European Commission

Identification of invasive alien species of Union concern in the field

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Identification of invasive alien species of Union concern in the field

Contents

The coypu somewhat resembles a very large rat, or a beaver with a small tail. © Jean-Marc Dufour-Dror.

The coypu (*Myocastor coypus*)

Identification guide to support the surveillance of invasive alien species of Union concern

Species ID	
Kingdom	Metazoa
Division	Chordata
Class	Mammalia
Order	Rodentia
Family	Myocastoridae
Genus	*Myocastor*
Species	*Myocastor coypus*

General description

Medium sized semi-aquatic rodent with dark reddish-brown and yellow-brown fur, sometime with lighter ends (but light-coloured and albino individuals are also known), with distinctive bright orange-yellow front teeth, and a long and heavy rat-like rounded tail (kept still when swimming, as the body is propelled by the feet). Usually found in a wide range of freshwater environments, mostly permanent water bodies, including ponds, drainage canals, rivers, lakes, marshes, and swamps.

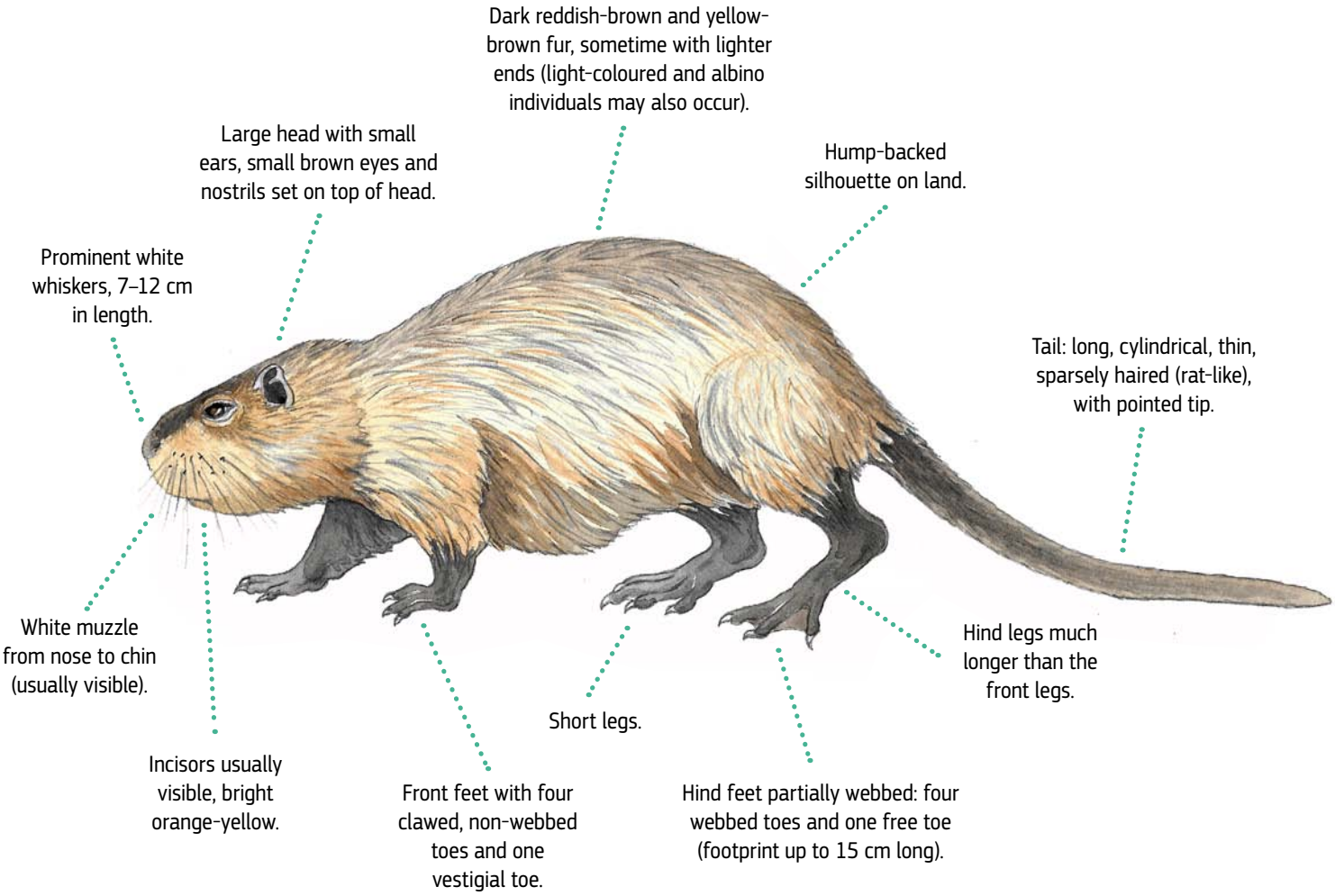
Size

Total length head to tail up to 1 meter (tail: 30–45 cm). Weight: 4–6 up to 9 kg.

Common names

BG Нутрия
HR Barska nutrija
CZ Nutrie říční
DA Sumpbæver
NL Beverrat
EN Coypu
ET Nutria
FI Nutria
FR Ragondin
DE Nutria
EL Μυοκάστορας
HU Nutria
IE Francach abhann
IT Nutria
LV Nūtrija
LT Nutrija
MT –
PL Nutria
PT Ratão-d'água
RO Nutrie
SK Nutria riečna
SL Nutrija
ES Coipú
SV Sumpbäver

Distinctive characteristics



Coypus can be found in permanent water bodies, including ponds, drainage canals, rivers, lakes, marshes, and swamps. © Aleksander Niweliński.

Similar species

All species are dark brown in colour with large front teeth (otter excluded) that are yellow to orange in colour, which are only visible externally well in coypus. From a distance they can be easily confused. The elements below should help identification in the field.

Muskrat
Ondatra zibethicus

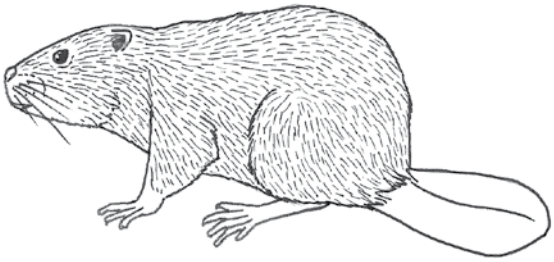
Small sized rodent. Muskrats are much smaller than coypu (adults coypus are 2–3 times larger than muskrats, but juveniles are similar in size).

Coypu
Myocastor coypus

Medium size rodent. Coypus are 2–3 times larger than muskrats.

Beaver[1]
Castor fiber and *Castor canadensis*

Large sized rodent. Beavers are 2 times the size of a coypu.



Rat
Rattus norvegicus and *Rattus rattus*

Small sized rodent. Rats are much smaller than coypus (but coypus juveniles are similar in size, and smaller than muskrats).

Otter[2]
Lutra lutra

Medium size carnivore. Body is as long as coypu or a little bit longer (1.5 longer).

Water vole
Arvicola amphibius

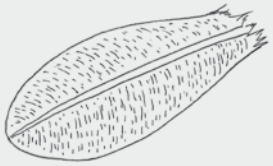
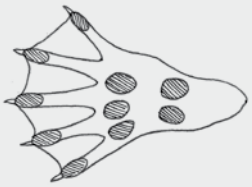
Body smaller than muskrat, tail shorter (6–10 cm) compared to body length (12–22 cm), weight 100–300 g.

American mink
Neovison vison

Overall very different shape (similar to the otter, but about half in length). Elongated body, with white patches on chin and throat (usually very small or not present on the upper lip). Very small and no visible incisors, long and slender somewhat flattened tail (13–23 cm long, about half body length) and slightly webbed feet. The fur is dark brown to black.

1 **Beaver:** *Castor fiber* and *C. canadensis*. The external appearance of the European beaver (*Castor fiber*) is very similar to that of American beaver (*Castor canadensis*) which is also occurring in Europe as a result of introductions
2 **Otter:** *Lutra lutra*. Overall very different shape. Elongated body, with a white patch which often extends from muzzle down throat, very small and no visible incisors, long and slender somewhat flattened tail and slightly webbed feet. The fur is brown above and cream below.

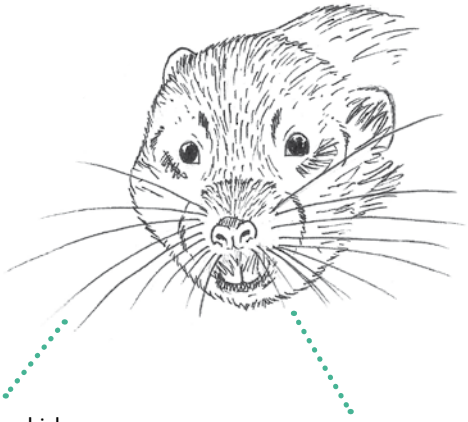
Tail and Feet

Species	Tail	Hind Feet
Muskrat *Ondatra zibethicus* • Long, laterally flattened, thin tail. • Hind feet not webbed but with an evident fringe of hairs.		
Coypu *Myocastor coypus* • Long, rounded and sparsely haired rat-like tail. • Partially webbed hind feet.		
Beaver *Castor fiber* and *Castor canadensis* • Large and broad flat tail, almost hairless. • Fully webbed hind feet.		
Rat *Rattus norvegicus* and *Rattus rattus* • Long naked tail. • No webbing in hind feet.		
Otter *Lutra lutra* • Thin robust tail, ticker at base. • Slightly webbed feet.		

The coypu has large orange teeth. © Jean-Marc Dufour-Dror.

Teeth and Whiskers

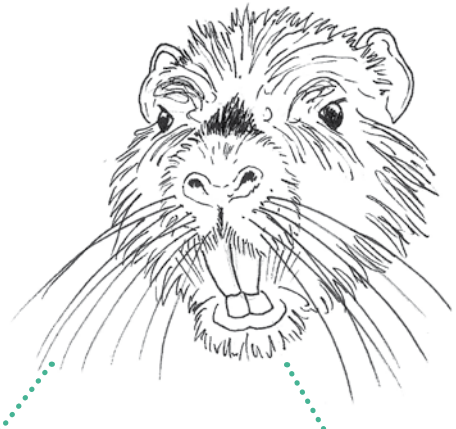
Muskrat
Ondatra zibethicus



Dark thin whiskers.

Orange coloured teeth, not visible.

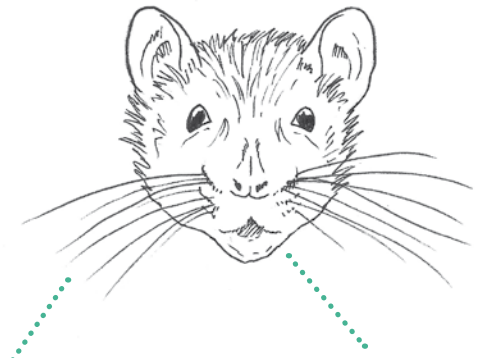
Coypu
Myocastor coypus



Long, evident white whiskers.

Large incisors bright yellow-orange.

Rat
Rattus norvegicus and
Rattus rattus



Black and white long whiskers

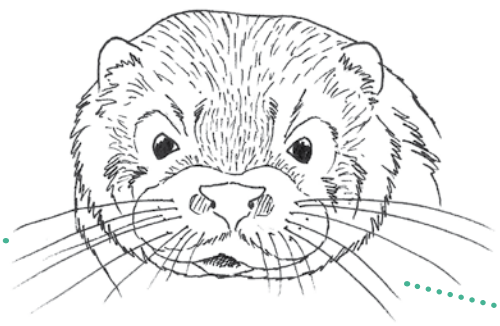
Incisors yellow-brown.

Beaver
Castor fiber and
Castor canadensis

Dark thin whiskers.

Large orange incisors

Otter
Lutra lutra



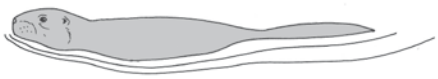
Long evident mostly white whiskers.

Less developed and white incisors.

Swimming

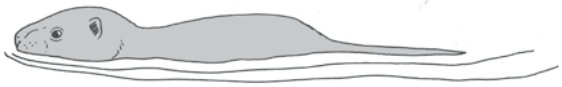
Muskrat
Ondatra zibethicus

When swimming much of the body emerges.



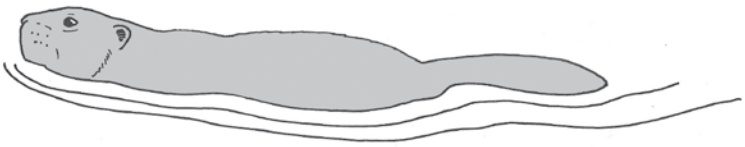
Coypu
Myocastor coypus

When swimming much of the body emerges.



Beaver
Castor fiber and *Castor canadensis*

When swimming on the water surface, the body is visible from head to tail. The tail is used to drive power, manoeuvre, and dive while swimming, and is often visible on the surface.



Rat
Rattus norvegicus and *Rattus rattus*

When swimming much of the body emerges.

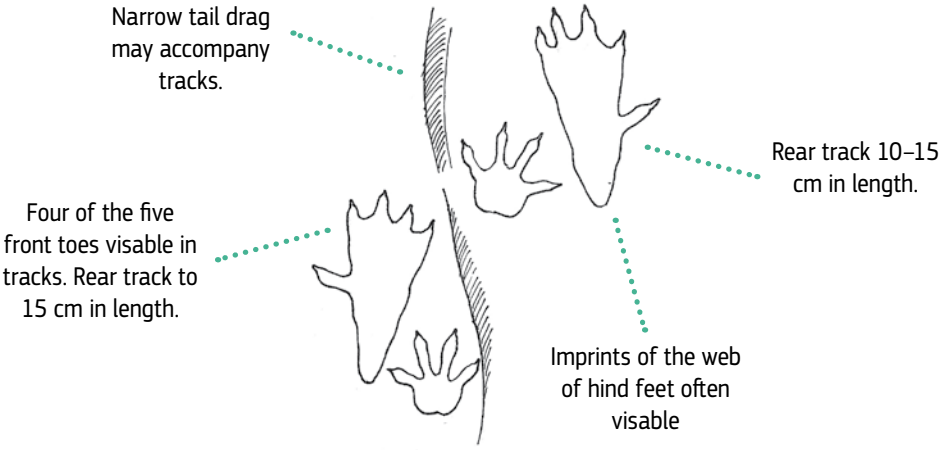
Otter
Lutra lutra

When swimming only the head and neck are kept above the water's surface. Can dive.

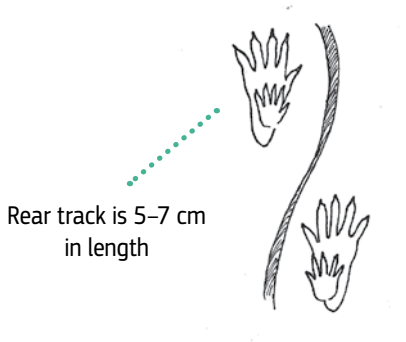
Coypu swimming. © Jean-Marc Dufour-Dror.

