



Vigie-Nature École

A citizen science programme for discovering biodiversity

Participant's kit



Thanks to Vigie-Nature École, you can now observe local biodiversity with your pupils and help scientists with their research.

This document provides all the keys you need for you and your classes to join in our citizen science programme. Thanks to rigorous protocols adapted for school children ages 3 to 18, Vigie-Nature École makes it possible to lead field trips that encourage direct contact with nature, while developing a scientific approach in your pupils.

This document includes four information sheets that explain the general principle of Vigie-Nature École, followed by details for each observatory. These resources will guide you as you implement our citizen science programme, clearly explaining the steps and techniques, as well as the basics for the scientific study of biodiversity.



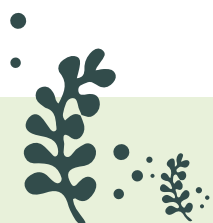
CONTENTS

How it works

Fact sheet 1: Vigie-Nature École at a glance.....	page 4
Fact sheet 2: About Vigie-Nature.....	page 9
Fact sheet 3: Assessing the state of biodiversity health.....	page 11
Fact sheet 4: Getting to know the data entry interface.....	page 13

About our observatories

 Operation Snails	page 15
 Garden Birds	page 27
 BirdLab	page 47
 Worm Plots	page 51
 Spipoll	page 63
 Wild on my street	page 75
 Vigie-Bat	page 95
 Lichens Go!	page 111
 BioCoast Junior	page 139





What does the programme consist of?

As you will have understood, Vigie-Nature École is the school version of the Vigie-Nature programme. It is a citizen science programme that enables teachers to raise pupil awareness about biodiversity as they contribute to a genuine research programme.

As of now, nine protocols are available, enabling the monitoring of a wide variety of groups (birds, snails, wild plants, pollinating insects, etc.).

The data collected by these observatories is sent to researchers at the Muséum National d'Histoire Naturelle via the Vigie-Nature École website. Scientists analyse the data to assess the state of health of biodiversity in France and measure human impact on ordinary biodiversity.

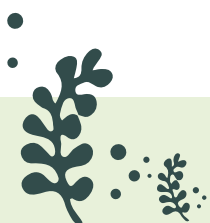
How do I set up Vigie-Nature École for my class(es)?

Choice of protocol

Start by choosing the protocol(s) you wish to follow. There are many resources available to help you choose: videos presenting the protocols, quizzes to practise species identification, resources on the biology of the taxa studied, etc. In addition, for each observatory, you can download a participant's kit from our website, which lays out the research objectives and provides the resources you'll need to implement the data collection protocol (e.g. count sheets, ready-to-use identification keys adapted to the species studied).

Once you have registered on the Vigie-Nature École website, you will have access to further resources: examples of educational activities, links to school curricula, etc. The aim is to help you make this system a part of your school year without it being a separate activity.

The following table will help you to narrow down your choice.



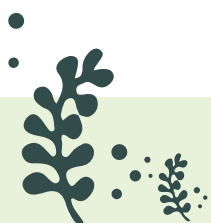


	Wild on my street	Garden Birds	BirdLab	Operation Snails	Worm Plots	Spipoll	BioCoast Junior	Vigie-Bat	Lichens Go !
Time in the field	30 min to 1 hr	Less than 30 min	5 min	Less than 30 min	1 hr to 1 hr 30	1 hr to 1 hr 30	30 min to 1 hr	15 min	30 min
Time of year	Year round, but especially flowering periods	Year round but easier in winter with birdfeeders	15 November through March	Year round, but few or no snails in winter	January through April	Year round	Year round	September - October and May-June	Year round, in dry weather
Cost of materials	€12 per booklet (plan on at least 4 booklets per class)	With feeders, plan €15 for 5 kg of seeds	Plan €15 for 5 kg of seed + tablets or smart-phones	Free if recycling used boards	About €7 for mustard jars	Plan on cameras	Plan on quadrats	About €5 for 3 LR06 batteries (AA)	A few euros for the purchase of the fence
Age of pupils	Ages 9-18	Ages 3-18	Ages 6-18	Ages 3-18	Ages 9-18	Ages 9-18	Ages 6-18	Ages 12-18	Ages 12-18

Register on the website

Once you have made your choice, register on our website.

Then, create one or more classes and at least one observation area (**see fact sheet n°4** for an overview of how the website works). The latter is extremely important as it helps scientists to analyse the data. They'll need to know, for instance, the context in which the observations were made: was it urban or rural? Were agrochemicals used? All this information helps to explain the distribution of the life observed. The questions will vary according to the observatory selected. Once these formalities have been completed, you're ready to participate!



Presenting the programme to pupils

In order for the data to be valid, it is imperative that the pupils comply fully with the protocol developed by the researchers. This is why, even before starting your observations, we advise you to explain the principle of citizen science to your pupils. They are sure to learn a new way of doing science and should be motivated to collect information that is truly useful to researchers. Numerous resources (texts, interviews with researchers) are available on our website.

Next, you will need to explain why the study of ordinary biodiversity is so important to science: here again, you'll find multiple resources online.

Then, we urge you to insist on the importance of sticking to the protocol we've provided. The aim is for your pupils to understand that the standardisation resulting from a given protocol enables scientists to compare the observations made at point A with those made at point B: the duration and method of observation are the same wherever the observer is.

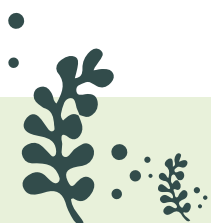
In addition to the protocol, which must be scrupulously adhered to, this approach enables pupils to understand the need for researchers to have a lot of data both geographically and over time.

Finally, we suggest that you train your pupils to use the identification tools in the classroom; the field sessions will be all the easier! To do this, you can use collections from living creatures (snail shells for example) or the photo quizzes available on our website.

Participation in this project is therefore not, in our opinion, a complementary or optional activity: it has a real scientific and educational impact. It therefore needs to be fully integrated into your pupils' curriculum. Their work can be assessed on different aspects of the curriculum and common case knowledge and skills. It can even simplify the assessment of aptitudes that are difficult to assess in conventional practices, such as team and project work.













Field implementation of the protocol and data collection

Once the previous steps have been completed, you are ready to implement the protocol in the courtyard or playground of your institution (or another location of your choice). Again, we must remind you that it is imperative that the pupils adhere to the protocol developed by the researchers. Once in the field, the pupils note the date of observation, the abundance of each species observed, and any additional information specific to each observatory. Back in classroom, teachers and/or pupils connect to the Vigie-Nature École website to send the data to the Museum's researchers.



Data entry

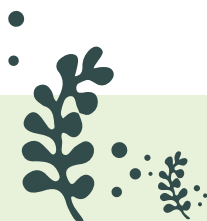
The same day, or at another session, send us your observations! All you have to do is log into your account (you can also create usernames for your different classes) and send in your observations. Data entry can be done using a video projector for the whole class to see, in a group in the computer room, or even from home... it's up to you! This step is essential for our researchers.

					
Amber snails	Four-tooth bulin	Decollate snail	Large bulin	White garden snail	Door snails
Number <input type="text" value="0"/>	Number <input type="text" value="0"/>	Number <input type="text" value="0"/>	Number <input type="text" value="0"/>	Number <input type="text" value="0"/>	Number <input type="text" value="0"/>
					
Cochlostoma	Round-mouthed snail	Burgundy snail	Quimper snail	Chocolate-band snail	Turkish snail
Number <input type="text" value="0"/>	Number <input type="text" value="0"/>	Number <input type="text" value="0"/>	Number <input type="text" value="0"/>	Number <input type="text" value="0"/>	Number <input type="text" value="0"/>

Example of the data entry form for Operation Snails observations.

Don't worry: it only takes a few minutes to enter data for the simpler observatories (Garden Birds, Operation Snails, etc.) and online help is available if you run into difficulties (and so are we, so don't hesitate).

Finally, even if you only observe a few of the life forms or none at all, this in itself is an important piece of data for scientists, so it is essential to send us these observations as well.



Possible complementary activities

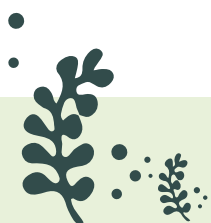
You may find that questions and hypotheses concerning the distribution of living beings arise from your observations (are there as many birds in the city as there are in the countryside? Does the use of pesticides have consequences on snails, etc.). The data positioning tools included in the participation report, which is sent at the end of the school year to all who are registered on the website, provides answers to some of these questions. The graphics included in the report position the observations made in a given establishment in relation to the data collected as a whole. For example, you will learn whether observing 4 species of snails in an establishment is a sign of healthy or poor biodiversity. Explanations are provided to help you interpret the results. These documents encourage your pupils to consider which actions could be taken to promote biodiversity in the courtyard or playground (installation of feeders, setting aside plots of land, etc.). By repeating the observations, you will be able to monitor the impact of these actions over time.

You can also process the data you've collected in other ways. For example, you can create graphics representing the species present in different areas of the establishment. These graphics allow pupils to visualise in a simple manner that there is a significant difference between two areas of the schoolyard. They can then propose hypotheses to explain the population differences (abiotic factors such as humidity, temperature for example).

You can also produce graphs showing the evolution of the number of species present seasonally. They allow you to follow changes in the number of individuals over the course of the year (for example, for the notion of bird migration). It is also possible to produce such graphs over several years by accumulating the numbers recorded month by month.

Many other illustrations are possible. For example, pupils can be asked to situate their data on an aerial photo of the school. They can then offer explanations for possible differences in the occupation of the various areas of the school.

Finally, you will find a wide range of educational activities on our website. Some of them are suggestions for introducing this activity but others take it a step further. For example, we have developed ways for your pupils to learn how to analyse data in the manner of an ecological researcher, or for them to think about actions to be taken within their establishments to promote biodiversity.





Following our presentation of the programme dedicated to schoolchildren, let's look at the scientific principles common to all Vigie-Nature observatories.

What does the programme consist of?

A conventional research laboratory can study the ecological functions, processes and mechanisms governing living things at the scale of a habitat or species. However, addressing this research issue on the scale of a country and over several consecutive years remains beyond the reach of most research structures. Such an approach implies adopting other research practices. One possible solution is to use large networks of outside collaborators to collect and report harmonised data (i.e. data collected according to a protocol that is common to all observations so that they are statistically exploitable). This principle of associating researchers and non-researchers is called **citizen science**.

Thirty years ago, a citizen science programme was launched by the Muséum National d'Histoire Naturelle, and more specifically the Muséum's Centre for Ecology and Conservation Sciences (CESCO), to study the impact of human activities on biodiversity. That programme is called **Vigie-Nature**, and it now comprises more than fifteen different observatories.

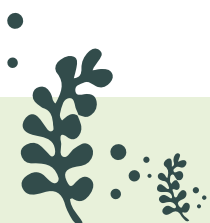
These observatories aim to sample a large number of sites, distributed over a vast area, in order to feed the work of researchers and enable them to answer ecological questions. Our aim is to achieve a high quality of observation, comparable to what exists in the fields of climate or economics.

All these observations make it possible to assess the state and dynamics of biodiversity in France as a whole, but also within its regions, departments and even municipalities. Thanks to this large-scale spatial and temporal monitoring, Vigie-Nature's scientists are able to study the relationships between species abundance and other types of variables, such as temperature, degree of urbanisation, use of agrochemicals, etc.



What type of data will you be asked to collect?

In order for our analyses to be meaningful, the data we ask you to collect are selected to provide significant information on the state of biodiversity: firstly, species identity and abundance, and secondly other descriptive variables such as the type of environment, how it is managed, etc.



What about data reliability?

Data collected by a neophyte is sometimes considered to be of little credibility by critics of citizen science when in fact it is a treasure trove of information for researchers. The Muséum scientists who coordinate Vigie-Nature attach the greatest importance to the protocols that guide the volunteers and ensure that they are rigorous. This is an essential condition for reliability. Thus, an adequately supervised observer provides data that can be fully exploited by researchers.

Another way of establishing the credibility of an observation is to increase the number of observations of the same type, in terms of both time and space, thanks to the largest possible number of volunteers. The more information is repeated, the more reliable it is: the observations of 10,000 neophytes can be much more accurate than those of 100 specialists.

Finally, there is often controversy over the level of accuracy that can be achieved by a non-specialist. It should be remembered that the majority of Vigie-Nature observations are made at the species level. However, the lists of species proposed to school observatories are limited in order to target a sample of species that are both easy to identify and representative of a given environment (garden, meadow, crops, street).

Moreover, data is not in itself scientific: it is the use we make of it and the conclusions we draw from it that may or may not be scientific.

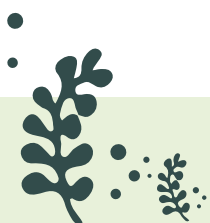
For example, "three white butterflies in my garden" is a very superficial piece of information at first glance, and while researchers might prefer "three cabbage whites (*Pieris brassicae*) in my garden", the initial statement still contains several pieces of information (number of individuals, colour, location) that are perfectly objective and therefore useable.

Observations collected by very different contributors—naturalists, the general public, schoolchildren, farmers and managers—all carry information that can be interpreted scientifically, and it is this interpretation that is more or less interesting.



How will the data be collected?

In order for this mass of data to be usable, it is essential that they are collected according to a standardised protocol, that is adhered to at all the sites being monitored and maintained over time. The law of large numbers takes care of the rest: the strength and accuracy of analyses increase with the amount of data collected, while uncertainties related to chance fade away.





Several approaches can be used to assess the state of biodiversity health. Vigie-Nature École proposes protocols for monitoring species and populations. The first approach focuses on abundance and diversity.

These are the two base quantities that have been shown to be closely linked to the proper functioning of living processes (recycling of organic matter, use of resources, etc.) and to the health of populations (genetic diversity, survival and reproductive success).

01 Abundance

The total number of individuals observed during the implementation of the protocol is called abundance. In the case of our protocols, we have abundance per species (or group) and overall abundance, i.e. the total number of individuals of any species. In the diagram opposite, 8 large, 8 medium and 12 small birds have an overall abundance of $12 + 8 + 8 = 28$ birds.

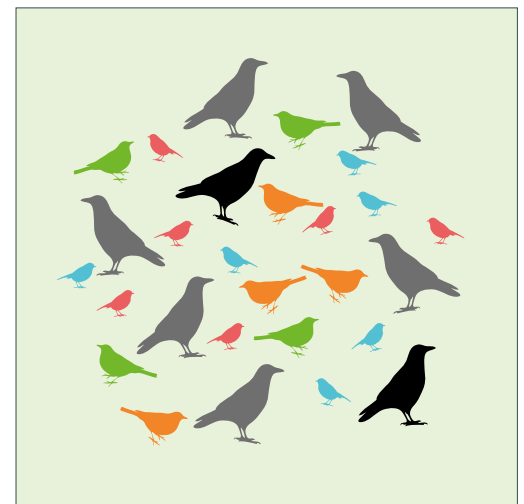


02 Diversity

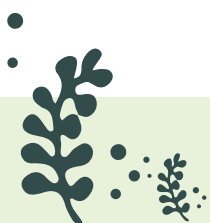
Specific diversity corresponds to the number of distinct species observed.

Within the framework of our protocols, certain morphologically related species have been grouped together.

For example, earthworms were divided into four groups rather than species, as there are about a hundred species in mainland France whose identification is based on a minute, difficult examination without capturing any individuals. In this case we speak of groups of species.



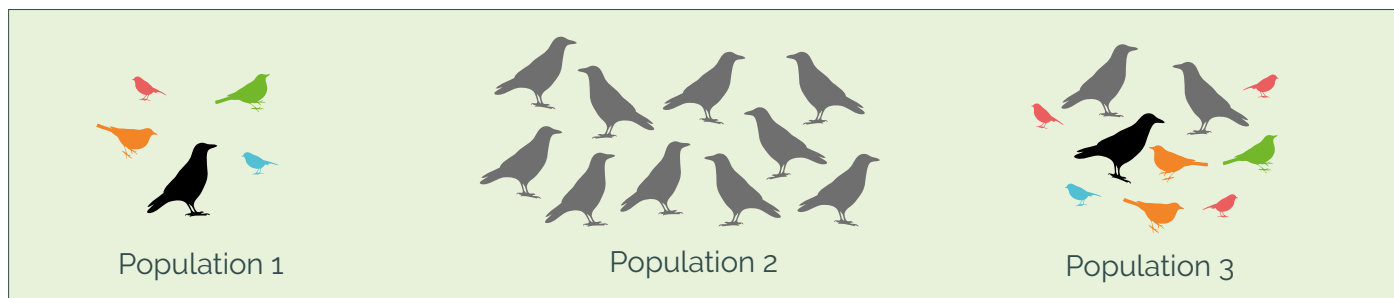
Once groups of species have been established, diversity then takes into account the number of species and the number of species groups. Naturally, the value recorded is lower than actual species diversity. Nevertheless, as the protocol is the same everywhere, the data remain comparable between sites and between surveys. In the diagram above, the diversity is 6: 'small blue' + 'small red' + 'medium orange' + 'medium green' + 'large black' + 'large grey' = 6.



03 Community structure and composition

We can then look at which species live side by side. The assemblage of species present constitutes a community. This is defined, among other things, by two quantities: abundance and diversity. Generally speaking, it is considered that the more diverse a community is, the better it is doing.

Finally, community structure also makes it possible to assess their condition: a balanced community is considered to be in better condition than a community dominated by a predominantly abundant species.



For example, among these three communities, it is estimated that population 3 will be the healthiest because it comprises numerous species and large numbers. Population 1, although having a large number of species, has few individuals. Population 2 is larger but has only one species.

04 Ecological characteristics of the species present

In addition to the variables described above, some known species-specific characteristics allow for refinement of the analyses. For example, some birds will migrate in winter while others are sedentary, automatically affecting surveys.

For the other groups studied, other factors can vary between species: diet, role in soil structuring for earthworms, etc. It is also possible to determine the more or less specialised nature of the species. Some, the generalists, are found in a large number of environments while others, the specialists, are present in only a few specific environments.

These characteristics, called traits, can be used to assess the state of biodiversity. Thus, the fact that various diets are represented in the community is fairly indicative of good functioning. A community made up of specialist species is considered to have suffered little disturbance because those that have tended to favour generalist species that are more adaptable to change. We are talking here about indicators of average traits. These are very complementary to abundance and diversity.



Vigie-Nature École is a biodiversity monitoring program that includes several observatories. This tutorial is common to all of them and explains how to send the data collected to the researchers at the National Museum of Natural History so that they can analyse it.

Collected data can be sent following registration on our site: vigienature-ecole.fr

01 Register on our site

To register, click on the button  at the top right of the page.

Form to be completed

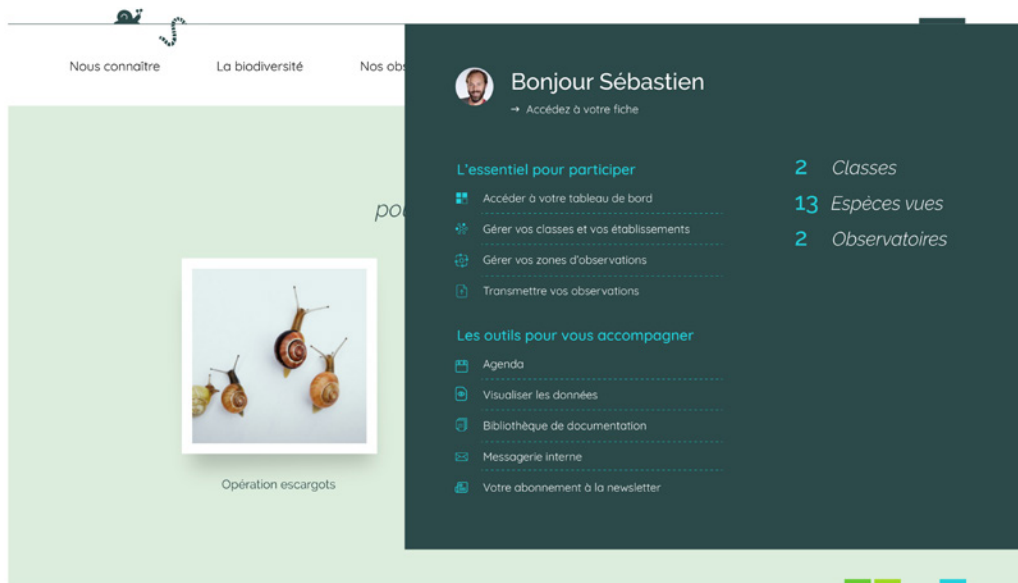
After filling in the fields concerning your identification, you will be able to indicate whether you are a teacher. A window will open for you to fill in your institution and where you will be exercising the activity (you can add other schools later).

Account Activation

When you have finished completing the form, click **Save**. An email containing an activation link will be sent to you automatically. Your account will only be activated after you click on this link.

02 Your teacher account

To log in, use the same button  as before, you will then have access to this menu:



The tab "Managing your observation zones"

When participating in Vigie-Nature École observatories, information must be provided on the area where the observation is being carried out. The data collected varies depending on the observatory. To save time with your pupils, the website allows you to prepare your observation zones in advance. In this tab, you can create new observation zones and visualize them.

To create a zone, click on **"Create a new observation zone"**.

The first step of creating an observation zone is to indicate in which observatory (or observatories) you wish to participate (you can choose several) then indicate the zone on a map.

The next steps depend on which observatory(ies) you've selected and involve providing information on the environment where the data is collected.

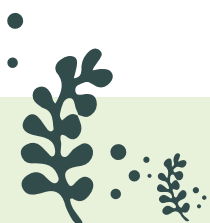
The tab "Managing Your classes and institutions"

This space allows you to create usernames and passwords for your various pupil groups. They will then be able to log in and enter their observations for the protocols you've selected for the observation zones. You can create as many groups per class as you wish.

You will also be able to monitor and change the data that your pupils enter, or enter them yourself if don't intend to do a data entry session in class or at home.

03 You aren't alone!

A video tutorial is available to help you through every step of managing your teacher account. Likewise, if you encounter any problems, please don't hesitate to contact us at: vne@mnhn.fr





Operation Snails



A programme of the



Co-founding partner
of the observatory





Why study snails and slugs?

At a time when biodiversity is under threat, it is essential to monitor its evolution in order to better understand its variations and to be able to preserve it. This is why the association Noé and the Muséum National d'Histoire Naturelle have launched Operation Snails. The principle is simple: pupils are invited to look for snails and slugs in their school yard, to identify them and to pass on their observations to the scientists at the Muséum.

By participating in this observatory, you help scientists to better understand the importance of green spaces and how they are managed in the conservation of snails and slugs in the city.

You can participate once or on a regular basis, there is no commitment. It is not necessary to know the snails beforehand: the tools contained in this booklet make it easy to identify the observatory species. **All your observations are important, we're counting on you!**



We're counting on you!



What's the protocol?

01 Place a wooden board on the ground

The wood must be **raw, unvarnished and untreated** (do not use plywood or pallet wood). **Each side of the board should be from 30 cm to 50 cm long** (e.g. your board could be a 40 cm x 40 cm square), with a minimum thickness of 1.5 cm.

Raise one side of the board with a stone or a piece of wood so that larger species can also crawl underneath for shelter.

Remember to remove the shells of dead snails so as not to skew the counts. **You'll then need to wait at least one month** (or longer if you wish) before lifting your board and taking inventory of the snails.



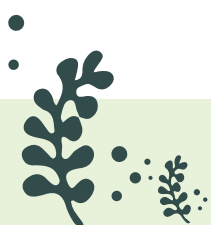
02 Identify and count snails, slugs and other small animals!

During the counting periods, on a day with mild weather, lift your board to make your count. If you find any empty shells, count those too and then remove them so you don't count them again next time. Repeat your count every month, if possible.



When to participate?

All year round, but you probably won't see many snails, if at all, in winter. You needn't take counts every month.



A few precisions

Board placement

Remember to place the board(s) at least one month before the activity with your class, preferably a location that is not easily accessible to the pupils.

Don't hesitate to lay several boards, and why not in a variety of settings (lawn, hedge...) to be able to make comparisons with your pupils. Lastly, to boost your chances of spotting snails, you can place your boards on the north side of an obstacle (tree, building...).

Why place wooden boards to observe snails?

Snails and slugs like damp places. When it rains, the wood of your boards absorbs water, providing an excellent moist shelter for snails in dryer weather.

Which wood should I choose for my boards?

Your boards must be made of unvarnished, untreated raw wood (no plywood or pallet wood). Varnishes, glues and other treatments can modify the porosity of the board and potentially have a repellent effect on the snails.

The type of wood seems to influence the presence of gastropods: pine boards, for instance, are less appealing to snails than those made of poplar.

Why wait a month?

Snails are slow movers, so it takes them a while to settle under your boards (sometimes you may have to wait more than a month). Once installed, you can leave your boards where they are as long as you like.



Materials you'll need

For groups of 3-4 pupils

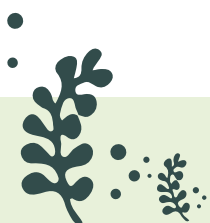
- 1 wooden board to be placed at least a month before the day of the count
- 1 hand magnifier
- this booklet
- 1 camera (optional)



Preparing your pupils

→ Getting your pupils ready

Don't hesitate to collect empty snail shells so you can teach your pupils to identify them in the classroom and make the field session all the easier! You can also use the photo quizzes available on our website.





01 Date and location

Date:/...../.....

Plate name:

02 Your count

Snails (for each species, record the number of individuals observed in the circle)



4.5 cm

Turkish snail




4 cm

Burgundy snail




3.1 cm

Brown-mouthed helix



3 cm

Common garden snail




2.2 cm

Algiers snail



2.1 cm

Chocolate-band snail




1.6 cm

Copse snail



1.6 cm

Hedge, garden & forest snails




1.5 cm

Helicella spp.



1.5 cm

White garden snail



1.1 cm

Quimper snail



0.8 cm

Lapidary snail




0.7 cm

Hairy snails



0.7 cm

Elegant land trochus



0.6 cm

Cheese snail




0.6 cm

Mask snail



0.6 cm

Glass snails




0.3 cm

Disk snails




3 cm

Decollate snail



1.8 cm

Large bulin




1.5 cm

Round-mouthed snail



1.1 to 1.5 cm

Amber snails



1.2 cm

Four-tooth bulin



0.5 to 1.6 cm

Cochlostoma spp.



0.8 to 2.2 cm

Door snails



0.3 to 1.4 cm

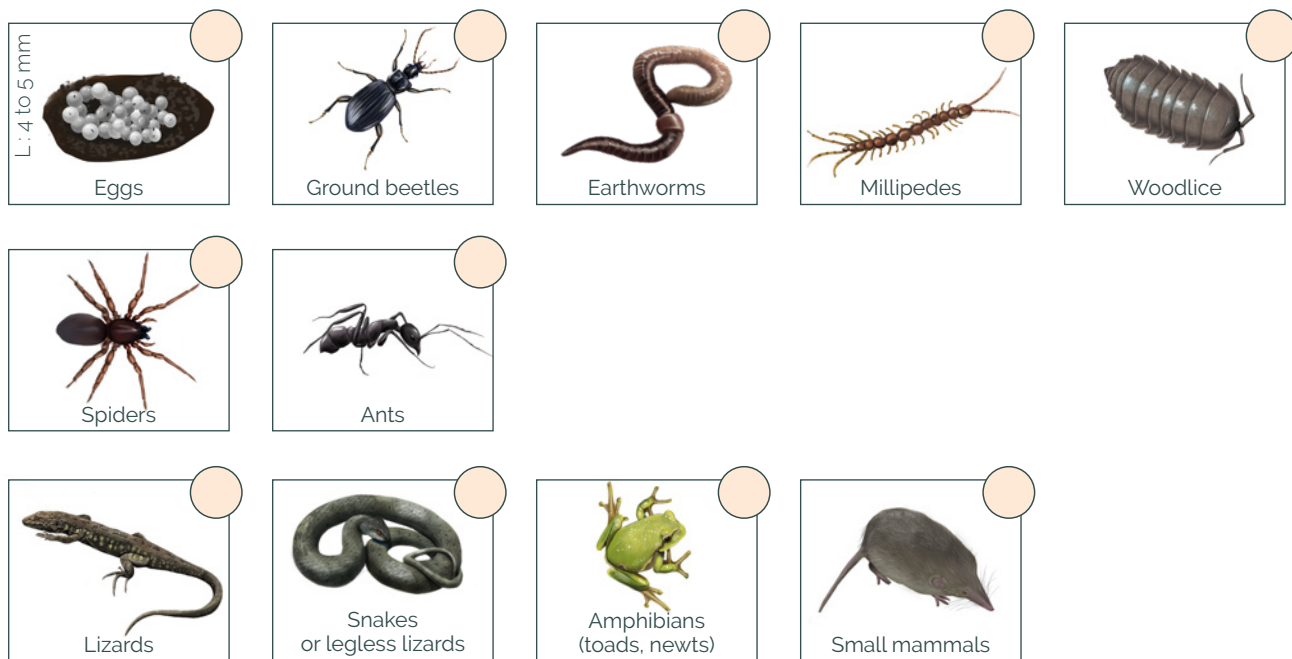
Chrysalis snails
Chondrinidae, Lauridae

Photos : Benoit Fontaine, Olivier Gargominy, Vincent Prié, Alexis Rondeau, Olivier Roques, Christophe Bernier

Slugs (for each species, record the number of individuals in the circle)



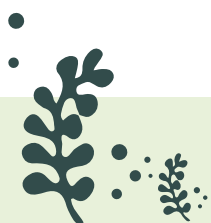
Other observations (or each species, check the circle if individuals are present)



Sending your observations

Log in and enter your data on vigienature-ecole.fr

If you have not seen any individuals, this too is important information for our researchers! Therefore, please enter the absence of individuals on our website as well.





