



Estonian bumblebees



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Bumblebees – who are they and what do they look like?







Bumblebees are insects with a burly, furry and colourful appearance. They are members of the bee genus *Bombus* in the family Apidae. People have given them different names and they can be met in forests, fields, meadows and gardens, both in the countryside and in towns. Bumblebees can be found throughout the world except for Australia and the Tropics. There are over 250 species of bumblebees in the world of which 68 species can be found in Europe. Bumblebees can be divided into true bumblebees and their nest parasites, known as cuckoo bumblebees. In Estonia 21 species of true bumblebees and 8 species of cuckoo bumblebees are found – 18 species of the true bumblebees belong to the species of the conservation category III of the Nature Conservation Act. This publication focuses mainly on true bumblebees (henceforth referred to as bumblebees).

Bumblebees have a head, thorax and abdomen. Six segmented legs are attached to the thorax, and there are long segmented antennae and big shiny compound eyes on both sides of the downwards-tilted head.

There are three black primitive eyes called ocelli arranged in a triangular pattern or in a row (depending on the species) on the top of the head between the compound eyes. The four wings on the back are attached and cover the centre of the back and the first segments of the abdomen as a shiny narrow stripe.

Bumblebees, like honeybees and wasps, have a poison sting and they can fiercely attack a disturber. Unlike honeybees, bumblebees do not die after stinging and they can defend themselves once again. Only queens and workers who form the majority of the colony are equipped with a sting. Workers are female bumblebees. Male bumblebees are totally unarmed and harmless.

Bumblebees are furry insects of different colours that might include black, white, red, orange, grey, yellow, brown and their variations. Each bumblebee species has its own characteristic colour combination according to which Estonian bumblebees can be classified as follows:

-  brown species (8)
-  black species with a red tail (3)
-  black species with two yellow bands (4)
-  black species with three yellow bands (3)
-  species of varied colour (1)
-  grey species (2)

This publication gives general knowledge about bumblebees followed by a description of the 14 most numerous bumblebee species found in Estonian agricultural landscapes. The inclusion of species into the most numerous species is based on bumblebee monitoring carried out within the framework of the evaluation of Estonian agri-environment support scheme coordinated by the Agricultural Research Centre (<http://pmk.agri.ee/pkt>). These most numerous species also include *B. schrencki*; however, this species is not described because there is limited information available about it. A short overview of less abundant bumblebee species and cuckoo bumblebees is also provided.

Life cycle

Bumblebees have an annual life cycle, which means that most individuals who emerge during spring and summer (workers, male bumblebees and old female bumblebees having found a nest) do not survive the following winter. Only young fertilised female bumblebees (queens) hibernate and start over next year. Bumblebees hibernate in soil or under a layer of leaves; in a former queen's nest; on northern slopes of moderate humidity; between tree roots; in wall cavities and holes, and; in rotten timber. Hibernation starts in July-August. In spring fertilised female bumblebees leave the hibernation site and start foraging and looking for a nesting site. The food in early spring, including willows and coltsfoot, is extremely important for bumblebees. Young female bumblebees are not

ready for laying eggs until they have consumed enough food – this takes about a fortnight. Thereafter the females start examining their surroundings. They make search flights over the surface and examine carefully every roughness on the ground. Search flights usually take several days.

The sites suitable for summer nests are abandoned underground burrows up to two metres deep (abandoned mouse nests in particular); rotten stumps; stone cracks; old leaves; space between roots; dry grass tufts; places under trees; bird nest boxes etc. Some species prefer open areas (e.g. meadows, clearings), others hide within the shelter of trees. Nests are preferably found in windless southward locations. As soon as a suitable nesting site is found, female bumblebees start building a nest. Nests are insulated with moss, soft pieces of plants and grass, straw and other available material found nearby. Masking according to the colours of the surroundings is a firm rule for the establishment of the exterior of the bumblebee nest. In case of an underground burrow the tunnel is always horizontal or found upwards in a slope to avoid rainwater from flowing into the nest.

After finishing the nest the queens start moulding a lump within which they lay their first batch of eggs. It takes about from three weeks to a month and a half for young bumblebees to emerge. Also, the queen forms wax pots in which nectar is stored. At first, the queen takes care of the feeding of the larvae and the cleanliness of the nest.

As the number of offspring grows the only responsibility of the queen remains to lay eggs, worker bees build combs and take over nursing and care for the cleanliness of the nest and take responsibility for guarding the nest and collecting food. Like queens, workers are female bumblebees; however, in most cases workers are much smaller. Male bees emerge in midsummer and live for a short time – their only task is to fertilise females. Males forage only for themselves.



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Foraging

Bumblebees feed on nectar and pollen. Female bumblebees do not forage only for themselves, but also for the colony – therefore, they have to be active flower-visitors and foragers. Female bumblebees collect pollen into a pollen basket on their hind legs where pollen balls of different colour can be seen. Floral scent and big compound eyes of bumblebees that are capable of distinguishing colours help them find forage resources. Bumblebees are capable of learning and, since it is necessary for them to reduce energy consumption, they remain constant to selected blossoms and collect food from two or three plant species during each forage flight. This is what makes them such good pollinators. Bumblebees need sufficient forage availability in a flower-rich area from spring to autumn. Various cultivated crops (e.g. clover, lucerne, oilseed rape) offer bumblebees a rich forage resource, however, they also need food when cultivated crops are not in bloom.