Signs of presence – Tracks

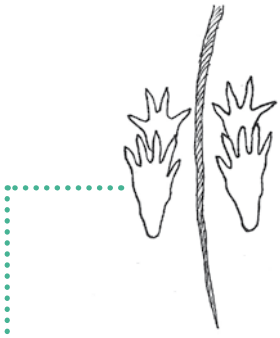
Coypu
Myocastor coypus



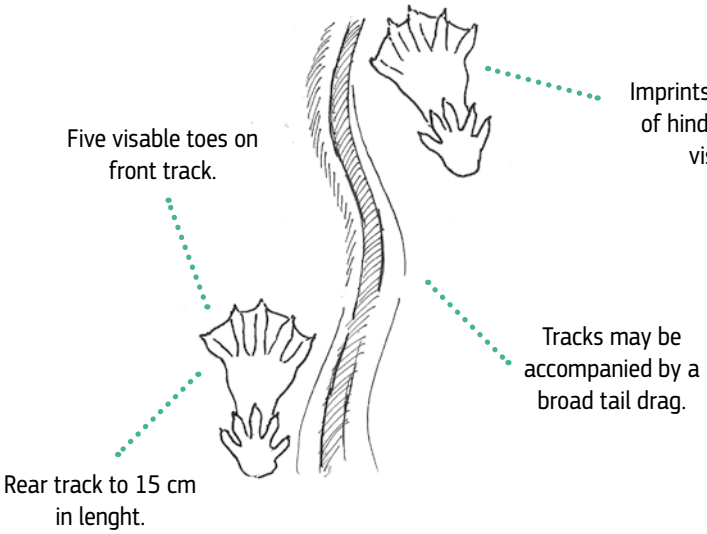
Muskrat
Ondatra zibethicus



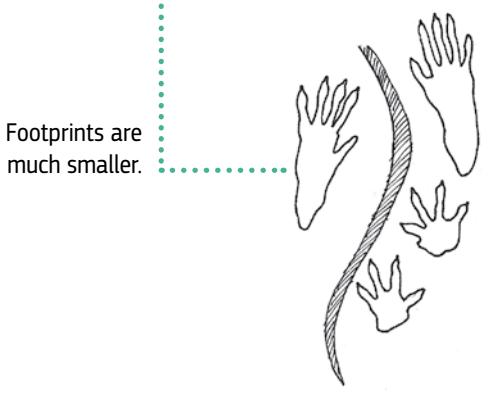
Water vole
Arvicola amphibius



Beaver
Castor fiber and
Castor canadensis



Rat
Rattus norvegicus and
Rattus rattus



Signs of presence – Runs

Coypu
Myocastor coypus

Paths through vegetation about 15–20 cm wide.

Muskrat
Ondatra zibethicus

Paths through vegetation about 10 cm wide.

Water vole vole
Arvicola amphibius

Paths through vegetation very narrow.

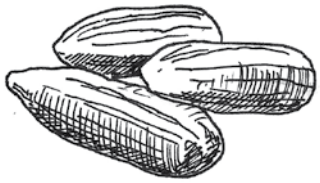
Beaver
Castor fiber and *Castor canadensis*

Paths through vegetation about 38 to 50 cm wide.

Signs of presence – Scat

Coypu
Myocastor coypus

Large droppings, cylindrical form, up to 70 mm long, with fine longitudinal striations.



Water vole
Arvicola amphibius

Latrines are similar to muskrat: flattened piles of droppings topped with fresh ones. Dropping are cylindrical with blunt ends, usually 12 mm long and 4–5 mm wide.

Muskrat
Ondatra zibethicus

Small droppings oval elongated form, 10–12 mm in length (diameter: 4–5 mm), usually deposited in clusters.

Rat
Rattus norvegicus and *Rattus rattus*

Droppings are similar to those of muskrat, but scattered not in latrines.

A muskrat (Ondatra zibethicus) *eating a plant, showing the long claws used for digging burrows. The muskrat is one of the species that could be mistaken by the coypu. © Linda Tanner. CC BY 2.0.*

Dens

Coypu
Myocastor coypus

Digs dens in ditches and river banks.

Muskrat
Ondatra zibethicus

Builds dome-shaped lodges, made of marsh vegetation and mud with underground entrances (smaller than beaver lodges) and digs in stream or pond banks.

Beaver
Castor fiber and
Castor canadensis

Builds dome-shaped lodges made of sticks and logs and digs into a stream bank. They could build dams to regulate water depth.

Water vole
Arvicola amphibius

Digs small burrows (4–8 cm at the entrance) in the bank.

Rat
Rattus norvegicus and
Rattus rattus

Digs small burrows (4–8 cm at the entrance) in the bank, similar to those of water vole.

Key references

Global Invasive Species Database (GISD) 2015. Species profile *Myocastor coypus*. Available from: http://www.iucngisd.org/gisd/species.php?sc=99 [Accessed 06 October 2018]

The Myriophyllum aquaticum*, also known as the parrot's feather, is a dioecious aquatic or amphibic plant and is glaucous green in colour. © Susannah Anderson. CC BY-NC-ND 2.0.*

The parrot's feather (*Myriophyllum aquaticum*)

Identification guide to support the surveillance of invasive alien species of Union concern

Species ID	
Kingdom	Plantae
Division	Tracheophyta
Class	Spermatopsida
Order	Saxifragales
Family	Haloragidaceae
Genus	*Myriophyllum*
Species	*Myriophyllum aquaticum*

General description

A dioecious aquatic or amphibious plant glaucous green in colour, characterised by submerged and emergent stems, which may extend from banks, or from deep waters, forming dense entangled mats. It is characterised by featherlike leaves in whorls of 4–6. Leaf stiffness and dimensions differ considerably depending on whether they grow in the emerged or submerged part of the plant. Another distinctive trait is the typical shape of emergent stems and leaves looking like miniature pine or fir trees. It can be found in a number of freshwater environments, particularly in still or slowly flowing waters rich in nutrients, such as lakes, marshes, ponds, streams and canals with muddy substrates (but also in banks, and muddy grounds near water).

Size

Stems (2)3–4(5) m in length, submerged leaves 3.5–4.0 cm long, (0.4)0.8–1.2 cm wide, emergent leaves (1.5)2.5–3.5 cm long, (0.4)0.7–0.8 cm wide.

Common names

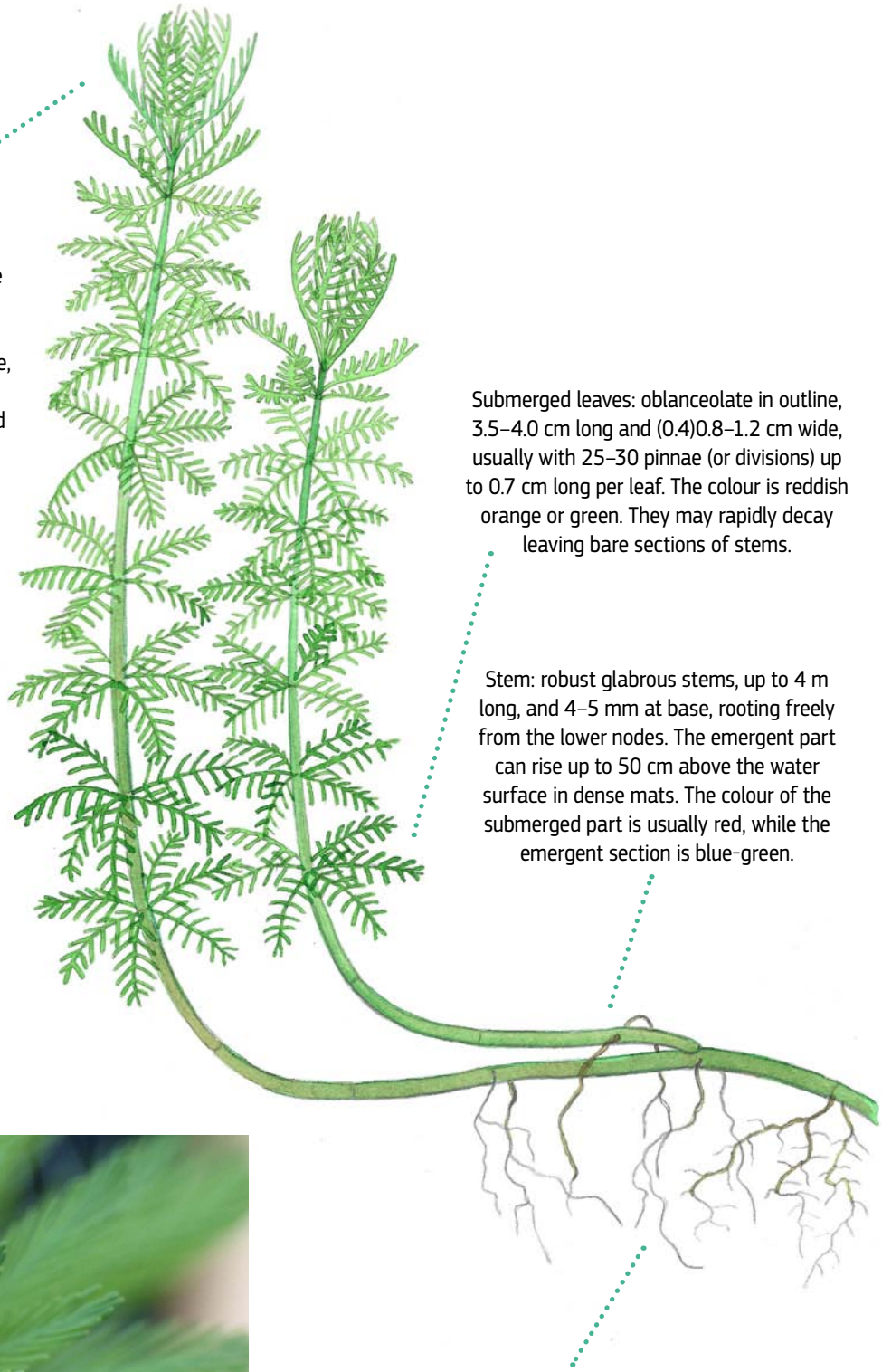
BG	Воден многолистник
HR	Vodeni krocanj
CZ	Stolístek vodní
DA	Papegøjefjer
NL	Parelvederkruid
EN	Parrot's feather
ET	Brasiilia vesikuusk
FI	Isoärviä
FR	Myriophylle du Brésil
DE	Brasilianisches Tausendblatt
EL	–
HU	Strucctoll-süllőhínár
IE	Líonán cleiteach
IT	Millefoglio americano
LV	–
LT	Stambioji plunksnalapė
MT	–
PL	Wywłócznik brazylijski
PT	Pinheirinha
RO	Peniță apei
SK	Stolístok vodný
SL	Brazilski rmanec
ES	Milenrama brasileño
SV	Storslinga

Disclaimer:

Myriophyllum species are reportedly difficult to identify based only on their morphology. Identification relies mostly on characters of flowers and fruits, which may not be present on these plants, as they rarely flower. Hence, genetic identifications may be required.

Distinctive characteristics

Emergent leaves: narrowly oblanceolate in outline, 1.5–3.5 cm long and 0.4–0.8 cm wide, usually with 18–36 pinnae (or divisions), c. 5 mm long and 0.3 mm wide, per leaf. They are slightly incurved and more robust than submerged leaves and bright blue-green in colour.



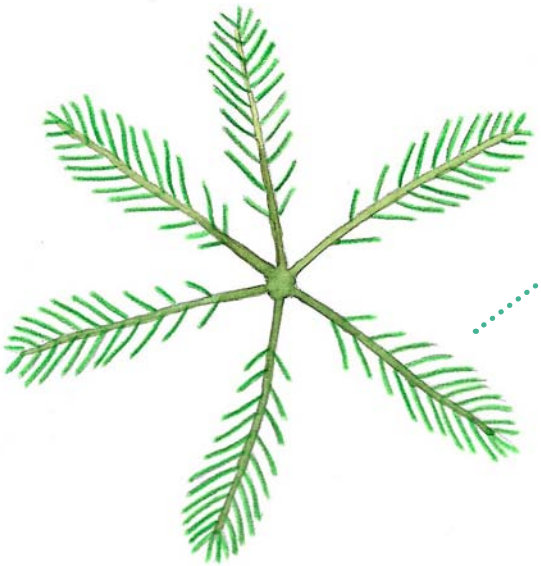
Submerged leaves: oblanceolate in outline, 3.5–4.0 cm long and (0.4)0.8–1.2 cm wide, usually with 25–30 pinnae (or divisions) up to 0.7 cm long per leaf. The colour is reddish orange or green. They may rapidly decay leaving bare sections of stems.

Stem: robust glabrous stems, up to 4 m long, and 4–5 mm at base, rooting freely from the lower nodes. The emergent part can rise up to 50 cm above the water surface in dense mats. The colour of the submerged part is usually red, while the emergent section is blue-green.

Stolon: stolons are completely submerged in winter in a temperate climate, but can sprout massively in spring.

The leaves of the Myriophyllum aquaticum *are usually densely packed upward. '© Carnat Joel. CC BY 2.0.*

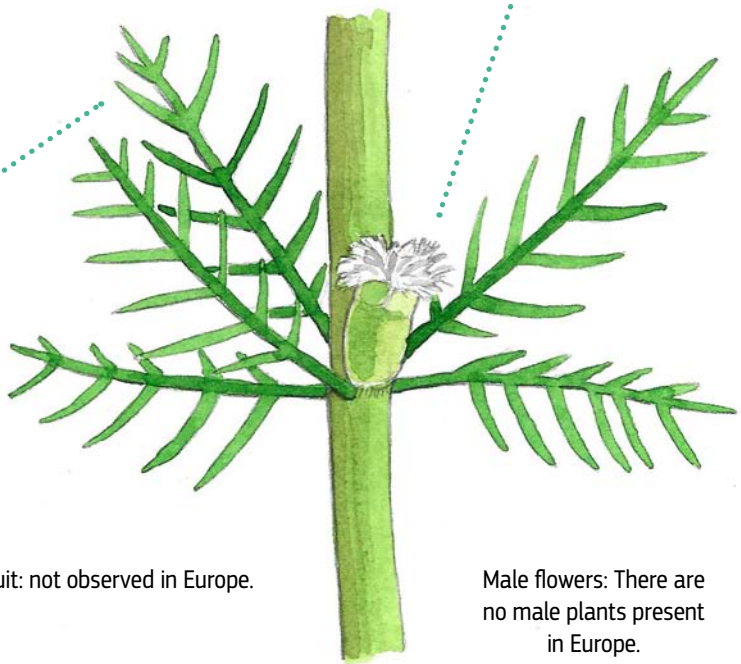
The female flowers of the parrot's feather can grow on very short pedicels in the upper leaf axils, between 2 small bracts. © Carnat Joel. CC BY 2.0.



Leaves: oblanceolate in outline and pectinate, 3.5–4.0 cm long and 0.4–1.2 cm wide, arranged around the stem in whorls of 4–6. They are usually more densely packed upward.

Female flowers: on very short pedicels in the upper leaf axils, between 2 small bracts. Characterised by 4 white, deltoid, denticulate sepals (size: 0.4–0.5 mm long and 0.3 mm wide) and prominent stigmas with numerous fine white hairs. Petals absent. Pyriform ovary, 0.6–0.7 mm long, 0.6 mm wide, longitudinally ribbed between sepals.

Inflorescence: very small, inconspicuous, axillary, indeterminate spike with unisexual flowers just above emergent leaves, subtended by 2 bracteoles.



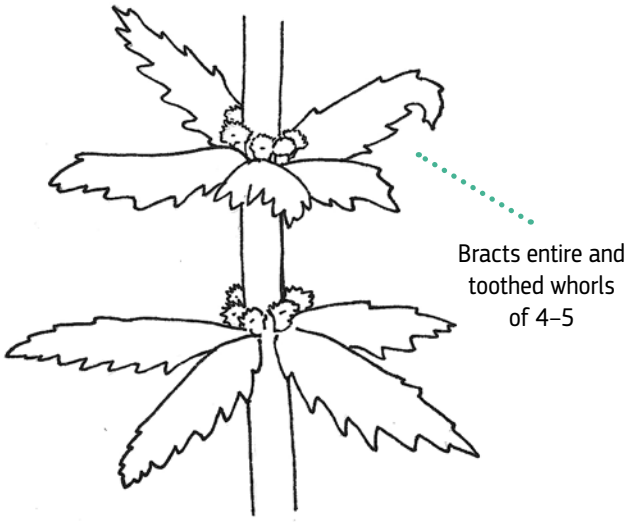
Fruit: not observed in Europe.

Male flowers: There are no male plants present in Europe.