Shell plate

The shells on this plate are true to size when printed in A4 format.



Turkish snail



Burgundy snail



Brown-mouthed helix



Common garden snail



Hedge/garden/forest snails



Copse snail



Chocolate-band snail



Algiers snail



Helicella spp.



Glass snails



Quimper snail



White garden snail



Elegant land trochus



Amber snails



Disk snails



Hairy snails



Cheese snail



Lapidary snail



Mask snail



Chrysalis snails
Chondrinidae,
Lauridae



Door snails



Cochlostoma
spp.



Round-mouthed snail



Decollate snail



Large bulin



Four-tooth bulin

Photos : Benoît Fontaine, Olivier Gargominy, Vincent Prié, Alexis Rondeau, Olivier Roques, Christophe Bernier



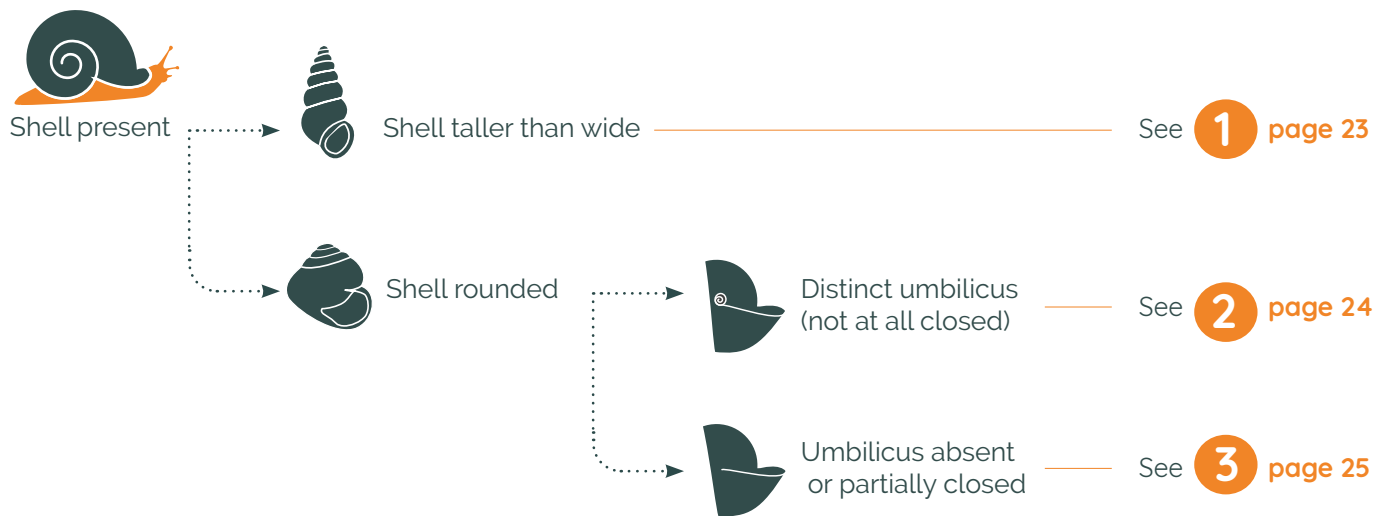


The identification key that we propose is only valid for species that have been selected as part of Operation Snails.

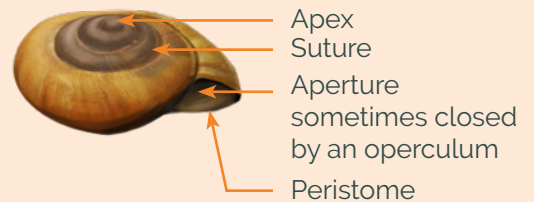
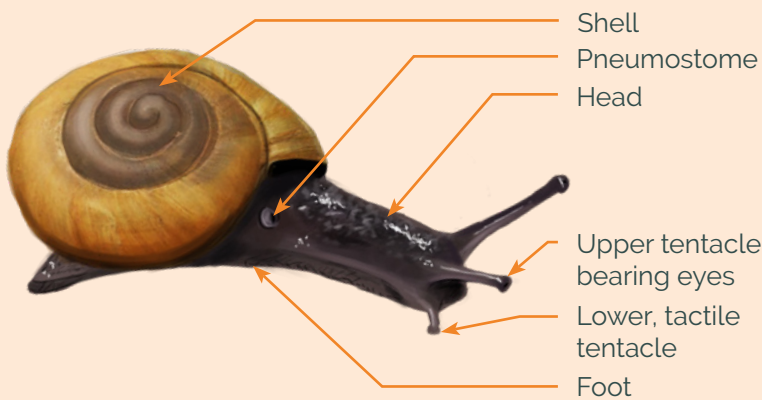
The following diagrams will help you to better understand what to observe on the animal during identification.



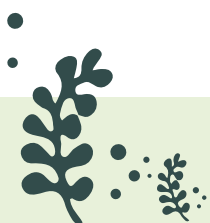
Snail identification



Snail anatomy



Illustrations : Yanis Giarraffa



1



Right-handed aperture (dextral shell)



Suture deep between whorls, aperture never toothed, operculum present in live animals



Flared, trumpet-like aperture, often radially striated (relief)

Cochlostoma spp.



Unflared aperture, Spirally striated (relief)

Round-mouthed snail *Pomatia elegans*



Suture shallow, aperture often toothed, operculum absent



Shell with dark vertical bands, aperture toothless

Large bulin *Zebrina detrita*



Elongated shell, aperture often toothed

Chrysalis snails *Chondrinidae, Lauridae*



Shell with broken tip

Decollate snail *Rumina decollata*

Aperture over half the height of the shell, which is fragile

Amber snails *Succineidae*



Left-handed aperture (sinistral shell)



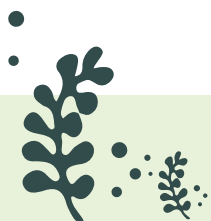
Aperture toothless or a single tooth

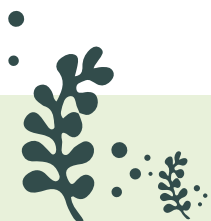
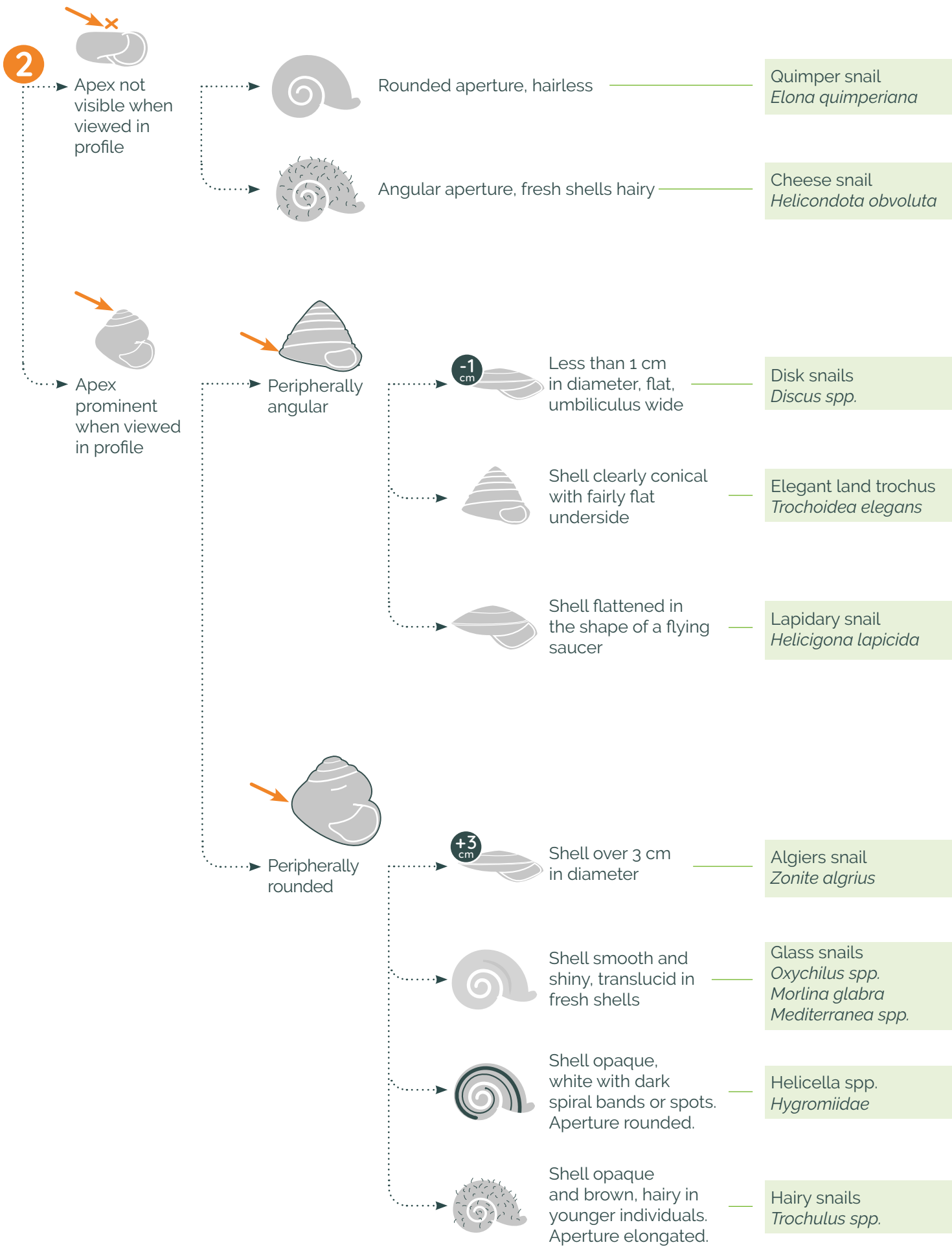
Door snails *Clausiliidae*

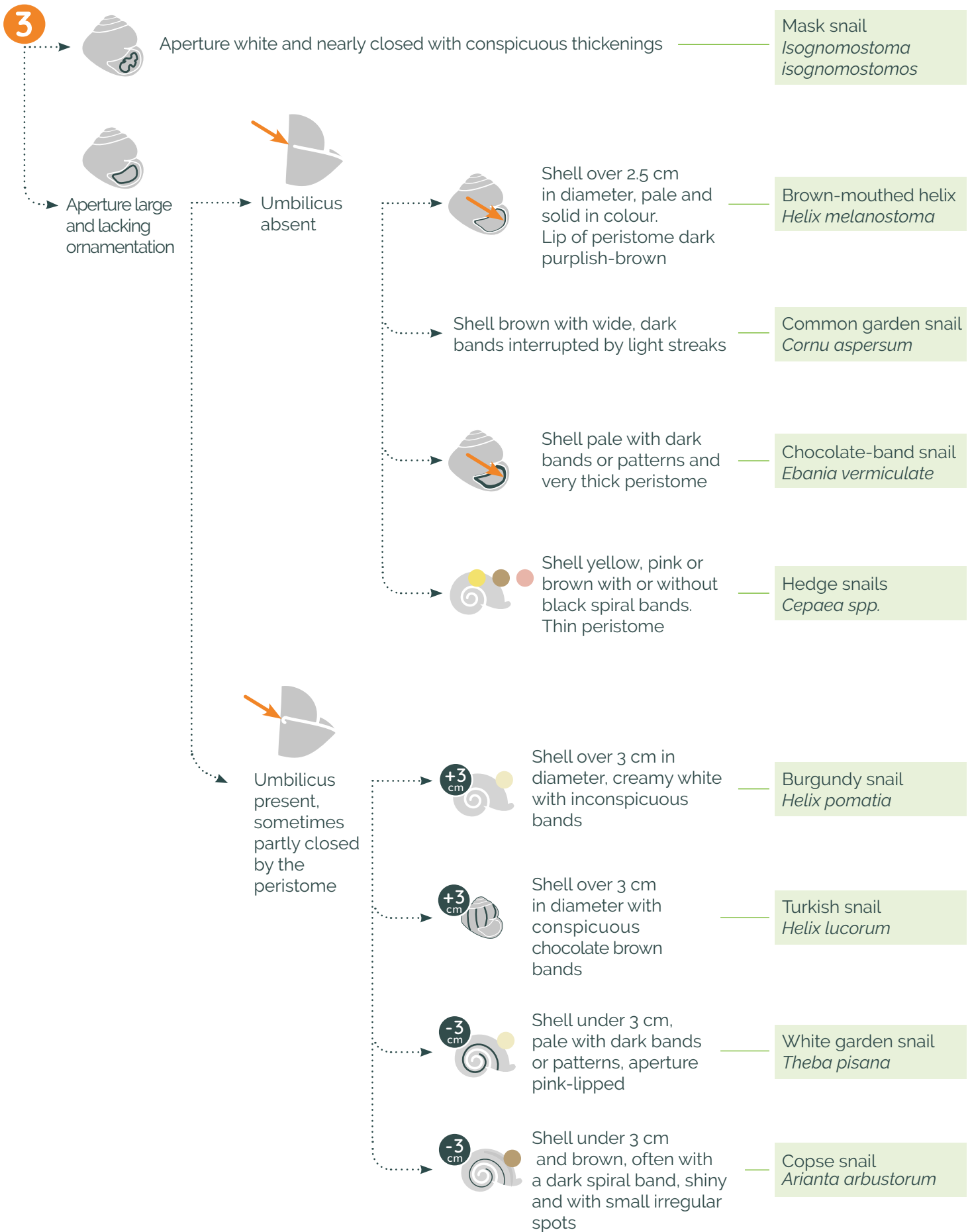


Aperture with several teeth

Four-toothed bulin *Jamina quadridens*

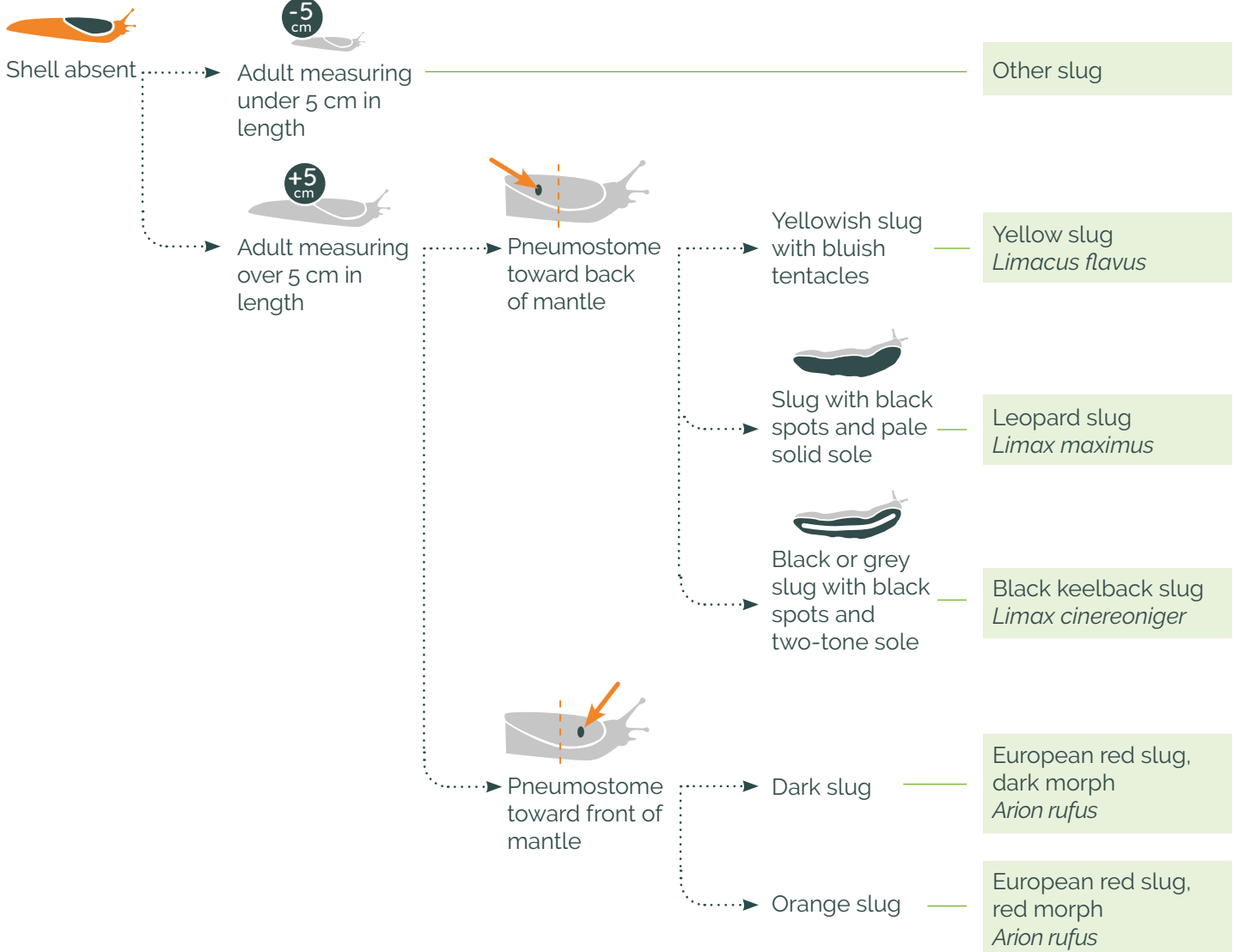




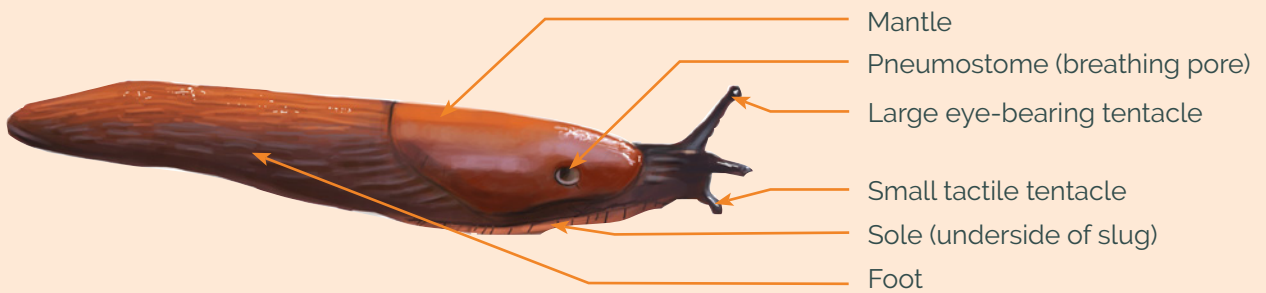




Slug identification



Slug anatomy



Illustrations : Yanis Giarraffa





Garden Birds



A programme of the



Co-founding partner
of the observatory



AGIR pour la
BIODIVERSITÉ



Why study birds?

Garden Birds is a citizen science observatory founded jointly with the French League for the Protection of Birds (LPO - Ligue pour la Protection des Oiseaux). Its objective is to identify and count the birds present in the courtyard of your institution, public park, garden or even a balcony!

While enjoying the observation of nature with your pupils, you are contributing to a research programme aimed at studying the effects of climate, urbanisation, and agricultural practices on the diversity of common birds. By participating, you help scientists understand when and why birds visit gardens.

You can participate once or on a regular basis, there is no commitment. It is not necessary to know the birds beforehand: the tools in this booklet make it easy to identify common species. **All your observations are important, we're counting on you!**



We're counting on you!



What's the protocol?

01 Choose your observation zone



The observation must be done in a clearly delimited area, within which you are sure to see, and therefore recognise, all the birds. This could be part of your establishment's courtyard or terrace, a town square or a well-defined area of a public park.

In winter, you can also install bird feeders to make it easier to observe the birds.

02 Identify and count the birds for a 15-minute period

First record the date of your survey and the start and end time of the observation period, knowing that **you must observe the birds for 15 minutes.**

During this time, note the maximum number of birds for each species observed for the period.

03 Repeat your observations as often as possible

This observatory operates all year round, you can try to monitor the bird populations in your establishment by counting them daily, once a month, or even sporadically!

By repeating your counts, you can, for example, assess the impact of the seasons on the birds. Finally, you should know that the more you participate, the more useful your information will be to our researchers!



When to participate?

You can observe the birds and send us your data throughout the year. In winter, observation will be easier if you put out a bird feeder.



A few precisions

Why bird-watch for 15 minutes?

The protocol asks that you observe the birds over a 15-minute period so that comparisons can be made using the data collected (if the observation time is not the same, the data are difficult to compare). 15 minutes is a reasonable length of time for students while giving researchers a good overview of bird diversity.

Which birds should be counted?

Count only the birds in the courtyard (or park, garden etc.) and not those flying over it! But... there are exceptions to this rule. For instance, you can count insectivores (swallows or swifts, for example) and birds of prey (European sparrowhawk...) that are hunting over your observation site.

Finally, if you observe a species that is not listed on the field sheet, you can take it into account and report it in the "Notes" section.

What does it mean to "count the maximum number of individuals"?

During your observations, record the maximum number of individuals of each species observed during a same period. For example, if you count 5 blue tits, then 7, then 4 again, you will only note 7 and not 16 (5+7+4) because you have seen a maximum of 7 blue tits at the same time and some may have come twice.



Prepare your pupils

In class, have your pupils practise using the identification key and recognising birds from photos. You can also use the quizzes available on our website.



Materials you'll need

Per class:

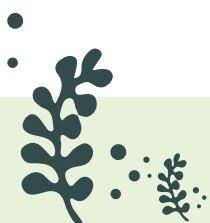
→ Feeders with seeds or fat balls (optional)

Per group of 3-4 pupils:

→ This booklet

→ Camera (optional)

→ Binoculars (optional)





01 Date

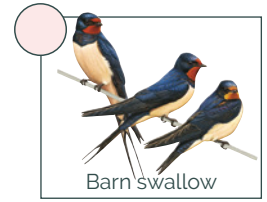
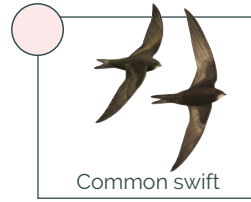
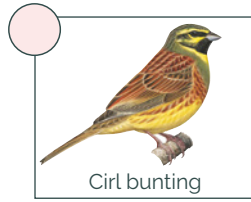
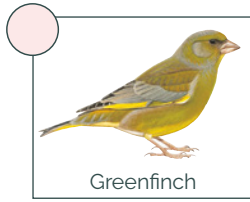
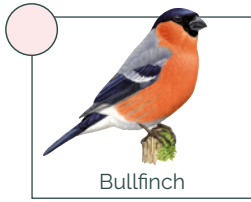
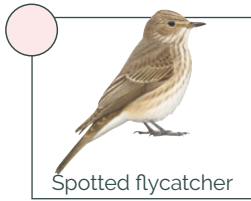
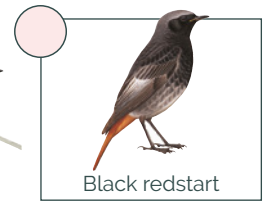
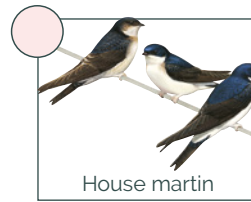
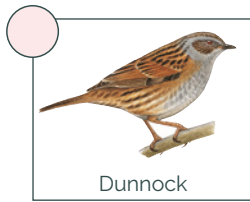
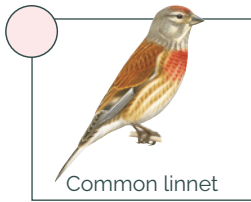
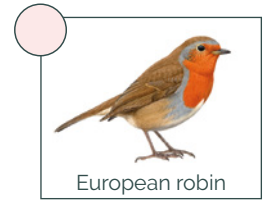
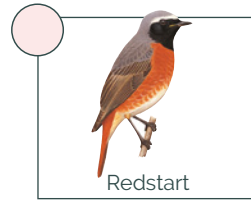
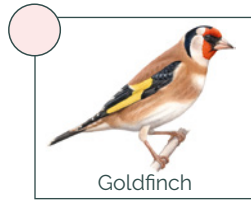
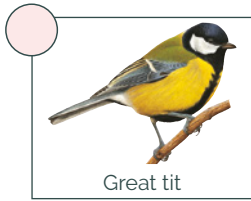
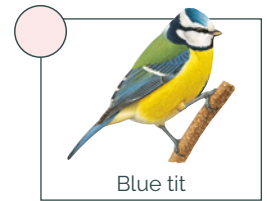
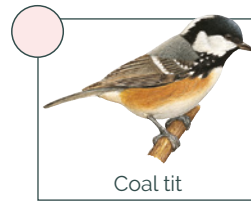
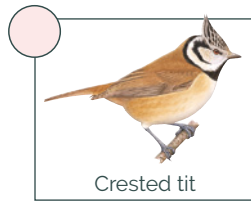
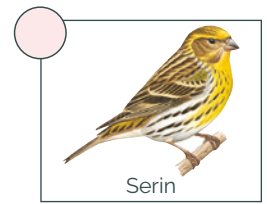
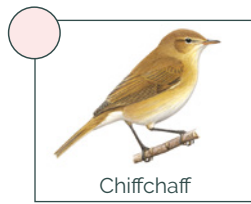
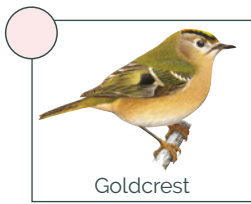
Date:/...../.....

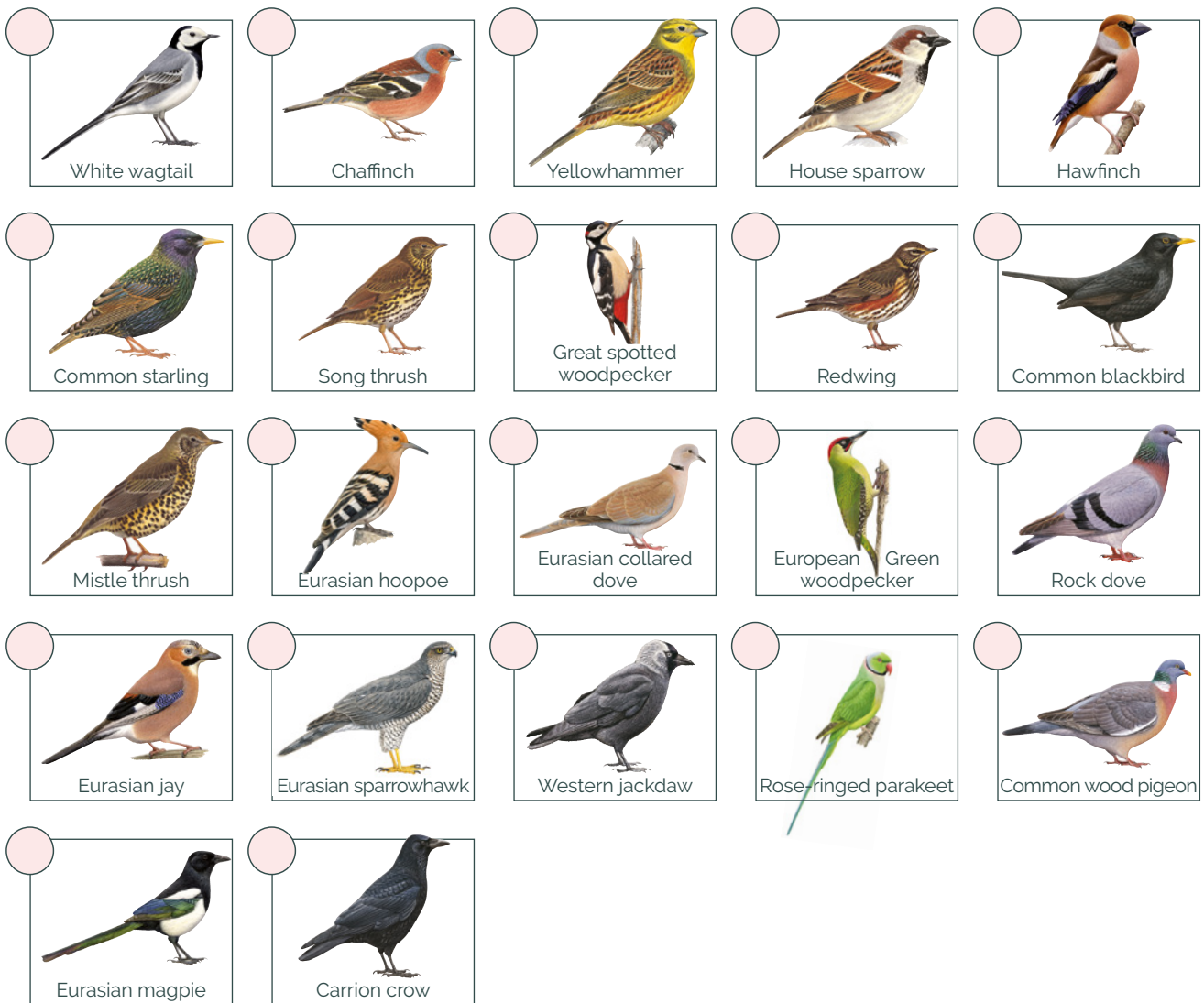
Start time:

End time:

02 Your count

For each species, record the number of individuals observed in the circle
The birds are presented here in order from smallest to largest.