Unlike honeybees, bumblebees are furry and can forage on cooler and rainier days and contribute to pollination on these days. High temperatures (over 26°C) are not suitable for them and on hot days they forage early in the morning and late in the evening. It is known that honeybees communicate with each other about good sources of forage by means of the waggle dance, but bumblebees are unable to recruit nestmates to specific places, so each individual has to learn for itself which flowers provide reward. However, bumblebee foragers do communicate about rewarding flowers but not about a specific location. Therefore, it is not efficient for bumblebees to forage as far away as honeybees do.

Why are bumblebees important for us?

Bumblebees are important for the provision of “pollination services”:

- Around 88% of pollination of flowering plants is carried out by fauna (mainly insects in our region). The most important pollinators are different kinds of bees (honeybees, bumblebees and solitary bees) who contribute to the pollination of both, wild and cultivated plants
 - In 2005 the economic value of pollination was estimated to be € 22 billion a year in Europe and € 153 billion a year in the world
 - Approximately 30% of the food consumed by humans is produced thanks to pollinators
 - The nutrition value of crop plants dependant on pollinators is very high, e.g. such plants contain more than 90% of vitamin C in our food
 - About 84% of all cultivated plants in Europe need insect pollination
 - Bumblebees pollinate the following plants: clovers, lucerne, common vetch, beans, oilseed rape, turnip rape, flax, sunflower, blackcurrant, gooseberry, raspberry, strawberry, tomato, cucumber, sour and sweet cherry trees, plum trees, apple-trees, carrot, radish, swede, turnip, onion, beetroot etc
- Different species of pollinators differ from one another in terms of anatomy, as well as food preferences. Therefore, it is not possible for a single species to pollinate all plant species, it is necessary to have a variety of pollinators



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What factors affect bumblebees?

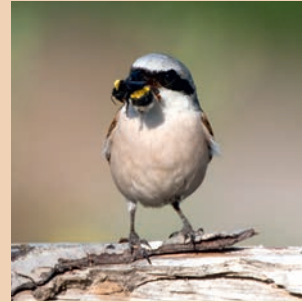
The available evidence suggests that the status of bumblebees has declined in Europe, North America and Asia. Consequently, there is concern about sufficient pollination of both cultivated and natural plants. It is difficult to define one single reason for the deteriorating status of bumblebees since there are several factors affecting them:

- Intensification of agriculture and change in land use are considered to be the major factors having a negative impact on bumblebees. This results in fragmentation of habitats, disappearance of suitable habitats, nesting sites and food resources, as well as increased use of pesticides
- Weather – hibernation and the beginning of the year are very important for all bumblebee species. Changeable winter or prolonged cold and rainy spring resulting in destroying blossoms have an extremely negative effect on bumblebees. Also, the impact of previous spring and summer on insects and plants can affect bumblebees. High surface water prevents bumblebees nesting underground from going into hibernation
- Parasites e.g. mites, larvae of some species of butterflies and dipterous, nematodes, cuckoo bumblebees

- Illnesses (trading with bumblebee colonies contributes to the spread of diseases)
- Non-native species – both plants and other pollinator species competing with bumblebees
- Predators e.g. several vertebrates (small mammals, birds, minks, foxes)
- Climate change



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How to promote bumblebees?

- The most important factor for bumblebees to thrive is ensuring **a continuous succession of flowering forage plants throughout the activity period i.e. from early spring to late summer**. Some abundantly flowering cultivated crops (clovers, lucerne, melilot and oilseed rape) provide bumblebees with generous food resource – papilionaceous are a particularly good food resource. At the same time, they also need forage at the time cultivated plants are not flowering. Therefore, availability of permanent and semi-natural grasslands, as well as uncropped areas of farmland, such as shelterbelts and field margins is of great importance. Fruit, berry and flower gardens are good forage sources. Suitable forage plants can be sown or planted. Bumblebees are fond of visiting clovers, brown knapweed, greater knapweed, wood cow wheat, blue echium, rosebay willowherb, St. John's Wort, cow vetch, common bird's foot trefoil, gypsy rose and creeping thistle.
- **Availability of nesting and hibernating sites** – areas that are not cultivated (necessary for the species nesting and/or hibernating both on the ground and underground). The species nesting on the ground may also suffer as a result of mowing the grassland. Rotten timber, old stone fences and walls, compost heaps, heaps of mown plants, old sand and gravel quarries provide good nesting sites. Therefore, it is advisable not to be too meticulous in maintaining the surroundings.

Also, people can make bumblebee nests for bumblebees and place them in suitable locations.

- **Limiting the use of pesticides** is necessary to avoid the poisoning of bumblebees. It is particularly important to avoid the drift of pesticides to the plants of field margins. Spraying of flowering cultivated crops should always be avoided.
- **In order to promote bumblebees in fields where crops dependent on insect pollination are cultivated, it is necessary to keep the fields relatively small**. This is because of the limited flight range of bumblebees from their nests. Since fields are constantly cultivated bumblebees cannot nest there and have to fly to the fields from other locations. It is therefore advisable to establish fields where cultivated plants dependent on insect pollination are grown as narrow stripes, or to establish small fields close to flower-rich communities. Flight range from the nest varies with different species and the foraging range of some species is much longer than others (in some species it is less than 500 metres, whilst in others it is over 2 km). Species with shorter flight range are more dependent on fragmented landscapes. Although species with longer flight ranges can be obstructed by woodland. The flight range of a number of species is not known and data can also vary according to the type of habitat.

