary. Two species, none in Scotland.
	<i>Megachile</i>	Leafcutter bees, solitary. Nine species, four in Scotland.
	<i>Osmia</i>	Mason bees, solitary. Twelve species, six in Scotland, two of which found nowhere else in Britain.
	<i>Stelis</i>	Cuckoo bees. Four species, none in Scotland.
Melittidae	<i>Dasygaster</i>	Mining bee, solitary. One species, not in Scotland.
	<i>Macropis</i>	Mining bee, solitary. One species, not in Scotland.
	<i>Melitta</i>	Mining bee, solitary. Four species, one in Scotland.

Key

Distinctive wild bees of Scotland

This key is for female bees only. The photos and notes following the key should also be used to confirm identification.

- 1** a) Striped yellow and black like a wasp, or red abdomen and black, fairly hairless, >10 mm long [Go to 2](#)
b) Not striped, often obviously hairy [Go to 4](#)
- 2** a) Red abdomen, black thorax, antennae red at base, black at end
b) Abdomen with yellow and black stripes [Go to 3](#)
- 3** a) Back of thorax with just two small yellow dots
b) Back of thorax with four or five yellow dots, like dice patterns
- 4** a) Bees <10 mm long [Go to 5](#)
b) Bees much more than 10 mm long [Go to 8](#)
- 5** a) Abdomen with a clear pattern of stripes on the end of each segment, last upper segment with a vertical line of hairs on the end (a hand-lens needed to see it) [Go to 6](#)
b) Abdomen without clear pattern of stripes, with or without vertical line of hairs on the end of the last upper segment [Go to 7](#)
- 6** a) Larger, almost 10 mm long, abdomen black, thorax with foxy-orange coloured hairs, hind legs strongly yellow
b) Smaller, abdomen and thorax greenish metallic, shining, hind legs dark

- 7** a) Abdomen shining black, hind legs clear yellow-orange, forages on tormentil (*Potentilla erecta*)
b) Otherwise various *Andrena* and *Lasioglossum*

- 8** a) Smokey-grey hairs on thorax with a band of black hairs crossing between the wings
b) Thorax (at least) with foxy-orange hairs [Go to 9](#)

- 9** a) Abdomen with obvious bands of pale hairs. Late summer, on heather flowers (the heather is important) [Go to 10](#)
b) Abdomen without obvious bands of hairs; flying in the spring [Go to 11](#)

- 10** a) Abdomen wider at the front and strongly tapered towards back, more pointed and hair bands whiter
b) Abdomen more evenly oval, hair bands browner

- 11** a) Abdomen and thorax foxy-orange [Go to 12](#)
b) Only thorax foxy-orange [Go to 13](#)

- 12** a) Foxy-orange very bright, black hairs under thorax and abdomen, black pollen-collecting hair brush on rear leg
b) Foxy-orange duller, two small prongs on front of head, pollen-collecting brush under abdomen, orange

- 13** a) Abdomen hairless, shining black, tuft of orange hairs at tip
b) Abdomen hairy all over [Go to 14](#)

- 14** a) Abdomen strongly black, sharply contrasting with thorax, early spring species at willow flowers
b) Abdomen dull brown and black, little contrast with thorax, later species found at a variety of flowers

Information on species from the key (in order of citation)

Nomada fabriciana



Cuckoo bee, <10 mm. Flying period in Scotland/Northern England: April to August.

There are very few records for this bee in Scotland. It may not be recognised as a bee because of its red and black colouring and it is also rather smaller than most of the other species. It is most often found flying over banks of bare ground in the sun as it searches for nests of its host mining bees, but it also visits a wide range of flowers.

Nomada marshamella



Cuckoo bee, 10–20 mm. Flying period in Scotland/Northern England: April to August.

In contrast to the very similar *Nomada goodeniana*, this bee is more widely recorded in Scotland. It is most often mistaken for a wasp as it flies over banks of bare ground in the sun searching for nests of its host mining bees. It also visits a wide range of flowers.

Nomada goodeniana



Cuckoo bee, 10–20 mm. Flying period in Scotland/Northern England: April to August.

There are few, scattered records for this bee in Scotland but it may prove to be more frequent, if searched for. It is most often mistaken for a wasp as it flies over banks of bare ground in the sun searching for nests of its host mining bees. It visits a wide range of flowers.

Halictus rubicundus



Mining bee, <10 mm. Flying period in Scotland/Northern England: April to September.

Widespread in Scotland, often nesting in small banks facing the sun. This species is unusual in that the first female of the year may rear workers which then help rear the next brood of sexual bees, rather than just rear the sexual forms herself. It visits a wide range of flowers.

Halictus tumulorum



Mining bee, <10 mm. Flying period in Scotland/Northern England: April to September.

There are few and very scattered records in Scotland, but it may be found to be more widespread if searched for carefully. It is the smallest bee from the species in the key, which may well account for its apparent rarity. It visits a wide range of flowers.

Andrena tarsata



Mining bee, <10 mm. Flying period in Scotland/Northern England: June to August.

This bee is becoming increasingly rare and threatened in England, but is still widespread in Scotland. It is strongly associated with moorlands and forest edges where it collects pollen from the small yellow flowers of tormentil, *Potentilla erecta*. It will also visit shrubby cinquefoil flowers in gardens.

Andrena cineraria



Mining bee, 10–20 mm. Flying period in Scotland/Northern England: May to July.