Other species observed

.....

.....

.....

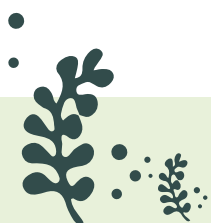
.....



Sending your observations

Log in and enter your data at vigienature-ecole.fr

If you haven't seen any individuals, this is still important information for our researchers! So please enter any absence of birds on our website as well.





01 Glossary of terms used to describe birds

Multicoloured: more than one colour, black & white included.

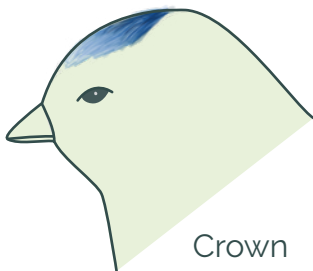
Wingbar: a coloured band on the wing that contrasts with the rest of the wing.

Erectile: which can be raised.

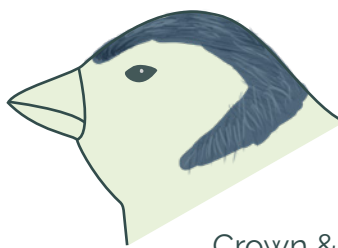
Rump: above the tail.

Tail streamers: two elongated outer tail feathers.

Crown, crown & nape, crest:



Crown



Crown & nape



Crest

02 Pictograms used in the identification key



This symbol indicates that the bird **frequents feeders**.



This symbol indicates that the bird is **present in France only in winter**.



This symbol indicates that the bird is **present in France only in summer**.



This symbol indicates that the bird **could be easily confused with other species**.



This symbol means that **the bird has the colour represented in the bubble on at least part of its plumage**.



Some pictograms only refer to one or more areas of the bird; **these are the characteristics to observe** most closely, with the arrows indicating the most important criterion.





This identification key is designed to identify adult birds in the Garden Birds programme. Using it couldn't be easier! Simply start with the first question below and then work your way from question to question until you find the name of the bird.



How big is the bird that you see?

→ **It's a small bird** that could fit in your coat pocket.

Bird with a **sparrow** silhouette



see page 35

Bird **climbing** on tree trunks



see page 42

Bird with a **swallow** silhouette



see page 42


→ **It's a big bird** that couldn't fit in your coat pocket.

Bird with a **blackbird** silhouette



see page 43

Crested Bird with a **long beak**



see page 44

Bird with a **woodpecker** silhouette



see page 44

Bird with a **bird of prey** silhouette



see page 34

Bird with a **pigeon** silhouette



see page 34

Parrot-like bird



see page 34

Bird with a **crow** silhouette



see page 34





Does the bird have yellow on its feathers?

YES



Does it have white on its cheeks?

YES

It must be one of these birds:

Black crown and nape, black band on breast



Great tit



Blue crown



Blue tit



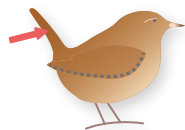
Goldfinch



NO → Go to page 36

NO → You have two possibilities

Very small, tail held high



Eurasian wren



Dunnock



It's another bird,
see page 35





Is the bird's tail shorter than the length of its back?

YES → It must be one of these birds:

Leading edge of wing bright yellow, strong bill.

Greenfinch

Yellowhammer
Cirl bunting

Conspicuous yellow wingbar. Pointed bill.

Siskin

Streaked/spotted flanks, very small bill

Serin

Very small bird, erectile yellow or orange crest

Goldcrest

NO → The bird's tail must be fairly long, **you have two possibilities:**

Yellow head, rust-coloured rump, found in rural environments

Male Female

Yellowhammer

Yellow head with black stripes, olive-grey rump

Male Female

Cirl Bunting





Is the bird's wing a solid colour or with only slight variation?

YES

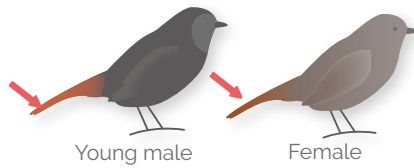


Does it have orangish-red on its feathers?

YES

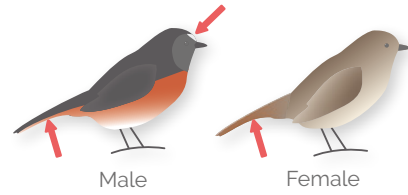
It must be one of these birds:

Male: dark grey back and breast, red tail.
Female: grey body, rusty-red tail.



Black redstart

Male: orangish breast, red on tail, white stripe on forehead.
Female: rusty-red tail, beige body.



Redstart



Breast and part of head red.



European robin



NO → Go to page 38

NO → It's wings are multi-coloured and/or patterned, go to page 37





Does the bird have a crown?

YES → It must be one of these birds:

Conspicuous white cheeks, tiny black bib beneath its bill, black crown.



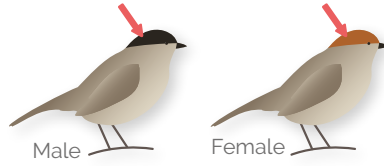
Marsh tit



Coal tit



Male: grey, black crown
Female: grey, rusty-red crown.



Male

Female

Blackcap

NO → It must be one of these birds:

Very small, greenish-grey back, pale belly, conspicuous eyebrow.



Crested tit



Chiffchaff

Grey, perches upright on the tops of trees and shrubs.



Spotted flycatcher





Does the bird have any orangish-red plumage?

YES → It must be one of these birds:

Black crown, grey back, white spot on rump, red or bright pink belly.



Bullfinch (male)



Red on breast and forehead, black and white tail, brown and black wings.



Common linnet (male)



Dark grey back and breast, red tail. White spot on wings.



Black redstart (adult male)

NO → You have two possibilities:

Small grey, black and white bird, head appears large with white cheeks.



Coal tit



Marsh tit




It's another bird.
See page 40




Does the bird have a long tail (longer than its back)?

YES → It must be one of these birds:

Very long tail, can perch upside down on tree branches.



Long-tailed tit




Often walks on ground with tail held parallel and wagging.




White wagtail

NO → The bird therefore has a short tail. **You have three possibilities:**

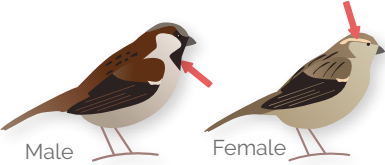
Thick bill.



Hawfinch




Female: conspicuous eyebrow, strong bill, striped back.
Male: grey cheeks, grey crown, black bib beneath bill.




Male Female

House sparrow



It's another bird,
see page 41

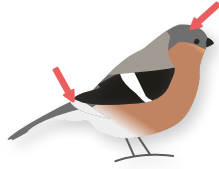




Does the bird have crown or crown and nape colouring?

YES → It must be one of these birds:

Prominent pinkish-grey belly, black crown, white patch on rump.



Bullfinch (female)



Brown crown and nape, white cheeks with a black patch and a small black bib.



Eurasian tree sparrow



Reddish belly, grey cap, brown back.

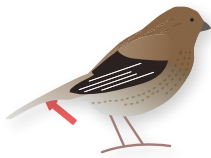


Chaffinch (male)



NO → It must be one of these birds:

Brown back, black and white tail, a few streaks on the breast.



Common linnet (female)



White and orange underparts, orange patch on wings.



Brambling



Chaffinch



Olive-grey, back with some brown but no streaking, cream wingbar.



Chaffinch (female)

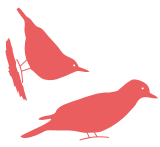


Fine bill, no white cheek, break and head slate grey.



Dunnock





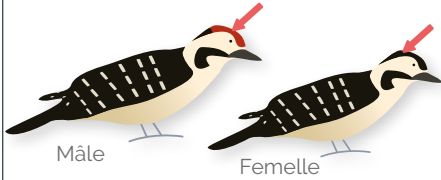
Bird that climbs tree trunks

It must be one of these birds:

Black and white striped back, absence of large wing patch.

Male: red crown

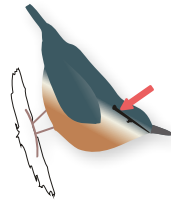
Female: black crown



Great spotted woodpecker



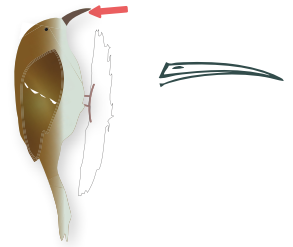
Blue-grey back, black eyeline, white cheeks, rusty-brown belly.



Eurasian nuthatch



Brown back, white underparts, long curved bill.



Short-toed tree creeper



Bird with swallow silhouette

It must be one of these birds:

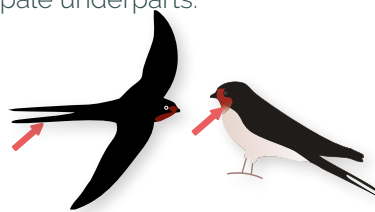
All black, very long wings, flies swiftly.



Common swift



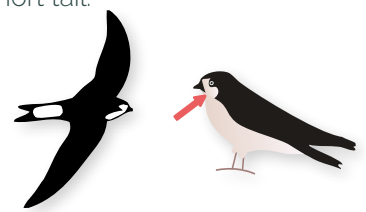
Red throat, long outer tail feathers, pale underparts.



Barn swallow



White throat, belly and rump, short tail.



House martin





Bird with a thrush silhouette



Does it have black upperparts?

YES → It must be one of these birds:

Plumage solid black, yellow bill.
Hops.



Common blackbird (male)



Plumage with white spots and
green iridescence, yellow bill.
Walks.

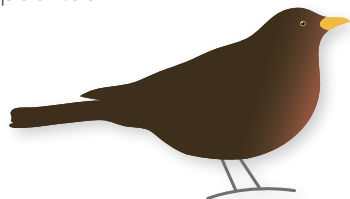


Common starling



NO → It must be one of these birds:

Plumage brown, breast lightly
speckled.



Common blackbird (female)



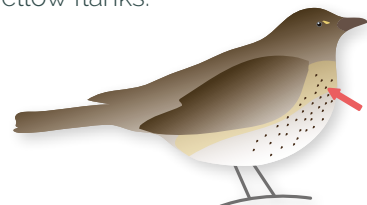
Conspicuous eyebrow, orange
underwing and flanks.



Redwing



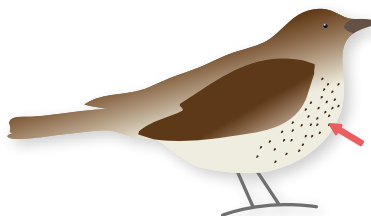
Inconspicuous eyebrow, pale
yellow flanks.



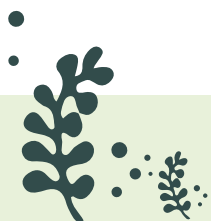
Song thrush



Spotted white breast.



Grive draine





Crested bird with a long bill

It must be this bird:

Orange, wings and tail with black stripes, erectile crest and long curved bill.



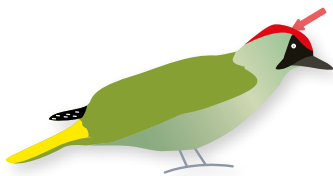
Eurasian hoopoe



Bird with a woodpecker silhouette

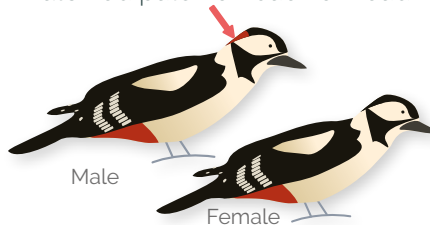
It must be one of these birds:

Red crown



Green woodpecker

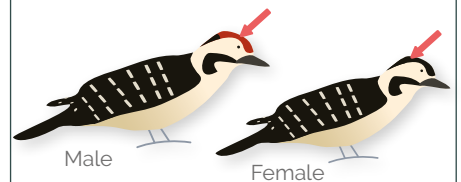
Large white patch on wing, red lower belly.
Male: red patch on back of head.



Great spotted woodpecker



Black and white striped back, no wing patch.
Male: red crown.
Female: black crown.



Lesser spotted woodpecker





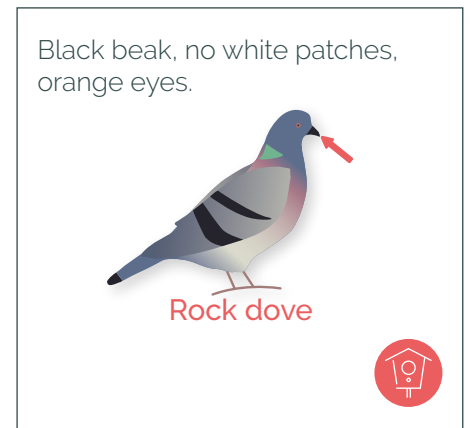
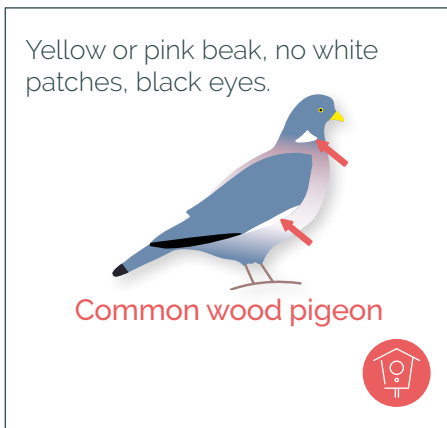
Bird with the silhouette of a bird of prey

It must be this bird:



Bird with a pigeon silhouette

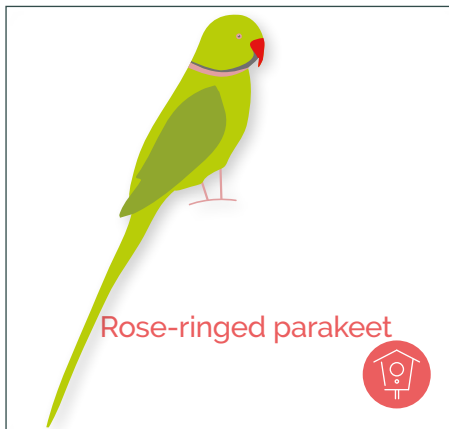
It must be one of these birds:





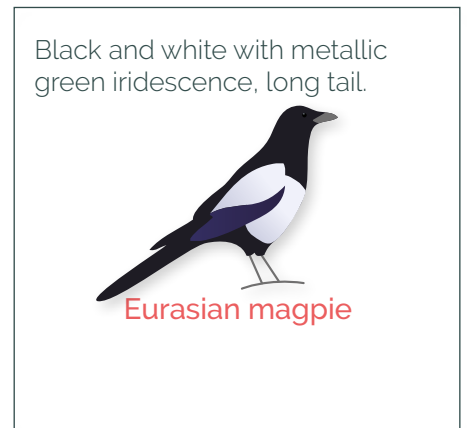
Bird resembling a parrot

It must be this bird:



Bird with a crow silhouette

It must be one of these birds:





BirdLab



A programme of the



Co-founding partner
of the observatory



AGIR pour la
BIODIVERSITÉ



Why study birds with an app?

How do birds behave at feeders? Does a bird prefer to feed where other birds are already present or does it prefer to feed alone? How do species cooperate? Are there competitive or cooperative behaviours between individuals or between species? Does habitat influence these behaviours? These are all questions that researchers are trying to answer through BirdLab. To help them out, the principle is simple: reproduce in real time, thanks to a game on a smartphone or tablet, the interactions between individuals belonging to 24 species as they feed at birdfeeders.

To take part, all you have to do is set up two birdfeeders and fill them with sunflower seeds, then wait a few days for the birds to spot them. Then all that remains is to reproduce the birds' comings and goings between the feeders on the app screen during five-minute intervals. It's both fun and essential for the advancement of knowledge.

What if, for once, playing with your phone could be useful? Everyone to your smartphones!



We're counting on you!



What is the protocol?

01 Download and install the free BirdLab app

You can easily find it in the Appstore for iPhones and iPads or on Google Play for Android telephones and tablets.

02 Install your birdfeeders

In BirdLab, tracking is to be done using two identical tray feeders spaced one to two metres apart. They must be equally accessible to birds: for instance, don't place one of the feeders near branches or bushes and not the other one. You will need salt-free sunflower seeds to fill your feeders. They are inexpensive and very popular with birds. Careful, so as not to modify behaviour of the birds, both feeders must contain the same amount of food. If you're not much of a DIYer, you can also hang two "fat ball" feeders, each with three identical balls.

03 List your birdfeeders in the app

Once you've installed your feeders, don't forget to list them in the "Birdfeeders" section of the application. You'll be able to geolocate them automatically, enter the distance between them, the context (urban, peri-urban, rural) as well as the presence of any trees, hedges, animals or noise in their close environment.

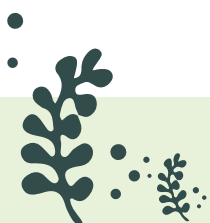
04 3, 2, 1... Play!

Stand facing your two feeders (at a respectful distance from so as not to frighten the birds) and reproduce the activity of the various species at the feeders in real time for five minutes by simply dragging and dropping.



How to participate?

You can participate annually from 15 November to 31 March. Outside of this period, the app will not allow you to play, but you can contain to train using the quizzes included.



A few precisions

There are birds underneath my feeders, should I count them too?

No, there is no way to count them, we ask that you concentrate on what is happening at the feeders. But what happens at the feeders is certainly influenced by what goes on underneath it (especially when there are crows for example), so don't hesitate to enter any noteworthy observations made under the feeders in the comments section, it won't be wasted!

What is the difference between Garden Birds and BirdLab?

BirdLab is interested in the behaviour of birds during feeding: this is why you are asked to reproduce their movements between two identical feeders. The focus of the study is on the interaction between species.

The Garden Birds protocol asks you to count the number of individuals per species that you observe. The observatory is always conducted in the same garden but at different dates and times in order to understand when and why the birds visit the gardens.

Do the feeders need to be cleaned?

Feeders should be brushed regularly to remove bird droppings. Hygiene at the feeder is very important: we certainly wouldn't want to encourage the transmission of any potential diseases between birds. Quite the contrary, we must do all we can to ensure that they leave healthy and well-fed, and that you collect valuable information at the same time.



Prepare your pupils

Before you can start to send us your data, your students will have to pass the quizzes in the "Training" section, which will help them learn to recognize the 27 most common garden bird species.



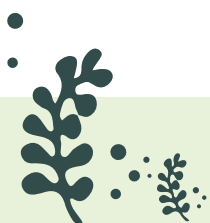
Materials you'll need

Per class:

→ Pairs of birdfeeders and sunflower seeds or fat balls.

Per group of 1-2 pupils:

→ A smartphone or tablet with the BirdLab app installed.





Worm Plots



A programme of the



Co-founding partner
of the observatory





Why study worms?

Earthworms represent the world's top terrestrial animal biomass: it is estimated that there is, on average, one tonne of earthworms per hectare.

Earthworms play a key role: they dig open tunnels near the soil's surface, thus favouring infiltration of water. These tunnels allow plant roots to grow and provide easier access to the water and oxygen contained in the soil.

To feed, earthworms break down and bury dead plants. By swallowing and digesting them, they contribute to decomposing them. Their excrements are rich in nutrients that plants use to grow.

But if the soil is frequently trampled or ploughed, the number of worms can drop by 50 to 80%! Such a drop can have very negative consequences on plant crops and the health of the soil in general. **Researchers from the University of Rennes 1 are keen to assess the state of health of earthworm populations in cities: through this observatory, you can help them!**

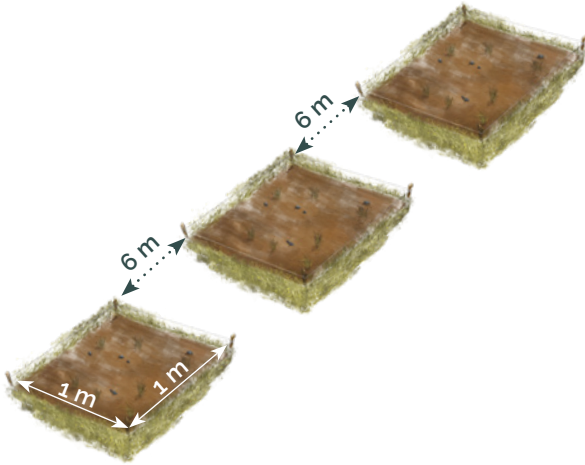


We're counting on you!



What is the protocol?

01 Stake out three 1 m² sampling zones in a row

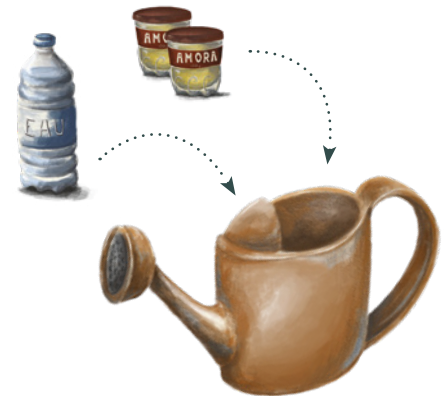


Choose a uniform, representative area for the plot (avoid trampled areas). The three 1 m² zones should be placed in the centre of this space, if possible at a distance of 6 m from each other.

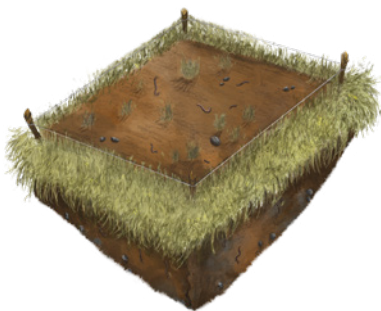
Take a photo of the immediate environment, then a second photo of the soil surface. Then mow the vegetation just before taking your sample (mow an additional 10 cm around each zone for better visibility). Take another photo of the soil surface.

02 Prepare the solution using gloves

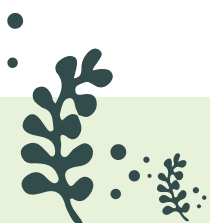
For each watering, and using a shaker, dilute with a little water 300 g of Amora "fine et forte» (fine and strong) mustard (brand mandatory to avoid any bias in the protocol). Pour into a watering can, rinse the shaker and add 10 L of water.



03 Water each sampling zone evenly with the mixture



For the next 15 minutes, collect any worms that come to the surface (only within the delimited area). Keep the worms in the basin with a little water. So as not to hurt the worm, be sure to wait until it is out of its gallery before picking it up. Avoid trampling around the areas.



04 When your 15 minutes are up, pour on another 10 litres of the solution

Collect any worms for another 15 minutes. If individuals are still surfacing after the first 15-minute period, wait a bit for the second watering and collect those worms first.

05 Spread the worms on a light-coloured surface, such as a tarp.



Identify them with the help of the identification key and separate them into the 4 groups. Count the number of individuals per group and record the results on the field sheet.

Take a photo of a specimen for each species.

06 Rinse the worms with plain water.

Let them go about 2 metres from the zone where you poured the mustard solution.



When to participate?

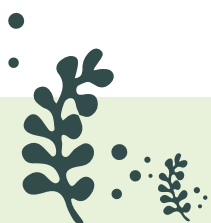
You can participate from **January through April**, preferably in the morning when temperatures are between 6° and 10°C and the soil is humid, but not soggy.



Materials you'll need

For three 1 m² zones:

- Grass trimmer (if there is grass)
- 12 pegs + string + metre stick (to delimit the 3 zones)
- 3 x 10 L watering cans + rose attachment
- Agitators (kitchen whisk for example)
- Water: 60 L (2 x 10 L) per m² + more for rinsing
- 1.8 Kg (3x2x300 g) of Amora fine, strong mustard
- Flat tweezers and gloves
- Pale tarp for identification
- Field sheets
- Basin
- Camera





What to plan for ahead of time

→ Plan on having water

For each zone, you will need 2 x 10 L of water. This makes a total of 60 L of water for the 3 zones. You may not have a water point near the observation area, so we suggest gathering large 5 L water bottles, the kind sold in supermarkets (4 bottles per group).

→ Train your pupils in advance

Don't hesitate to use the photo quizzes available on our site, the field session will be all the easier!

→ Divide up the work

In order not to waste time in the field, we recommend you thoroughly brief your pupils of the various stages of the protocol in the classroom.

Don't hesitate to split up the work into groups: pupils in charge of the water-mustard mixture, others who collect the worms and a final sub-group who can identify and photograph them.

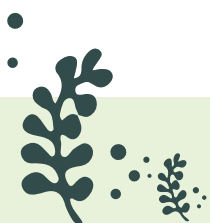
A few precisions

Why carry out the earthworm protocol between January and April?

We ask that earthworms be collected at the end of winter, when the soil has warmed up and morning temperatures are around 6-10°C. Indeed, when the soil is too cold (< 8°C at a depth of 10 cm) or too dry, some species die (as with epigeic species) while others enter a phase of slowed activity, called lethargy. At this point the earthworms no longer react to the application of mustard. For some of them (anecic black-headed worms), this phenomenon is triggered hormonally during the month of June.

Why does mustard make the worms come out?

Mustard contains an active ingredient, Allyl Isothiocyanate (AITC), which is stinging to earthworms. Contact with AITC, triggers an escape reflex in earthworms, which drives them to the surface.



Why use "Amora Fine et Forte" mustard?

The concentration of AITC varies from one brand of mustard to another, so to be able to compare the results, it is important that each participant use the same mustard, hence the use of Amora Fine et Forte, available everywhere in France.

Why mow the lawn?

Tall grass may hide some earthworms and therefore distort the results.



© Sébastien Turpin | Vigie-Nature École





01

Date

Date:/...../.....

Start time:

End time:

02

Your count

(to facilitate identification, use the identification key too)



		Zone 1	Zone 2	Zone 3
Epigeic	Small individuals (1-5 cm) The species that make up this group are intensely coloured, often a Burgundy red.			Number of juveniles
Anecic	Large individuals (10-100 cm) The heads of earthworms in this group are intensely coloured, while the rest of the body grows paler the closer you get to the tail. The clitellum is orangish in red-headed anecic worms, and brown in the black-headed ones. To see the colour well, press gently on the worm's head.			Number of juveniles
				Number of juveniles
Endogeic	Small to medium individuals (3-20 cm) In this group, the species show little colour: pinkish, greenish, pale grey. You can sometimes see the digestive tube through their skin.			Number of juveniles

Number of unidentified individuals

--	--	--

TOTAL PER ZONE

--	--	--



03

Observation conditions



T°C:

Date of last rain:

Date of last frost:



pH (optional):



Rain: none light heavy

Wind: none light heavy

Sun: sunny partly cloudy mostly cloudy
 dense clouds overcast



Soil moisture: dry moist waterlogged



Number of mole holes in the parcel selected for the plots:

none 1 2-6 6-12 more than 12



How easy is it to push the tip of a crayon or pen into the surface of the soil?

difficult not too difficult easy very easy



Sending your data

Log in and enter your data at vigienature-ecole.fr

Even the fact of not seeing any individuals is an important indication for our researchers! Please remember to enter this information on the website as well.