Description of species

The following sections describe the eight main characteristics (provided the data is available) of the more abundant bumblebee species. There is more information available about some species than others and still much work to do in terms of bumblebee research. A number of basic characteristics of bumblebees provided in this publication have not been surveyed in Estonia yet and the majority of information provided here is based on survey data from other countries (except for abundance, appearance, partly nesting site, time of emerging from hibernation and the main habitat).

Abundance

The abundance factor shows whether a specific species is one of the most abundant species, a species of medium abundance or belongs to the least abundant species of the 14 species presented in more depth in this publication. The data is based on bumblebee monitoring in agricultural landscape carried out within the framework of the evaluation of Estonian agri-environment support scheme coordinated by the Agricultural Research Centre, as well as some surveys by the Estonian University of Life Sciences.

Appearance

In most cases the fur colour of the bumblebee species is described (back view) and in some cases other characteristics that can be determined by the naked eye have been given. Colour codes of female (queens ♀ and workers ♀) and male bumblebees (♂) of all species have been provided. There can be variations in fur colour that can fade throughout the lifetime of the bumblebee, therefore the fur colour might not always give the right identification result. Comprehensive identification includes determination of many other characteristics, mostly under the microscope.

Colour codes provide the main colour combination for the head, thorax and abdomen of bumblebees. Two white circles on the thorax are the places where the wings join the thorax (tegula). From the tegula towards the edge the upper part of the sides is depicted. The colour codes are presented in the following colour scale:



The photos present queens and workers (female bumblebees). They are different in size – the former are usually significantly bigger. Females and males are rather different-looking. Males emerge in midsummer, they can be recognized by long antennae. The male's antenna consists of 13 segments, whereas the female has 12 antennal segments. Males have 7 abdominal segments versus 6 in females – therefore, males are not as round as females. One can never see a pollen ball on the hind legs of males because they do not have a pollen basket, they forage only for themselves. In this publication mostly the appearance of female individuals is described and if not pointed out specifically, then the males do not differentiate substantially. Males are usually identified on the basis of genitalia under the microscope.

Tongue length

Bumblebees can be divided into short-tongued, medium-tongued and long-tongued species. The classification of various authors is different and in this publication the research of Pekkarinen (1979) has been taken as a basis for the classification. Tongue length is one of the reasons for different forage preferences of bumblebee species. Long-tongued species have the most limited forage range and consequently they are most threatened. Short-tongued species are the least threatened. Long-tongued species are particularly important for their capability to pollinate deepflowered crops (e.g. red clover, fieldbeans) while honeybees with their short tongue are not able to do this.

Nesting site

Some bumblebee species nest in close vicinity to the ground, others nest underground (from a couple of centimetres to over a metre) and certain species nest above the ground. To some extent the exact location of nests depends on the species. Availability of mouse nests and open ditches is favourable for the species founding their nests in holes in the ground. The species nesting on the ground are sensitive to mechanical disturbance and burning of dead grass. Those nesting underground are affected by field cultivation. The nest sites of rare species are not known. Tolerance to proximity to humans varies by species.



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Emergence from hibernation

Spring kicks off with a fertilised overwintering queen emerging from hibernation as soon as it becomes warm, having spent half or even more of her life in the nest. Emerging from hibernation varies by species. The quickest species become active already at the end of March despite the weather. Most species visit flowers at the end May to collect strength for establishing a new generation. Various studies have shown that earlier species are associated with closeness to woodland, while later emerging species are more associated with grasslands. Most of the later species are medium-tongued or long-tongued.

Colony size

Depending on the species a normally developed bumblebee colony may involve up to several hundred workers. Colony size varies between species. In most cases the species with larger colonies have a longer flight range. In this publication the colony size is classified as follows: a small colony (up to 100 workers); a medium colony (100-200 workers), and; a large colony (up to several hundred workers).

Life expectancy of the colony

Life expectancy of the bumblebee colony can be divided according to species as follows: short, medium or long. Some species are able to go through two colony cycles in the activity period.

Main habitat

Bumblebees prefer to live in open areas, they do not like dark forests and wet brushwood. They prefer sunny forest edges, clearings, meadows, semi-natural grasslands, clear-cut areas, fields and gardens. It is possible to distinguish the main habitat preferences by bumblebee species (vicinity to forest, open areas etc).

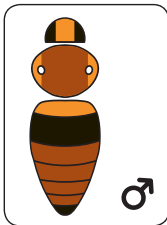
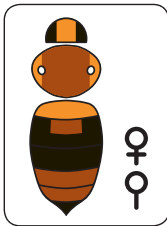


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Bombus pascuorum

Bombus pascuorum



Abundance: one of the three most abundant species.

Appearance: it has a brownish-chestnut (in some cases yellowish-grey or brownish-grey) thorax top that becomes creamy at the sides. The first segment of the abdomen is usually light brown or yellowish-grey, followed by a wide black band, the fourth and fifth segments are also brownish-chestnut. The species has few hairs. The size of workers varies to a great extent. The queen and worker may be of the same size.

Tongue length: medium.

Nesting site: nesting occurs on the surface in dense vegetation or underground near the surface (e.g. in abandoned mouse nests), in some cases also above the surface (e.g. in bird nest boxes, walls of buildings, attics, cavities of tree trunks). *B. pascuorum* tolerates proximity to humans.

Emergence from hibernation: from the middle of April to the beginning of May.

Colony size: medium. Development of the colony until the colony attains full size is slow.