Similar species

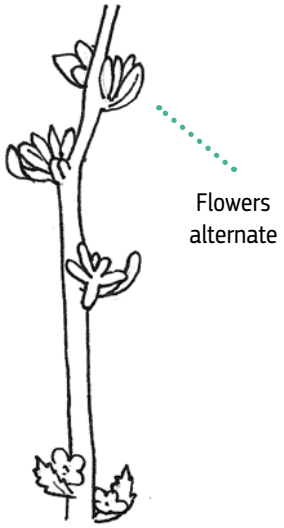
In Europe the species cannot be mistaken for any other aquatic or riparian plant by its mat forming habit and whorls of glaucous featherlike leaves.

Myriophyllum heterophyllum



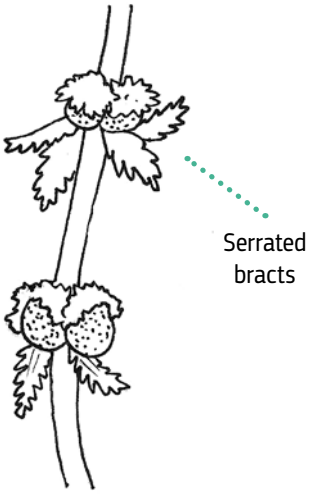
Length of internodes: 1/4 length of leaves (length of internodes relates to the submerse leaves)

Myriophyllum alterniflorum



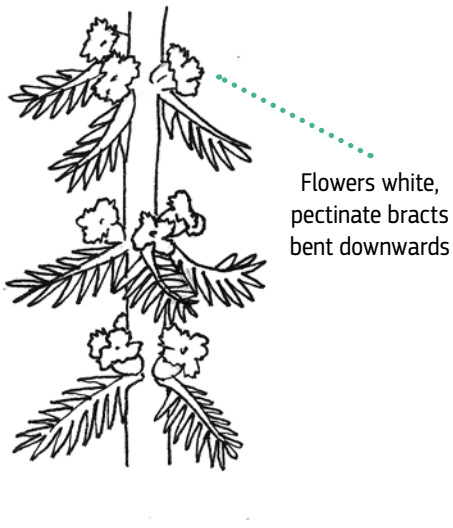
Length of internodes: Same length as leaves (length of internodes relates to the submerse leaves)

Myriophyllum spicatum



Length of internodes: Same length as leaves (length of internodes relates to the submerse leaves)

Myriophyllum verticillatum



Length of internodes: 1/2 length of leaves (length of internodes relates to the submerse leaves)

In Europe the species cannot be mistaken for any other aquatic or riparian plant by its mat forming habit and whorls of glaucous featherlike leaves. © Vilseskogen. CC BY-NC 2.0.

Key references

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http://keys.lucidcentral.org/keys/v3/aquatic_plants/

The broadleaf watermilfoil is a perennial evergreen submerged aquatic herb. © Leslie J. Mehrhoff, University of Connecticut. CC BY 3.0

The broadleaf watermilfoil (*Myriophyllum heterophyllum*)

Identification guide to support the surveillance of invasive alien species of Union concern

Species ID	
Kingdom	Plantae
Division	Tracheophyta
Class	Spermatopsida
Order	Saxifragales
Family	Haloragidaceae
Genus	*Myriophyllum*
Species	*Myriophyllum heterophyllum*

General description

A perennial evergreen submerged aquatic herb, having both submerged and emergent leaf forms. Submerged leaves are feather-like and pinnate (2–5 cm long and 2–4 cm wide). Each leaf has 8–22 pinnae. Emergent leaves can take two forms, either a terrestrial form (pinnately dissected), which is expressed when growing on damp mud, or an emergent leaf form (entire toothed) on a stem on which flowers are produced. Emergent leaves are variable in both shape and structure, 4–30 mm long, 1.5–3 mm wide and stiff in texture. May occur in a number of freshwater environments, particularly in shallow and slow-moving waters like lakes, ponds, rivers and swamps, but also in semi-terrestrial conditions, e.g. stranded on muddy grounds, but this is merely a survival strategy.

Size

Stem up to several meters in length, depending on water depth and stream velocity.

Common names

BG	Разнолистен многолистник
HR	Raznolisni krocanj
CZ	Stolístek různolistý
DA	Forskelligbladet tusindeblad
NL	Ongelijkbladig vederkruid
EN	Broadleaf watermilfoil
ET	Erilehine vesikuusk
FI	Kampaärviä
FR	Myriophylle hétérophylle
DE	Verschiedenblättriges Tausendblatt
EL	–
HU	Felemáslevelű süllőhínár
IE	–
IT	Millefoglio
LV	–
LT	Kaičioji plunksnalapė
MT	–
PL	Wywłócznik różnolistny
PT	–
RO	–
SK	Stolístok
SL	Raznolistni rmanec
ES	–
SV	–

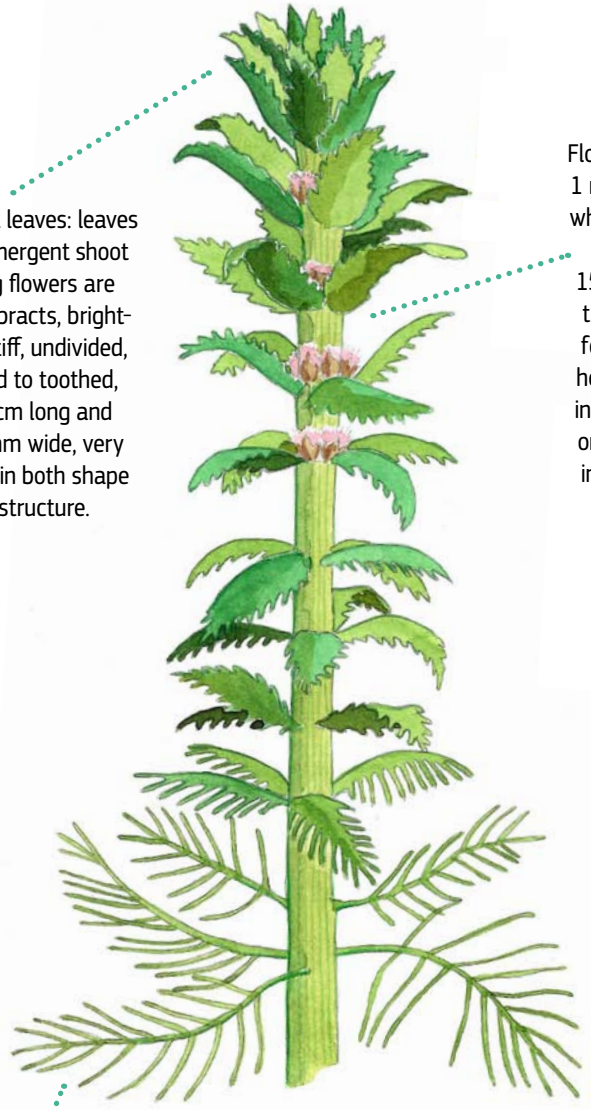
Disclaimer:

Myriophyllum species are reportedly difficult to identify based only on their morphology. Identification relies mostly on characters of flowers and fruits, which may not be present on these plants, as they rarely flower. Hence, genetic identification may be required.

Distinctive characteristics

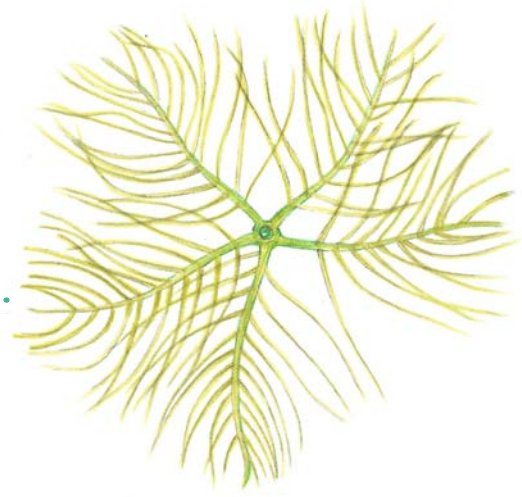
Emergent leaves: leaves in the emergent shoot bearing flowers are actually bracts, bright-green, stiff, undivided, serrated to toothed, 0.4–3 cm long and 1.5–5 mm wide, very variable in both shape and structure.

Flowers: very tiny (about 1 mm long) and grow in whorls of 4 in emergent terminal spikes of 15(35) cm in length. In the native range with female flowers below, hermaphrodite flowers in the middle and male ones at the top. So far in Europe only female flowers, reddish in colour, observed.



Fruits: None observed in Europe.

Submerged leaves: green, feather-like and pinnate, arranged into pseudowhorls of 4–5 leaves, 2–5 cm long and 2–4 cm wide. Deeply divided: 8–22 pinnae (or divisions) per leaf.

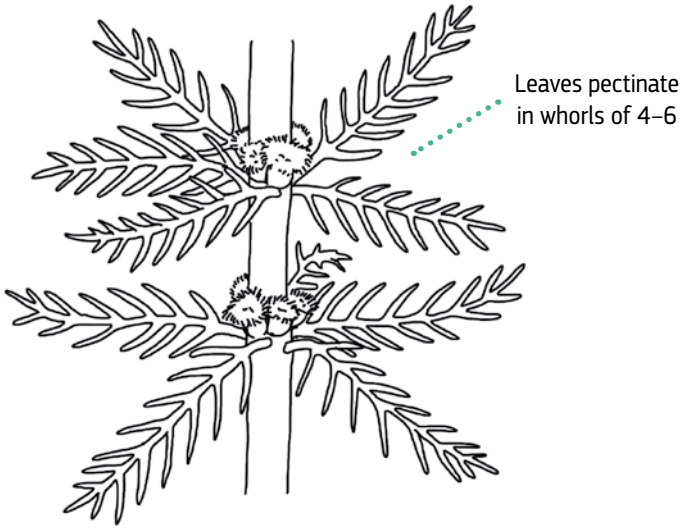


The submerged leaves of the plant are green, feather-like and pinnate, and arranged into pseudowhorls of 4–5 leaves. © Leslie J. Mehrhoff, University of Connecticut. CC BY 3.0

Similar species

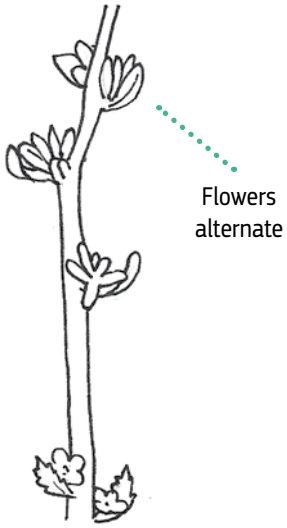
In Europe, the species can be distinguished when flowering by its entire and toothed bracts in whorls of 4–5.

Myriophyllum aquaticum



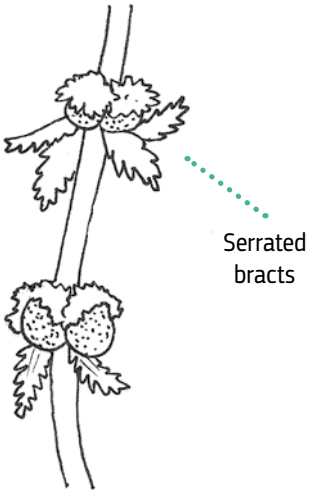
Length of internodes: 1/2 length of leaves (length of internodes relates to the submerse leaves)

Myriophyllum alterniflorum



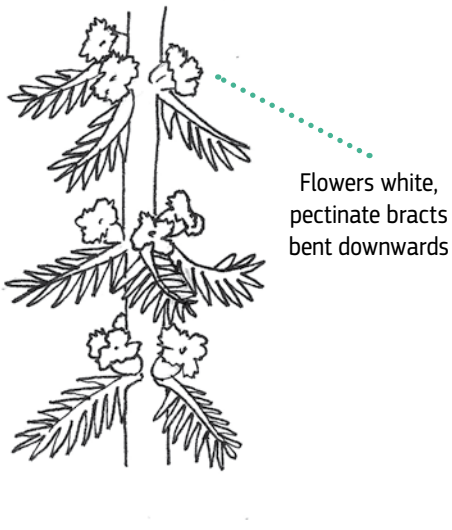
Length of internodes: Same length as leaves (length of internodes relates to the submerse leaves)

Myriophyllum spicatum



Length of internodes: Same length as leaves (length of internodes relates to the submerse leaves)

Myriophyllum verticillatum



Length of internodes: 1/2 length of leaves (length of internodes relates to the submerse leaves)

So far in Europe only female flowers of the broadleaf watermilfoil plant, reddish in colour, have been observed. © Leslie J. Mehrhoff, University of Connecticut. CC BY 3.0.

Key references

CABI, 2018. *Myriophyllum heterophyllum*. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc

https://www.korina.info/files/Myriophyllum_similar%20species_q-bank.pdf

http://keys.lucidcentral.org/keys/v3/aquatic_plants/

EPPO, 2016. Data sheets on pests recommended for regulation/Fiches informatives sur les organismes recommandés pour réglementation: *Myriophyllum heterophyllum* Michaux. Bulletin OEPP/EPPO Bulletin (2016) 46 (1), 20–24

A muskrat, a small semi-aquatic rodent with dense and typicaly brown to reddish or lighter brown fur, in its habitat, a freshwater environment. © Cephas. CC BY-SA 3.0 .

The muskrat (*Ondatra zibethicus*)

Identification guide to support the surveillance of invasive alien species of Union concern

Species ID	
Kingdom	Metazoa
Division	Chordata
Class	Mammalia
Order	Rodentia
Family	Muridae
Genus	*Ondatra*
Species	*Ondatra zibethicus*

General description

Small semi-aquatic rodent with dense and typically dark brown to reddish or lighter brown waterproof fur (but colour may vary from dark to almost white). No sexual dimorphism. It is characterised by a distinctive tail, thin and vertically compressed (triangular cross-section), which is used for swimming with rapid serpentine movements. The tail alone may be sufficient to distinguish this species from other similar mammals. The species is also characterised by the presence of perineal musk glands, hence the common English name. Well adapted to a number of freshwater environments, especially with still or slow-moving water (streams, canals, drainage ditches, marshes, ponds, lakes, swamps, and reservoirs), but also on slightly salty water.