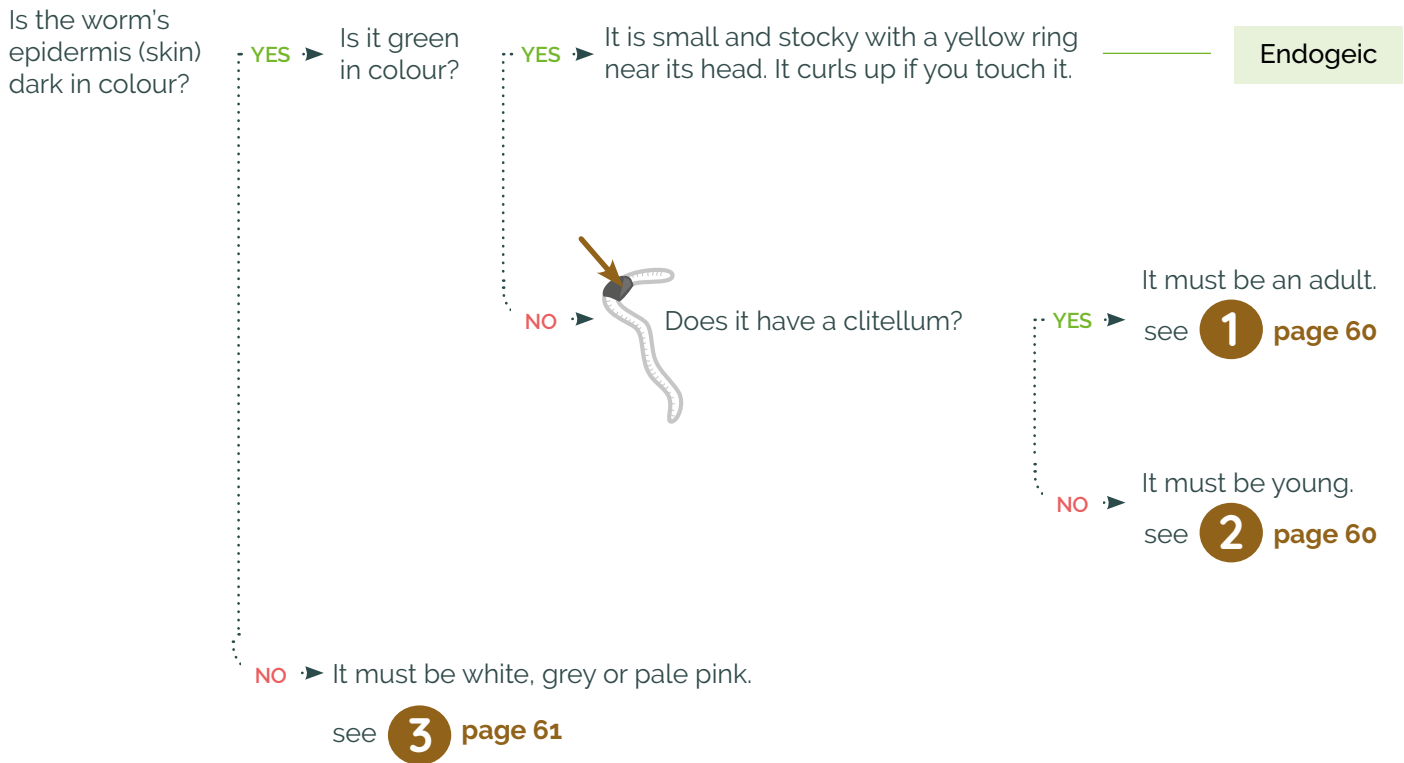


This protocol was developed jointly by the University of Rennes 1 and the Muséum national d'Histoire naturelle.





It is very difficult to identify earthworms down to the species level, which is why we propose grouping them into 4 categories that bring together species (with a slightly different appearance) with similar ecologies.



What is a clitellum?

A clitellum is a coloured ring located in the first third of an earthworm's body. Only adults have a clitellum.



Illustrations : Yanis Giarraffa

This identification key was adapted from a project of the OPVT in 2014 (University of Rennes 1 / CNRS-OSUR-UMR Ecobio).



1



Is it smaller than 5 cm?

YES

Epigeic

NO



Is there a paler colour between its rings (on its head when it stretches)?

YES



Its clitellum is orangish

Red-headed anecic

NO



Its clitellum is often brown

Black-headed anecic

2



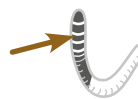
Does the worm display a colour gradient?

YES



Does its tail flatten during locomotion?

YES



Paler colour between rings (on its head when it stretches)?

YES



Over 2 mm in diameter?

YES

Red-headed anecic

NO

Epigeic

NO

Black-headed anecic

NO -> it is grey or black

NO



It measures less than 5 cm

Epigeic



3



Can you see its digestive tube through its skin?

YES



Does it have a clitellum?

YES

Endogeic

NO

Is the tip of its head dark and its fore rings blackish?

YES

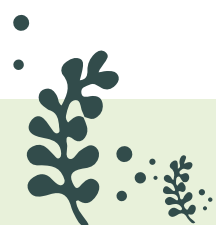
Black-headed anecic

NO

Endogeic

NO

Endogeic



Learn more about the 3 groups of earthworms studied

01 Epigeic species

These worms live on the soil surface (in leaf litter, compost, manure etc.). They are small (less than 5 cm), agile and reddish-brown in colour (a colour that protects them from UV rays). They consume dead plant matter found on the soil surface.

02 Endogeic species

These species are pale in colour (pale pink, grey or green) and dig horizontal (or almost horizontal) tunnels. They feed on dead organic matter (e.g. dead root tips) and never eat the living parts of plants.

03 Les espèces anéciques

Anecic earthworms are large (over 10 cm) worms that dig almost vertical tunnels, the walls of which are lined with their droppings.

They move back and forth between the subsoil and the soil surface. These powerful species pull plant matter such as leaves from the surface of the soil and bury it in their galleries. This is the group to which the common earthworm so well known to fishermen, belongs.



Illustrations : Chloé Sourd





Spipoll



A programme of the



Co-founding partner
of the observatory





Why study insect pollinators?

Created by the French Office for Insects and their Environment (OPIE) and the Muséum National d'Histoire Naturelle, Spipoll (Suivi Photographique des Insectes POLLinisateurs) aims to obtain data on pollinating and/or floricultural insects by monitoring them photographically. The data are collected using a simple and attractive protocol using photographs of insects as they forage. The photographs make it possible to measure variations in their diversity throughout metropolitan France.

This requires collecting data from a large number of sites in a variety of environments. **The more who participate, the more information scientists will have on the relationships between floricultural insects and agricultural practices, the effect of landscape fragmentation and global warming.**



We're counting on you!



What's the protocol?

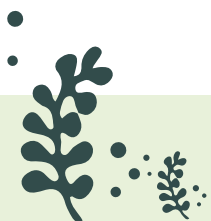
01 Photography

The protocol consists of choosing a single flower and photographing all the insects that land on it over a 20-minute period. If the plant has several flowers, don't move more than five metres from the location of your first photo, or you may lose track of the flower you're focusing on. You should also take a close-up of the flower and a leaf as well as a wider shot of the whole plant. Finally, remember to photograph the environment in which you find yourself.



Illustrations : Chloé Sourd

You can work on a flower in groups of two or three pupils but only one should take photos so as not to alter the protocol. If pupils take turns, only the most abundant insects risk being photographed



The other pupils can fill in the field sheet, draw the plant or diagram its location, which will be useful for data entry. We recommend that you assign the tasks to each pupil before going into the field to avoid forgetting anything.



Materials you'll need

Per group of 2-3 pupils

- 1 camera
(with macro setting)
- field sheet
- identification key

02 Take notes on the environment

On your field sheet, don't forget to record:

- date and time;
- type of cloud cover;
- wind;
- temperature;
- type of habitat;
- number of individuals per species.

03 Identify the insects



Back in the classroom, your students should only keep one or two photos of each insect observed. Then they should identify it using the online identification key.

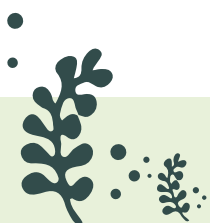
In the same way, the photos of plants will allow for identification online.

These identification tools are available with the data entry form at our website: vigienature-ecole.fr.



When to participate?

You can observe insect pollinators and send us your data throughout the year. But you will have a better chance of encountering pollinators in spring (from April onwards) on a sunny, mild day with not much wind.





Prepare your pupils

→ Learn how to use your macro setting:

Have your pupils practise using camera macro settings in class (possibly with an art colleague) so that they don't end up with blurry photos!

→ Stake out familiar plants:

In order not to overload the online recognition session, it is best to focus on the insects. The easiest way to do this is to direct your pupils to plants that you are familiar with and can name. Remember to choose plants that are attractive to insects, such as lavender, for example, so that there will be many observations.

→ Become familiar with the protocol:

To be sure not to forget anything in the field that could later prevent data entry, we recommend that you present the protocol to your pupils in class along with the field sheet.

A few precisions

What kind of camera should you use?

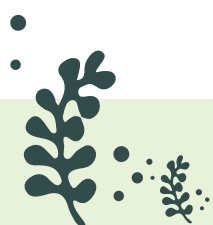
You can use any digital camera with a macro setting. The use of a smartphone or tablet is possible, but the quality of the photos and the speed of the camera must be tested beforehand so that photos of moving insects are sharp.

Why is it necessary to stay 20 minutes in front of a flower?

The protocol requires 20 minutes in front of a flower so that statistics can be compiled from the data collected (with the same observation time and comparable "observation pressure"). Twenty minutes is an acceptable length of time for the participants while giving researchers a good view of pollinator diversity.

What if my plant is not on the list?

Unfortunately, not all flowering plants in France are referenced in the determination key. If the plant you are interested in is not present, don't panic! A field for entering your plant is available after "You know a more precise name". You can then choose at the very end of the drop-down list "taxon not included in the key".





01 Flower station

The plant is: spontaneous cultivated can't say

Approximate distance between your flower and the closest beehive: metres


Presence within a radius of 50 metres of a major flower crop:

yes no can't say

Type of habitat:

- urban
- major crop(s)
- public park or garden
- peri-urban
- forest
- private garden
- rural
- prairie
- roadside

02 The session

 Date:/...../..... Start time:h..... End time:h.....

 Sky (cloud cover): 0-25% 25-50% 50-75%

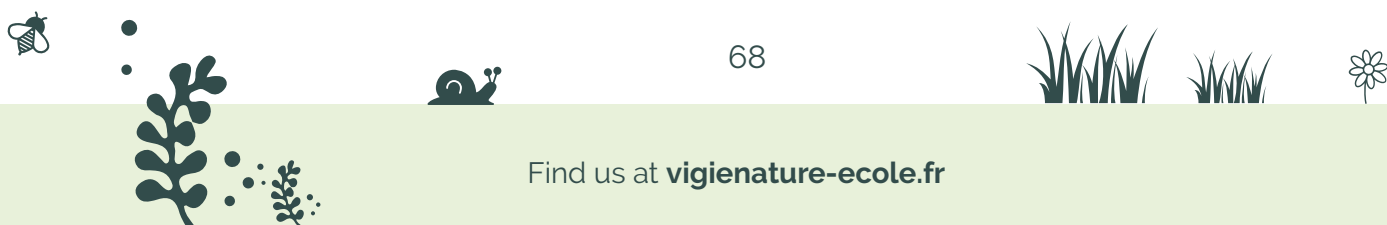
 Temperature: < 10°C 10-20°C 20-30°C > 30°C

 Wind: none or weak irregular weak continual strong continual



Sending your data

Log in and enter your data at vigienature-ecole.fr
Even the fact of not seeing any individuals is an important indication for our researchers! Please remember to enter this information on the website as well.





To make it easier to identify insects in the computer room, we suggest that you observe them closely in the field using, for example, this list of criteria. **Please note that in order not to make a mistake when determining the insects, one form must be filled in for each insect.**

Insect number:



Number of individuals:







Criteria observable on all insects


Tick off the characters clearly visible on the insect, in case of doubt do not tick anything.

Insect's general appearance




Body shape?  short  elongated




Hairyness?  with  without



Metallic sheen?  with  without

Body colour type?  multiple colours  solid colour



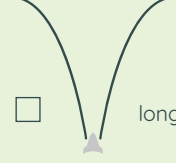
Body colour(s)?




 black  brown  green

 violet  orange  yellow

 red  blue

What to look for on the head

Antennae length?  short  medium  long

Rostrum, proboscis?  Fine proboscis  Rostrum or beak  none





To which order of insect pollinators does your insect belong?

Order: Coleoptera

Hymenoptera

Lepidoptera

Diptera



Coleoptera

See other criteria [page 70](#)



- 2 antennae
- 2 eyes
- 2 hardened wings (elytra)
- 6 jointed legs
- 2 membranous wings



Hymenoptera

See other criteria [page 71](#)



- 2 "bee" eyes
- 2 antennae
- A waist
- 6 jointed legs
- 2 pair membranous wings



Criteria to look for on an in

See other criteria [page 72](#)



- 2 pair colored wings
- 2 antennae
- 2 eyes
- 1 proboscis
- 6 jointed legs

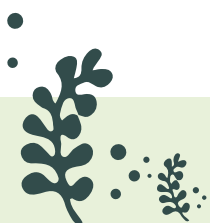


Diptera

See other criteria [page 73](#)



- 2 membranous wings
- 2 halteres
- 2 "fly" eyes
- 2 antennae





Criteria to look for on an insect that looks like a beetle or bug (beetles and hymenopterans)

Size?



What to look for on the head

Presence of a snout?



Type of antennae?



Colour of antennae?



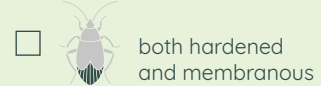
What to look for on the thorax

Patterns on thorax?



What to look for in the elytra

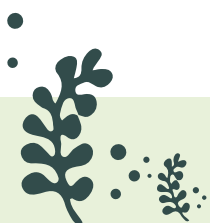
Type of elytra?



Proximity of elytra?

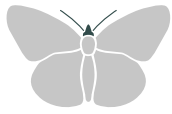


Patterns on elytra?





Criteria to look for on an insect that looks like a butterfly (lepidopterans)



What to look for on the head

Type of antennae?



What to look for in the wings

Colour of topside of wing?



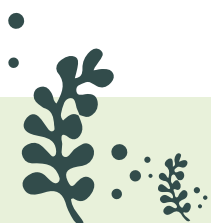
Translucent wings with margin?



Silhouette of lepidopterans with club-like antennae?



Silhouette of lepidopterans with another type of antennae?





Criteria to look for on an insect that looks like a fly, bee, wasp, or bumblebee (dipterans and hymenopterans)



What to look for on the head

Shape of eyes?

 fly-like eyes

 bee-like eyes



Length of junction between the thorax and abdomen?

 long

 short



What to look for on the abdomen

Colouring on abdomen?

 solid

 multiple colours

Main colours on abdomen?

 black and yellow

 black and copper

 black and red

 black and white

 black and green

 other





Wild on my street



A programme of the



Co-founding partner
of the observatory





Why study wild plants?

Wild on my street is both an educational project led by the association Tela Botanica, and the scientific project of a Muséum National d'Histoire Naturelle laboratory that aims to better inventory and understand the distribution of plant species in the city. You don't need to be a botanist, any city dweller interested in the future of the biodiversity around them can participate.

Wild on my street is a fun, informative and useful research program. Your data will allow researchers to complete their knowledge of species distribution in the city, the influence of green spaces (even as small as the foot of a tree) and the influence of urban structures on the quality of biodiversity.

Researchers need your data! The following tools will help you with the process.



We're counting on you!



What's the protocol?



Choose an area to be inventoried (whole street, part of a street, school yard...) and fill in the location details on the field sheet. If you make your observations in a courtyard or on a terrace, remember to specify this in "Notes" when entering the data. You are now ready to set off in search of wild plants!

Your objective is to recognise all the species present in your chosen area. To identify the plants, we provide you with an identification key (see page 83) to be used when possible in conjunction with the field guide *Sauvages de ma rue* (French only).

You can also use online or mobile applications such as Pl@ntNet (however, it seems to us preferable in terms of reasoning to let the pupils use the identification key before checking their identification on the application). If you can't identify a plant, don't worry! You'll be able to indicate "unidentified" plant and attach a photo when entering the data.



When to participate?

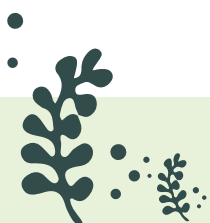
This protocol can be carried out year-round. But plants are more easily recognisable when their flowers are present, usually at the start of the school year or in spring.



Materials you'll need

Per group of 3-4 pupils:

- A camera with macro setting (not mandatory)
- Something to write with
- Field sheet
- Identification key
- The field guide *Sauvages de ma rue*





Things to know ahead of time

→ Scouting ahead of time:

Before your session, you can prepare a mini identification key specific to your school or institution, should your pupils be unable to use the tools as planned (the field guide *Sauvages de ma rue*, the identification included herewith, etc.). You can also use the photo quizzes available on our website.

→ How to prepare your pupils:

If your outing won't last more than an hour, we recommend holding a special session on plant observation, photography and field guide use ahead of time.

→ Getting to know the protocol:

To avoid forgetting anything in the field that might prevent data entry afterwards, we recommend presenting the protocol and field sheet to your class ahead of time.

A few precisions

What is a wild plant?

A wild plant is a plant that grows spontaneously, unlike a horticultural plant planted by a gardener. But over time, some garden centre plants, for instance passion flowers, have ended up colonising our streets spontaneously.

Where to participate?

You can make your observations in every crack and cranny. You can participate in the courtyard of your establishment, on a pavement, etc.

I can't determine a species...

Despite our identification key, it can sometimes be difficult to identify a plant (for example, if it is not in flower). No need to panic! You can indicate "unidentified" plant and attach a photo when entering the data. And you could always come back a few days later to try to identify it again (it may have bloomed in the meantime). You will then be able to change your entry.

Finally, don't hesitate to use the Pl@ntnet application which offers identification based on a simple photo.





01 Date et location



Date:/...../.....

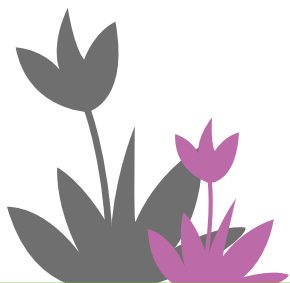


Town of observation:

Specify the observation site (name of street, school yard, etc.):
.....

If the count was done on a street, state the closest street numbers:

02 Your count



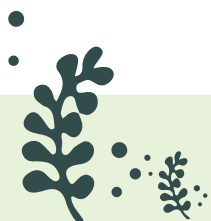
	At the foot of a tree	On a wall	Grassy area	Flower bed or planter	Cracks in the pavement	Under hedges and shrubberies	Dirt paths or gravel patches	Other, specify...
List of wild species								



Sending your data

Log in and enter your data at vigienature-ecole.fr

Even the fact of not seeing any plants is an important indication for our researchers!
Please remember to enter this information on the website as well.





This double page will provide you with all the information and vocabulary you need to use the identification key on the following pages.

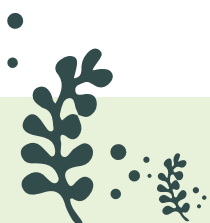
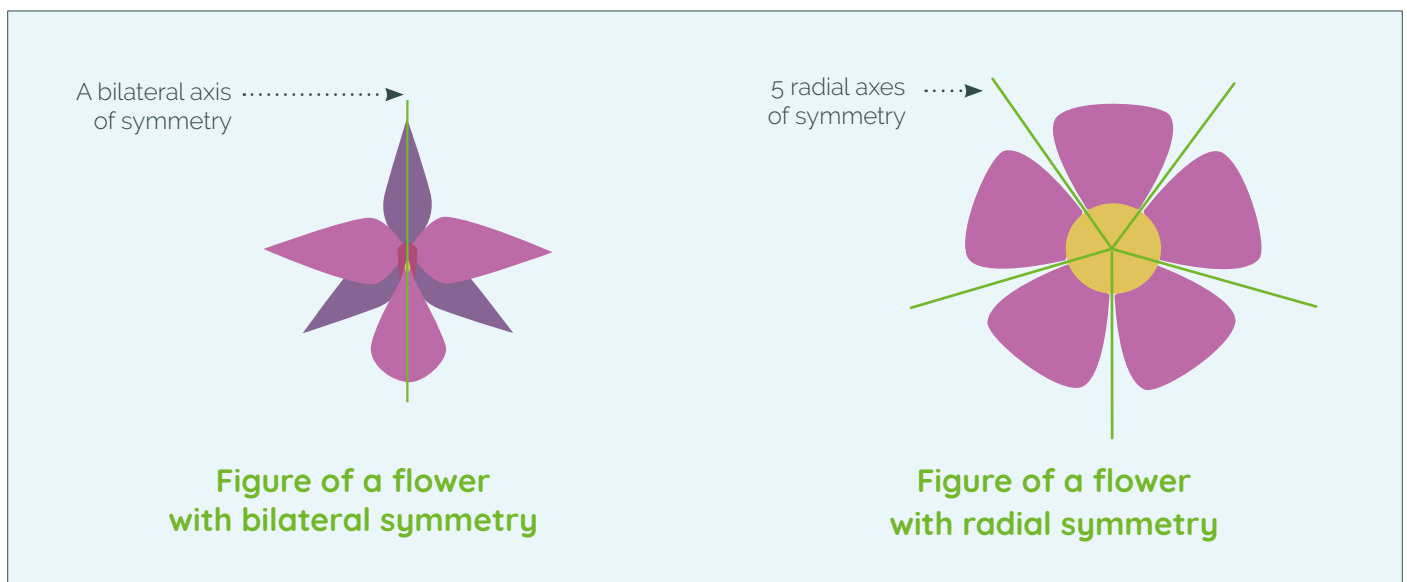
Flowers, a bit of vocabulary...

A flower is the reproductive structure of flowering plants, called angiosperms. They come in many different forms. After fertilisation, the flower produces the fruit, which in turn contains seeds.

Closely observing flowers is a good way to identify plants. One of the first criteria is the type of symmetry found in the flower. This can be:

01 **bilateral symmetry** when it can be **divided into two identical parts** (a mirror-image);

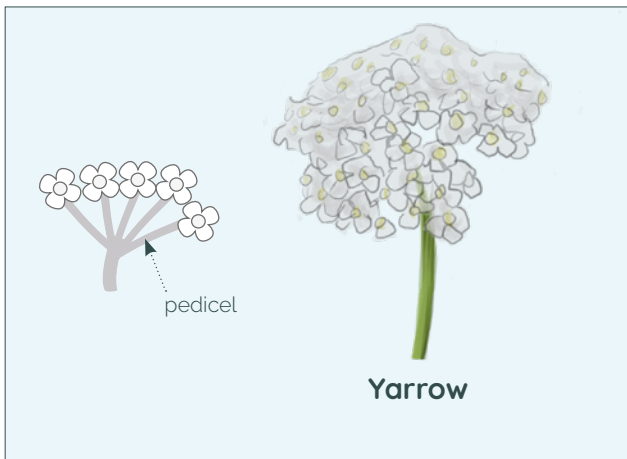
02 **radial symmetry** when it can be **divided into more than two equal parts around the centre of the flower** (examples: tubular flowers, flowers with 4 petals, etc).



We can also observe how a plant's flowers are grouped:

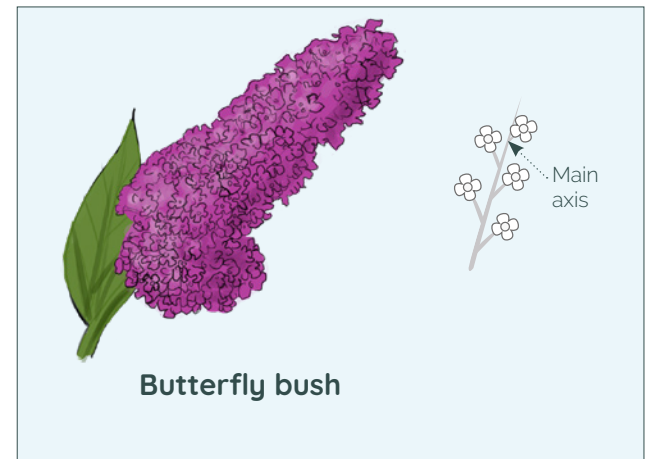
01 Flower umbels

The flowers, on small stalks called pedicels, are inserted at and spread from a common point on the main stem.



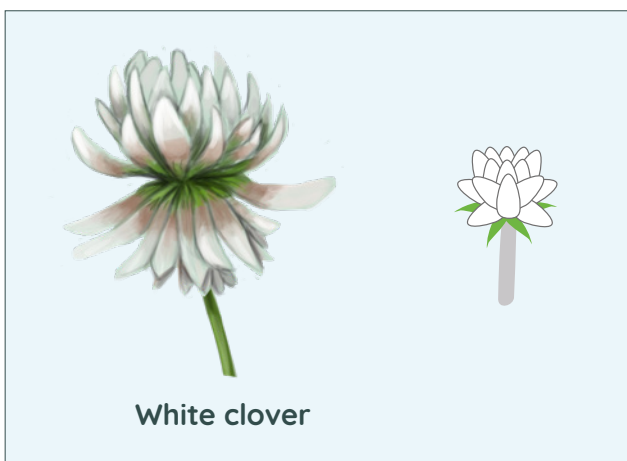
02 Flower racemes

The flowers are inserted at different points along the main stem.



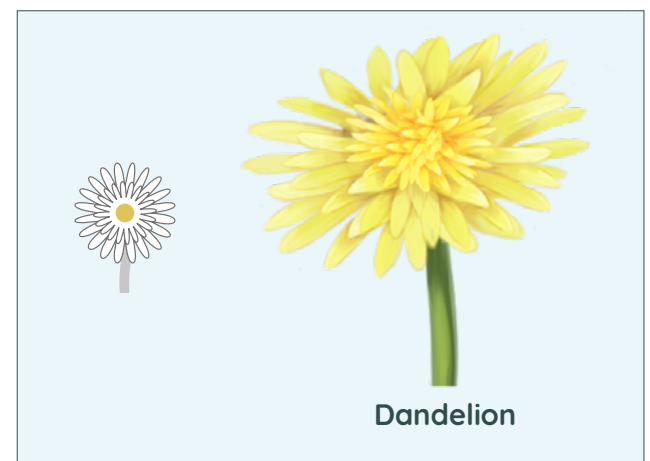
03 Flower glomerules

The flowers are all inserted at the same point of the stem and appear glued to each other, forming a ball.