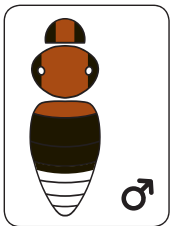
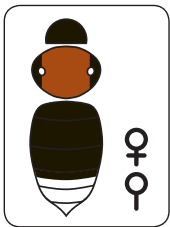
Life expectancy of the colony: long. *B. pascuorum* is one of the latest species to go into hibernation.

Main habitat: widespread (*B. pascuorum* is particularly fond of pastures and fields of papilionaceous species), they like the presence of forest in the landscape.



BROWN SPECIES

Bombus hypnorum



Bombus hypnorum

Abundance: a species of medium abundance.

Appearance: *B. hypnorum* has a brown thorax. The first segment of the abdomen is usually black, in some cases brown. First segment is followed by black band and white tail. Males have brown hairs on the head.

Tongue length: short.

Nesting site: *B. hypnorum* prefers to nest in cavities above the ground (bird nest boxes, trunk cavities, walls of buildings, attics). *B. hypnorum* tolerates proximity to humans.

Emergence from hibernation: from the middle of April to the beginning of May.

Colony size: from medium to large.

Life expectancy of the colony: short.

Main habitat: woodland.

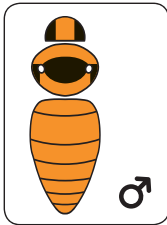
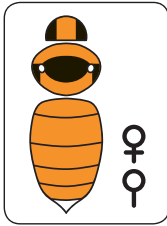


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Bombus distinguendus

BROWN SPECIES



Bombus distinguendus

Abundance: a species of medium abundance.

Appearance: *B. distinguendus* is a long-haired species, it is all olive yellow (outdoors it may seem light brown) with a single black band between the wings across the thorax.

Tongue length: long.

Nesting site: nests are mostly underground.

Emergence from hibernation: one of the latest species to emerge from hibernation.

Colony size: small.

Life expectancy of the colony: short.

Main habitat: open habitat, preferably blossom-rich meadows, pastures and cultivated grasslands (particularly red clover fields), as well as noxious weeds (growing in locations impacted by human activity, such as road verges, wastelands, surroundings of buildings and dwellings).



Bombus subterraneus

Bombus subterraneus

Abundance: one of the three least abundant species of the 14 species presented more thoroughly in this publication.

Appearance: a big short-haired bumblebee with brownish-yellow bands across the front and back part of the thorax (the front band is thicker than the second) with black band between the wings. The front part of the abdomen is also brownish-yellow, there is a black band across the middle part of the abdomen, the tip of the abdomen is off-white, rear edges of a number of abdominal segments are brown. *B. subterraneus* can be mistaken for *B. hortorum* and *B. jonellus*, however, the tail of the last two is clear white. *B. subterraneus* can be distinguished from *B. jonellus* by an extremely short tongue and a round face of the latter. Unlike *B. hortorum*, *B. subterraneus* has a wedge-shape ridge on the lower part of the last segment of the abdomen.

The male is similar to the female, but the male has a brownish-yellow tuft of hair on the head. Also, the off-white tail can be even duller. Sometimes black bands on the abdomen may be so regressed that it is difficult to distinguish *B. subterraneus* from *B. distinguendus* – however, they can be identified by their genitalia.

Tongue length: long.

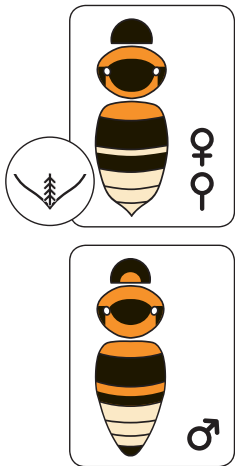
Nesting site: nests are underground (e.g. in abandoned mouse nests).

Emergence from hibernation: one of the last species to emerge from hibernation. They hibernate quite deep underground, therefore, spring arrives later for them.

Colony size: small.

Life expectancy of the colony: short.

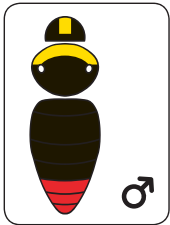
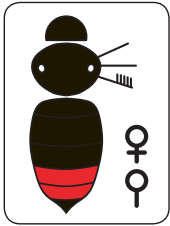
Main habitat: open habitat, preferably blossom-rich meadows and cultivated grasslands (particularly red clover fields), as well as noxious weeds.





Bombus lapidarius

Bombus lapidarius



Abundance: one of the three most abundant species.

Appearance: the thorax and the front part of the abdomen are black, the tail is red. It can be confused with *B. ruderarius* from a distance and one must identify the hairs on the pollen baskets to tell them apart. The hairs on the pollen baskets of *B. lapidarius* are black, but the hairs on *B. ruderarius* pollen baskets are orange-red. *B. lapidarius* is difficult to distinguish from a rare species of the *B. confusus* with the naked eye – however, *B. lapidarius* has longer hair. In addition, the location of the ocelli must be identified. The ocelli of the *B. confusus* are below the supraorbital line, the ocelli of *B. lapidarius* are at the supraorbital line. Also, *B. lapidarius* can be mistaken for a subspecies of *B. soroensis* – the species must be identified by the mouthparts under the microscope. The size of workers of *B. lapidarius* varies a great deal, sometimes very small individuals can be found. The queen is significantly bigger than workers. The male *B. lapidarius* has a well-formed yellow collar and a yellow tuft of hair on the face.

Tongue length: queens are medium-tongued and workers short-tongued.

Nesting site: mostly underground, in some cases on the surface. Very often nests are in stone heaps and gardens and in stony ground. Nests have been found in a foundation, shed, above the shed door, under the threshold of a door and under a flowerpot, in a straw heap, in the wall and attic. *B. lapidarius* tolerates proximity to humans.