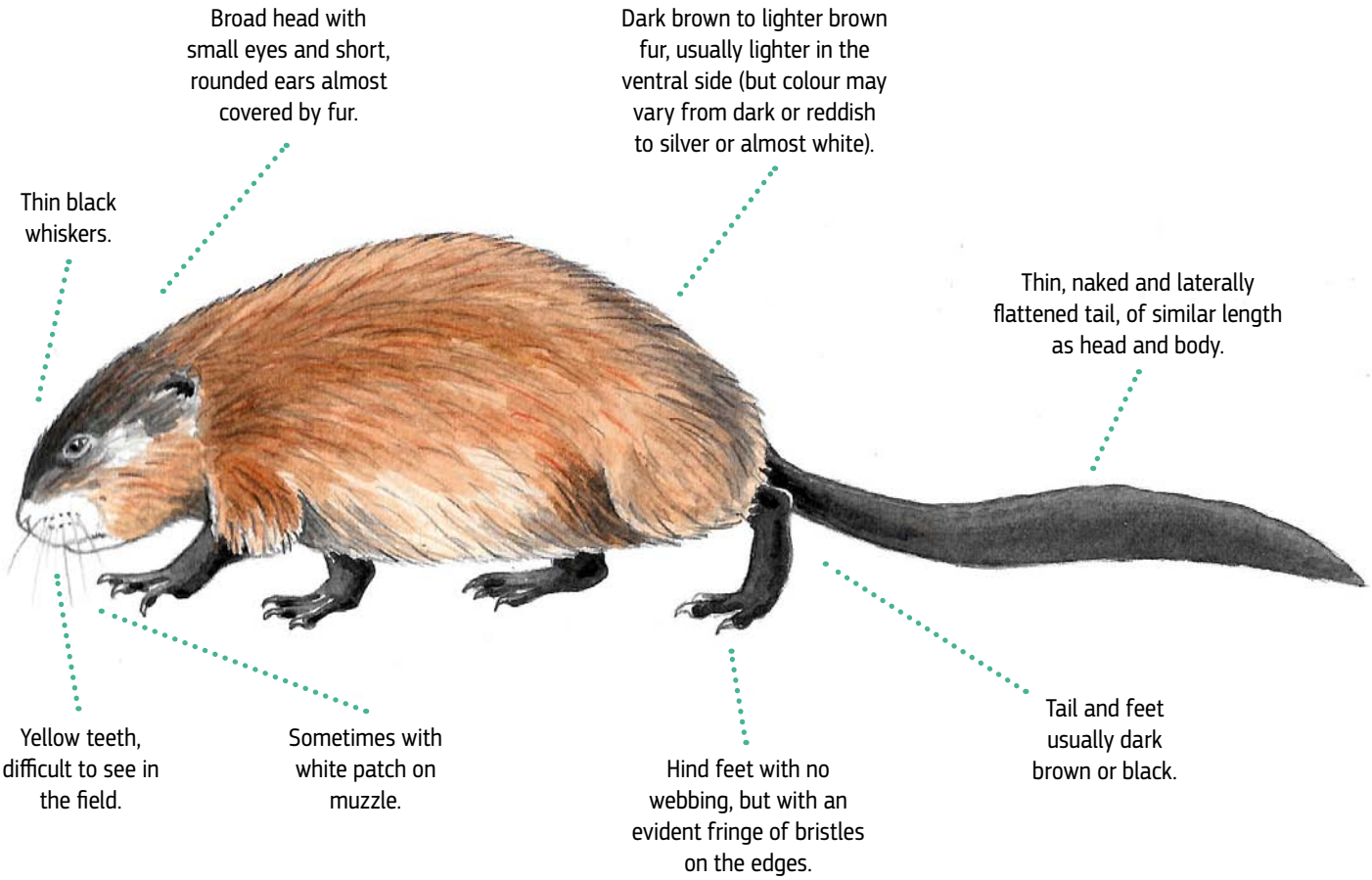
Size

Total length head to tail 40–67 cm (tail: 20–28 cm); weight: 0.6–2 kg.

Common names

BG	Ондáтра
HR	Bizamski štakor
CZ	Ondatra pižmová
DA	Bisamrotte
NL	Muskusrat
EN	Muskrat
ET	Piisamrott
FI	Piisami
FR	Rat musqué
DE	Bisamratte
EL	Μοσχοπόντικας
HU	Pézsmapocok
IE	Muscfhrancach
IT	Topo muschiato
LV	–
LT	Ondatra
MT	–
PL	Piżmak
PT	Rato-almiscarado
RO	Bizam
SK	Ondatra pižmová
SL	Pižmovka
ES	Rata almizclera
SV	Bisam

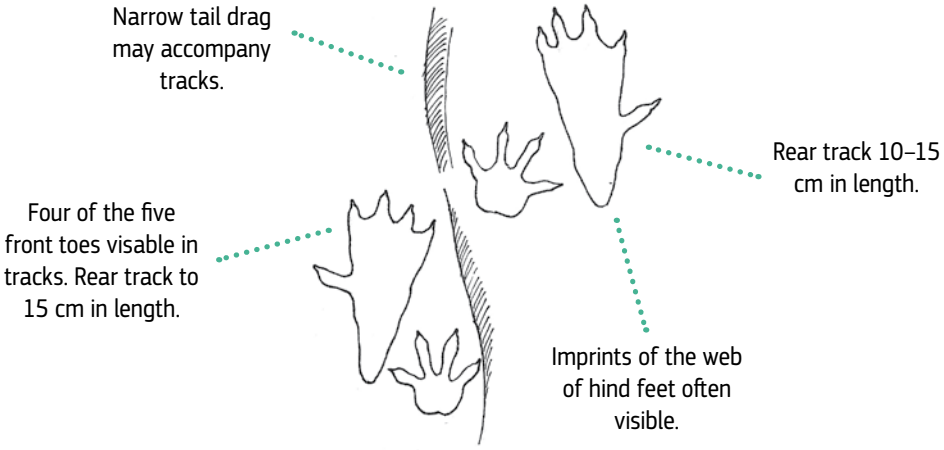
Distinctive characteristics



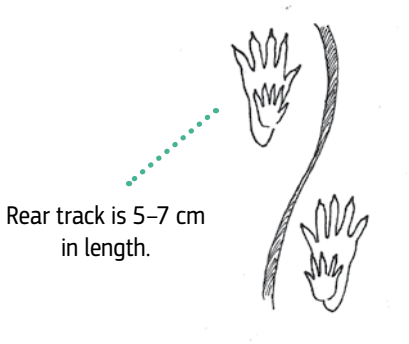
The Ondatra zibethicus *has a broad head with small eyes and short rounded ears almost covered by fur. © Cephas. CC BY-SA 4.0.*

Signs of presence – Tracks

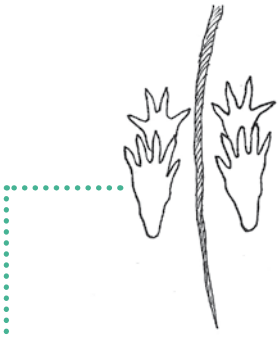
Coypu
Myocastor coypus



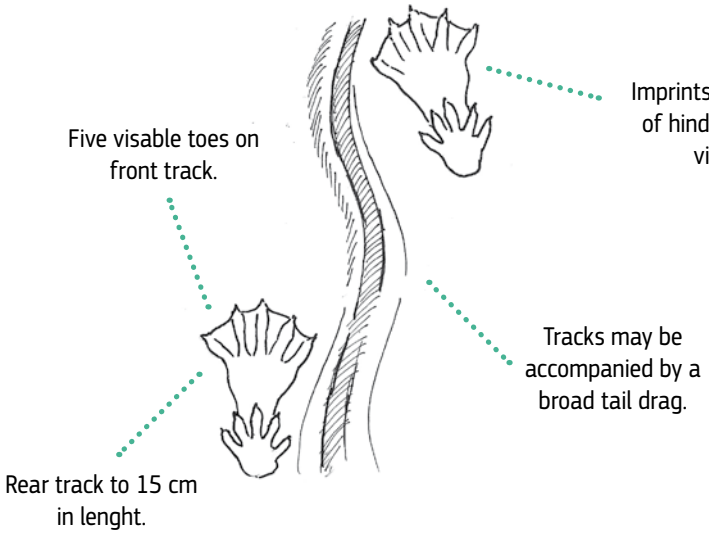
Muskrat
Ondatra zibethicus



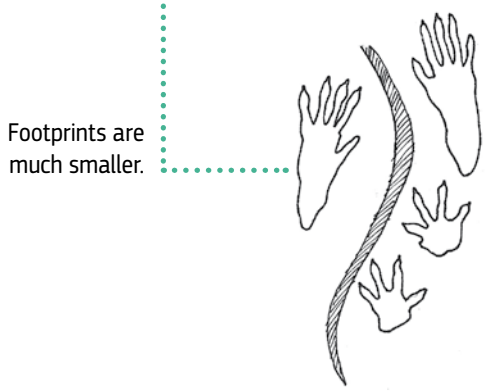
Water vole
Arvicola amphibius



Beaver
Castor fiber and
Castor canadensis



Rat
Rattus norvegicus and
Rattus rattus



Signs of presence – Runs

Coypu
Myocastor coypus

Paths through vegetation about 15–20 cm wide.

Muskrat
Ondatra zibethicus

Paths through vegetation about 10 cm wide.

Water vole
Arvicola amphibius

Paths through vegetation very narrow.

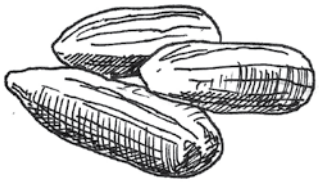
Beaver
Castor fiber and *Castor canadensis*

Paths through vegetation about 38 to 50 cm wide.

Signs of presence – Scat

Coypu
Myocastor coypus

Large droppings, cylindrical form, up to 70 mm long, with fine longitudinal striations.



Water vole
Arvicola amphibius

Latrines are similar to muskrat: flattened piles of droppings topped with fresh ones. Dropping are cylindrical with blunt ends, usually 12 mm long and 4–5 mm wide.

Muskrat
Ondatra zibethicus

Small droppings oval elongated form, 10–12 mm in length (diameter: 4–5 mm), usually deposited in clusters.

Rat
Rattus norvegicus and *Rattus rattus*

Droppings are similar to those of muskrat, but scattered not in latrines.

A muskrat's whiskers are thin and black. © Cephas. CC BY-SA 3.0.

Signs of presence – Dens

Coypu
Myocastor coypus

Digs dens in ditches and river banks.

Muskrat
Ondatra zibethicus

Builds dome-shaped lodges, made of marsh vegetation and mud with underground entrances (smaller than beaver lodges) and digs in stream or pond banks.

Beaver
Castor fiber and
Castor canadensis

Builds dome-shaped lodges made of sticks and logs and digs into a stream bank. They could build dams to regulate water depth.

Water vole
Arvicola amphibius

Digs small burrows (4–8 cm at the entrance) in the bank.

Rat
Rattus norvegicus and
Rattus rattus

Digs small burrows (4–8 cm at the entrance) in the bank, similar to those of water vole.

Similar species

Similar species are dark brown in colour with large front teeth (otter excluded) that are yellow to orange in colour, which are only visible externally well in coypus. From a distance they can be easily confused. The elements below should help identification in the field.

Muskrat
Ondatra zibethicus

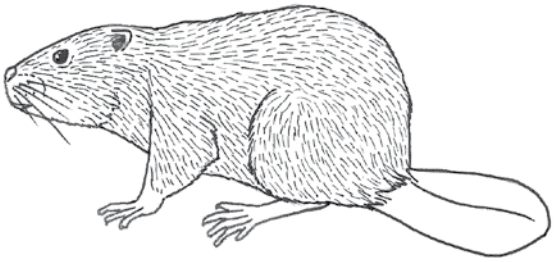
Small sized rodent. Muskrats are much smaller than coypu (adults coypus are 2–3 times larger than muskrats, but juveniles are similar in size).

Coypu
Myocastor coypus

Medium size rodent. Coypus are 2–3 times larger than muskrats.

Beaver[1]
Castor fiber and *Castor canadensis*

Large sized rodent. Beavers are 2 times the size of a coypu.



Rat
Rattus norvegicus and *Rattus rattus*

Small sized rodent. Rats are much smaller than coypus (but coypus juveniles are similar in size, and smaller than muskrats).

Otter[2]
Lutra lutra

Medium size carnivore. Body is as long as coypu or a little bit longer (1.5 longer).

Water vole
Arvicola amphibius

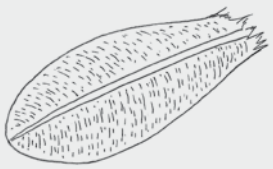
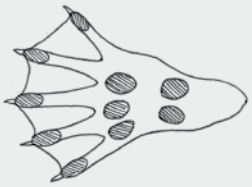
Body smaller than muskrat, tail shorter (6–10 cm) compared to body length (12–22 cm), weight 100–300 g.

American mink
Neovison vison

Overall very different shape (similar to the otter, but about half in length). Elongated body, with white patches on chin and throat (usually very small or not present on the upper lip). Very small and no visible incisors, long and slender somewhat flattened tail (13–23 cm long, about half body length) and slightly webbed feet. The fur is dark brown to black.

1 **Beaver:** *Castor fiber* and *C. canadensis*. The external appearance of the European beaver (*Castor fiber*) is very similar to that of American beaver (*Castor canadensis*) which is also occurring in Europe as a result of introductions
2 **Otter:** *Lutra lutra*. Overall very different shape. Elongated body, with a white patch which often extends from muzzle down to throat, very small and no visible incisors, long and slender somewhat flattened tail and slightly webbed feet. The fur is brown above and cream below.

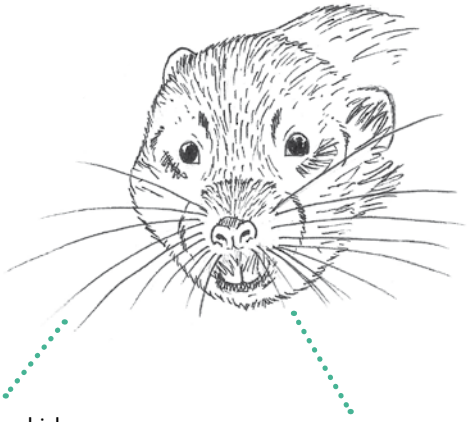
Similar species – Tail and Feet

Species	Tail	Hind Feet
Muskrat *Ondatra zibethicus* • Long, laterally flattened, thin tail. • Hind feet not webbed but with an evident fringe of hairs.		
Coypu *Myocastor coypus* • Long, rounded and sparsely haired rat-like tail. • Partially webbed hind feet.		
Beaver *Castor fiber* and *Castor canadensis* • Large and broad flat tail, almost hairless. • Fully webbed hind feet.		
Rat *Rattus norvegicus* and *Rattus rattus* • Long naked tail. • No webbing in hind feet.		
Otter *Lutra lutra* • Thin robust tail, ticker at base. • Slightly webbed feet.		

The muskrat can often be confused with the coypu, which is 2–3 times as big as the muskrat. © JM Dufour-Dror (location of image: Israel, Hula Valley, 2006).

Simliar species – Teeth and whiskers

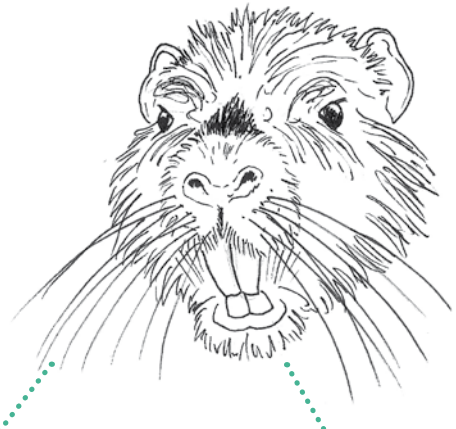
Muskrat
Ondatra zibethicus



Dark thin whiskers.

Orange coloured teeth, not visible.

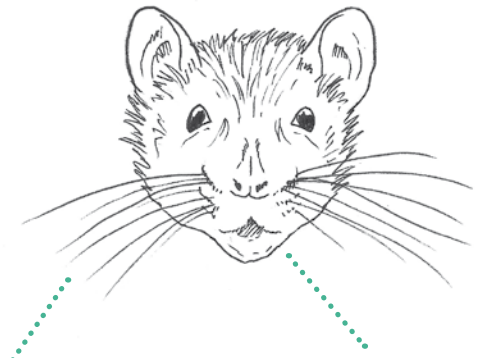
Coypu
Myocastor coypus



Long, evident white whiskers.

Large incisors bright yellow-orange.

Rat
Rattus norvegicus and
Rattus rattus



Black and white long whiskers

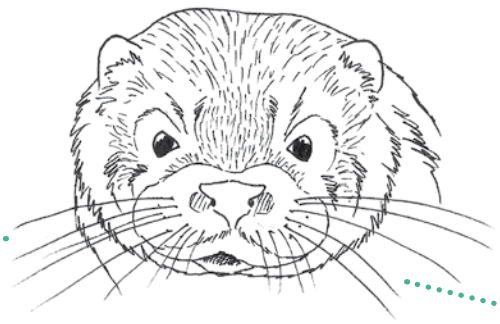
Incisors yellow-brown.

Beaver
Castor fiber and
Castor canadensis

Dark thin whiskers.

Large orange incisors

Otter
Lutra lutra



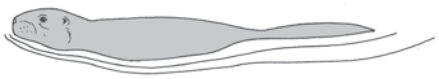
Long evident mostly white whiskers.