04 Flower heads

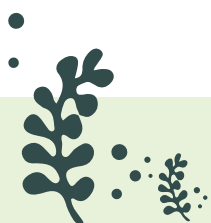
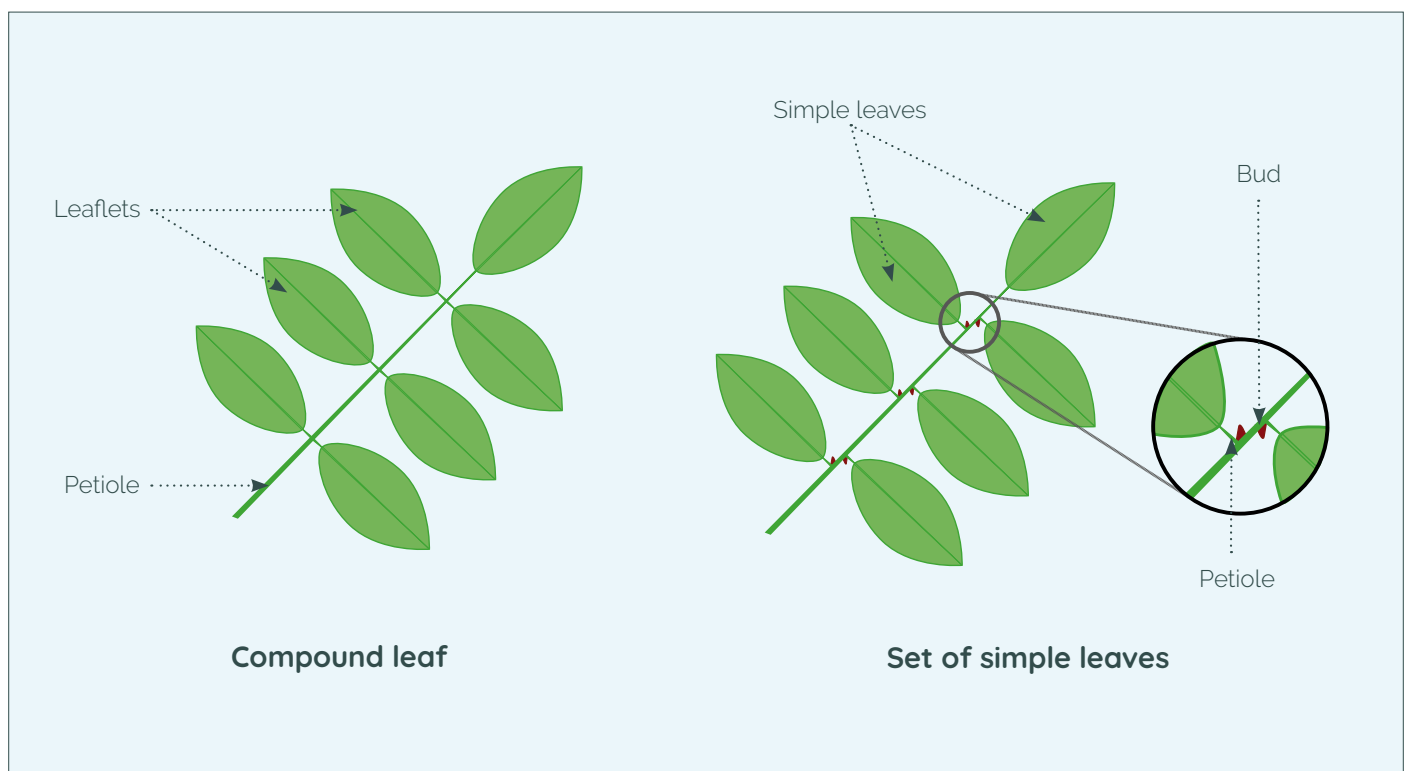
The flowers are all inserted at the same point on the stem and appear to be glued together in a flattened shape.



Compound leaf or simple leaf ?

Using the identification key, you will also need to determine whether the leaves are simple or compound, and this is no small task! Indeed, in some plants, a single compound leaf can easily be confused with a set of simple leaves.

- 01** A **single leaf** has a bud at the base of its petiole. If it hasn't got one, it must be the **leaflet** of a compound leaf.
- 02** A **compound leaf** has several leaflets on its stalk, which is attached to the twig.





The identification key that we propose here refers you to the pages of the French field guide *Sauvages de ma rue*.



Trees and shrubs:

The stem is often thick and woody. Only trees with young seedlings that are commonly found on the street are included in this list.

► French field guide p. 32 to 60



Ferns and horsetails:

These are not flowering plants. They reproduce by means of spores. They generally live in moist environments, in the shade of old walls, for example.

► French field guide p. 64 to 68



Poaceae:

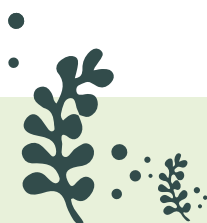
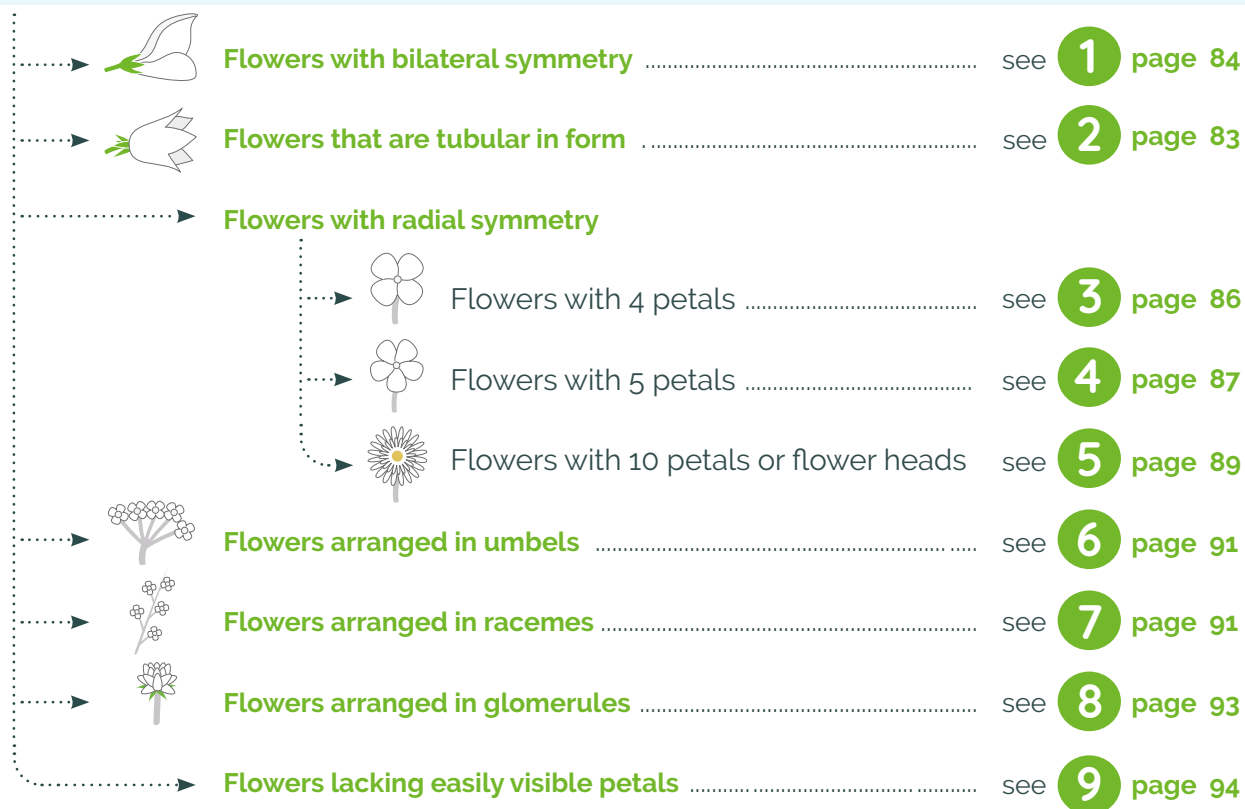
These are the plants commonly known as "grasses". Their flowers are arranged in spikelets and their leaves, always long and narrow, usually occur in tufts.

► French field guide p. 72 to 75



Flowering plants:

All other species that bloom on your street but with flowers that are not always visible (mowed flowers, tiny flowers, etc.). What are your flowers like?



1 Flowers with bilateral symmetry



White flowers



Simple leaves



Simple entire leaves with smooth margins, linear

Small toadflax p 302



Simple entire leaves with toothed margins

Gypsywort (*deeply toothed margins*) p 112

White nettle (*hairy margins*) p 284

Field pansy p 306



Compound leaves



Leaflets with smooth margins

Hairy vetch (*numerous leaflets and tendrils*) p 110

Honey clover (*3 leaflets*) p 278

Clovers (*3 leaflets*) p 280-282



Leaflets deeply lobed

White ramping fumitory p 288



Yellow flowers



Simple leaves with smooth margins, linear (narrow and elongated)

Common snapdragon p 205

Yellow toadflax p 206



Compound leaves



Leaflets with smooth margins

Bird's foot trefoil p 176

Burclover p 178-179



3 Leaflets with toothed margins

Yellow sweet clover p 180



Pink flowers



Simple leaves



Simple entire leaves with toothed margins

Himalayan balsam p 334

Henbit p 352

Red deadnettle p 354



Compound leaves



Leaflets with smooth margins

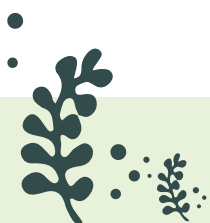
Common vetch (*numerous leaflets and tendrils*) p 342

Red clover (*3 leaflets*) p 342



Leaflets deeply lobed

Common fumitory p 362





Blue or violet flowers



Simple leaves



Simple entire leaves with smooth margins

Viper's bugloss p 394
 Bugle p 398



Simple entire leaves with toothed margins

Heal-all (leaf toothed at base) p 374
 Ground ivy (round leaves) p 376
 Common violet (round leaves) p 384



Simple lobed leaves

Kenilworth Ivy p 380



Compound leaves with smooth-edged leaflets

Alfalfa (3 leaflets) p 372
 Bush vetch (numerous leaflets and tendrils) p 396

2 Flowers that are tubular in form



White flowers



Simple leaves with smooth margins

Catchflies p 266-268
 Hedge bindweed (arrowhead or heart-shaped) p 272
 Navelwort p 274



Simple lobed leaves

Jimsonweed p 304



Needle-like leaves

Sharp-leaved Asparagus p 80



Pink flowers



Simple leaves



Simple entire leaves with smooth margins

Field bindweed (arrowhead-shaped) p 338



Simple entire leaves with toothed margins

Hollyhock (large round leaves) p 358



Blue or violet flowers



Simple leaves with smooth margins

Viper's bugloss (linear leaves) p 394

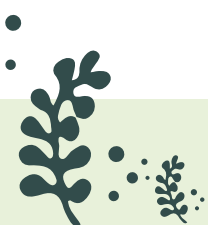


Green flowers

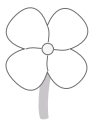


Simple leaves with smooth margins

Italian arum (arrowhead-shaped leaves) p 138






3 Flowers with 4 petals



White flowers

Simple leaves

-  **Simple entire leaves with smooth margins**
 - Thale cress p 92
 - The galiums p 126-128
 - Spring draba p 262
 - Hoary cress p 262
-  **Simple entire leaves with toothed margins**
 - Least pepperwort p 97
 - The galiums p 126-128
 - Garlic mustard p 258
-  **Simple lobed leaves**
 - Shepherd's purse p 94
 - White rocket p 260
 - Glandular speedwell p 303




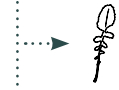

Compound leaves

- Hairy bittercress p 96
- Old Man's beard p 294



Yellow flowers

Simple leaves

-  **Simple entire leaves with smooth margins**
 - Wallflower p 168
 - Common evening-primrose p 186
-  **Simple lobed leaves with smooth margins**
 - Rapeseed p 164
 - Wild rocket p 166
 - Wild mustard p 170
 - The rockets p 172
-  **Simple lobed leaves with toothed margins**
 - Greater celandine p 190



Red flowers

- Common poppy p 322



Blue flowers

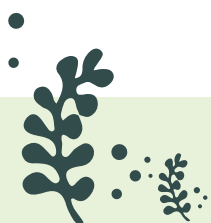
Simple lobed leaves with toothed margins

- Ivy-leaved speedwell p 402



Simple leaves with toothed margins



- The speedwells p 402-407



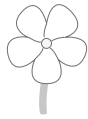


Pink flowers

Simple leaves




- 
Simple entire leaves with smooth margins, hairy
 Field madder p 362
- 
Simple entire leaves with toothed margins
 Square-stalked willowherb p 360

4 Flowers with 5 petals



White or greenish flowers

Simple leaves

- 
Simple entire leaves with smooth margins
 The mouse-ears p 098
 Black bindweed p 121
 Japanese knotweed p 292
 Thyme-leaf sandwort p 264
 The catchflies p 266-268
 Chickweed p 270
 White stonecrop (*fleshy leaves*) p 276
- 
Simple entire leaves with toothed margins
 Dwarf mallow (*round leaves*) p 286
 Hollyhock (*large round leaves*) p 358
- 
Simple lobed leaves
 Rue-leaved saxifrage (*fleshy 3-lobed leaves*) p 300
- 
Simple deeply lobed leaves
 English mandrake (*hairy leaves*) p 146



Compound leaves: Leaflets with toothed margins

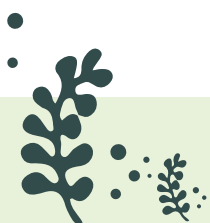
- Blackberry p 298



Yellow flowers

Simple leaves

- 
Simple entire leaves with smooth margins
 Goldmoss stonecrop (*small fleshy leaves*) p 174
 St John's wort p 184
 Common purslane (*fleshy leaves*) p 192
- 
Simple lobed leaves
 The buttercups p 194-196





Compound leaves



Leaflets with toothed margins

- Wood avens p 200
- Mock strawberry p 202
- Creeping cinquefoil p 204



3 leaflets

- The wood sorrels p 188-189



White flowers with yellow centre



Simple entire leaves

- Black nightshade p 318



Red or orange flowers



Simple entire leaves with smooth margins

- Scarlet pimpernel p 324



Pink flowers



Simple leaves



Simple entire leaves with smooth margins

- Lady's thumb p 118
- Wild sweet William p 336



Simple entire leaves with toothed margins

- Dwarf mallow p 286
- Hollyhock (large round leaves) p 358



Simple lobed leaves with toothed margins

- Mediterranean stork's-bill p 346
- Dovesfoot geranium p 348
- Dovesfoot geranium p 348
- Common mallow p 378



Simple lobed leaves

- Dovesfoot geranium p 348
- Cutleaf geranium p 350



Compound leaves with lobed leaflets

- Common stork's-bill p 344
- Herb-Robert p 350





Compound leaves with toothed leaflets

- Blackberry p 298



Blue or violet flowers

Simple leaves

- 
Simple entire leaves with toothed margins
 Starflower (*hairy leaves*) p 390
 Field forget-me-knot p 392
- 
Simple lobed leaves with toothed margins
 Common mallow p 378

Simple lobed leaves

- 
With smooth margins
 Bittersweet p 382
- 
With toothed margins
 Common verberna p 134

5 Flowers with 10 petals or arranged in heads



White flowers with 10 petals

- Bluecrown passionflower p 400



White "flowers" with yellow centres arranged in heads



Simple leaves

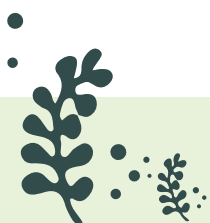
- 
Simple entire leaves
 Narrow-leaved aster p 310
 The Galinsoga (*five 3-toothed petals*) p 312
 Lawn daisy p 316
- 
Simple lobed leaves
 The mayweeds p 314-315



Yellow "flowers" arranged in heads

Simple entire leaves

- 
With smooth margins
 Common andryala p 210
 Naked weed (*linear leaves*) p 212
 Meadow salsify (*linear leaves*) p 235
 Narrow-leaved ragwort (*linear leaves sometimes lightly toothed*)..p 238
- 
With toothed margins
 Spiny sowthistle (*spiny, perfoliate leaves*) p 220
 Nipplewort (*leaves lobed at base*) p 226
 Giant goldenrod p 241
 Coltsfoot (*round*) p 242





Simple lobed leaves



With smooth margins

- The hawksbeards p 214-217
- The oxtongues p 228
- Flatweed (*thick leaves*) p 232
- Common brighteyes p 234



With toothed margins

- Common sowthistle (*perfoliate leaves*) p 218



Simple lobed leaves

- Slender sowthistle p 218
- Wall lettuce p 222
- Prickly lettuce p 224
- Dandelion p 230
- The ragworts and groundsels..... p 236, 237, 240
- Common ragwort p 239
- Smooth golden fleece (*leaves lobed at base*)..... p 244



Pink or violet "flowers" arranged in heads



Simple leaves



Simple entire leaves with smooth margins

- Lesser burdock p 366



Simple entire leaves with toothed margins

- Italian thistle p 330
- Wild teasle p 340



Simple lobed leaves with toothed margins

- Italian thistle p 330
- Creeping thistle p 368



Simple lobed leaves

- Spear thistle (*hairy, spiny leaves*) p 368
- Sweet scabious p 370



Blue "flowers" arranged in heads

- Chicory p 388



6 Flowers arranged in umbels



White flowers



Simple deeply lobed leaves

Wild carrot	p 250
Cow parsley	p 252
Rough chervil (<i>hairy leaves</i>)	p 252
Japanese hedge parsley	p 254
Yarrow (<i>feathery leaves</i>)	p 256



Compound leaves with deeply lobed leaflets

Common hogweed	p 248
----------------------	-------



Yellow flowers



Simple lobed leaves

Fennel (<i>feathery leaves</i>)	p 160
Cultivated parsnip	p 162



Pink flowers



Compound leaves with deeply lobed leaflets

Hemp agrimony	p 332
---------------------	-------

7 Flowers arranged in racemes



White or greenish flowers



Simple leaves

Simple entire leaves with smooth margins

Pokeweed	p 290
Japanese knotweed	p 292

Simple entire leaves with toothed margins

Navelwort	p 274
-----------------	-------

Simple lobed leaves

White ramping fumitory (<i>deeply lobed leaves</i>)	p 288
White mignonette	p 296



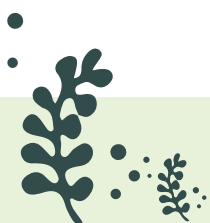
Compound leaves

Leaflets with smooth margins

Harry bittercress	p 96
Honey clover (<i>3 leaflets</i>)	p 278
White clover (<i>white "circumflex" on the 3 leaflets</i>)	p 282

Leaflets with toothed hairy margins

Hare's-foot clover	p 280
--------------------------	-------





Yellow flowers

Simple leaves

Simple entire leaves with smooth margins

- Snapdragon (*linear leaves*) p 205
- Yellow toadflax (*linear leaves*) p 206
- Giant goldenrod p 241

Simple lobed leaves

- Yellow mignonette p 198

Compound leaves with 3 Leaflets with toothed margins

- Yellow sweet clover p 180



Pink flowers

Simple leaves with smooth margins

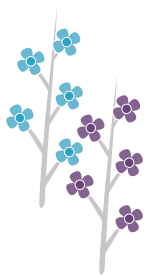
- The knotweeds p 118-121
- Red valerian p 326
- Purple loosestrife p 356

Simple lobed leaves

- Common fumitory p 362

Compound leaves with toothed margins et poilus

- Hare's-foot clover p 280



Blue or violet flowers

Simple leaves

Simple entire leaves with smooth margins

- Viper's bugloss p 394
- Bugle p 398

Simple lobed leaves with toothed margins

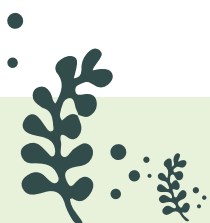
- Common verbena p 134

Compound leaves with smooth-edged leaflets

- Alfalfa (*3 hairy leaflets*) p 372

Deeply lobed leaflets

- Common fumitory p 362





Green flowers

Simple leaves

Simple entire leaves with smooth margins

The amaranths	p 78-79
The goosefoots	p 106-107
The plantains	p 114-117
The docks and sorrels	p 122-123
Pellitory of the wall	p 132

Simple entire leaves with toothed margins

The goosefoots	p 106-107
Annual mercury	p 108
The nettles	p 130-131



Simple lobed leaves

Annual ragweed	p 82
The mugworts	p 84-87

8 Flowers arranged in glomerules



White flowers

Compound leaves with 3 leaflets

White clover	p 282
--------------------	-------



Yellow flowers

Compound leaves with 3 leaflets

Black medic (<i>leaflets ending in short point</i>)	p 179
Lesser trefoil and sulphur clover	p 182-183



Purple flowers

Compound leaves with toothed leaflet margins

Salad burnet	p 124
--------------------	-------



Green flowers

Lobed leaves with toothed margins

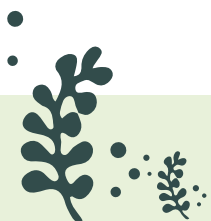
Common hop (<i>resembling a liana</i>)	p 144
--	-------



Violet flowers

Simple leaves

Lesser burdock	p 366
Heal-all	p 374





Pink flowers



Simple leaves

Wild teasel	p 340
Lesser burdock	p 366



Compound leaves

Red clover	p 342
------------------	-------

9 Flowers lacking easily visible petals

Simple leaves



Simple entire leaves



Smooth margins

The amaranths	p 78-79
The manyseeds	p 100
The pearlworts	p 102
The saltbushes	p 104-105
The goosefoots	p 106-107
The plantains	p 114-117
The docks and sorrels	p 122-123
Pellitory of the wall	p 132
The spurge	p 148-153
The knotweeds	p 118-121



Toothed margins

The fleabanes	p 88-90
The goosefoots	p 106-107
Annual mercury	p 108
Buck's-horn plantain	p 114
The nettles	p 130-131



Simple lobed leaves

Common ivy	p 140
------------------	-------



Simple leaves deeply lobed

Mugworts and ragweeds	p 82-87
Wild chamomile	p 142
Parseley piert	p 154



Needle-like leaves

Asperagus	p 80
-----------------	------

Compound leaves



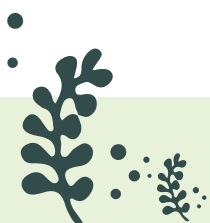
Leaves with 5 toothed-margined leaflets

Creeper	p 156
---------------	-------



Numerous smooth-margined leaflets

Hairy vetch	p 110
-------------------	-------





Vigie-Bat



A programme of the





Why Study Bats?

Metropolitan France has 36 species of bats. Some of them are found throughout the territory, such as the common pipistrelle or the common serotine, while others have a limited distribution, such as the long-fingered bat, which is only present in the Mediterranean region.

We know little about the distribution of many species in most regions. This is mainly due to their discretion, to how difficult it is to study them, and to our ever-changing knowledge of them. Thus the Alcathe bat was only discovered in the early 2000s! Several long-running studies of rare species suggest that most species are in decline.

Vigie-Bat tracks common bats as they hunt and makes it possible to assess the population's state of health.. This guide will explain how you and your pupils can participate. We're counting on you!



We're counting on you!



What's the protocol?



01

Set up your ultrasound bat detector, following the instructions in the enclosed configuration guide.

02

Place the detector close to your establishment.

You'll want to start recording 30 minutes before sunset, so be sure to set up your device early enough. Stop recording 30 minutes after sunrise. After each night of recording, collect your device and transfer the data to a hard disk (CAREFUL! several gigabytes will be recorded over the course of the night and your memory card may soon be full). You will then have to divide and rename the files according to our data transfer guide. As the volume of these files is very large, even for a single night of recording, sending them may take several hours.

03 Following the first night of recording

If your institution is large enough, you can move the device another night by at least 150 m (please note that you will need to define two recording spots when sending the recordings). You can, for example, vary the location of the recorder between one lit and one dark area to better understand the impact of artificial light on the hunting habits of bats

04 And after that?

Once the recordings have been made, you will need to deposit them on the Vigie-Bats platform. The website allows you to analyse your recordings and identify the bats that frequent your premises. The analysis generally takes less than 48 hours. At the same time, we will send you a summary table of all the sounds detected during the night, a graphical illustration of this table, and some recordings so that your pupils can try to identify them from the species sheets. **Also, don't forget to return the device to us!**



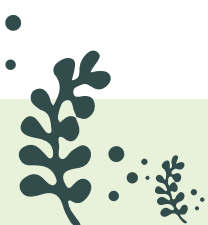
When to participate?

- from the start of the school year through 1 November.
- and from 1 April until the summer holidays.



Materials you'll need

We can lend you an ultrasonic bat detector free of charge. Contact us as soon as possible to reserve it.



A few precisions about the protocol

How long can I keep the ultrasound detector?

We generally lend our bat detector for a maximum of one week in order to make it available to as many classes as possible.

Pay close attention to the weather conditions.

If the wind blows above 15 km/h, the bats' activity is likely to be limited to the most sheltered areas.

Note that if 30 minutes after sunset, the temperature drops below 10°C, bat activity is limited and it is unlikely that you will record many calls.

Get to know your bats

Bats use their hearing to find their way around at night or at dusk. This ability, called echolocation, works like radar: bats emit sounds that reflect off the objects around them in the form of an echo.

From this echo, bats create a mental image of their surroundings, just as we do with our eyes, which receive the light reflected from the objects around us.

Each species of bat emits calls with its own characteristics (frequency, intensity and duration), which allow us to determine which bat species made the call. The calls are ultrasonic, which means that they are too high-pitched for the human ear to perceive.

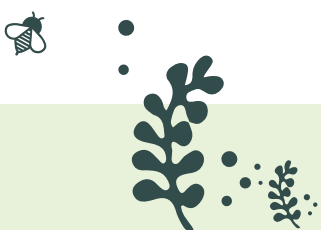


Grey long-eared bat



Common serotine bat

Common pipistrelle





01 Describe your environment (send back page at same time as recording)

Recording session

Check a specialized website to obtain the precise information below.



Date:/...../.....

Start time:h.....

End time:h.....



T°C start of night:

T°C end of night



Wind intensity:

- Calm: less than 1 km/h, smoke rises straight up
- Low: from 1 to 11 km/h, slight breeze to light breeze
- Medium: from 12 to 28 km/h, gentle breeze to moderate breeze
- Strong: 29km/h or more, fresh breeze



Cloud cover: 0-25% 25-50% 50-75% 75-100%

Environment:



Habitat within a radius of 100 m from the spot where you're leaving the recorder:

- Forest (trees over 10 m tall)
- Young forest (trees between 5 and 10 m tall)
- Thicket (lower than 5 m)
- Heath or grassland
- Water or aquatic environment
- Agricultural environment
- Urban environment



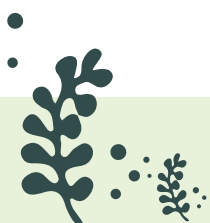
Is the area artificially lit? no yes

Is so, what colour is the light? white orange other

Does the light turn off during the night? no yes, give time:

Distance to closest light source: < 1 m 1-5 m 5-10 m
 10-50 m 50-100 m > 100 m

02 Send your data to vigienature-ecole.fr





01 Bat anatomy

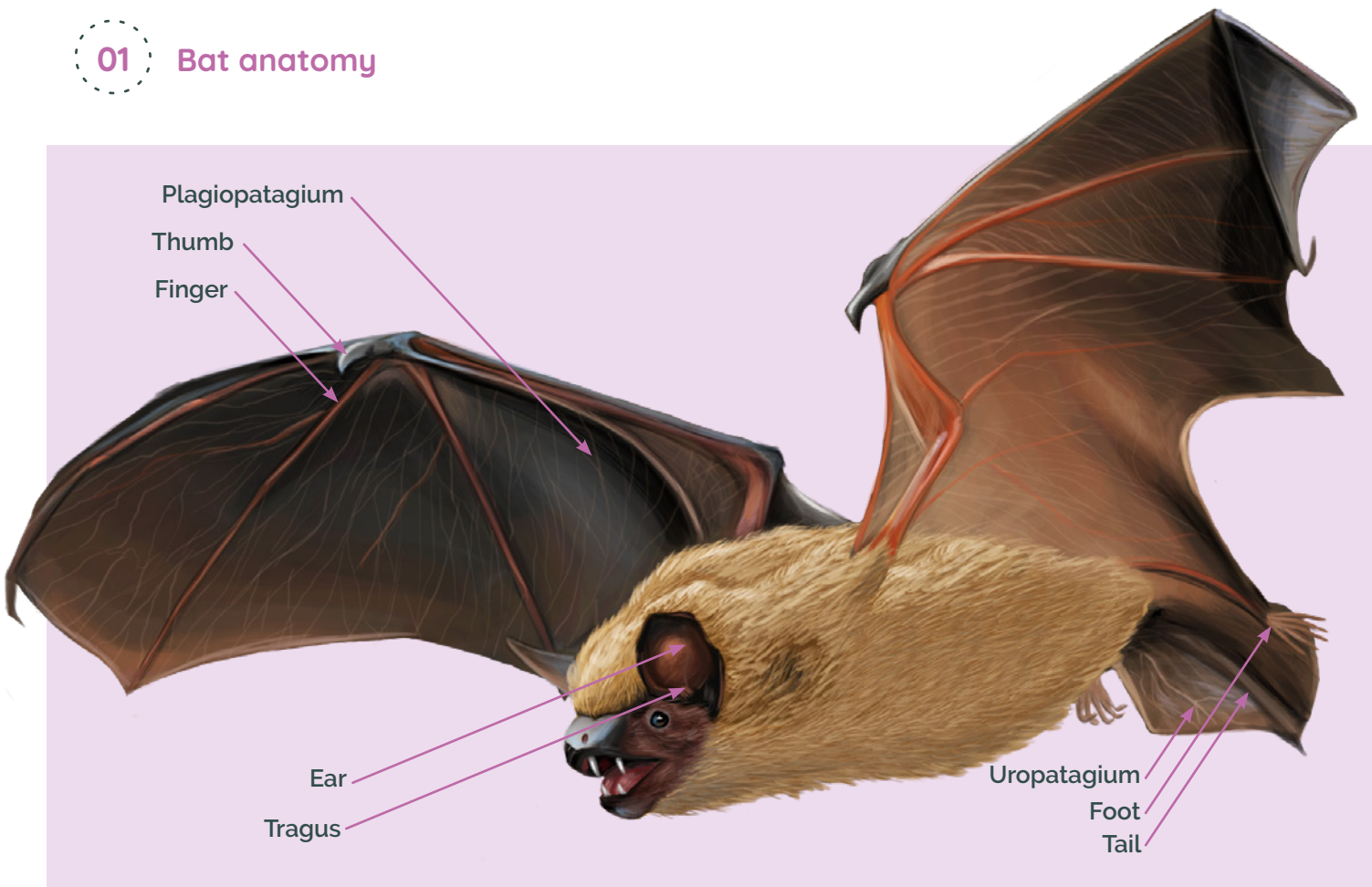
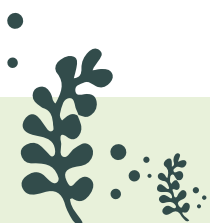
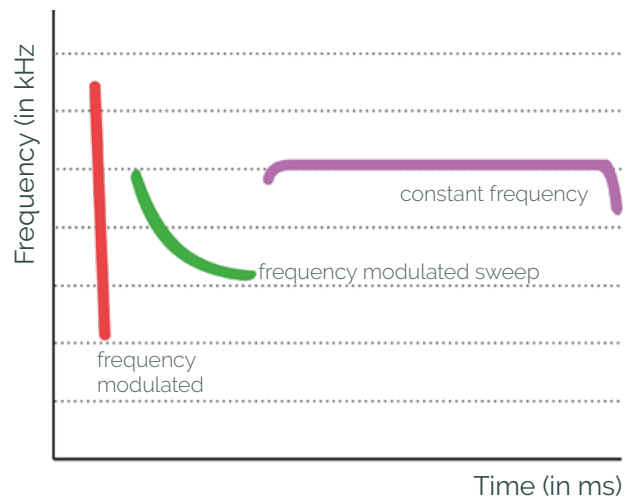


Illustration : Yanis Giarrappa

02 The main types of signals emitted by chiropterans:

Each bat species emits calls with its own characteristics (frequency, intensity and duration), which allow us to determine which species of bat we are dealing with.