Emergence from hibernation: from the middle of April to the beginning of May.

Colony size: medium to large.

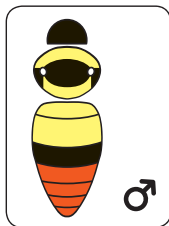
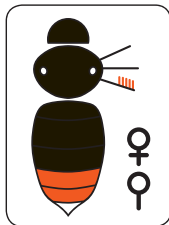
Life expectancy of the colony: medium.

Main habitat: open habitat, preferably stony and blossom-rich meadows. *B. lapidarius* avoids too woody habitats. They can fly much higher than other species.



Bombus ruderarius

Bombus ruderarius



Abundance: one of the six most abundant species.

Appearance: the thorax and the front part of the abdomen are black, the tail is orange-red. It can be confused with *B. lapidarius* from a distance and one must identify the hairs around the edge of the pollen baskets on each hind leg. The hairs around the edge of the pollen baskets of *B. lapidarius* are black, but the hairs of *B. ruderarius* pollen baskets are orange-red. Also, *B. ruderarius* is difficult to distinguish from a rare species of the *B. confusus* whose hairs on the pollen baskets are not orange-red, but black. Also the ocelli are located below the supraorbital line. *B. ruderarius* can be confused with a subspecies of *B. soroeensis*, however the hairs on the pollen baskets of the latter are black. The male has a greyish-yellow thorax with a black band between the wings. The front part of the abdomen of the male is also greyish-yellow.

Tongue length: medium.

Nesting site: they are nesting on the surface (e.g. in the moss, in compost heaps) or underground near the surface (e.g. in abandoned mouse nests).

Emergence from hibernation: rather early, *B. ruderarius* emerges after *B. pratorum*, *B. lucorum* and *B. terrestris*.

Life expectancy of the colony: short/medium.

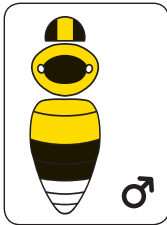
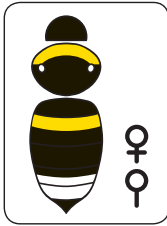
Main habitat: open habitat, as well as noxious weeds. *B. ruderarius* avoids too woody habitats.



Bombus lucorum

BLACK SPECIES WITH TWO YELLOW BANDS

Bombus lucorum



Abundance: one of the three most abundant species.

Appearance: all black, but the collar and the second segment of the abdomen is bright yellow and the tail is pure white. *B. lucorum* can be confused with *B. terrestris* whose collar is narrower and dark yellow. *B. lucorum* is a little smaller than *B. terrestris*. Also, *B. lucorum* can be confused with a more rare species *B. cryptarum* and a subspecies of *B. soroensis*. Unlike *B. lucorum* the *B. cryptarum* has usually a S-shaped black stripe on the yellow band (broken yellow band) on the thorax. The yellow band on the abdomen of *B. soroensis* is broken in the middle and the edge of the black band on the abdomen is orange. The size of *B. lucorum* workers varies very little. The queen is significantly bigger than the worker. The male *B. lucorum* have yellow hairs on the head, the thorax is in most cases yellow and there is a black band between the wings. The front part of the abdomen is also yellow.

It is difficult to distinguish *B. lucorum*, *B. terrestris* and *B. cryptarum*; therefore, they all are often included in *B. lucorum* group.

Tongue length: short.

Nesting site: nesting occurs mostly underground (e.g. in abandoned mouse nests), however, sometimes *B. lucorum* also uses holes above the surface (e.g. bird boxes). *B. lucorum* tolerates proximity to humans.

Emergence from hibernation: *B. lucorum* and *B. pratorum* are the earliest of all bumblebees to announce the beginning of spring.

Colony size: large.

Life expectancy of the colony: long.

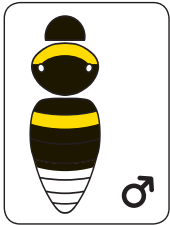
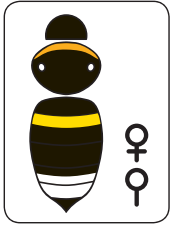
Main habitat: widespread.



Bombus terrestris

BLACK SPECIES WITH TWO YELLOW BANDS

Bombus terrestris



Abundance: a species of medium abundance.

Appearance: all black, but with a dark yellow collar at the front of the thorax. The second segment of the abdomen is yellow and the tail is whitish. It can be confused with *B. lucorum*, but the yellow collar of *B. terrestris* is narrower and dark yellow. Also, *B. terrestris* can be confused with a more rare species *B. cryptarum* and a subspecies of *B. soroensis*. Unlike *B. terrestris*, the *B. cryptarum* usually has a S-shaped black stripe on the yellow band (broken yellow band) on the thorax. The yellow band on the abdomen of *B. soroensis* is broken in the middle and the edge of the black band on the abdomen is orange. The size of *B. terrestris* workers varies very little. The queen is significantly bigger than workers. It is difficult to distinguish *B. lucorum*, *B. terrestris* and the *B. cryptarum*; therefore, they all are often included in *B. lucorum* group.

Tongue length: according to some data *B. terrestris* is short-tongued, but it can also be classified as a medium-tongued species.

Nesting site: underground (e.g. in abandoned mouse nests) – the length of the tunnel can be up to two metres. *B. terrestris* tolerates proximity to humans.