Less developed and white incisors.

Similar species – swimming

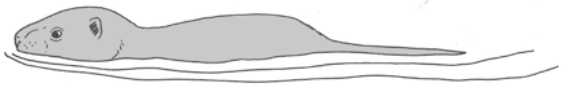
Muskrat
Ondatra zibethicus

When swimming much of the body emerges.



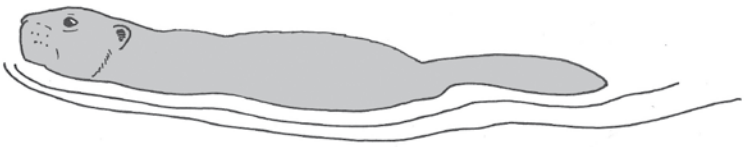
Coypu
Myocastor coypus

When swimming much of the body emerges.



Beaver
Castor fiber and *Castor canadensis*

When swimming on the water surface, the body is visible from head to tail. The tail is used to drive power, manoeuvre, and dive while swimming, and is often visible on the surface.



Rat
Rattus norvegicus and *Rattus rattus*

When swimming much of the body emerges.

Otter
Lutra lutra

When swimming only the head and neck are kept above the water's surface. Can dive.

When swimming, much of the muskrat's body emerges out of the water. © Аимаина хикари. Public domain.

Key references

CABI, 2018. *Ondatra zibethicus* (muskrat)[original text by Patrick Triplet]. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc.

The muskrat builds done-shaped lodges, made of marsh vegetation and mud with underground entrances. © Cephas. CC BY-SA 3.0.

The spinycheek crayfish is an invasive alien species, which has a total body length up to 12 cm. © Ansgar Gruber. CC BY-SA 2.0.

The spinycheek crayfish (*Orconectes limosus*)

Identification guide to support the surveillance of invasive alien species of Union concern

Species ID	
Kingdom	Metazoa
Division	Arthropoda
Class	Malacostraca
Order	Decapoda
Family	Cambaridae
Genus	*Orconectes*[1]
Species	*Orconectes limosus*
Other designation	Other sources indicate this species as Faxonius limosus (Rafinesque, 1817)

General description

Medium-sized crayfish, characterised by transverse reddish-brown bands across the abdominal segments and on pleura. Other distinctive features are the presence of sharp hepatic spines on the side of the carapace in front of the cervical groove (hence the English common name) and the tip of the chelae orange and black. Usually found in a wide range of freshwater environments, including temporary and polluted habitats which the species can tolerate pretty well.

Size

Total body length up to 12 cm.

Common names

BG	Американски шипобузест рак
HR	Bodljobradi rak
CZ	Rak pruhovaný
DA	Amerikansk flodkrebs
NL	Gevlekte Amerikaanse rivierkreeft
EN	Spinycheek crayfish
ET	Ogapõskne vähk
FI	Amerikankääpiörapu
FR	Écrevisse américaine
DE	Kamberkrebs
EL	Ποταμοκαραβίδα της Αμερικής
HU	Cifrarák
IE	–
IT	Gambero americano
LV	Dzeloņvaigu vēzis
LT	Rainuotasis vėžys
MT	–
PL	Rak pręgowany
PT	Lagostim-dos-canais
RO	Rac dungat
SK	Rak pruhovaný
SL	Trnavec
ES	Cangrejo de los canales
SV	Taggkindskräfta

Disclaimer:

Species identification may be difficult for non-experts and laypeople, hence it is usually recommended to contact an expert. In general, for correct identification, the animals need to be captured because the distinctive characteristics are not always visible from a distance and may be not well developed (particularly in juveniles). In some cases, identification may require specific checks, e.g. spines or male gonopod morphology (which can require the use of microscope).

1 This species underwent a reclassification in August 2017, changing the genus *Orconectes* to *Faxonius* (Crandall and De Grave, 2017). Crandall, K.A. and S. De Grave, 2017. An updated classification of the freshwater crayfishes (Decapoda: Astacidea) of the world, with a complete species list. *Journal of Crustacean Biology*, 37(5):615-653. https://doi.org/10.1093/jcbiol/rux070.

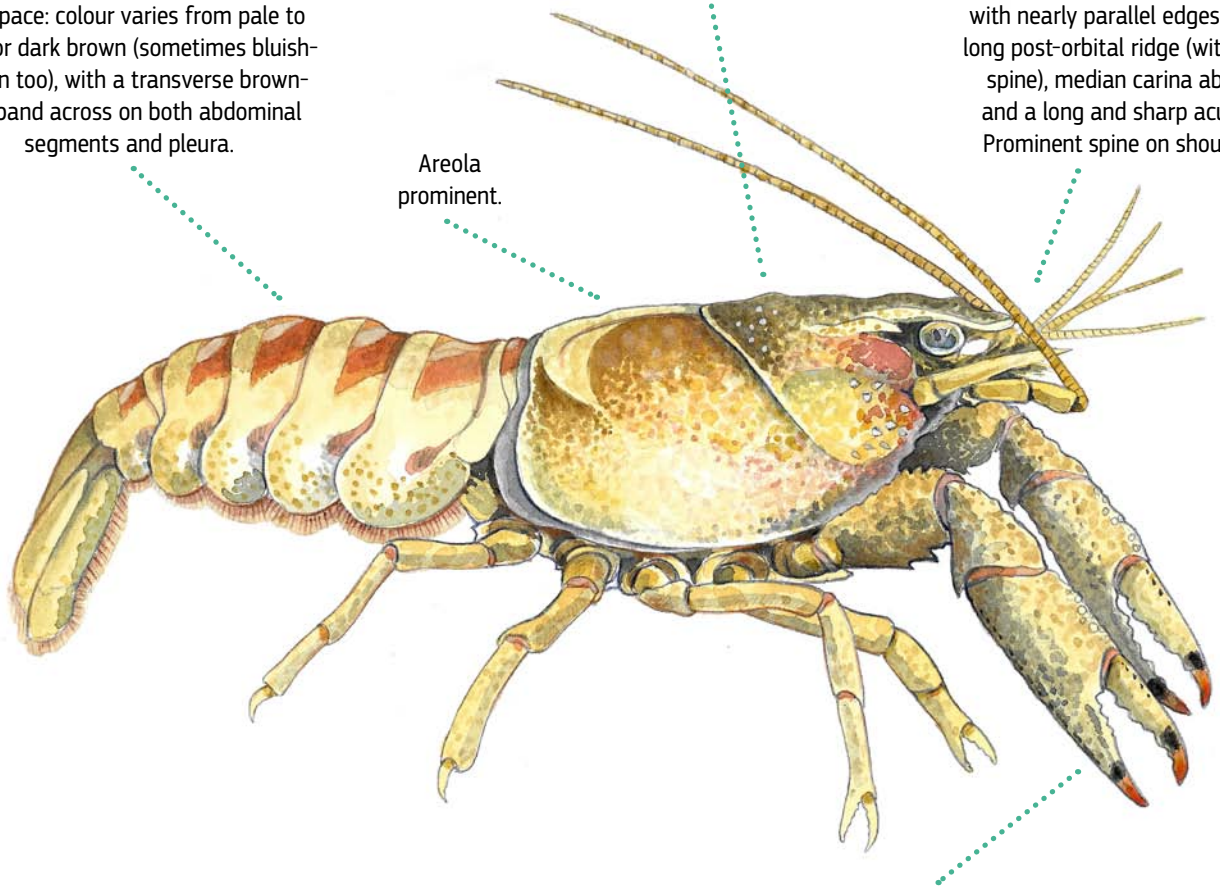
Distinctive characteristics

Carapace: relatively smooth, with some prominent hepatic spines on sides of anterior carapace (in front of the cervical groove and the cephalic area).

Carapace: colour varies from pale to olive or dark brown (sometimes bluish-brown too), with a transverse brown-red band across on both abdominal segments and pleura.

Rostrum: smooth and elongated, with nearly parallel edges, single long post-orbital ridge (with distal spine), median carina absent, and a long and sharp acumen. Prominent spine on shoulders.

Areola prominent.



Chelae: strong and smooth, characterised by regular rows of small light-coloured tubercles along margins of hand and moveable finger, and by the tips coloured in orange followed by a black band. Ventral side with lighter colour. Lost claws can regenerate in a smaller size. Prominent spur on inner side of carpus.

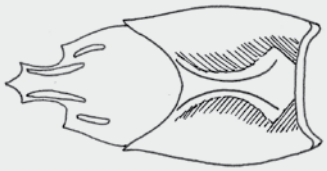
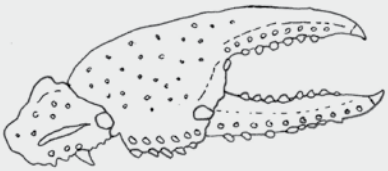
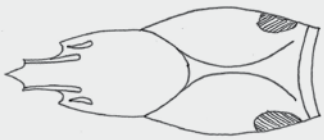
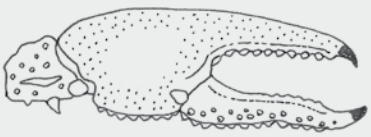
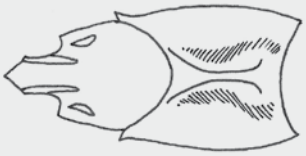
The spinycheek crayfish's carapace has a clear and definitive brown-red band across on both its abdominal segments and pleura. © Archive of Institute Symbiosis.

The orconectes limosus's *rostrum is smooth and elongated and has a prominent spine on its shoulders. © Keskkonnavahk. CC BY-SA 4.0.*

Signs of presence

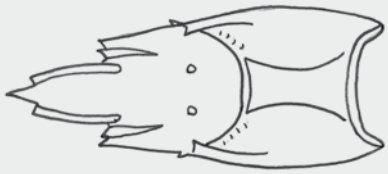
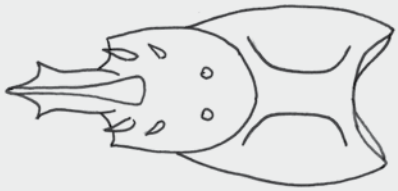
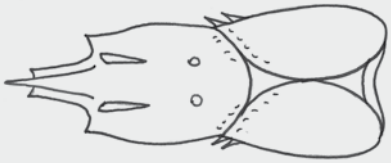
Burrows in banks of water bodies (not diagnostic and described only in England so far). Parts of dead animals including claws and body shell can be found near their habitats or discarded by predators, e.g. in bird or mammal nests. However, identification depends on overall quality of body remains.

Similar species

	Carapace	Chelae
Orconectes virilis	 Rostrum without median carina. Parallel margins. Open areola.	 Broad and flat, with straight margin on movable finger. Rows of tubercles. May be blue in colour.
Orconectes rusticus[2]	 Rostrum without median carina. Open areola. Dark, rusty spots on either side of its carapace.	 Dark rusty spots. Tubercles not in rows. Oval gap when closed.
Orconectes immunis	 No hepatic spines on lateral margins of carapace. Typical pale bands running along dorsal surface of abdomen.	 Broad, flattened tuberculate chela, with straight margin of movable finger.

2 Some risk of confusion may exist with *Orconectes juvenilis*, a species phenotypically similar to *Orconectes rusticus* (see this species description) recently found in France. In fact, in France, *O. juvenilis* was initially misidentified with *O. rusticus* and only the gonopod and genetic analyses led to the correct identification. Thus, in case of doubts, an expert is needed to confirm the identification.

Other species alien to Europe

	Carapace	Chelae
Procambarus fallax f. virginalis	 Open areola.	 Very small, weakly granulate.
Pacifastacus leniusculus	 Rostrum with median carina. Large areola.	 Robust and smooth, with white turquoise patch on top of junction of fingers.
Procambarus clarkii	 No areola.	 S-shaped, covered with small bumps.

The Orconectes rusticus, *which has dark rusty spots on its chelae, can be confused with the* Orconectes limosus. *© Cgoldsmith1. CC BY-SA 3.0.*

Key references

Pockl M, Holdich D, Pennerstorder J, 2006. Identifying native and alien crayfish species in Europe. Melk, Austria: European Project CRAYNET, Guglar Cross Media, 47.

Souty-Grosset C, Holdich D, Noël O, Reynolds J, Haffner P(eds), 2006. Atlas of crayfish in Europe. Museum National d'Histoire Naturelle, Paris

The spinycheek crayfish is able to live in temporary and polluted habitats as the species can tolerate these pretty well. © Maciej Bonk.

Orconectes virilis, *also known as the virile crayfish, is a medium-sized crayfish which can have a body length of up to 13 cm.*
© ALAN SCHMIERER. Public domain .

The virile crayfish (*Orconectes virilis*)

Identification guide to support the surveillance of invasive alien species of Union concern

Species ID	
Kingdom	Metazoa
Division	Arthropoda
Class	Malacostraca
Order	Decapoda
Family	Cambaridae
Genus	*Orconectes*[1]
Species	*Orconectes virilis*
Other designation	Other sources indicate this species as Faxonius virilis (Hagen, 1870)

General description

Medium-sized crayfish, typically brown or olive green in colour. The species name in English derives from the male sexual organs, the copulatory stylets, characterised by long white hair-like structures. Can be found in a range of freshwater environments (e.g. streams, rivers, canals, ponds and lakes, even in deep water), and is known to build extensive burrow networks in the banks of rivers.

Size

Total body length up to 13 cm (but usually less than 10 cm).

Common names

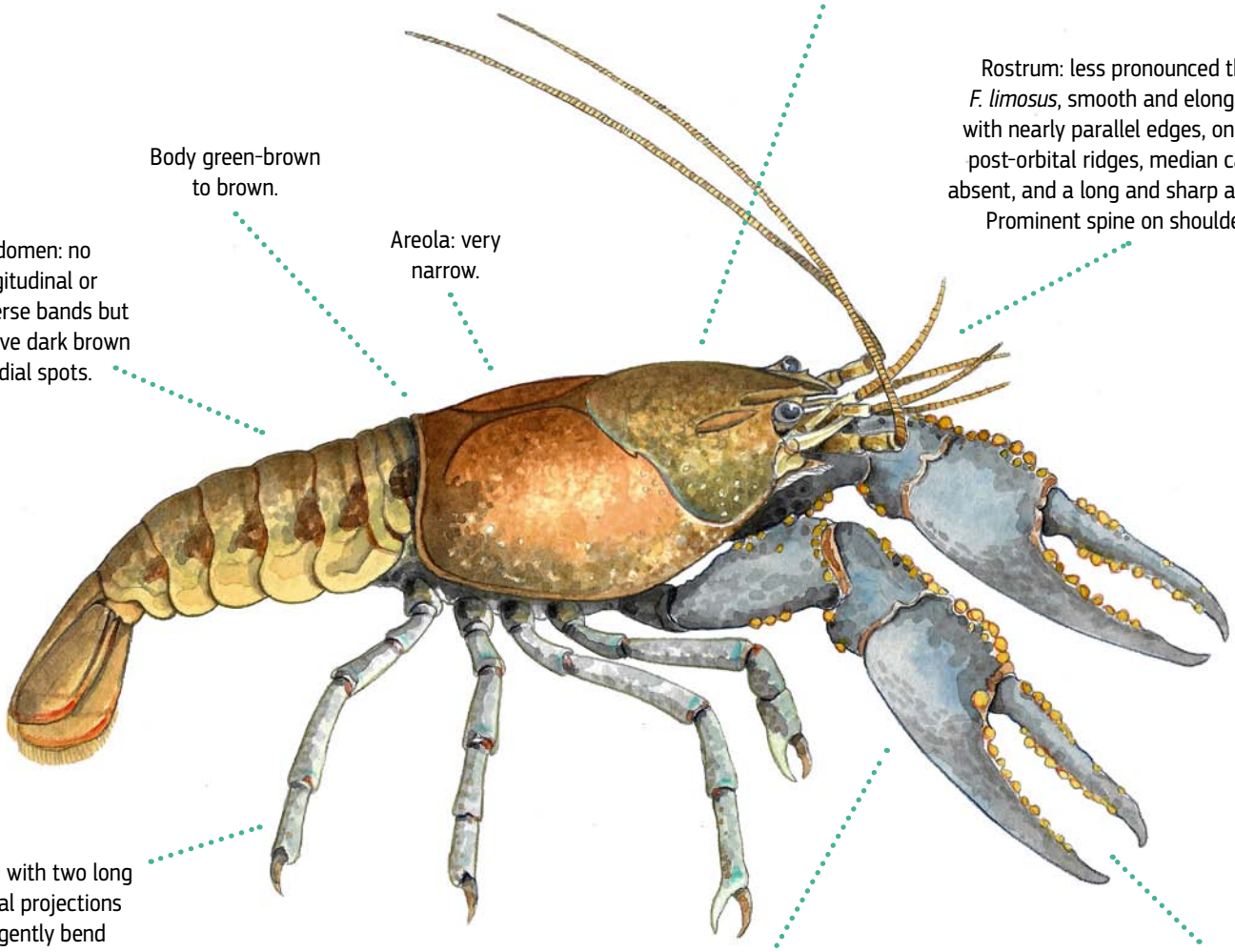
BG	Северен рак
HR	Virilan rak
CZ	Rak severský
DA	Viril krebs
NL	Geknobbelde Amerikaanse rivierkreeft
EN	Virile crayfish
ET	Eesti keelse nimeta vähk
FI	Viirilirapu
FR	Écrevisse à pinces bleues
DE	Viril-Flusskrebs
EL	–
HU	Északi cifrarák
IE	–
IT	Gambero virile
LV	–
LT	Šiurkštusis vėžys
MT	–
PL	Rak prężny
PT	Lagostim-viril
RO	–
SK	Rak severný
SL	Bradavičasti trnavec
ES	Cangrejo del norte
SV	Gulvårtskräfta

Disclaimer:

Species identification may be difficult for non-experts and laypeople, hence it is usually recommended to contact an expert. In general, for correct identification, the animals need to be captured because the distinctive characteristics are not always visible from a distance and may be not well developed (particularly in juveniles). In some cases, identification may require specific checks, e.g. spines or male gonopod morphology (which can require the use of microscope).

