

# OCTOPUS

CARD 8

GROUP 6: PRIMITIVE ANIMALS

PHYLUM  
*Mollusca*

CLASS  
*Cephalopoda*

GENUS & SPECIES  
*Octopus vulgaris*



Nature

**The well armed octopus has a secret weapon. Concealed in the folds of its body lies a sackful of ink, which the octopus secretes to ward off or confuse its enemies.**

## KEY FACTS



### SIZES

**Length:** Up to 10 ft., but usually smaller.

**Weight:** Up to 55 lb. Females are mature at 2 lb. Males, at 3 1/2 lb.



### BREEDING

**Sexual maturity:** Females, 1 1/2 -2 years. Males, earlier.

**No. of eggs laid:** Up to 150,000.

**Hatching time:** 4-6 weeks.



### LIFESTYLE

**Habit:** Solitary, bottom-dwelling.

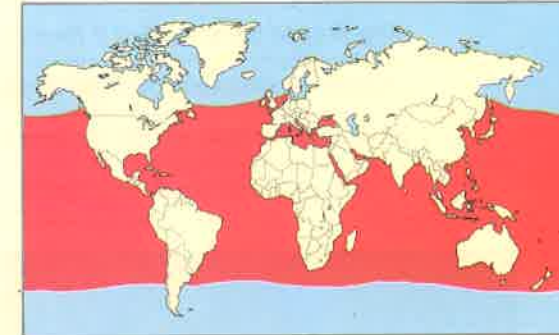
**Diet:** Mainly crabs, crayfish, and bivalves.

**Lifespan:** Females usually die after breeding at about 2 years of age; males live longer.



### RELATED SPECIES

Octopus are closely related to squid, cuttlefish, and nautilus.



Range of the octopus.

### DISTRIBUTION

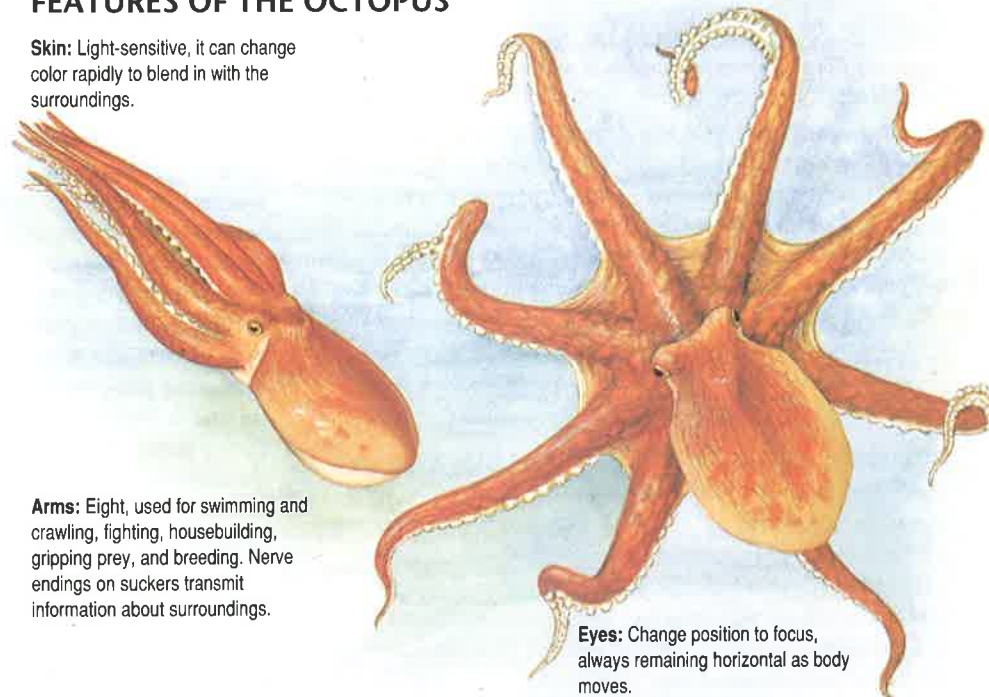
The octopus is found worldwide, generally in warm waters.