Emergence from hibernation: *B. terrestris* becomes active early in spring; it emerges after *B. pratorum* and *B. lucorum*.

Colony size: large. *B. terrestris* protects itself fiercely when disturbed.

Life expectancy of the colony: long.

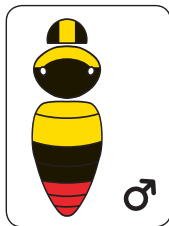
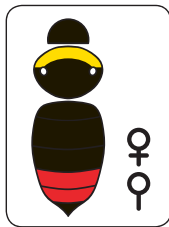
Main habitat: *B. terrestris* prefers open areas and avoids woodland.

Some artificial production of *B. terrestris* colonies is carried out and bumblebees are taken to the crops in need of pollination (*B. terrestris* is used particularly for the pollination of tomatoes in greenhouses).



Bombus pratorum

Bombus pratorum



Abundance: a species of medium abundance.

Appearance: all black except for a rusty tail and a fairly bright yellow collar behind the head. Sometimes the first segment of the abdomen is yellow. *B. pratorum* is one of the most easily recognized species. The size of workers varies to a certain extent. The queen and the worker can be almost of the same size.

The upper side of the head, the collar, sides and the lower part of the thorax of the male are yellow. Also, the front part of the abdomen is yellow and the tail is rusty. Male bumblebees have particularly conspicuous bright hair that makes the identification of the species easier.

Tongue length: short.

Nesting site: nesting occurs in different locations: underground, on the ground and above the surface (e.g. bird nest boxes, tree holes, underground cavities, plant shrubs).

Emergence from hibernation: *B. pratorum* and *B. lucorum* are the earliest of all bumblebees to announce the beginning of spring.

Colony size: small.

Life expectancy of the colony: short. The colony develops fast and fertilised females go into hibernation early. Some queens start a new colony during the same period of activity.

Main habitat: the habitat is widespread (arable areas, parks, meadows, bushes), however, *B. pratorum* prefers woodland.



Bombus hortorum

BLACK SPECIES WITH THREE YELLOW BANDS

Bombus hortorum

Abundance: one of the six most abundant species.

Appearance: a quite a big bumblebee. The front and back part of the thorax, as well as the first segment of the abdomen are yellow, the tail is white. *B. hortorum* has got a twin – *B. jonellus*. However, the latter is smaller, the face is shorter and rounder and the tongue is short. The hairs on the pollen baskets of the hind legs of *B. hortorum* are black, the hairs on the pollen baskets of *B. jonellus* are usually orange. *B. hortorum* can also be confused with *B. subterraneus*. Unlike *B. hortorum*, the tail of *B. subterraneus* is off-white and the rear edges of a number of segments are brown. Unlike *B. hortorum*, *B. subterraneus* has a wedge-shape ridge on the bottom of the last segment of the abdomen. The size of *B. hortorum* workers varies a great deal. The queen and worker can be of the same size. The male bumblebee has a yellow tuft of hair on the head.

Tongue length: long. The tongue of *B. hortorum* is the longest of all Estonian bumblebee species.

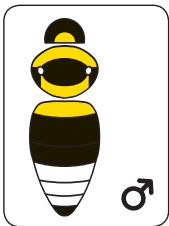
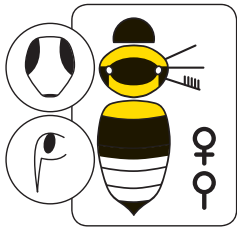
Nesting site: nesting occurs both underground and on the surface. In some cases nests can be found above the ground (bird nest boxes), also, in unusual places (e.g. in a coat pocket or in a lawn mower). *B. hortorum* tolerates proximity to humans.

Emergence from hibernation: one of the first bumblebees after *B. pratorum*, *B. lucorum* and *B. terrestris* to start foraging on flowers and looking for a nest thereafter.

Colony size: from small to medium.

Life expectancy of the colony: short. Some queens start a new colony in the same period of activity.

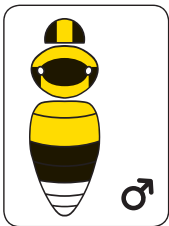
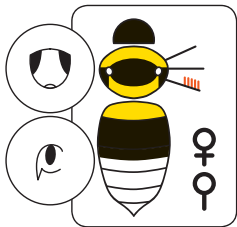
Main habitat: open habitat, usually in cultivated land. *B. hortorum* can often be found in ornamental gardens and plantations.





Bombus jonellus

Bombus jonellus



Abundance: one of the least abundant species of the 14 species described more thoroughly in this publication.

Appearance: the front and back part of the thorax and the first segment of the abdomen are yellow, the tail is white. *B. jonellus* is the smaller twin of *B. hortorum*. The head of *B. jonellus* is shorter and rounder and the tongue is short. In addition, the hairs of the pollen baskets on the hind legs of *B. jonellus* are usually orange, whilst the hairs of the pollen baskets of *B. hortorum* are black. *B. jonellus* can also be confused with *B. subterraneus* but unlike *B. jonellus*, the tail of *B. subterraneus* is off-white and the rear edges of a number of segments are brown, also, the face is oval and the tongue is long. The male *B. jonellus* is similar to the female, but the male bumblebee has yellow hairs on the head.

Tongue length: short.

Nesting site: nests are underground (e.g. in abandoned mouse nests), although sometimes nesting occurs on the surface.

Emergence from hibernation: quite early in spring.

Colony size: small.