1 This species underwent a reclassification in August 2017, changing the genus *Orconectes* to *Faxonius* (Crandall and De Grave, 2017). Crandall, K.A. and S. De Grave, 2017. An updated classification of the freshwater crayfishes (Decapoda: Astacidea) of the world, with a complete species list. *Journal of Crustacean Biology*, 37(5):615–653. https://doi.org/10.1093/jcbiol/rux070.

Distinctive characteristics



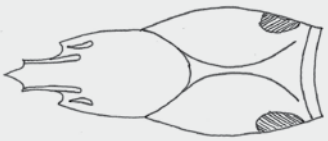
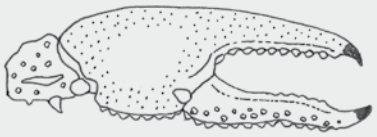
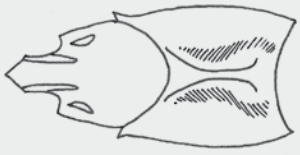
The virile crayfish's carapace is typically smooth, green-brown to brown in colour, with a row of tubercles on shoulders behind cervical groove and no hepatic spine. © Robert Aguilar, Smithsonian Environmental Research Center. CC BY 2.0 .

The rostrum of the virile crayfish is smooth and elongated with nearly parallel edges and having a prominent spine on its shoulders.

Signs of presence

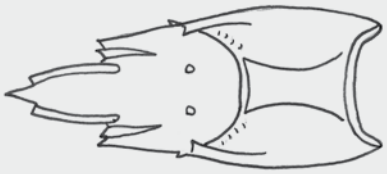
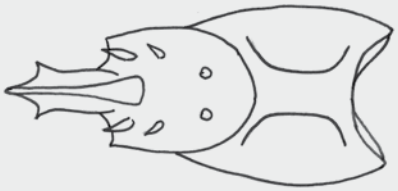
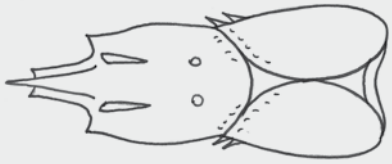
Burrows in banks of water bodies (not diagnostic and described only in England so far). Parts of dead animals including claws and body shell can be found near their habitats or discarded by predators, e.g. in bird or mammal nests. However, identification depends on overall quality of body remains.

Similar species

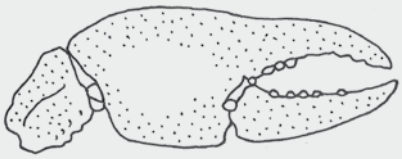
	Carapace	Chelae
Orconectes limosus	 Rostrum without median carina. Parallel margins. Spines on each side of the carapace. Open areola.	 Broad and flat, with straight margin on movable finger. Rows of tubercles.
Orconectes rusticus[2]	 Rostrum without median carina. Open areola. Dark, rusty spots on either side of its carapace.	 Dark rusty spots. Tubercles not in rows. Oval gap when closed.
Orconectes immunis	 No hepatic spines on lateral margins of carapace. Typical pale bands running along dorsal surface of abdomen.	 Broad, flattened tuberculate chela, with straight margin of movable finger.

2 Some risk of confusion may exist with *Orconectes juvenilis*, a species phenotypically similar to *Orconectes rusticus* (see this species description) recently found in France. In fact, in France, *O. juvenilis* was initially misidentified with *O. rusticus* and only the gonopod and genetic analyses led to the correct identification. Thus, in case of doubts, an expert is needed to confirm the identification.

Other species alien to Europe

	Carapace	Chelae
Procambarus fallax f. virginalis	 Open areola.	 Very small, weakly granulate.
Pacifastacus leniusculus	 Rostrum with median carina. Large areola.	 Robust and smooth, with white turquoise patch on top of junction of fingers.
Procambarus clarkii	 No areola.	 S-shaped, covered with small bumps.

Species native to Europe

	Carapace	Chelae
Austropotamobius pallipes	 Rostrum with median carina. One pair of subapical spines on each side of carapace. Margins converging toward acumen. Open areola.	 Robust, weakly granulate. Pink/ beige/or white underside.

Key references

Pockl M, Holdich D, Pennerstorder J, 2006. Identifying native and alien crayfish species in Europe. Melk, Austria: European Project CRAYNET, Guglar Cross Media, 47.

Souty-Grosset C, Holdich D, Noël O, Reynolds J, Haffner P (eds), 2006. Atlas of crayfish in Europe. Museum national d'Histoire naturelle, Paris

The body of the virile crayfish is usually green-brown to brown and has a very narrow areola on its carapace. © Robert Aguilar, Smithsonian Environmental Research Center. CC BY 2.0.

Pacifastacus leniusculus, *also known as the American signal crayfish, can be found in a range of freshwater environments such as streams, rivers or canals. © Astacoides. CC BY-SA 3.0.*

The American signal crayfish (*Pacifastacus leniusculus*)

Identification guide to support the surveillance of invasive alien species of Union concern

Species ID	
Kingdom	Metazoa
Division	Arthropoda
Class	Malacostraca
Order	Decapoda
Family	Cambaridae
Genus	*Pacifastacus*
Species	*Pacifastacus leniusculus*

General description

A relatively large crayfish, light reddish or bluish-brown in colour, from which it derives its English common name, by the presence of a white turquoise dorsal patch at the junction of the moveable and fixed finger of the chela. Can be found in a range of freshwater environments (e.g. streams, rivers, canals, ponds and lakes), and is known to dig tunnels into banks or under rocks in Europe.

Size

Total body length up to 16 cm or more (males are larger than females whose body length is usually up to 12 cm).

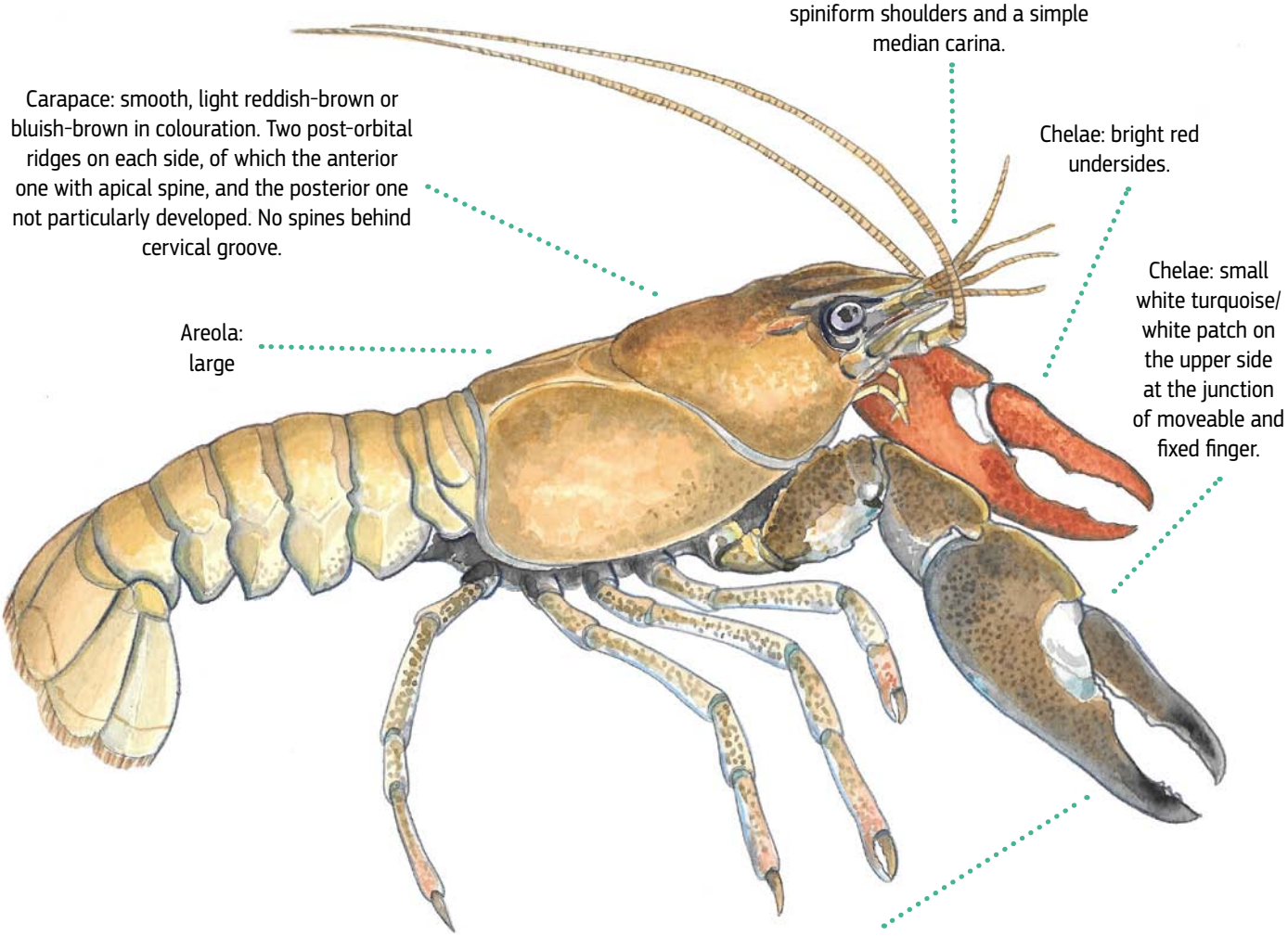
Common names

BG	Сигнален (калифорнийски) рак
HR	Signalni rak
CZ	Rak signální
DA	Signalkrebs
NL	Californische rivierkreeft
EN	Signal crayfish
ET	Signaalvähk
FI	Täplärapu
FR	Écrevisse signal
DE	Signalkrebs
EL	Αμερικανική καραβίδα
HU	Jelzőrák
IE	–
IT	Gambero della California
LV	Amerikas signālvēzis
LT	Žymėtasis vėžys
MT	Iċ-ċkala tal-ilma ħelu
PL	Rak sygnałowy
PT	Lagostim-sinal
RO	Rac de California
SK	Rak signálny
SL	Signalni rak
ES	Cangrejo señal
SV	Signalkräfta

Disclaimer:

Species identification may be difficult for non-experts and laypeople, hence it is usually recommended to contact an expert. In general, for correct identification, the animals need to be captured because the distinctive characteristics are not always visible from a distance and may be not well developed (particularly in juveniles). In some cases, identification may require specific checks, e.g. spines or male gonopod morphology (which can require the use of microscope).

Distinctive characteristics



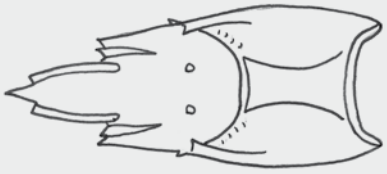
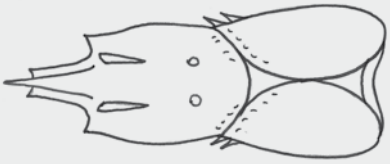
The areola of the American signal crayfish is large and prominent on its carapace. © Archive of Institute Symbiosis.

The American signal crayfish's chelae have bright red undersides and have a small white turquoise patch on the upper side. © MdE. CC BY-SA 3.0

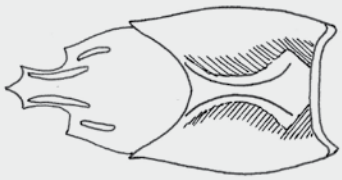
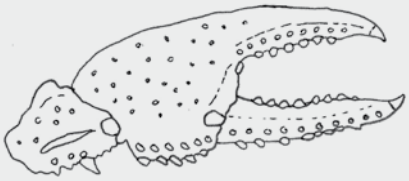
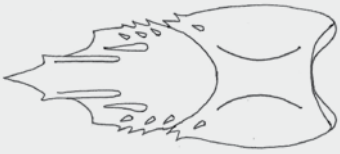
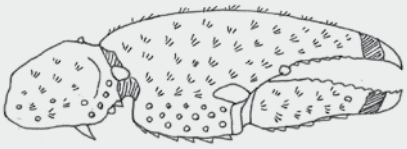
Signs of presence

Burrows in banks of water bodies (not diagnostic and described only in England so far). Parts of dead animals including claws and body shell can be found near their habitats or discarded by predators, e.g. in bird or mammal nests. However, identification depends on overall quality of body remains.

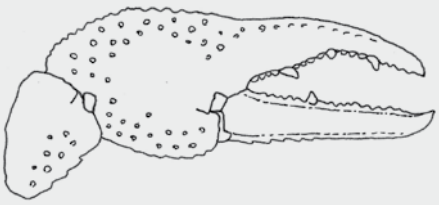
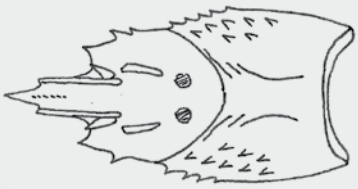
Similar species

	Carapace	Chelae
Procambarus fallax f. virginalis	 Open areola.	 Very small, weakly granulate.
Procambarus clarkii	 No areola.	 S-shaped, covered with small bumps.