There are, however, a large number of variations that can be grouped schematically into three categories, shown here in the diagram opposite.



Common pipistrelle, *Pipistrellus pipistrellus*



© Laurent Arthur



4 to 8 g



36 to 51 mm



180 to 240 mm

Description:

The Common pipistrelle is tiny. It is no bigger than a human thumb and weighs no more than a 50-centime coin! Its coat is brown and its muzzle is almost black.

Distribution:

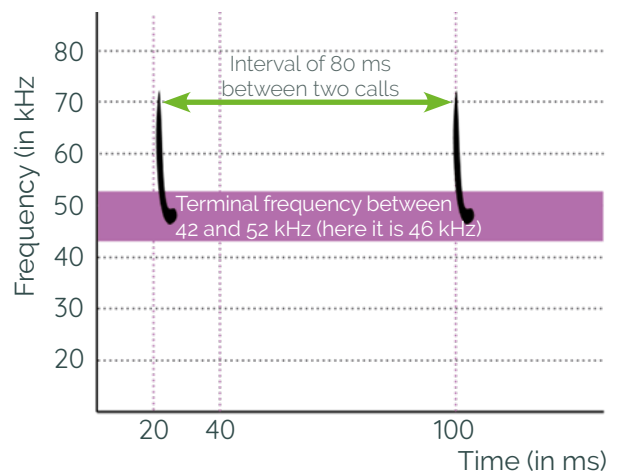
Eurasia and the Maghreb.

Habitat:

This species can be found in all environments. It can be found in cities, including the major European capitals such as Paris, where the largest known wintering colony is located under a tunnel over the Paris ring road in the 14th district. Its summer shelters are for the most part human constructions: barns, attics, garages... It hunts in all environments but has a preference for wetlands, which are richer in insects.

Acoustic recognition:

Common pipistrelles emit sweeping frequency modulated signals with a terminal frequency between 42 and 52 kHz. The calls are emitted every 0.8 s on average.



Nathusius's pipistrelle, *Pipistrellus nathusii*



© Mmolif



6 to 15.5 g



46 to 55 mm



220 to 250 mm

Description:

Nathusius's pipistrelle is a little larger than the other pipistrelles. Its coat is often long and woolly, and brown to red in colour. It has hairs on the uropatagium.

Distribution:

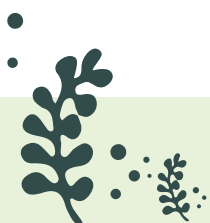
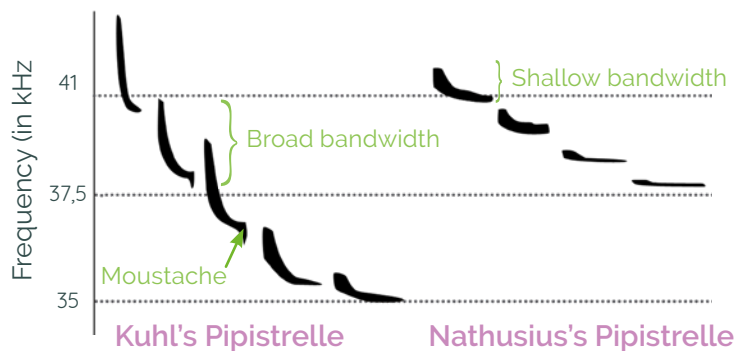
Found throughout Europe. It is a migratory species that winters in Europe.

Habitat:

Nathusius's pipistrelle lives mainly in wooded areas with lots of ponds. It spends the winter in small groups (about ten individuals) which shelter under bark and in tree holes and sometimes in piles of firewood. In summer, it crawls into tree holes or between the boards of shacks or other wooden walls.

Acoustic recognition:

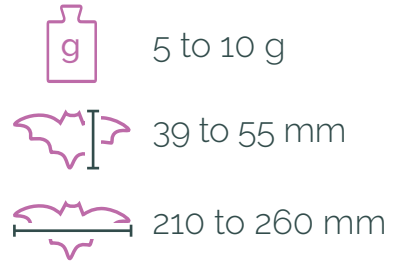
Nathusius's pipistrelle calls are fairly narrowband whereas Kuhl's pipistrelle calls are broadband (part of the modulated call). The calls of Kuhl's Pipistrelle sometimes also end with a slight, characteristic flattening.



Kuhl's pipistrelle, *Pipistrellus kuhlii*



© Laurent Arthur



Description:

Kuhl's pipistrelle is a very small bat. Its coat is brown or caramel coloured, lighter on the belly. It has a round snout and a white border along the membrane.

Distribution:

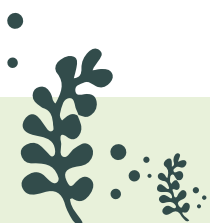
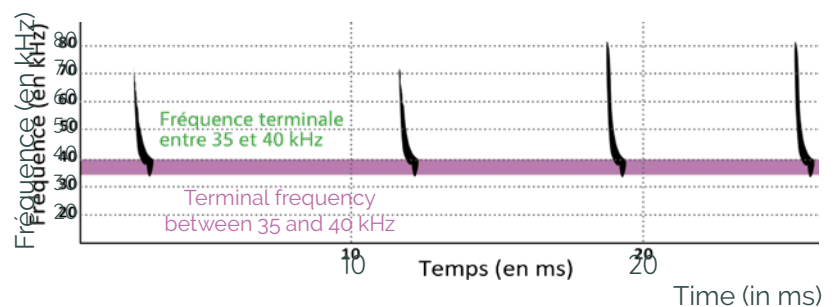
Eurasia. In France, it is found everywhere except in the north-east and in Brittany.

Habitat:

Kuhl's pipistrelle is very present in urban areas. During the winter, it shelters in buildings such as churches or cellars but also in cracks in building facades. In summer, it can be found under roofs or behind shutters waiting for the sun to set. At night, it hunts in parks and gardens or near public lighting.

Acoustic recognition:

The calls of Nathusius's pipistrelle and Kuhl's pipistrelle are very similar making it difficult to distinguish between the two species. They also resemble those of the Common pipistrelle but with a terminal frequency between 40 and 35 kHz.



Common noctule, *Nyctalus noctule*



 17 to 45 g

 60 to 90 mm

 320 to 450 mm

Description:

The common noctule is one of the largest bats in Europe. Its coat is smooth with golden highlights. Its ears are shaped like shovels.

Distribution:

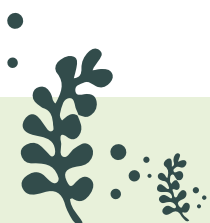
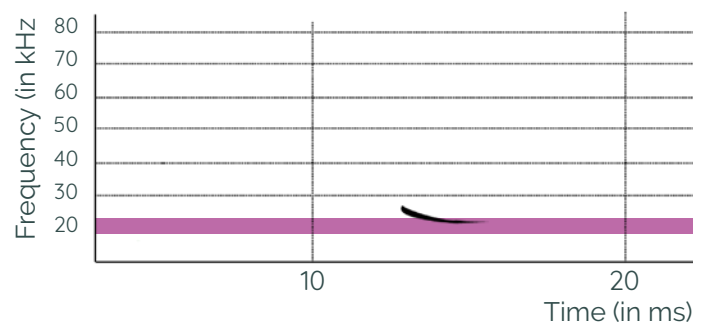
Eurasia. In France, it is rare in the South, from Brittany to Pas-de-Calais and is absent from Corsica.

Habitat:

The common noctule is a forest species but can also be found in cities. In both of these environments, it is found near water. It winters in tree cavities or, in the city, under bridges or in small cavities in buildings. In summer, its favourite places to stay are holes in oak trees in the forest and in plane trees in the city.

Acoustic recognition:

The common noctule emits sweeping frequency modulated signals with a terminal frequency between 18 and 22 kHz. Its echolocation calls are partly audible, especially for younger human ears! It also often alternates between low and high-pitched calls.



Lesser noctule, *Nyctalus leisleri*

© Laurent Arthur



8 to 23 g



48 to 72 mm



260 to 340 mm

Description:

The lesser noctule has a brown face and a short, dull coat. Even its wings are covered with hair!

Distribution:

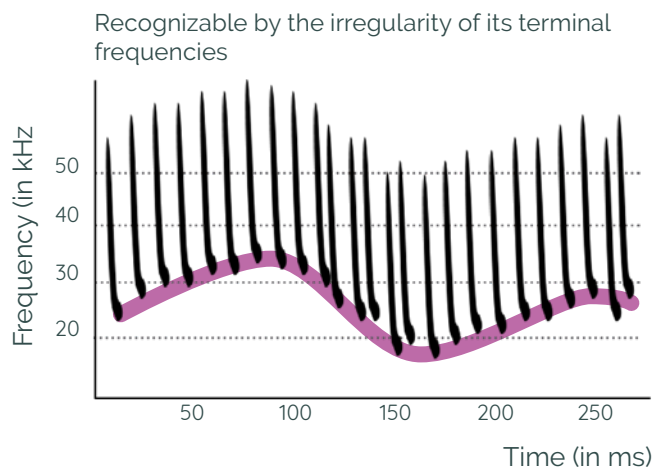
Eurasia and the Maghreb.

Habitat:

The lesser noctule is a forest species but can also be found in towns and cities. It winters in tree holes or, in urban areas, under bridges or in small cracks in buildings. In summer, its favourite shelter are holes in oak trees in the forest or in plane trees in the city.

Acoustic recognition:

The lesser noctule emits sweeping frequency modulated signals with a terminal frequency between 21 and 26 kHz. For a same series of calls, the terminal frequency may vary slightly, often alternating between low and long calls and high and short calls. These last two characteristics make it possible to distinguish the lesser noctule from the common serotine bat.




Common serotine bat, *Eptesicus serotinus*



© Laurent Arthur

 18 to 35 g

 63 to 90 mm

 315 to 381 mm

Description:

The common serotine bat has a very dark face. Its coat is dark brown on the back, lighter on the belly.

Distribution:

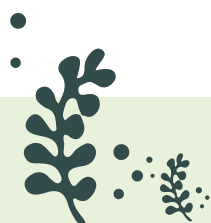
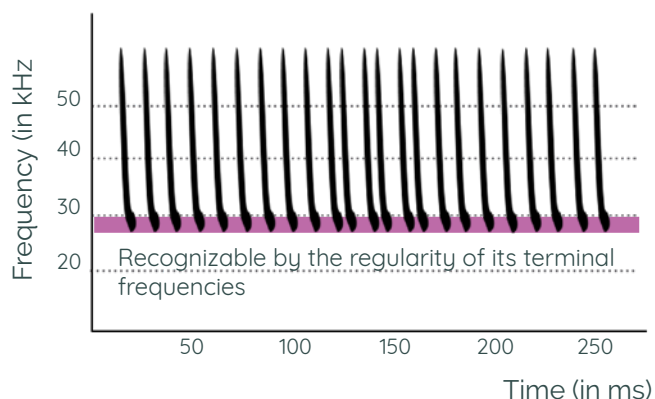
Except at high altitudes, it is found throughout Europe as far as southern Sweden.

Habitat:

The common serotine can be found in the countryside as well as in cities. It is very inconspicuous in winter as it insulates itself in deep cracks or in the roofs of cool attics. In summer, colonies choose warmer shelters such as attics or behind shutters.

Acoustic recognition:

The common serotin bat emits sweeping frequency modulated calls with a terminal frequency between 26 and 30 kHz. When flying at cruising speed, there is never any alternation between high- and low-pitched calls.



The mouse-eared bats, *Myotis* sp.

There are several species of mouse-eared bats in France, all of which emit modulated calls without terminal flattening. It is therefore very difficult to distinguish the different species on the basis of their calls, so we prefer to group them into three groups:

01 Small mouse-eared bats

Geoffroy's bat and Alcatheo's bat with a terminal frequency higher than 33 kHz.

02 Medium-sized mouse-eared bats

Daubenton's bat, Natterer's bat, Bechstein's bat, whiskered bat, Brandt's bat and long-fingered bat with a terminal frequency between 25 and 33 kHz.

03 Large mouse-eared bats

Greater mouse-eared bat and lesser mouse-eared bat with a terminal frequency of less than 25kHz.

In this guide we present only Daubenton's bat, the most common mouse-eared bat in mainland France.



Bechstein's bat

Daubenton's bat, *Myotis daubentonii*



© Laurent Arthur



6 to 12 g



43 to 55 mm



240 to 275 mm

Description:

Juveniles are grey, adults are brown. Daubenton's bat has hair almost all the way down to its muzzle which is pinkish.

Distribution:

Eurasia.

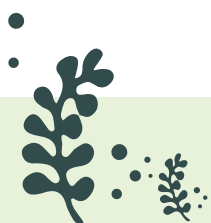
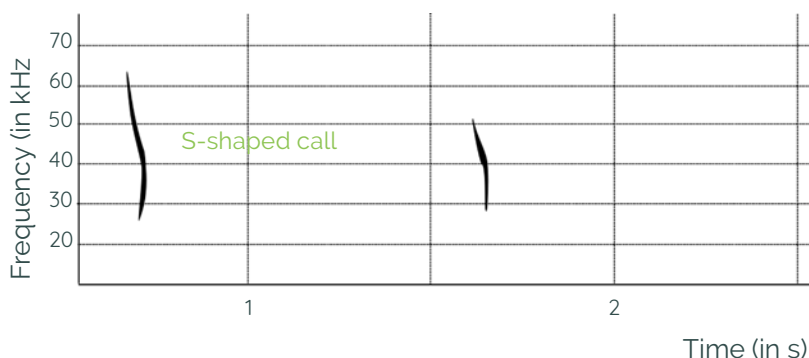
Habitat:

Daubenton's bat hunts over water, so it can be found close to wetlands.

It sometimes even catches small fish. It hibernates in cellars, caves or damp quarries, and in summer it shelters in holes in deciduous trees or under bridges.

Acoustic recognition:

Its call's terminal frequency is between 25 and 33 kHz.



Western barbastelle, *Barbastellus barbastellus*



© Laurent Arthur



6 to 14 g



45 to 60 mm



240 to 290 mm

Description:

The Western barbastelle is very dark. Its coat varies from ashy grey to black. Its muzzle and ears are black.

Distribution:

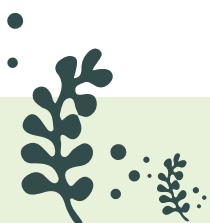
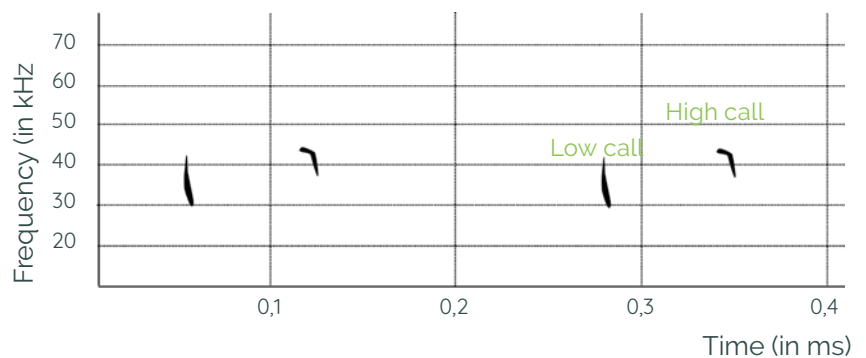
Eurasia and the Maghreb.

Habitat:

This species is mainly found in forest environments, but it can also be found in agricultural landscapes if old hedges are present. In winter, it hibernates in cellars, ruins, underground or under the bark of old trees. In summer, it spends its days hidden under the bark of trees or in the wooden structures of buildings (beams, shutters).

Acoustic recognition:

The Western barbastelle emits two types of alternating calls, a low modulated call between 40 and 30 kHz and a high call in the shape of an upside-down hockey stick starting at over 40 kHz and ending below it.



Grey long-eared bat, *Plecotus austriacus*

© Laurent Arthur



6 to 14 g



41 mm



240 to 300 mm

Description:

The grey long-eared bat has very large ears and a long dark muzzle. Its coat is ash-grey on the back, pale on the belly.

Distribution:

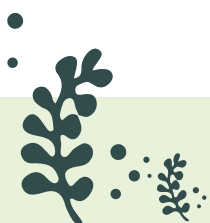
Found in Central Europe, and from the south of England to the north of Italy.

Habitat:

The grey long-eared bat lives in plains, mountains and warm valleys, in agricultural areas as well as in cities with plenty of green spaces. In winter as in summer, it takes refuge in attics or cracks in cliffs or building facades.

Acoustic recognition:

The different species of long-eared bats are very difficult to distinguish by their calls, which are modulated and whose high frequency is between 45 and 65 kHz and whose terminal frequency is between 18 and 28 kHz. The sounds are emitted mainly through the nostrils.





Lichens Go !



Lichens Go! is a joint observatory of PartiCitaE (Sorbonne Université) and Vigie-Nature École (Muséum national d'Histoire naturelle). It is proposed in partnership with Tela Botanica as part of the project Auprès de mon arbre (Around my tree).





Why study lichens?

Lichens are extraordinary organisms. They are made up of a fungus and an alga living together in symbiosis. The fungus allows the lichen to adhere firmly to a substrate (rock, tree trunk or even the ground). It protects the alga against external aggressions (UV radiation, drying out, predators, etc.) and captures water and minerals from the atmosphere, fog, rain and snow. The alga provides the fungus with sugars and nutrients from photosynthesis.

As they are permeable to water, lichens are very much exposed to atmospheric pollution. However, not all lichen species are equally affected by pollution. Some are particularly sensitive to it and die quickly when the air becomes polluted, others on the contrary are very resistant, while still others actually benefit from certain types of pollution.

By using this protocol to study the different species of lichens that grow on trees, we can assess air quality. And as lichens grow very slowly, they provide us with a cumulative pollution level over a period of several years rather than an instantaneous value.



We're counting on you!



What's the protocol?

01 Selecting a zone

The area you will be studying should have at least **three isolated trees** (i.e. not growing in a forest or grove). These trees should be spaced **2 to 10 metres** apart.

02 Selecting trees

You will have to make an inventory of the lichens present on 3 trees (if the chosen area prevents you from observing three trees, you can do it on only two, but no fewer).

These trees must be:

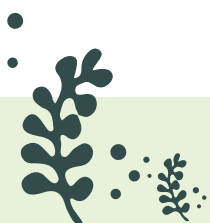
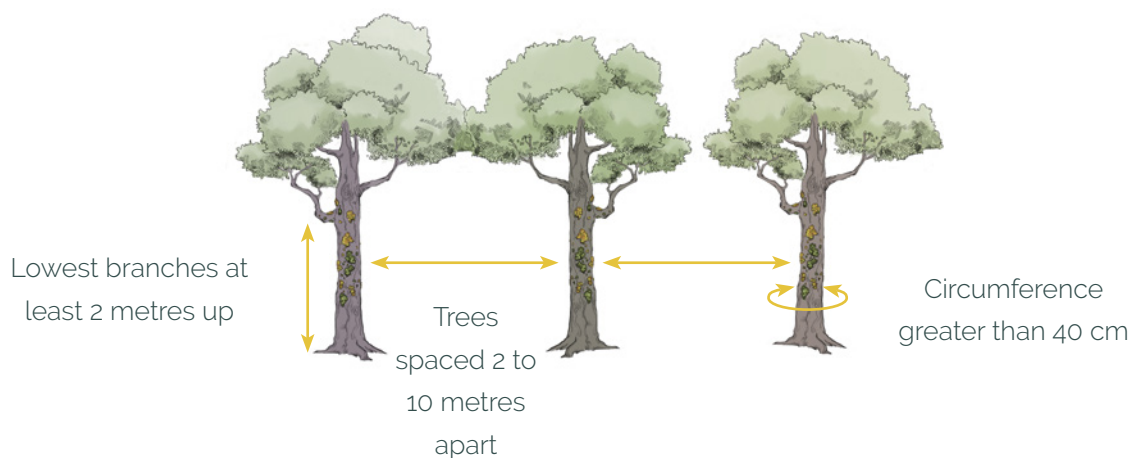
- straight, with a **circumference over 40 cm**;
- neither coniferous trees (pines...), nor plane or birch trees (the bark of these species is regularly renewed or too acidic, which prevents old lichens from forming);
- **have little or no moss or ivy cover**;
- with **the lowest branches at least 2 metres up**.



When to participate?

This protocol can be carried out all year round on a dry day (rain complicates lichen identification).

Setting up the grid and observing the lichens



03 Recording the lichens

Using a compass (or your smartphone), determine the north facing side of each tree (compass should point north).

Attach the grid consisting of 5 squares (see materials section next page) vertically to the trunk using strings or straps. **The bottom of the grid must be placed one metre off the ground.**

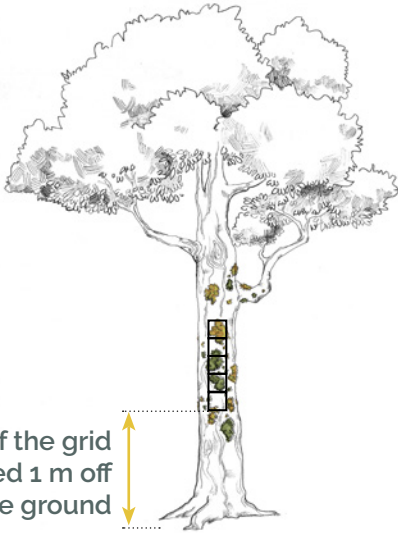


Illustration : Pauline Bouman

Using the identification key, identify the different species present. For each species, indicate the square or squares on the grid where it is present. Ideally, take a photo (macro setting) of each species.

Do the same for the east, west and south sides of the tree.

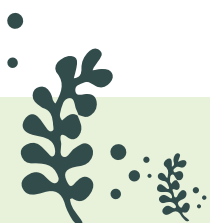
Remember to complete the field sheet as you go.



Materials you'll need

- a grid with five 10 x 10 cm squares, which will allow you to delimit your observation area. You can either use 10 x 10 cm mesh or print the "grid" document on page 119.
- string to secure the grids
- a magnifying glass (magnification x 10)
- a compass or your phone to determine the tree's exposure
- some water
- a camera (optional)
- the identification key and the field sheet

This protocol is proposed by M. Boulanger, N. Malle, G. Plattner, L. Turcati and S. Turpin in collaboration with C. Van Haluwyn.





How to prepare ahead of time?

→ Divide up the work

In order not to waste time in the field, we recommend that you review the various stages of the protocol with your pupils in the classroom.

Don't hesitate to form sub-groups for each tree before the field trip..

→ Do a location check in the field

We advise you to doublecheck, beforehand, that the trees on which you want to carry out this study meet the criteria defined above. You can also use online mapping tools to do this.



© M Boulanger, N Matle, C Van Haluwyn

Ramalina fraxinea



A few details

Why install a grid with 5 spaces?

In this protocol, as is often the case in ecology, we assess two parameters: the number of species present and the abundance of these species. Finding a lichen in a single box will indicate that it is less abundant than if it were present in all the boxes. In our analyses to assess air quality, we will consider both of these parameters (species diversity and abundance of each).

Why do an inventory of all four sides of a tree?

During preliminary studies, we have noticed that the face of the tree with the highest lichen abundance varies according to many factors: geographical area, humidity and sunlight on the different sides, proximity of buildings, etc. To get around this difficulty, we have chosen to ask you to study all four sides of each tree.

Why three trees?

Carrying out observations on three trees gives a better overview of a site. It also allows us to average the results if one of the trees is richer or poorer in lichens than the others.

How can air quality be assessed from lichens?

There is currently a methodology, called Fomofa, which makes it possible to assess air quality based on the types of lichens present (crustose, foliose and/or fruticose).

This method tells us that:

- if only crustose lichens are present, there is probably a relatively high level of air pollution;
- if there are both crustose and foliose lichens present, air pollution is moderate;
- finally the presence of fruticose lichens indicates very low air pollution.

Within the framework of this protocol, we will try to be even more precise (this is why we are asking you to name the lichens observed)... but for this, we need a lot of data!





01 Address or GPS coordinates of the area

Blank area for address or GPS coordinates.

Date:/...../.....

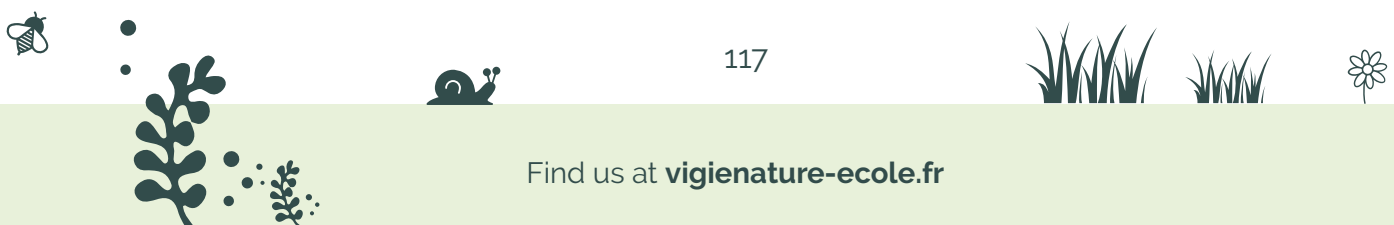
02 Your comments

	Tree 1	Tree 2	Tree 3
Tree species:			
Circumference of the trunk at mid-height:			

Could one or more sides of the tree be shaded most of the time?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't know	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't know	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't know
If so, which sides?	North East South West <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	N E S O <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	N E S O <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

		North	East	South	West	N	E	S	O	N	E	S	O
Name of lichen 1	Square 1 (the highest)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 5 (the lowest)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Name of lichen 2	Square 1 (the highest)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 5 (the lowest)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



		North	East	South	West	N	E	S	O	N	E	S	O
Name of lichen 3	Square 1 <small>(the highest)</small>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 5 <small>(the lowest)</small>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

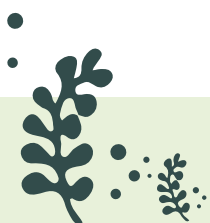
Name of lichen 4	Square 1 <small>(the highest)</small>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 5 <small>(the lowest)</small>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Name of lichen 5	Square 1 <small>(the highest)</small>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 5 <small>(the lowest)</small>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Name of lichen 6	Square 1 <small>(the highest)</small>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 5 <small>(the lowest)</small>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Name of lichen 7	Square 1 <small>(the highest)</small>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 5 <small>(the lowest)</small>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Name of lichen 8	Square 1 <small>(the highest)</small>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Square 5 <small>(the lowest)</small>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Make your observation grid

- If you have not found a screen (see the "Materials" section of the protocol sheet), print two copies of this page in A4 format.
- Glue the two pages together at the junction point.
- Cut out the inside of the grid to keep only the grey part. You will thus obtain a grid with five 10 x 10 cm squares.