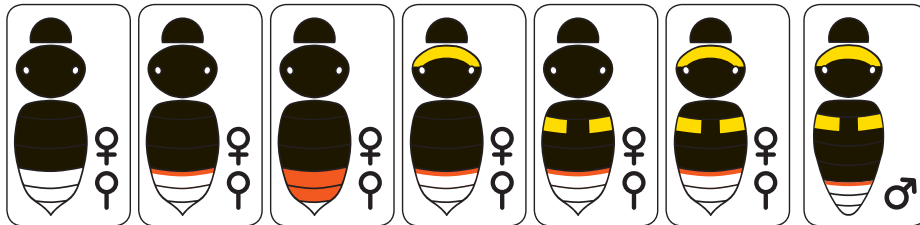
Life expectancy of the colony: short. Some queens start a new colony in the same period of activity.

Main habitat: particularly in heaths and woodland, *B. jonellus* avoids cultural landscapes.



Bombus soroensis

Bombus soroensis



Abundance: a species of medium abundance.

Appearance: two subspecies of *B. soroensis* live in Estonia. The front of the thorax and the second segment of the abdomen of one of the subspecies *B. s. soroensis* are yellow (the stripe on the abdomen often broken yellow). The edge of the black band on the abdomen is orange, the tail is white. The other subspecies *B. s. proteus* is black, the tail is white and the edge of the white band can be orange. Interbreeding can give offspring of different colour. The subspecies *B. s. soroensis* can be confused with the majority of black species with two yellow bands, particularly with *B. lucorum*, *B. terrestris* and *B. cryptarum*. Unlike these species the yellow band on the segment of the abdomen of *B. soroensis* is broken in the middle and the edge of the black band on the abdomen is orange.

Tongue length: short.

Nesting site: nests are underground (e.g. in abandoned mouse nests).

Emergence from hibernation: one of the latest to emerge from hibernation.

Colony size: small to medium.

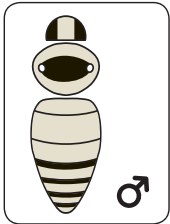
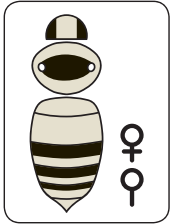
Life expectancy of the colony: medium.

Main habitat: widespread (woodland, meadows, cultivated crops and noxious weeds).



Bombus veteranus

Bombus veteranus



Abundance: *B. veteranus* is one of the six most abundant species.

Appearance: all whitish or yellowish-grey, except for a narrow band between wings and even narrower black bands between the segments of the abdomen.

Tongue length: medium.

Nesting site: nests are on the ground and above the ground (nests have been found in tree holes and waste and wood shingle heaps).

Colony size: small.

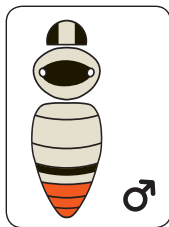
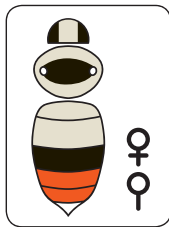
Life expectancy of the colony: medium.

Main habitat: *B. veteranus* prefers open habitats and avoids woodlands.



Bombus sylvarum

Bombus sylvarum



Abundance: *B. sylvarum* is a species of medium abundance.

Appearance: the thorax is yellowish-grey and there is a black band between wings. The two first segments of the abdomen are yellowish-grey, the third segment is usually black, the fourth and fifth segments are orange. It is characteristic of *B. sylvarum* to make a higher sound when flying compared with the flying sound of other bumblebee species.

Tongue length: medium.

Nesting site: nests are on the ground (hidden in old grass) or underground just near the surface. Often abandoned mouse nests and bird nests are used. The nest is often in the shelter of a bush.

Emergence from hibernation: one of the latest together with *B. distinguendus* and *B. subterraneus*.

Colony size: small.

Life expectancy of the colony: medium.

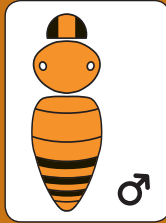
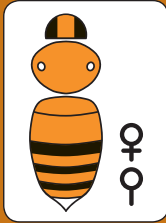
Main habitat: blossom-rich grasslands and woodlands. It is a species of the woodland edge.

In addition to the species provided above the following bumblebees can be found in Estonia:

BROWN SPECIES:

Bombus schrencki

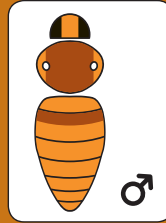
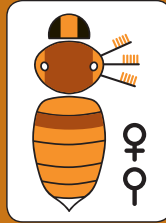
One of the most abundant of the less abundant species.



© Riho Marja

Bombus humilis

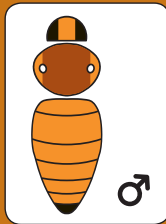
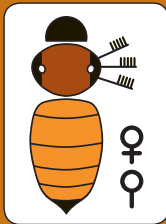
One of the most abundant of the less abundant species.



© Margit Möttus

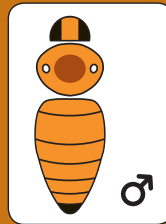
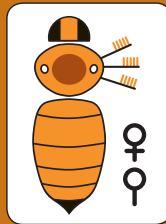
Bombus muscorum

One of the most abundant of the less abundant species.



Bombus laesus

Rarely found.

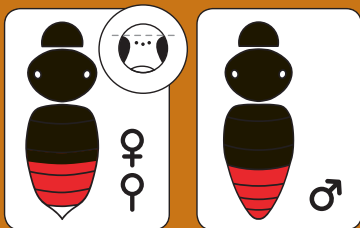


Less abundant species

BLACK SPECIES WITH A RED TAIL:.....