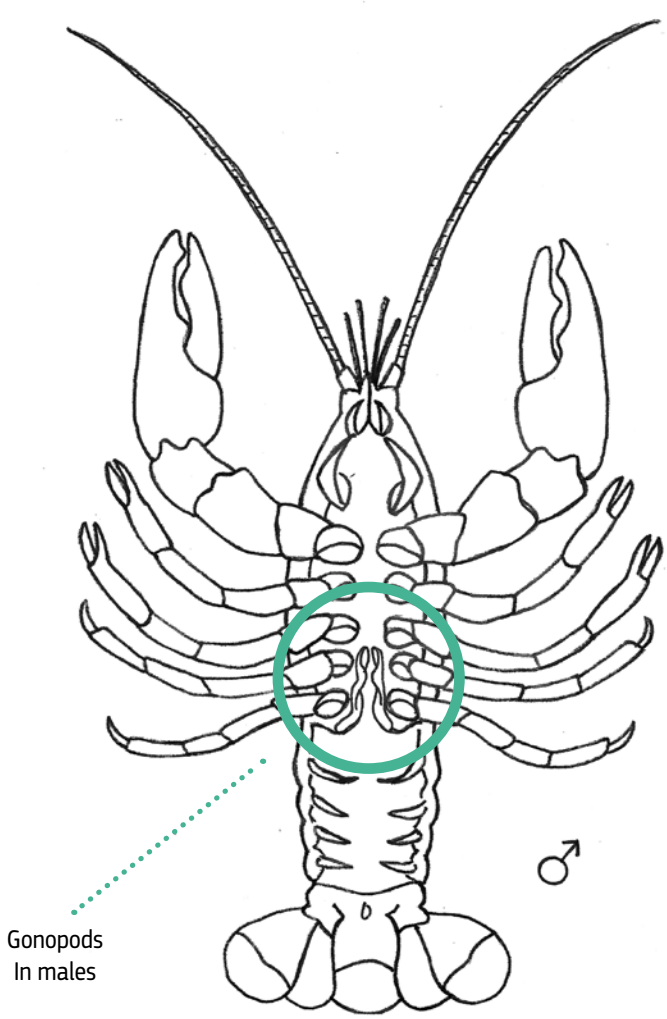
Other species alien to Europe

	Carapace	Chelae
Orconectes virilis	 Rostrum without median carina. Parallel margins. Open areola.	 Broad and flat, with straight margin on movable finger. Rows of tubercles. May be blue in colour.
Orconectes limosus	 Rostrum without median carina. Parallel margins. Spines on each side of the carapace. Open areola.	 Broad and flat, with straight margin on movable finger. Rows of tubercles.

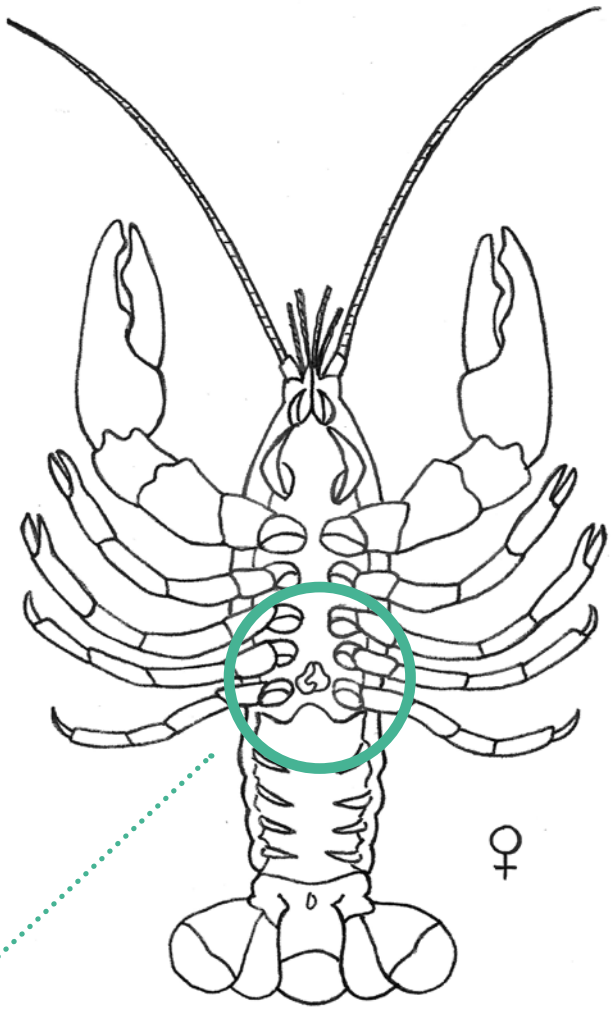
Species native to Europe

	Carapace	Chelae
Astacus astacus	 Rostrum with median carina. Margins almost parallel between the eyes. One pair of subapical spines on each side of the carapace. Open areola.	 Red undersides.
Astacus leptodactylus	 Rostrum with median carina. Parallel. Margins parallel between the eyes. One pair of subapical spines on each side of the carapace. Open areola.	 Uniquely shaped claws with elongated fingers.

Pacifastacus leniusculus has external fecundation, and females lack the annulus ventralis (seminal receptacle), which in cambarid crayfish (*Procambarus* and *Orconectes*), is located between the 4th and 5th pairs of walking legs.



Gonopods
In males



Annulus ventralis

(seminal receptacle of a female crayfish).
It is located on the ventral side between the bases of the 4th and 5th walking legs, and becomes cornified in mature females.

Key references

Johnsen SI, Taugbøl T, 2010. *Pacifastacus leniusculus*. NOBANIS Invasive Alien Species Fact Sheet. Online Database of the North European and Baltic Network on Invasive Alien Species – NOBANIS. http://www.nobanis.org

Pockl M, Holdich D, Pennerstorder J, 2006. Identifying native and alien crayfish species in Europe. Melk, Austria: European Project CRAYNET, Guglar Cross Media, 47.

Souty-Grosset C, Holdich D, Noël O, Reynolds J, Haffner P (eds), 2006. Atlas of crayfish in Europe. Museum National d'Histoire Naturelle, Paris

A relatively large crayfish, the American signal crayfish derives its English common name by the presence of a white turquoise dorsal patch at the junction of the moveable and fixed finger of the chela. © David Perez. CC BY 3.0.

Procambarus clarkii, *known as the red swamp crayfish in English, has a totally body length up to 15 cm. © Archive of Institute Symbiosis*

The red swamp crayfish (*Procambarus clarkii*)

Identification guide to support the surveillance of invasive alien species of Union concern

Species ID	
Kingdom	Metazoa
Division	Arthropoda
Class	Malacostraca
Order	Decapoda
Family	Cambaridae
Genus	*Procambarus*
Species	*Procambarus clarkii*

General description

A relatively large crayfish, which can be found in a range of freshwater environments, including temporary and saline waters which the species can tolerate pretty well. Can cover large distances, even overland, and can dig tunnels into banks. As suggested by the English common name, it is usually characterised by a bright red colouration (which may vary depending on the habitat, e.g. lighter in muddy waters and darker in clear waters). The colour of young, i.e. before sexual maturity, is usually greenish-brown. Other typical features are the lack of the areola and the S-shaped chelae.

Size

Total body length up to 15 cm, usually 10 cm

Common names

BG	Червен (луизиански) блатен рак
HR	Crveni močvarni rak
CZ	Rak červený
DA	Louisiana-flodkrebs
NL	Rode Amerikaanse rivierkreeft
EN	Red Swamp Crayfish
ET	Punane soovähk
FI	Punarapu
FR	Écrevisse de Louisiane
DE	Roter Amerikanischer Sumpfkrebs
EL	βαλτογαρίδες
HU	Kaliforniai vörösrák
IE	–
IT	Gambero rosso della Louisiana
LV	Sarkanais purva vēzis
LT	Klarko vėžys
MT	Iċ-ċkala tal-ilma ħelu
PL	Rak luizjański
PT	Lagostim-vermelho-da-Louisiana
RO	Rac de Louisiana
SK	Rak červený
SL	Močvirski škarjar
ES	Cangrejo rojo
SV	Röd sumpkräfta

Disclaimer:

Species identification may be difficult for non-experts and laypeople, hence it is usually recommended to contact an expert. In general, for correct identification, the animals need to be captured because the distinctive characteristics are not always visible from a distance and may be not well developed (particularly in juveniles). In some cases, identification may require specific checks, e.g. spines or male gonopod morphology (which can require the use of microscope).

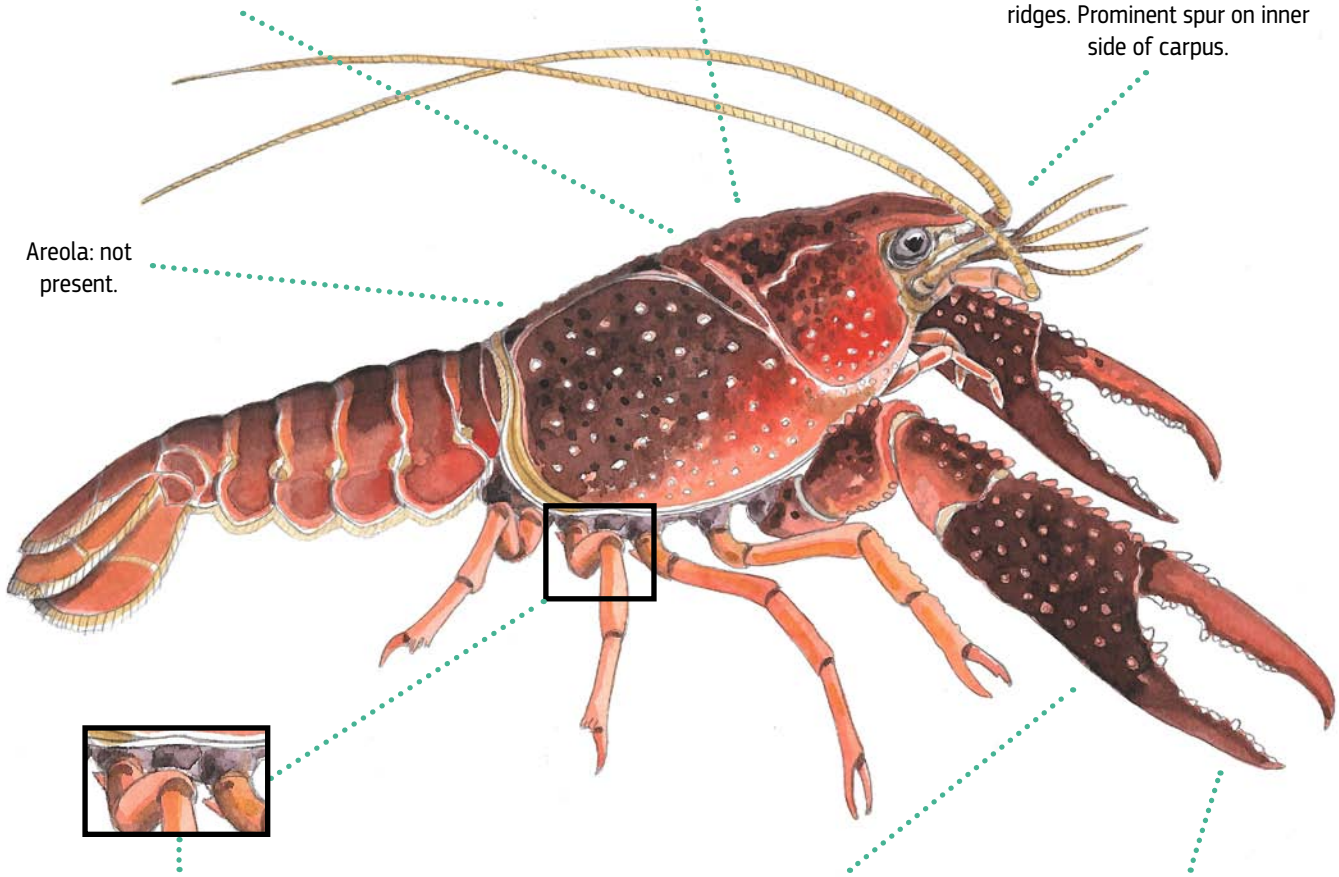
Distinctive characteristics

Carapace: rough, particularly behind cervical groove. Usually red in colour, i.e. from orange to reddish-brown or even darker, but young are greenish-brown.

Carapace: one pair of post-orbital ridges. Prominent spur on inner side of carpus.

Carapace: one pair of post-orbital ridges. Prominent spur on inner side of carpus.

Areola: not present.



In sexually active males there are typically hooks on the ischia (the part of the leg close to the body) of 2nd and 3rd walking legs.

Chelae: covered in small tubercles, particularly on the dorsal side, with spines. Two tubercles on inside margin of fixed finger. Inflated at sexual maturity in both males and females.

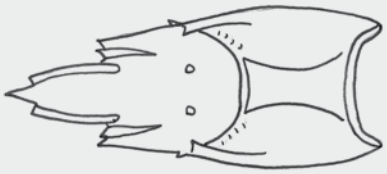
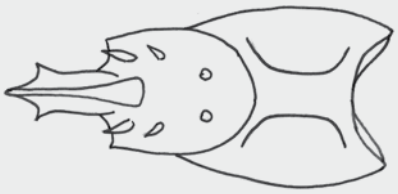
Chelae: long and slender, typically S-shaped, and red on both surfaces, particularly in the adults.

A distinctive characteristic of the red swamp crayfish is their chelae, which are long and slender, typically S-shaped while also covered in small tubercles. The chelae are red on both surfaces, especially in adults. © Luc Hoogenstein. CC BY-SA 4.0 .

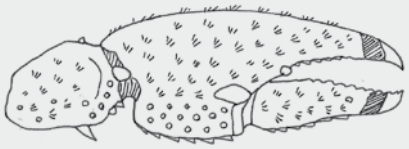
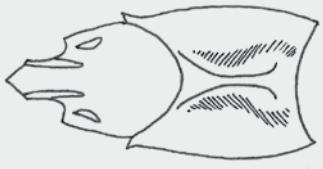
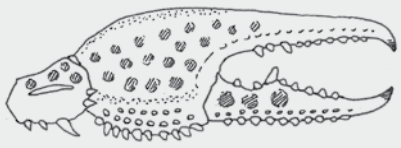
Signs of presence

Burrows in banks of water bodies (not diagnostic and described only in England so far). Parts of dead animals including claws and body shell can be found near their habitats or discarded by predators, e.g. in bird or mammal nests. However, identification depends on overall quality of body remains.

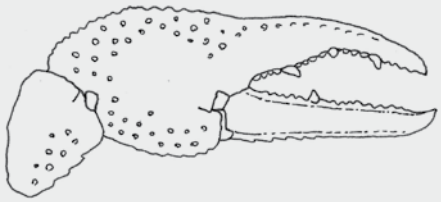
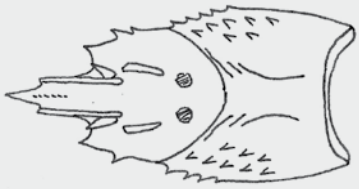
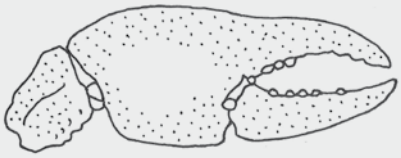
Similar species

	Carapace	Chelae
Procambarus fallax f. virginalis	 Open areola.	 Very small, weakly granulate.
Pacifastacus leniusculus	 Rostrum with median carina. Large areola.	 Robust and smooth, with white turquoise patch on top of junction of fingers.

Other species alien to Europe

	Carapace	Chelae
Orconectes limosus	 Rostrum without median carina. Parallel margins. Spines on each side of the carapace. Open areola.	 Broad and flat, with straight margin on movable finger. Rows of tubercles.
Orconectes immunis	 No hepatic spines on lateral margins of carapace. Typical pale bands running along dorsal surface of abdomen.	 Broad, flattened tuberculate chela, with straight margin of movable finger.

Species native to Europe

	Carapace	Chelae
Astacus astacus	 Rostrum with median carina. Margins almost parallel between the eyes. One pair of subapical spines on each side of the carapace. Open areola.	 Red undersides.
Astacus leptodactylus	 Rostrum with median carina. Parallel. Margins parallel between the eyes. One pair of subapical spines on each side of the carapace. Open areola.	 Uniquely shaped claws with elongated fingers.
Austropotamobius pallipes	 Rostrum with median carina. One pair of subapical spines on each side of carapace. Margins converging toward acumen. Open areola.	 Robust, weakly granulate. Pink/ beige/or white underside.