Only recorded for Southwest and West of Scotland, but the species is spreading rapidly in England. It nests in very large aggregations in areas of bare ground and visits a wide range of flowers.

Colletes succinctus



Mining bee, 10–20 mm. Flying period in Scotland/Northern England: July to September.

In Scotland, this species is concentrated mostly in the west coast and is rarer inland. This species is exclusively associated with the flowers of heathers. It often nests in very large aggregations on areas of warm bare ground within moorlands. There may be many more locations for this bee than are currently known.

Andrena fuscipes



Mining bee, 10–20 mm. Flying period in Scotland/Northern England: July to September.

Widespread in Scotland, but with few records. This species is exclusively associated with the flowers of heathers. There may be many more locations for this bee than are currently known.

Andrena fulva



Mining bee, 10–20 mm. Flying period in Scotland/Northern England: April to June.

Recorded for southwest and central Scotland only, but may be elsewhere. Often nests in large aggregations in mown suburban lawns, but also under deciduous trees and shrubs. It visits a wide range of flowers.

Osmia bicornis



Mason bee, 10–20 mm. Flying period in Scotland/Northern England: April to July.

This bee has been spreading northwards and recently has become well-established in the Central Lowlands of Scotland, as far north as Perth. It is a good pollinator of many garden and wild plants.

Andrena haemorrhoa



Mining bee, 10–20 mm. Flying period in Scotland/Northern England: April to June.

A distinctive, widespread and comparatively well-recorded species in Scotland. Nests singly in short vegetation and bare ground. It visits a wide range of flowers, including dandelions and hawthorn.

Andrena clarkella



Mining bee, 10–20 mm. Flying period in Scotland/Northern England: April to May.

Widespread in Scotland. This bee only visits the flowers of willows (pussy willow) for its pollen. It nests in areas of bare ground, often in deciduous woodland.

Andrena nigroaenea



Mining bee, 10–20 mm. Flying period in Scotland/Northern England: April to July.

Only recorded in East Scotland, but could be much more widespread. At first glance it may easily be mistaken for a honey bee, but the orange hairs on the rear legs – or the dry pollen on these – should alert you to its true identity. It visits a wide range of flowers.

Further reading

Books:

Michener, C.D. 2007. The bees of the world, 2nd ed. Johns Hopkins University Press, Baltimore, USA. The definitive work on bee systematics by the world's leading authority; a comprehensive, worldwide treatment of bees – 1,200 genera altogether. Highly technical and perhaps intimidating for novice melittologists (those who study bees), but an essential tool for bee taxonomists.

O'Toole, C. & A. Raw. 1991. Bees of the world. Facts on File, New York, USA.

A comprehensive introduction for the general reader about several aspects of solitary bees, such as life styles, bee-flower relationships, bee groups and their geographical distribution. Highly recommended.

Mader, E., M. Spivak & E. Evans. 2010. Managing alternative pollinators: a handbook for beekeepers, growers, and conservationists. Natural Resource, Agriculture, and Engineering Service (NRAES). www.nraes.org or www.sare.org. A detailed guide for rearing and managing solitary bees and bumblebees, with information on diseases and pests, pollination and agricultural production. Despite its focus on American species and habitats, a very useful handbook for British melittologists.

Dicks L.V., D.A. Showler & W.J. Sutherland. 2010. Bee conservation: evidence for the effects of intervention. Synopses of conservation evidence 1. Pelagic Publishing. Summaries and analyses of studies relevant to the conservation of wild bees.

Bosch, J. & W. Kemp. 2001. How to manage the blue orchard bee for orchard pollination. Sustainable Agriculture Network handbook series no. 5. A practical guide on natural history, rearing and management of one of the most commercially successful *Osmia* species. Available free at www.sare.org/Learning-Center/Books/How-to-Manage-the-Blue-Orchard-Bee.

Free, J.B. 1993. Insect pollination of crops. Academic Press, London. An authoritative, well-known but a bit dated compendium on crop pollination. It is out of print, but chapters can be downloaded from www.internationalpollinatorsinitiative.org/jsp/manage/manage.jsp.

Web resources:

www.bwars.com. The Bees, Wasps and Ants Recording Society. The site provides information on recording, distribution and biology of aculeate Hymenoptera (bees, wasps and ants), maps and identification guides.

www.hymettus.org.uk. Site of the organisation dedicated to the conservation of aculeates in Great Britain. It provides colourful "Information sheets" about several species and project reports.

www.pollinatorparadise.com/Solitary_Bees/SOLITARY. Lots of information about mason bees and other solitary species.

www.xerces.org/pollinator-conservation/native-bees. Site of the Xerces Society, an American organization dedicated to the conservation of invertebrates. It contains much information and printable material about solitary bees and pollination.

www.hbrg.org.uk. The Highland Biological Recording Group, dedicated to recording Highland wildlife. Here you will find a list of all Scottish aculeates.



Written by Mike Edwards.

Photography by Mike Edwards and Jeremy Early.

Further reading by Athayde Tonhasca.

For further information on this publication please contact

Dr Athayde Tonhasca
Scottish Natural Heritage
Battleby, Redgorton
Perth
PH1 3EW
Telephone: 01738-458 671
E-mail: athayde.tonhasca@snh.gov.uk

A warm sunny bank suitable for nesting by mining bees