### CONSERVATION

Because of overfishing, the octopus has become scarce in some localities. In these areas, the octopus needs protection so that the population can recover.

## FEATURES OF THE OCTOPUS

**Skin:** Light-sensitive, it can change color rapidly to blend in with the surroundings.



**Arms:** Eight, used for swimming and crawling, fighting, housebuilding, gripping prey, and breeding. Nerve endings on suckers transmit information about surroundings.

**Eyes:** Change position to focus, always remaining horizontal as body moves.



The strange-looking octopus has a bulbous body and eight arms. Its bag-shaped body—called a mantle—houses a remarkably well developed brain and nervous system, making the octopus surprisingly intelligent.



### HABITS

A bottom-dwelling animal, the octopus makes its home in a hole or rock crevice in shallow water. Sometimes it digs a gravel nest or forms a protective area with a pile of rocks. By day, the octopus spends

most of its time hidden in its lair. When it hunts, it propels itself by swimming or crawling along on its tentacles. Its large, lidded eyes are adapted to focus in dim underwater light.

### DID YOU KNOW?

- The first writing ink was made from pigment found in the octopus's ink sac.
- The octopus is messy. It is easy to identify its lair by the pile of discarded shells outside the entrance.
- If an octopus damages one

of its vital arms, it can grow a new one.

- The octopus is capable of learning. In an experiment, octopuses were trained to distinguish between shapes and also to recognize objects by touch.



Far left: An octopus crawls along the seabed on its tentacles.

Left: The octopus swims headfirst. In emergencies, it can expel water through the funnel-shaped end of its mantle to give it a real burst of speed.

### FOOD & HUNTING

The octopus does most of its hunting at night. It emerges from its rocky lair to seek crabs, crayfish, and mollusks, which are its favorite foods.

The octopus catches most of its prey by stealth. Having changed color to blend in with its surroundings, the well-camouflaged octopus waits for prey to pass by and then seizes it with its long arms. The arms are powerful and flexible, with two rows of suckers that help it grip its slippery prey. The octopus then stuns its victim with a secretion of nerve poison. To stalk lobsters and other dangerous prey, the octopus squirts ink into the water to form a screen. Hiding behind the dark cloud, it creeps up on its victim and grabs it from behind.

If the octopus's prey is hard-shelled, the octopus punctures the shell by drilling with its tongue, which is covered in small, sharp teeth.

### PREDATORS & DEFENSES

The octopus's predators include moray and conger eels, dolphins, and sharks. Whenever possible, the octopus will escape from its predators by shooting a jet of water through its body to create a burst of speed.

Often, however, the octopus avoids detection completely. It can change its body color and texture so perfectly that it can virtually disappear. The colored pigment in its skin can be concentrated or diluted, forming

stripes and patterns that blend into the environment.

The octopus's ink sac also helps it avoid attack. It releases a disorienting black cloud that is accompanied by another secretion to dull the attacker's sense of smell.

### BREEDING

When octopuses mate, the male sends waves of spermatozoa down one of its arms—the *hectocotylus*—into the female to fertilize her eggs.

For about a week afterward, the female lays clusters of

grapelike eggs inside her nest. She will not leave her nest in the month to 6 weeks that it takes for the eggs to hatch. Because female octopuses do not eat while they are guarding their eggs, it is

not uncommon for them to die of starvation.

The eggs hatch into larvae that look like tiny versions of their parents. They come to rest on the seabed, where they mature quickly.



Frank Lane Picture Agency

The female octopus lays up to 150,000 eggs and guards them for four to six weeks.



Bruce Coleman Ltd

An octopus egg reveals the embryo within. Hatching time depends on water temperature.



Oxford Science Films

When hatched, the 1/4-inch larva resembles a perfectly formed baby octopus.