The carapace of the red swamp crayfish is usually rough and red in colour, with the young often having a greenish-brown colour. © Archive of Institute Symbiosis.

Key references

Pockl M, Holdich D, Pennerstorder J, 2006. Identifying native and alien crayfish species in Europe. Melk, Austria: European Project CRAYNET, Guglar Cross Media, 47.

Souty-Grosset C, Holdich D, Noël O, Reynolds J, Haffner P (eds), 2006. Atlas of crayfish in Europe. Museum national d'Histoire naturelle, Paris

The rostrum of Procambarus clarkii *is wide at the base, with edges converging toward a sharp acumen. © Mike Murphy. Public domain.*

Procambarus fallax *f.* virginalis *has a marble pattern, from which the German common name Marmorkrebs is derived from. This marble pattern varies from dark brown to olive to tan to reddish brown or blue. © Aleksander Niweliński.*

The marbled crayfish (*Procambarus fallax* f. *virginalis*)

Identification guide to support the surveillance of invasive alien species of Union concern

Species ID	
Kingdom	Metazoa
Division	Arthropoda
Class	Malacostraca
Order	Decapoda
Family	Cambaridae
Genus	*Procambarus*
Species	*Procambarus fallax* f. *virginalis*
Other designation	Other sources indicate this species as Procambarus virginalis Lyko, 2017

General description

The marble pattern, from which the common name Marmorkrebs is derived (German for "marbled crayfish"), is always present and especially prominent on the lateral parts of the carapace. The marble pattern is highly variable, usually dark brown to olive, but can vary from tan to reddish brown or blue. Chelipeds (claws) are relatively small, two times shorter than the carapace length.

Size

Up to 13 cm, but often less than 10 cm.

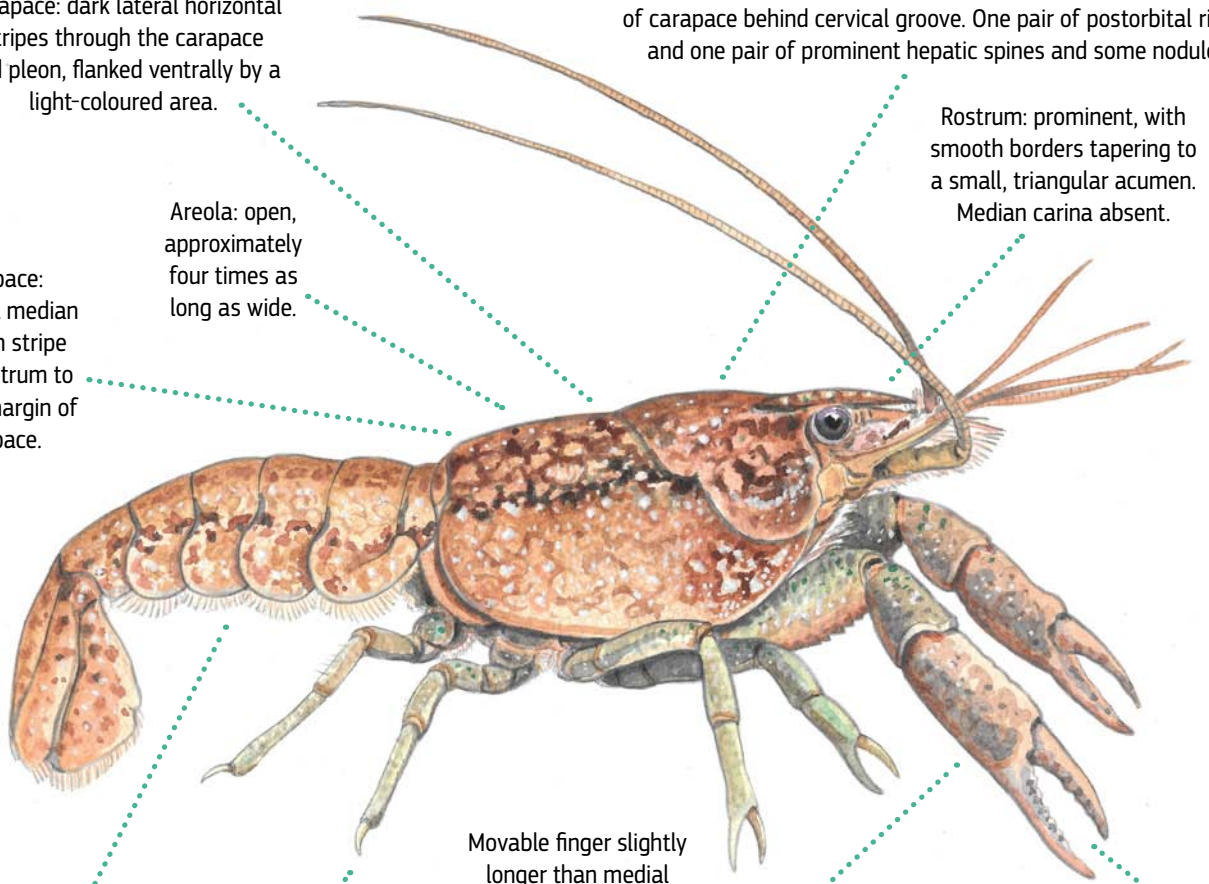
Common names

BG Американски мраморен рак
HR Mramorni rak
CZ Rak mramorovaný
DA Marmorkrebs
NL Marmerkreeft
EN Marbled crayfish
ET Marmorvähk
FI Marmorirapu
FR Écrevisse marbrée
DE Marmorkrebs
EL –
HU Virginiai márványrák
IE –
IT Gambero marmorato
LV Marmorvēzis
LT Marmurinis vėžys
MT Iċ-ċkala tal-ilma ħelu
PL Rak marmukowy
PT Lagostim-mármore
RO Rac marmorat
SK Rak mramorový
SL Marmornati škarjar
ES Cangrejo de mármol
SV Marmorkräfta

Disclaimer:

The taxonomic identity of this species – recently recognised as new independent species (Liko, F. 2017) – was uncertain. As shown by molecular techniques and morphological studies, it seemed to be the parthenogenetic form of *Procambarus fallax* (all marbled crayfish known so far are female and all specimens in Europe are clones). Individuals confirmed as Marbled crayfish by molecular techniques, but with rather different body patterns and a totally different rostrum shape, are known. Species identification of juveniles is even more difficult for non-experts because the distinctive characteristics are not always well developed. It can require the use of microscope. Just in case, it is recommended to contact an expert.

Distinctive characteristics



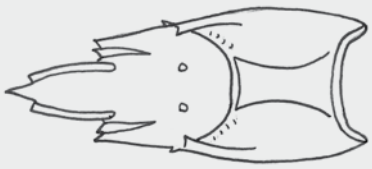
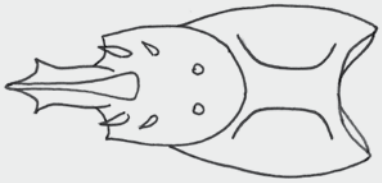
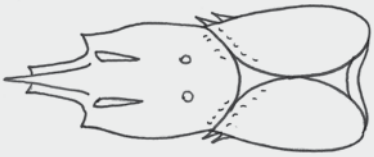
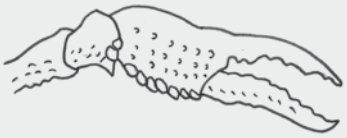
The marbled pattern on the carapace has dark lateral horizontal stripes flanked ventrally by a light coloured area. © André Karwath aka Aka. CC BY-SA 2.5 .

Signs of presence

Burrows in banks of water bodies (not diagnostic). Parts of dead animals including claws and body shell can be found near their habitats or discarded by predators, e.g. in bird or mammal nests. However, identification depends on overall quality of body remains.

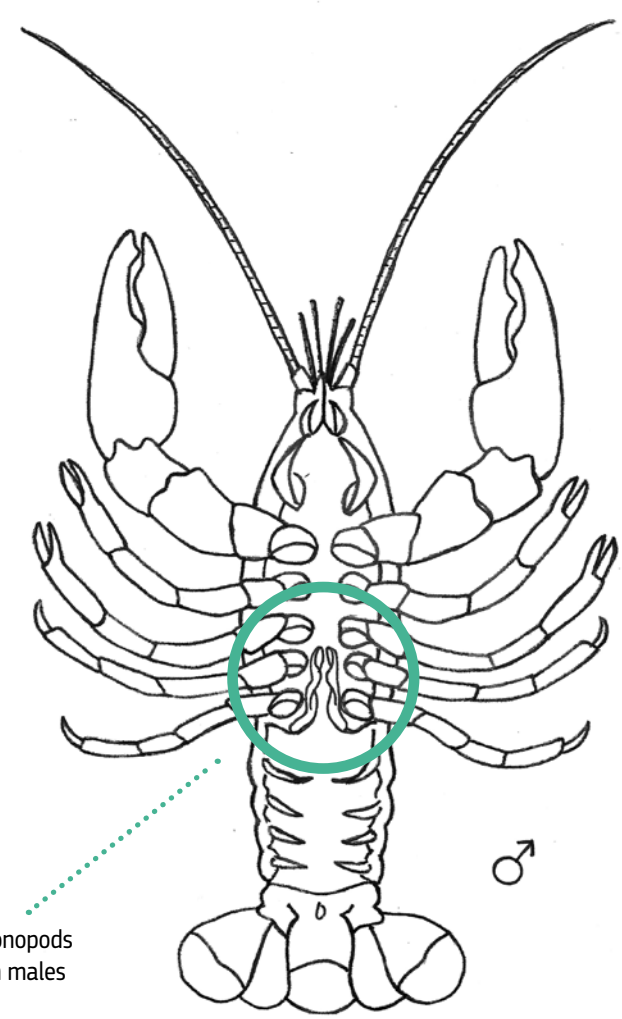
Similar species

About 460 species of cambarids are known, of which around 179 species belonging to the genus *Procambarus*, although not all are found in trade. A high degree of overlap exists between species. Additionally, *Procambarus fallax* f. *virginalis* is characterised by a high intraspecific variability, e.g. concerning coloration, growth, life-span, reproduction, behaviour and number of sense organs, due to non-genetic or environmentally induced changes during ontogenesis. For example differences concern the marbled pattern, the rostrum shape, and the presence of several spines at the margin of the rostrum. In particular, the rostrum variations led to uncertainties because shape and other features of this body part are important characters for species identification within cambarids (Martin *et al.,* 2010).

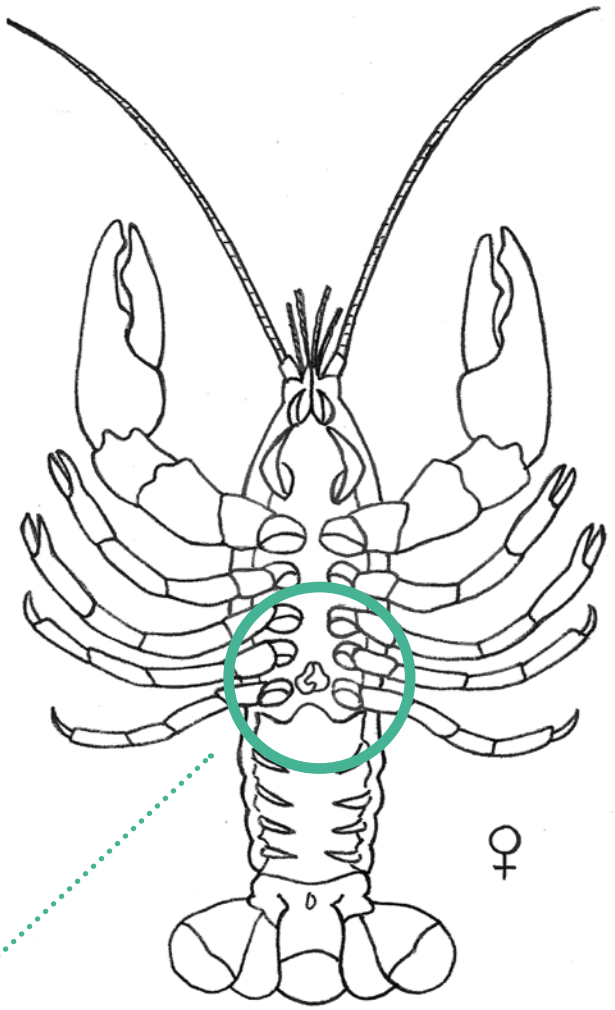
	Carapace	Chelae
Procambarus fallax* f. *virginalis	 Open areola.	 Very small, weakly granulate.
Pacifastacus leniusculus	 Rostrum with median carina. Large areola.	 Robust and smooth, with white turquoise patch on top of junction of fingers.
Procambarus clarkii	 No areola.	 S-shaped, covered with small bumps.

Procambarus fallax	***Procambarus acutus* and *Procambarus zonangulus***	***Procambarus alleni***
Very similar to Procambarus *fallax* f. *virginalis*. Marble pattern less evident.	Very similar to *P. clarkii*, their taxonomy is still debated, possibly may belong to a species complex. Carapace covered in tubercles producing a rough texture. Open areola. Chelae long and slender.	Very similar to *P. clarkii*, but usually bluish tinged to brightly blue coloured (which may occur also to marbled crayfish in water with low pH). Marble pattern less evident. Characteristic facial dark spots. Chelae: marble pattern less evident, not as slender, thicker.

Procambarus fallax f. *virginalis* is a species that reproduces parthenogenetically, and only females are known[1]. Therefore, a way to exclude that the crayfish to be identified belongs to *Procambarus fallax* f. *virginalis* is to check the presence of gonopods[2], which occur only in male crayfish (left).



Gonopods
In males



Annulus ventralis

(seminal receptacle of a female crayfish).
It is located on the ventral side between the bases of the 4th and 5th walking legs, and becomes cornified in mature females.

Procambarus fallax f. *virginalis*

Procambarus clarkii

1 With the notable exception of an intersexual specimen (with both *Annulus ventralis* and only one pair of gonopods) found in 2010 in a lab (Martin & Scholtz, 2012).
2 The gonopods are the first two pairs of pleopods (also known as swimmerets) on the crayfish's abdomen. The gonopods have been specially modified for reproductive purposes. The gonopods are held against the body of the crayfish between the last two pairs of walking legs.

Key references

CABI, 2017. *Procambarus fallax f. virginalis* (Marmorkrebs) [original text by Christoph Chucholl]. In: Invasive Species Compendium. Wallingford, UK: CAB International. https://www.cabi.org/isc/datasheet/110477 (Access Date: 01/11/2017)

Holdich D, 2011. GB Non-native Organism Risk Assessment for *Procambarus* sp. www.nonnativespecies.org (Access Date: 01/11/2017)

Lyko F, 2017. The marbled crayfish (Decapoda: Cambaridae) represents an independent new species. *Zootaxa* 4363(4): 544-552.

Martin P, Scholtz G, 2012. A case of intersexuality in the parthenogenetic Marmorkrebs (Decapoda: Astacida: Cambaridae). *Journal of Crustacean Biology* 32: 345–350.

Martin P, Shen H, Füllner G, Scholtz G, 2010. The first record of the parthenogenetic Marmorkrebs (Decapoda, Astacida, Cambaridae) in the wild in Saxony (Germany) raises the question of its actual threat to European freshwater ecosystems. *Aquatic Invasions* 5:397-403.

Pöckl M, Holdich DM, Pennerstorfer J, 2006. Identifying native and alien crayfish species in Europe. European Project CRAYNET.

Souty-Grosset C, Holdich DM, Noël PY, Reynolds JD, Haffner P, (eds), 2006. *Atlas of Crayfish in Europe*. Muséum National d'Histoire Naturelle, Paris. Patrimoines naturels, 64.

In comparison to the Procambarus fallax *f.* virginalis*, the* Procambarus clarkii *has s-shaped chelae which are covered in small bumps. © Mike Murphy. Public domain.*

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