Junction point between
the two pieces





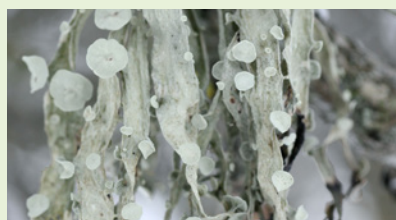
01 The three main types of lichens

The observation of lichen morphology allows us to group them into the three main categories described below.



Fruticose lichens

Strappy or bushy. Attached to the trunk by a very small base. Very easy to remove from the tree trunk.



Ramalina fraxinea



Ramalina farinacea



Ramalina fastigiata



Foliose lichens

Composed of lobes, resembling small leaves. Almost the entire surface of the thallus is attached to the trunk except at the edge where the lobes are detached. Can be easily removed with a fingernail.



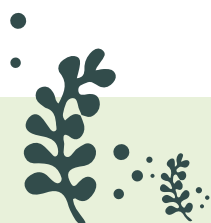
Parmelina saxatilis



Xanthoria parietina



Punctelia jeckeri





Crustose lichens

In the form of a crust or blotch. The lichen's entire surface is firmly adhered to the trunk. Cannot be detached without tearing off the bark.



Amandinea punctata



Diploicia canescens

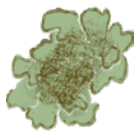


Candelariella vitellina

02 Elements to observe on lichens

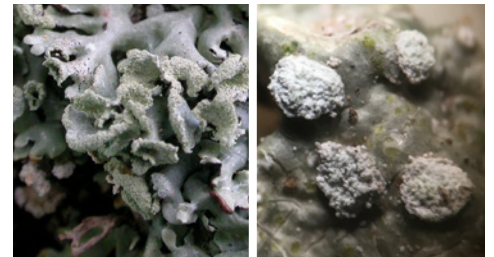
Reproductive organs

Lichens have several types of reproductive organs, listed below. In the determination key, you will be asked to verify their presence or absence.



Soralia

Asexual reproductive organs with a granular appearance (powdery substance)



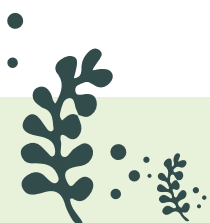
Isidia

Asexual reproductive organs forming wart-like or cylindrical outgrowths.



Apothecia

Sexual reproductive organs forming small cups or disks.



Other parts to be observed

In the identification key, other structures are useful for the identification of lichens.



Thallus

The body of the lichen (scientists use this term for organisms devoid of roots, stems, leaves and nerves).



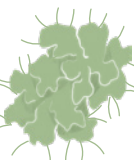
Lobe

A leaf-like part of the thallus.



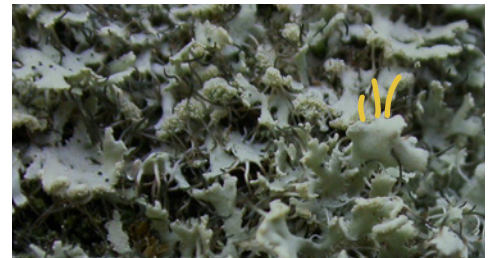
Rhizine

Small filamentous root-like structures on the underside of some thalli, enabling them to attach to their surface



Cilia

Filaments generally inserted at the edge of the topside the thallus.



Pseudocyphella

Small scar-like structures (on the topside of the lichen) that give it a waffle-like appearance.





This identification key, designed in partnership with Particitae, allows you to recognize the most common lichens in towns and cities in Metropolitan France. **Don't hesitate to use a magnifying glass to see a lichen clearly.**

The species you are observing is...

... **dry and rigid**
it's a lichen

Lichen is strappy or bushy. Attached to the trunk by a very small base. Can very easily be detached from the trunk.



Fruticose lichen
See page 124

Lichen composed of lobes, resembling small leaves. Attached to the trunk by almost the entire surface of the thallus except at the edge where the lobes are detached. Can be easily removed with a fingernail.



Foliose lichen
See page 123

Lichen's entire surface firmly adhered to the trunk. In the shape of a crust or blotch. Cannot be detached without tearing off the bark.



Crustose lichen
See page 123

... **soft and green.**
With a magnifying glass, you can make out structures resembling stems and leaves.

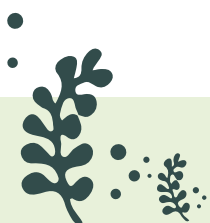
It's a moss (found on the moistest side of the tree).

The moss group isn't covered in this study.

... **splotchy,** leaves a trace on your skin if you touch it.

It's an alga (found on the moistest side of the tree).

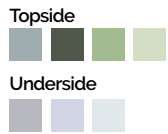
This group isn't covered in this study.



FRUITCOSE LICHEN



Lichen with flattened strap-like branches



Topside and underside of the lichen are of different colours

Presence of cilia on the top side

Absence of cilia

Underside whitish to greenish (not to be confused with *Ramalina farinacea* more rigid strap-like branches)

Underside black at base

& Topside
Underside

Topside and underside of the lichen are of the same colour

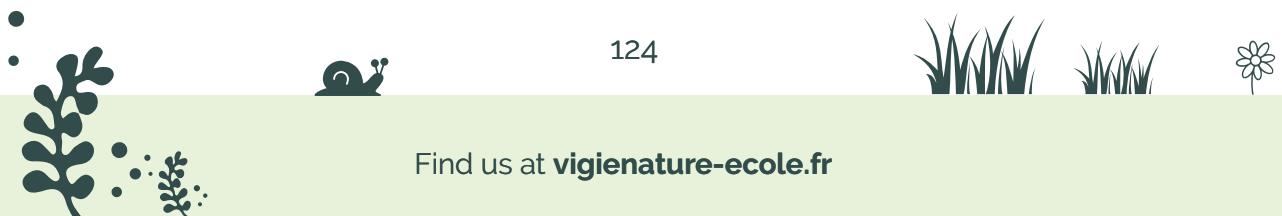


Presence of apothecia, absence of soralia and isidia, rigid branches






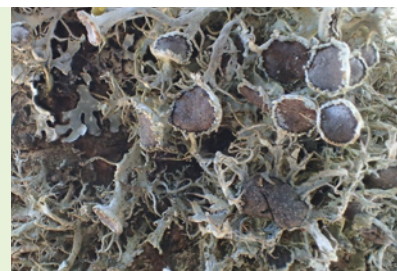
Apothecia rare but presence of soralia on edge, rigid strap-like branches (not to be confused with *Evernia prunastri* with softer strap-like branches)

Lichen with cylindrical branches: [see page 124](#)






Anaptychia ciliaris

-  Apothecia on a short stalk
-  Presence of long cilia
-  Strap-like branches elongated and velvety (under the magnifying glass)






Evernia prunastri

-  Apothecia very rare, possible presence of powdery soralia
-  Absence of cilia and rhizines
-  Soft elongated strap-like branches, top and undersides differ in colour






Pseudevernia furfuracea

-  Apothécies très rares, présence d'isidies cylindriques
-  Absence of cilia and rhizines
-  Soft elongated strap-like branches, top and undersides differ in colour






Ramalina fastigiata

-  Apothecia at end of branches
-  Absence of cilia and rhizines
-  Strap-like branches elongated (up to 5 cm), highly ramified and dense






Ramalina fraxinea

-  Apothecia on edge of branches
-  Absence of cilia and rhizines
-  Strap-like ranches rigid and very elongated (max. 20 cm), larges (max. 2,5 cm)



Ramalina farinacea

-  Apothecia rare, presence of soralia on edge of branches
-  Absence of cilia and rhizines
-  Strap-like branches elongated (max. 10 cm) fine (max. 3 mm) and rigid



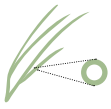
Apothecia terminal



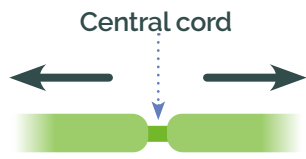
Apothecia lateral

Photo credits: photo 1 © Jean-Michel Sussey / Photo 2 © M. Boulanger / Photos 3, 5, 6 © M. Boulanger, N. Malle, C. Van Haluwyn / Photo 4 © Lairich Rig





Lichen with cylindrical strap-like branches



Presence of a central cord. This cord consists of fungal filaments forming a central axis. To see if your lichen has one, gently pull on the sides of the strap-like branch.

Central cord absent

Other fruticose lichen cylindrical branches



If you haven't found your foliose lichen here (we've only included the most commonly found), add "**Other foliose lichen**" to your field sheet.



Usnea sp.



Reproductive organs variable according to species



Cilia present in a few species



Strap-like branches elongated and cylindrical

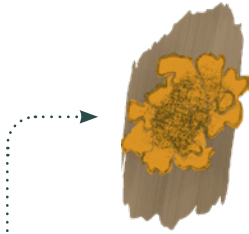


Photo © J. Claude CC BY-SA 3.0

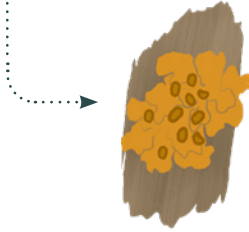
Foliose LICHEN



Lichen yellow or orangish



Absence of apothecia, presence of soralia



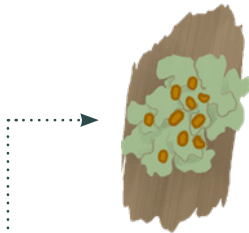
Presence of orange apothecia, absence of soralia and isidia

Thallus often well-developed with conspicuous lobes

Small thallus (less than 3 cm) entirely covered in apothecia, no visible lobes



Lichen brown to khaki green



Presence of numerous, very large apothecia, absence of soralia. Presence of small "warts" that resemble isidia (but they are not)

Apothecia rare, isidia and soralia that break when touched

Apothecia rare, isidia that don't break when touched






Lichen greyish, whitish, olivish or a different colour: [see page 130](#)



Photo crédits: *Candelaria concolor* and *Xanthoria parietina* © M. Boulanger, N. Malle, C. Van Haluwyn / *Xanthoria polycarpa* and *Melanelixia glabratula* © Richard Droker / *Melanohalea exasperata* © Christophe Quintin






Candelaria concolor

-  Presence of soralia at end of lobes
-  Absence of cilia, presence of rhizines
-  Very short lobes that don't adhere to the tree trunk






Xanthoria parietina

-  Apothecia orangish
-  Absence of cilia, rhizines rare
-  Lobes well developed






Xanthoria polycarpa

-  Very numerous orangish apothecia
-  Absence of cilia, rare presence of rhizines
-  Thallus cushion like, almost entirely covered by apothecia






Melanohalea exasperata

-  Apothecia numerous and up to 8 mm in diameter
-  Rhizines sometimes extending beyond the thallus
-  Thallus up to 10 cm, narrow lobes (about 4 mm)



Melanelixia glabrata

-  Apothecia rare, presence of isidia and/or fragile soralia
-  Absence of cilia, presence of rhizines
-  Thallus of variable size, adhered to trunk



Autres Melanohalea



If you haven't found your foliose lichen (we've only included the most commonly found lichens), add "**Other foliose lichen**" to your field sheet





Lichen greyish, whitish, olivish or another colour



Presence of cilia on the topside



Numerous dark apothecia

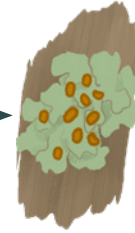


Apothecia rare

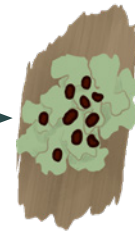


Absence of cilia, quickly changes colour when water is applied (becomes an almost fluorescent green)

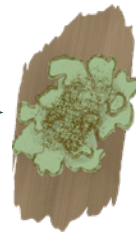
Absence of soralia



Apothecia rusty red, absence of isidia and soralia



Black apothecia covered in a white powder that is also present on the edge of the lobe (called pruinosity)



Presence of soralia

Lichen with soralia, presence of a very fine white powder on lobe margins (called pruinosity)



Absence of cilia, changes little or not at all when wet

Presence of soralia [see page 130](#)

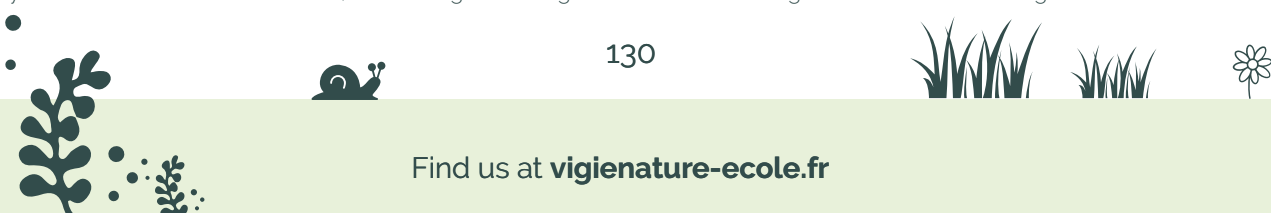
Absence of soralia [see page 130](#)

Absence of pruinosity, presence of soralia especially in the centre of the thallus (which measures less than 3 cm in diameter) and narrow lobes (roughly the size of a pencil end)






Photo credits:

P. leptalea © M. Boulanger / P. ascendens et P. grisea © M. Boulanger, N. Malle, C. Van Haluwyn / P. acetabulum et P. orbicularis © C. Van Haluwyn / P. distorta © Robert Reisman, M. Boulanger / H. adglutinata © Annelie Burghause / Photos showing water effect © I. Voedts






Physcia leptalea

-  Numerous apothecia, absence of soralia
-  Presence of cilia and a few rhizines
-  Lobes narrow, from 0.3 to 1.5 mm wide






Physcia adscendens / tenella

-  Presence of soralia at end of lobes
-  Presence of cilia (1 to 3 mm) and a few rhizines
-  Lobes narrow, 0.3 to 1.5 mm wide






Pleurosticta acetabulum

-  Apothecia larges and may be curled in a vase shape
-  Presence of rhizines
-  Lobes up to 1.5 cm wide.






Physconia distorta

-  Presence of apothecia, absence of soralia and isidia
-  Presence of dense black rhizines
-  Thallus measuring up to 10 cm, lobes 0.6 to 2 mm wide






Physconia grisea

-  Presence of large soralia
-  Presence of rhizines on the underside
-  Lobes narrow, 2 mm wide, rounded at end






Hyperphyscia adglutinata

-  Very frequent presence of soralia, apothecia rarer
-  Rhizines short and few
-  Thallus less than 1.5 cm, lobes less than 0.5 mm



Phaeophyscia orbicularis

-  Very frequent presence of soralia, apothecia rarer
-  Rhizines extending beyond the thallus
-  Thallus less than 3 cm, lobes less than 1 mm



Thallus almost crustose, very difficult to detach, no rhizines visible at lobe margins

Thallus rounded and strongly adhered to the bark, rhizines extending beyond the edge of the lobes



Lichen with soralia, doesn't turn green when wet, measures more than 3 cm in diameter

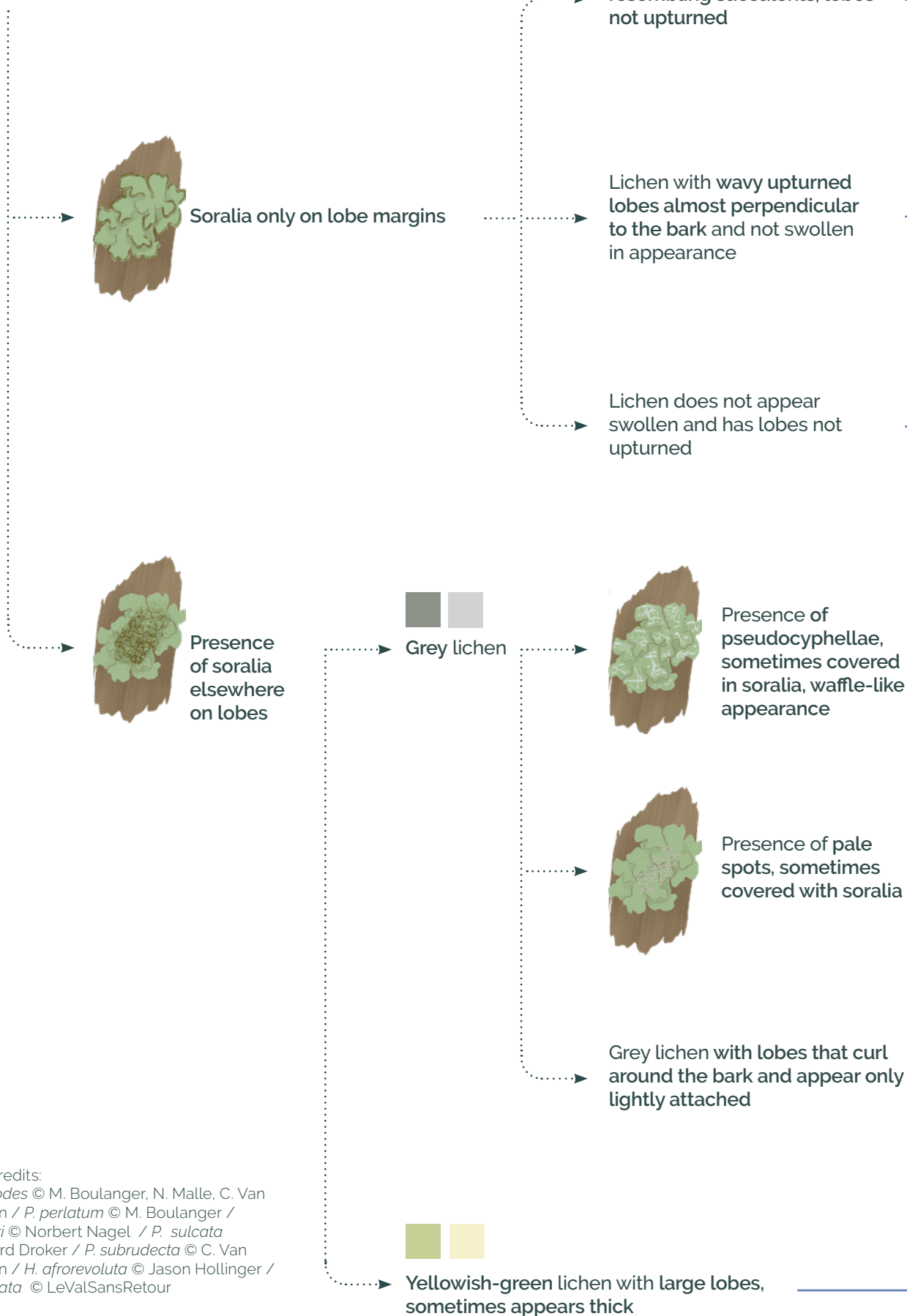





Photo credits:
H. physodes © M. Boulanger, N. Malle, C. Van Haluwyn / *P. perlatum* © M. Boulanger / *P. jeckeri* © Norbert Nagel / *P. sulcata* © Richard Droker / *P. subrudecta* © C. Van Haluwyn / *H. afrorevoluta* © Jason Hollinger / *F. caperata* © LeValSansRetour






Hypogymnia physodes / tubulosa

-  Soralia on lobe margins, apothecia rare
-  Absence of cilia and rhizines
-  Lobes swollen and narrow, 1 to 3 mm wide, and ends upturned






Parmotrema perlatum / reticulatum

-  Soralia on lobe margins, apothecia rare
-  Sometimes cilia on lobe margins, rhizines hardly visible
-  Lobes 1.5 cm wide maximum, lobe margins upturned






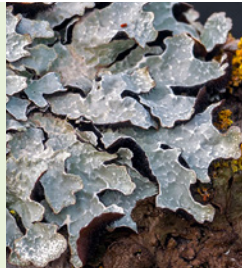
Punctelia jeckeri

-  Numerous soralia
-  Absence of cilia
-  Lobes narrow, 3 mm wide, rounded at end






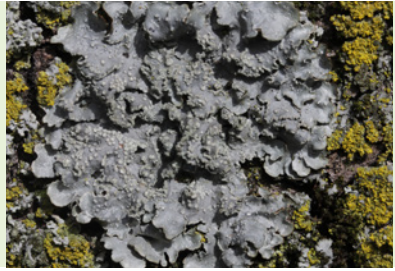
Parmelia sulcata

-  Presence of soralia
-  Presence of rhizines
-  Lobes 1 to 5 mm wide and 2 cm long, appears cut off at end






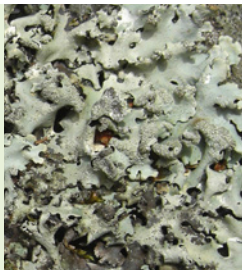
Punctelia subrudecta / borrieri

-  Numerous soralia
-  Absence of cilia
-  Lobes narrow, 3 mm wide, rounded at end






Hypotrachyna afrorevoluta / revoluta

-  Presence of soralia, sometimes apothecia
-  Absence of cilia
-  Lobes fairly narrow

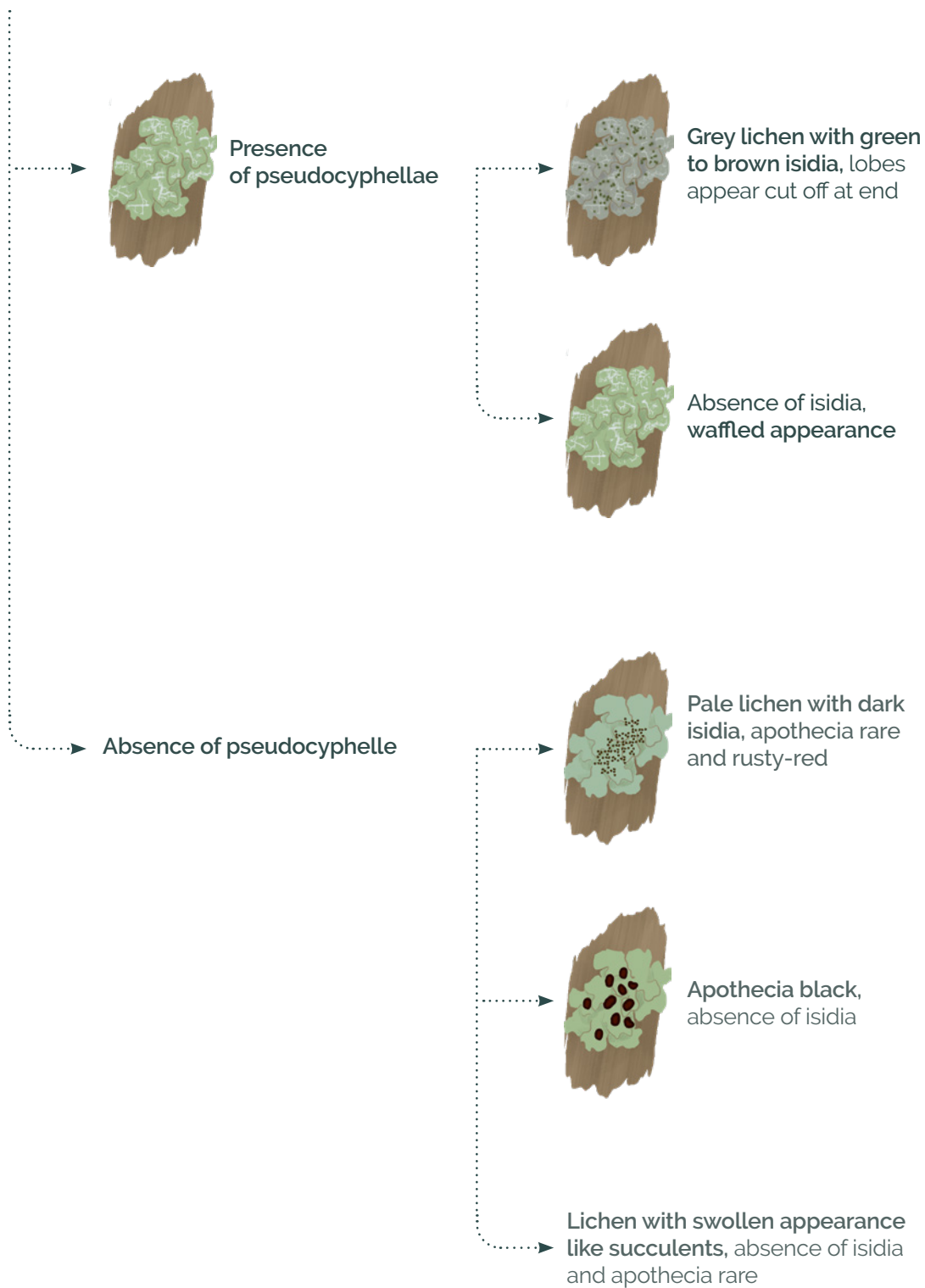


Flavoparmelia caperata / soledians

-  Soralia in centre of thallus, apothecia rare
-  Absence of cilia, presence of rhizines
-  Thallus up to 20 cm in diameter, lobes under 1.5 cm.






Lichen lacking soralia that doesn't turn green when wet.



Photos credits: *Parmelia saxatilis* and *Parmelina tiliacea* © C. Van Haluwyn / *Parmelia sulcata* © Richard Droker / *Physcia aipolia* © Jason Hollinger / *Hypogymnia physodes* © M Boulanger, N Malle, C. Van Haluwyn






Parmelia saxatilis

-  Presence of isidia, apothecia rare, absence of soralia
-  Presence of rhizines
-  Lobes appear cut off at end, presence of pseudocyphellae .






Parmelia sulcata

-  Soralia sometimes absent
-  Presence of rhizines
-  Lobes 1 to 5 mm wide and up to 2 cm long






Parmelina tiliacea / pastillifera

-  Presence of isidia, sometimes apothecia, absence of soralia
-  Presence of rhizines
-  Lobes arrondis de moins de 6 mm






Physcia aipolia / stellaris

-  Presence of apothecia, absence of soralia and isidia
-  Presence of rhizines, absence of cilia
-  Thallus measuring up to 10 cm, strongly adhered to bark



Hypogymnia physodes / tubulosa

-  Soralia on lobe margins, apothecia rare
-  Absence of cilia and rhizines
-  Lobes swollen and narrow, 1 to 3 mm, ends upturned



CRUSTOSE UCHEN



Lichen yellow or orangish

On closer look through a magnifying glass, this lichen is actually a foliose lichen: the thallus is not wholly adhered to the bark

On closer look through a magnifying glass, this lichen is actually a crustose lichen: the thallus solidly adheres to the bark

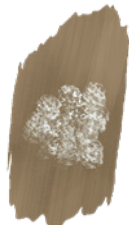


Lichen of another colour

Lichen without apothecia



White or greenish round lichen. The edges are clear, white with joined lobes



Powdery spreading lichen forming patches with no clear margin



Lichen with round apothecia



Margin of apothecia differs in colour from centre



Margin of apothecia is same colour as rest of apothecia






Lichen with apothecia located in small wart-like outgrowths (resembling caries in molars)



Lichen with comma-shaped apothecia called lirella






Candelaria concolor (foliose)

-  Presence of soralia on lobe margins
-  Absence of cilia and presence of rhizines
-  Very short lobes that don't adhere to the tree trunk






Candelariella sp.

-  Apothecia with yellow disks
-  Absence of cilia and rhizines
-  Absence of lobe, granulose thallus perfectly adhered to trunk



Diploicia canescens

-  Numerous soralia in centre, absence of apothecia with rare exceptions (in which case they are black).
-  Absence of cilia and rhizines
-  Thallus rounded and lobed and perfectly adhered to bark






Crustose lichen with a powdery appearance

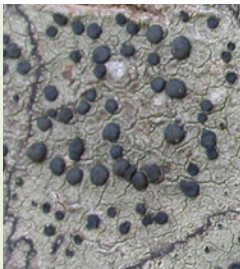
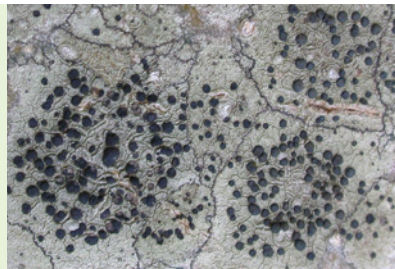


If you haven't found your crustose lichen (we've only included the most common), add "Other crustose lichen" to your field sheet.




Lecanora sp.