Bombus confusus

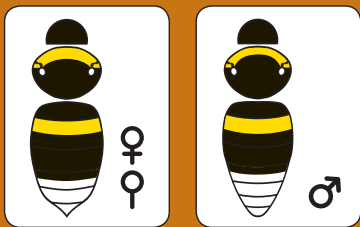
Rarely found.



BLACK SPECIES WITH TWO YELLOW BANDS:.....

Bombus cryptarum

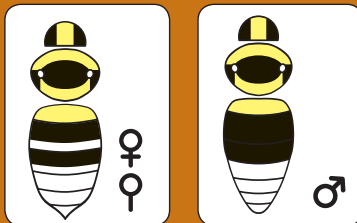
One of the most abundant of the less abundant species, particularly in semi-natural habitats.



BLACK SPECIES WITH THREE YELLOW BANDS:.....

Bombus semenoviellus

A newcomer in Estonia.



In addition to the 21 species described in this publication three more species have been mentioned in different Estonian databases: *B. sporadicus*, *B. magnus* and *B. consobrinus* – it might be possible to find them in Estonia. These three species have not been described in this publication as reliable data on these species' existence in Estonia is not available.

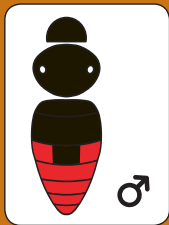
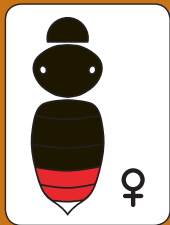
Cuckoo bumblebees (*Psithyrus sp.*) parasitise the nests of true bumblebees and can be easily mistaken for true bumblebees. They enter the nests of true bumblebees, destroy the host larvae and often kill the queen. They lay their own eggs to be cared for by the host workers. There is often a resemblance in colour between cuckoo and host bumblebees, but the body hairs of cuckoo bumblebees are sparser which means that the shiny black body beneath the hairs is more apparent. Cuckoo bumblebees have a thicker and tougher cuticle than the host bumblebees and they are armoured with a longer tongue. Also, their wings often appear darker than the wings of true bumblebees.

However, the main difference lies in the hind legs – the legs of cuckoo bumblebees are narrower and without pollen baskets. Cuckoo bumblebees do not need the collecting apparatus as they never forage for the colony. All the food they collect is for their own use, they idle on one flower for a long time. Cuckoo bumblebees have no workers of their own, just females and males. Females go into hibernation later in summer and emerge from hibernation later in spring than true bumblebees. The species of cuckoo bumblebees found in Estonia (classified according to the colour), their host true bumblebees and colour codes (the main colour combination, often variations occur) are given below.

THE SPECIES WITH BLACK AND RED:.....

Bombus rupestris

Mostly the nest parasite of *B. lapidarius* (sometimes the nest parasite of *B. sylvarum* and *B. pascuorum*).

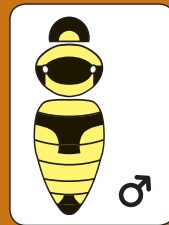
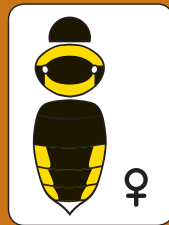


© Riho Marja

THE SPECIES WITH BLACK AND YELLOW:.....

Bombus campestris

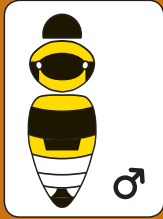
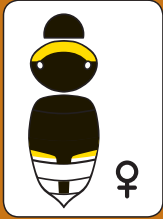
Mostly the nest parasite of *B. pascuorum* (sometimes the nest parasite of *B. humilis* and *B. pratorum*).



THE SPECIES WITH BLACK, YELLOW AND WHITE:

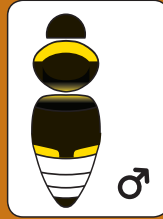
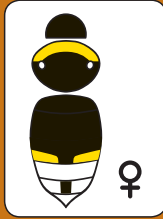
Bombus bohemicus

The nest parasite of *B. lucorum*.



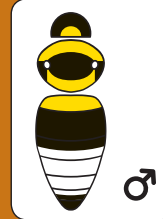
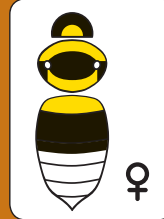
Bombus vestalis

The nest parasite of *B. terrestris*.



Bombus barbutellus

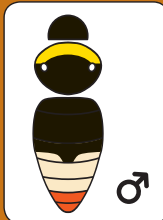
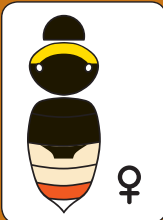
The nest parasite of *B. hortorum*.



THE SPECIES WITH BLACK, YELLOW, WHITE AND ORANGE:

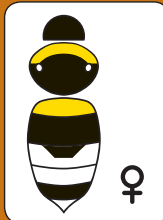
Bombus norvegicus

The nest parasite of *B. hypnorum*.



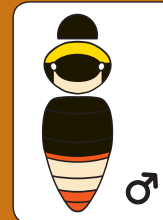
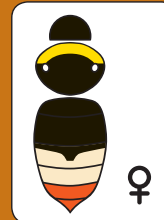
Bombus sylvestris

The nest parasite of *B. pratorum* (at times the nest parasite of *B. jonellus*)



Bombus quadricolor

Rare species, the nest parasite of *B. soroensis*.





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