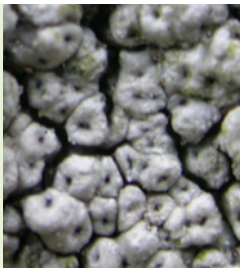
Amandinea punctata / Lecidella elaeochroma

-  Apothecia numerous and black
-  Absence of cilia and rhizines
-  Thallus whitish- to greenish-grey



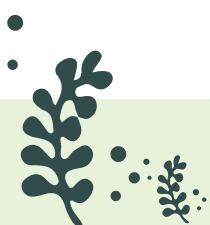
Pertusaria pertusa

-  Numerous apothecia located on tops of small "warts"
-  Absence of cilia and rhizines
-  Thallus whitish- to greenish-grey



Crustose lichen with lirella

Photos credits: *Candelaria concolor* © C. Van Haluwyn / *Candelariella sp.* © Richard Droker / *Diploicia canescens* © M Boulanger, N Malle, C. Van Haluwyn / *Amandinea punctata* and *Pertusaria pertusa* © M Boulanger





BioCoast Junior



A programme of the



Co-founding partner
of the observatory





Why study brown algae?

For the past twenty years, without scientists really understanding why, the quantity of brown algae seems to be declining at various points along the coastline.

This results not only in a change in the algal cover on the rocks, but also in a change of the species present. Where this occurs, the brown algae we study are replaced by oysters, mussels and limpets.

Several hypotheses can account for this disappearance: climate change, a growing number of seaside visitors, pollution, invasive species that prevent the development of brown algae, and the proliferation of certain herbivores, such as limpets, which love to feed on brown algae.

With the help of your observations, the scientists at Planète Mer and the Muséum national d'Histoire naturelle are hoping to better understand these changes!



We're counting on you!



What's the protocol?

01 Photograph the upper foreshore

Begin by asking your pupils to photograph the upper foreshore, looking toward the sea. Then head down toward the water and have them observe the various algal belts and their succession.

Careful: in some cases, the belts may overlap. The different species of algae can be distinguished by their various shapes and colours.

This protocol involves six species of brown algae. On your way down to the sea, ask your pupils to complete the field sheet, indicating the algae they observe. When you arrive at the lower part of the foreshore, take a second photograph looking inland.

02 Record the species in a quadrat

Then assign your pupils to a seaweed belt(s) of your choice. Remember that the goal of this study is to collect as much information as possible per belt. The statistical processing of the data only becomes significant starting at thirty observations. It is therefore preferable to observe the same belt at any given site so as to quickly obtain this quota of thirty observations per belt.

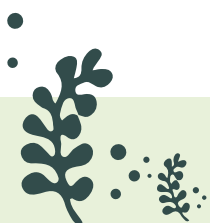
Once the belt has been selected, each group of pupils tosses their quadrat onto the algae and begins to count all the living gastropods they find in it. The pupils will then need to photograph a specimen of each species: remember to check the quality of the photos before removing the quadrat!



When to participate?

You can take part in this protocol and send us your data throughout the year.

Of course, participation will be more enjoyable sunny days from April onward!





Prepare your outing

Locate a rocky foreshore where algal belts are diverse and easily accessible at low tide. Not all the belts indicated on the observation sheets will necessarily be represented in the field: this is not a problem.

Conduct your outings at low tide (tide schedules available online). For safety reasons, begin your observations one hour before low tide and end them one hour after low tide at the latest.

Finally, remember to print labels for your photos (see the last page of the booklet).

A few precisions

Concerning the belt box «rock not covered with brown algae».

As the quadrats are tossed randomly, it is possible that they will fall on an area where brown algae are not dominant but rather on bare rock or other algae (red for example). In this case, the conditions are marginal, i.e. the gastropod species you identify will be at the edge of the belt. These observations provide important additional information and allow for complementary studies of habitat/species relationships.

It is also possible that the quadrat may fall on a nearly bare rock but within a clearly identified belt. Do not move the quadrat!

In both cases, include the gastropods identified in the "Other observations" column.



Materials you'll need

Per group of 3-4 pupils:

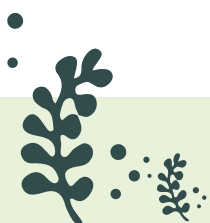
- 1 camera (with macro mode)
- 1 33 cm quadrat
- the field sheet
- the species identification sheet (to be laminated if possible before leaving)
- labels with the names of the species (to be used when taking photos)
- something to write with



Prepare your students

In order for scientists to be able to analyse your data, your photos must be usable. We advise you to practice using a camera with a macro setting with your pupils. Without this, the information collected won't allow for scientific interpretation.

In addition, don't hesitate to collect empty shells ahead of time. This will help you to familiarise your pupils with identification in the classroom and make the field session all the easier! You can also use the photo quizzes available on our website.



A few precisions

Unidentified shell?

If certain species cannot be clearly identified, it is important to send their photos so that the scientists can identify them.

Do not prospect in pooled water.

Tide pools are ecosystems with highly specific environmental conditions of their own (species constantly wet, strong variation in water temperature). Therefore, they are not covered in this programme.



© Tristan Dimeglio / Planète Mer

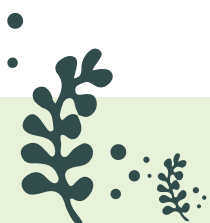
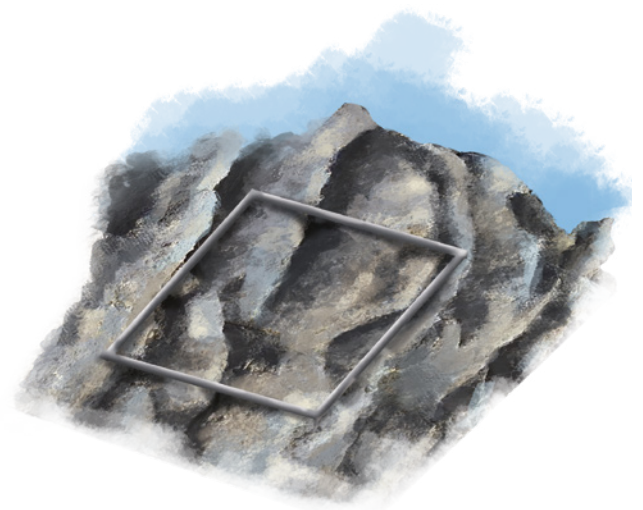
What is a foreshore?

The foreshore is the part of the coastline that is submerged at high tide and exposed at low tide. This part of the shore occupies the mid-littoral zone, regularly exposed and submerged by the tides. It is intermediate between the marine and terrestrial environment and subject to considerable stress due to the constant changes in the physical parameters that define it: salinity, duration of exposure, temperature, etc. The foreshore can be of several types: sand, gravel or rocky. It is this last type of foreshore that we propose to study.

What is a quadrat?

A quadrat is a square (or other four-sided shape) with a predefined surface area. It can be made of metal, wood or plastic. It is used in ecology to take inventories.

In our case it is a square with 33 cm sides. It can be made with four PVC tubes connected by a string.





01 Date and location

Location (commune, specific location, beach, car park, etc.):

Date: / /

Start time:

Time of low tide:h.....

Tidal coefficient:

02 Your observations

Photographing the foreshore facing the sea

From the upper foreshore, **take a photo looking towards the sea**. The foreshore is the part of the coastline that is submerged at high tide and exposed at low tide.

Go down towards the sea and observe the algae.

In this programme, we are only interested in six species of brown algae, generally organised in belts that run parallel to the shoreline. Not all of these belts are always present or clearly delimited. Heading down to the sea, and using the identification sheets, **name each species of algae present** and tick the corresponding box:

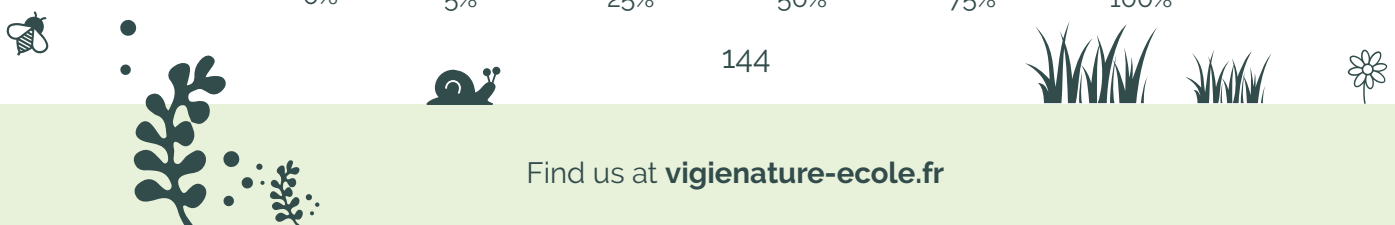
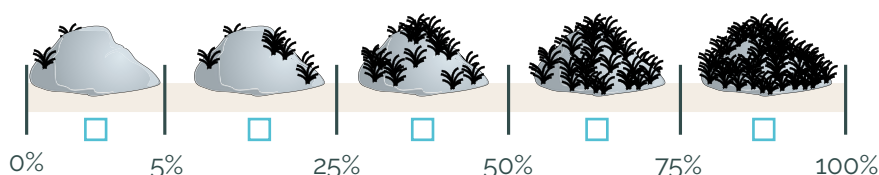
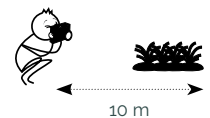
ALGAE OBSERVED	Channelled wrack	Spiral wrack	Bladder wrack	Knotted wrack	Toothed wrack	Thongweed	Other observations: <input type="checkbox"/> Bare rock <input type="checkbox"/> Red algae <input type="checkbox"/> Green algae
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Photographing the foreshore facing inland

Once you are at the water's edge, turn your back to the sea and take a picture in the direction you came from. Together, these two landscape photos will help scientists understand the environment you are in.

Photograph and observe an algal belt

Take a photo of the algae belt to be studied: to do this, crouch down, parallel to the shoreline, so that you have the algae at your feet in the foreground, and as much of the belt as you can up to about 10 m in front of you. Next, estimate the percentage of rock covered by all algae species within a radius of 5 metres from where you are crouched.



Position the quadrat

Toss the quadrat at random onto the algae belt being studied. If the quadrat falls on a puddle, throw it again. Reposition the four sides to make sure it is square and not lopsided.

As you lift the algae inside the quadrat, gently harvest the animals, except for mussels, oysters, barnacles and limpets, which must remain attached to the rock. Group all the animals harvested in the quadrat by species.

Fill in the tables by noting the number of individuals for each species found:

Name of algae studied	
-----------------------	--

Species found	Number of individuals
Oyster	
Rough periwinkle	
Black-lined periwinkle	
Common periwinkle	
Littorina obtusata	
Littorine fabalis	
Thick top shell	
Turbinate monodont	
Flat top shell	
Grey top shell	

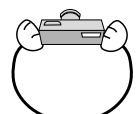
Species found	Number of individuals
Great top shell	
Limpet	
Calliostoma spp.	
Netted dog whelk	
Atlantic dogwinkle	
European sting winkle	
Japanese oyster drill	

Species found	% of cover on rocks
Mussel	%
Limpets	%

Photographing the sea snails



Take a photo of a single shell for each species found, as per the instructions on the photo sheet (page 150).



To inform properly scientists, the photo cannot be blurred and must show the entire aperture (opening)!



Sending your observations


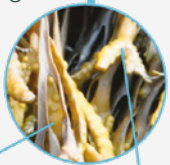





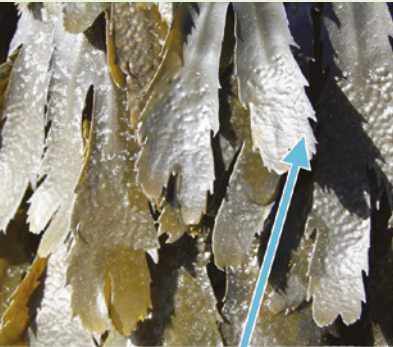
Log in and enter your data on vigienature-ecole.fr

If you have not seen any individuals, this too is important information for our researchers! So please be sure to enter the absence of individuals on our website as well.





The algae

<p>Channelled wrack</p>  <p>Algae arranged in tufts</p>  <p>Fronks form channels Tips forked</p>	<p>Fronk wavy, Smooth round air bladders</p>  <p>Bladder wrack</p>	<p>Spiral wrack</p>   <p>Tip swollen in spring Fronk spiralled</p>
<p>Knotted wrack</p>  <p>Fronks leathery and strap-like</p> <p>Large air bladders along the lengths</p>	<p>Fronks strappy and bean-like Base mushroom-like</p>  <p>Thongweed</p>	<p>Toothed wrack</p>  <p>Edge of frond toothed</p>

→ For more information and to learn more about brown algae and sea snails go to: biolit.fr



The filter feeders



Mussels



European flat or Pacific oysters

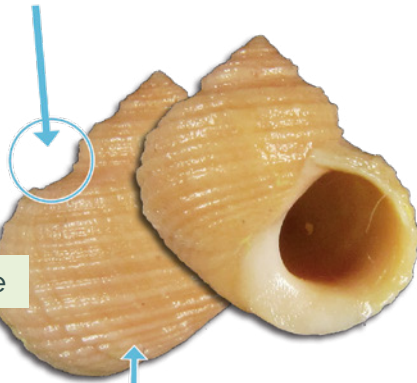


Limpets

Sea snails that graze on algae

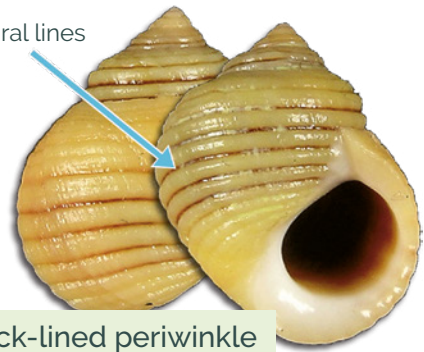
The periwinkles

Conspicuous hollow



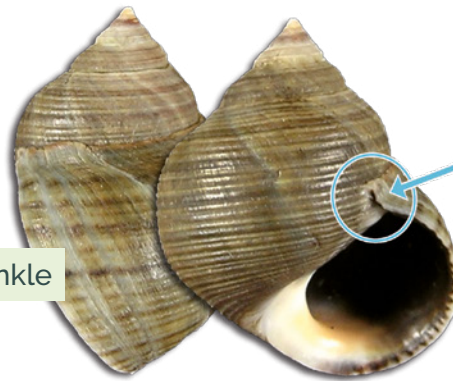
Rough periwinkle

Dark spiral lines



Black-lined periwinkle

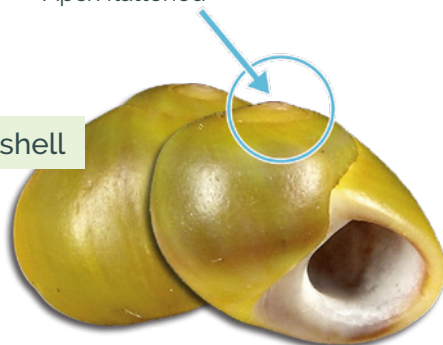
Prominent ridges



Common periwinkle

Pointed shell with curved upper aperture

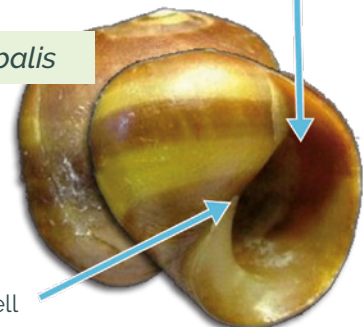
Apex flattened



Flattened tip of shell

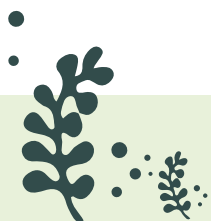
Oval aperture

Littorine fabalis

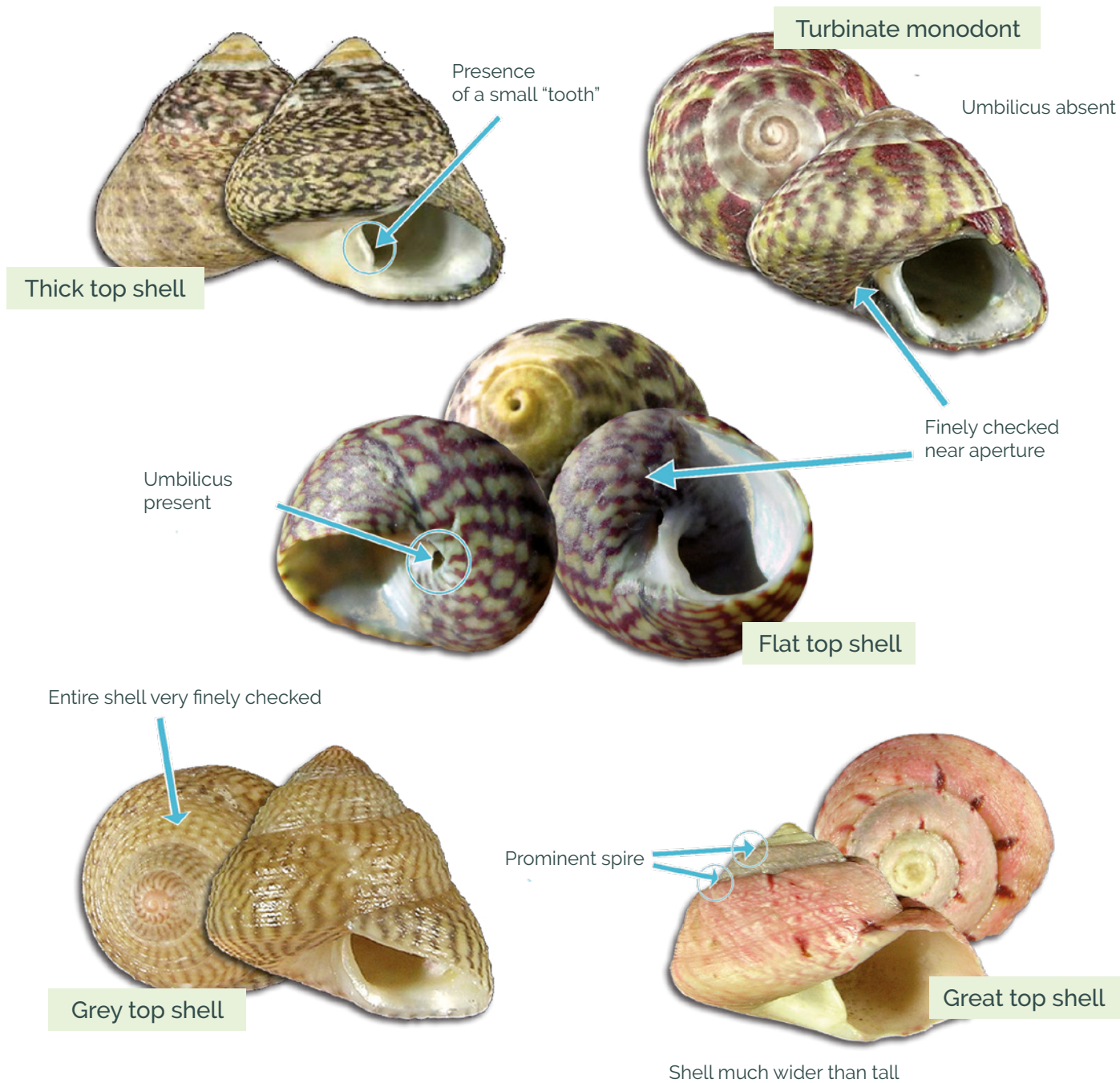


Last whorl appears to enter shell

!
Shell colour can vary. The illustrations are not to scale.



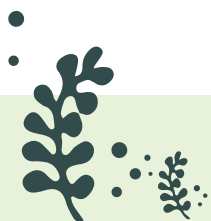
The top snails



Limpet

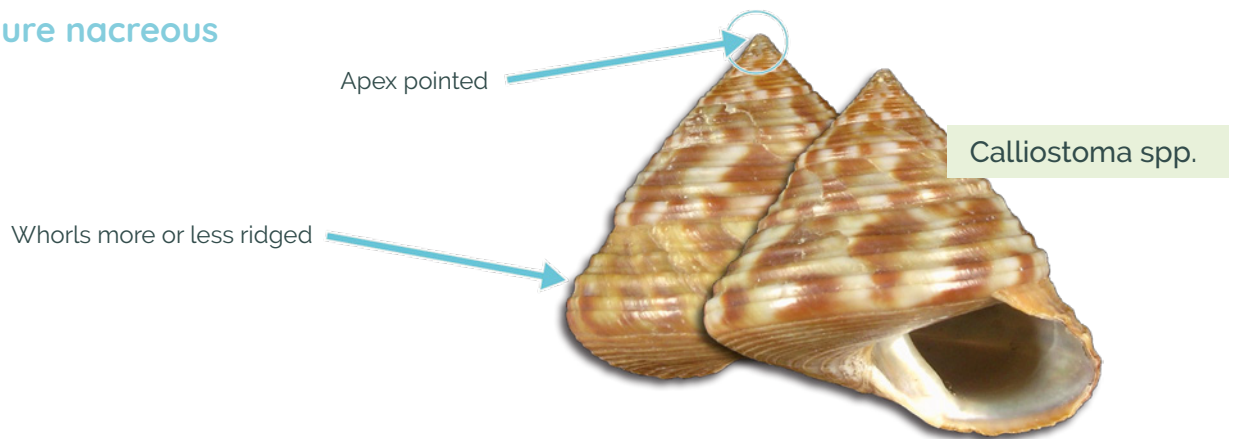


Shell like an Asian rice hat

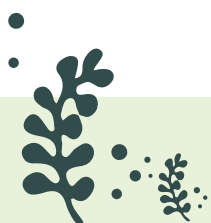
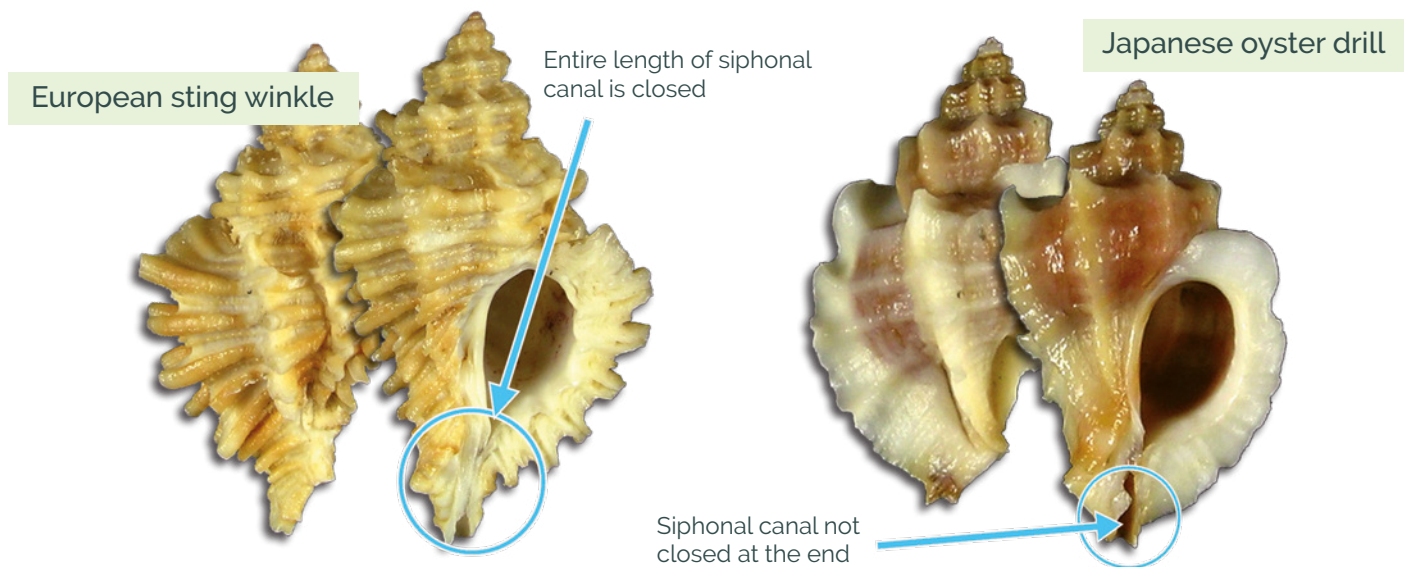
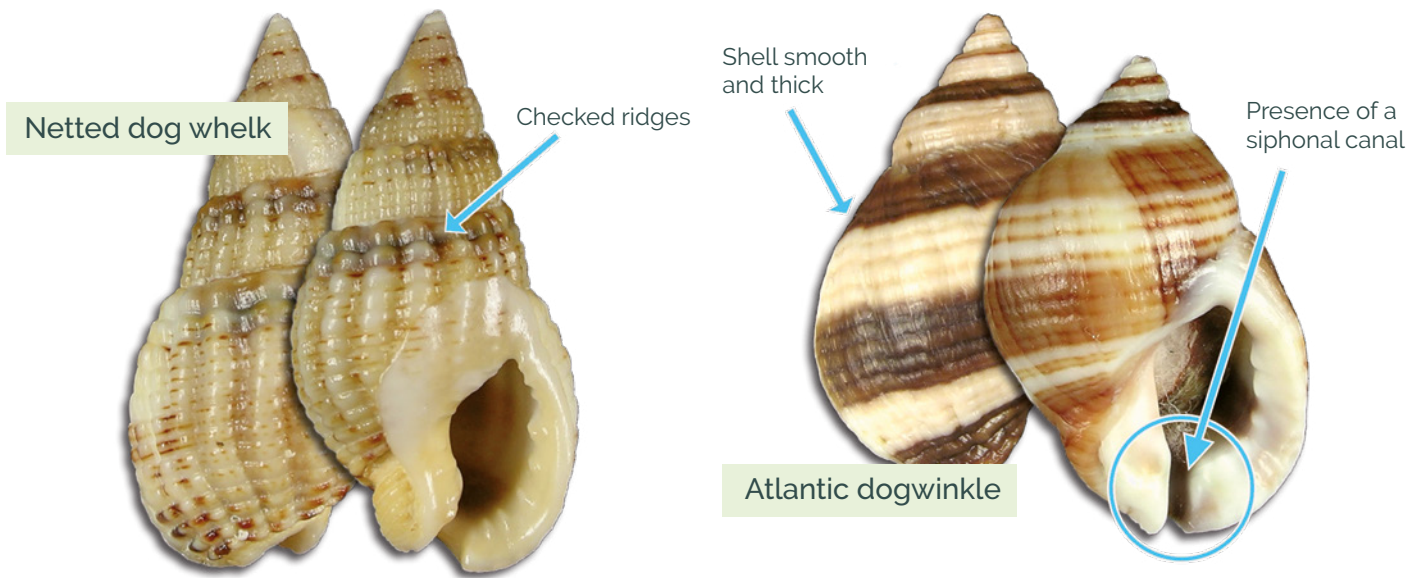


Predatory sea snails

Aperture nacreous



Aperture not nacreous, presence of a siphonal canal





- Locate the box with the name of the alga that matches the one in your quadrat. Place the first shell, aperture facing up, on the box. From all the labels, choose the one with the name of the animal.
- Take a macro shot of the box containing the shell and the label. Start over with the other species (you must take one photo per species).



Spiral wrack



Group

1

Common periwinkle

Spiral wrack

Place a sea snail found on the algae with its aperture showing

Place the label with the name of the sea snail here

Bladder wrack

Place a sea snail found on the algae with its aperture showing

Place the label with the name of the sea snail here

Knotted wrack

Place a sea snail found on the algae with its aperture showing

Place the label with the name of the sea snail here

Toothed wrack

Place a sea snail found on the algae with its aperture showing

Place the label with the name of the sea snail here

Thongweed

Place a sea snail found on the algae with its aperture showing

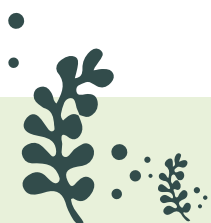
Place the label with the name of the sea snail here

Channelled wrack

Place a sea snail found on the algae with its aperture showing

Place the label with the name of the sea snail here

Other observation





Vigie-Nature École at a glance!

- Protocols for the study of ordinary biodiversity
- Accessible to pupils ages 3 to 18
- Available throughout the year

Our observatories



Follow us, contact us



vigienature-ecole.fr



vne@mnhn.fr



[VigieNatureEcole](https://www.facebook.com/VigieNatureEcole)



[@VigieNature](https://twitter.com/VigieNature)

A programme of the



With the support of



With the backing of



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 82016.