# EUROPEAN STARFISH

CARD 7

GROUP 6: PRIMITIVE ANIMALS

CLASS  
Asteroidea

FAMILY  
Asteroiidae

GENUS & SPECIES  
*Asterias rubens*



**The European starfish is a brownish-orange color and has five tapering limbs that give it its star shape. It is a common seashore sight along the coastline of western Europe.**

## KEY FACTS



**SIZES**  
**Length:** Up to 18 in. across.  
**Arm length:** Up to 10 in.



**BREEDING**  
**Sexual maturity:** 1 year.  
**Spawning season:** Spring.  
**No. of eggs:** About 2.5 million eggs in each spawning.  
**Larval stage:** About 2 months.



**LIFESTYLE**  
**Habit:** Occurs where prey is abundant. Creeps across seabed using tube feet.  
**Diet:** Mainly bivalve mollusks, especially oysters, mussels, and scallops.



**RELATED SPECIES**  
There are about 1,600 species of starfish in 31 families, distributed throughout the oceans of the world. The family *Asteriidae* includes numerous species in North America.



Range of the European starfish.

### DISTRIBUTION

Found on the coasts of northern and western Europe and northwest Africa, from the lower shore to 650 feet below sea level.

### CONSERVATION

The European starfish is still common and widespread throughout its range, but some are collected, dried, and sold as decorative trinkets.

## FEATURES OF THE EUROPEAN STARFISH

**Outer surface:** Supports many tiny pincers that snap shut on intruding creatures to deter or even kill them.

**Outer wall:** Very flexible. Made mostly from muscle fiber and bony supports.

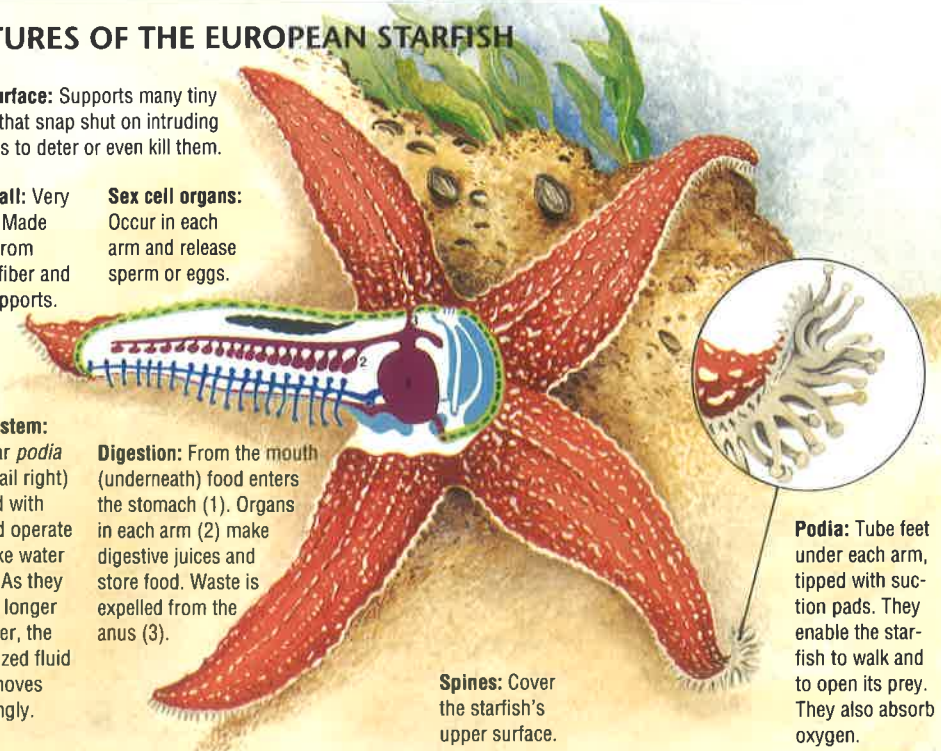
**Fluid system:** Muscular *podia* (see detail right) are filled with fluid and operate much like water pumps. As they become longer or shorter, the pressurized fluid inside moves accordingly.

**Sex cell organs:** Occur in each arm and release sperm or eggs.

**Digestion:** From the mouth (underneath) food enters the stomach (1). Organs in each arm (2) make digestive juices and store food. Waste is expelled from the anus (3).

**Spines:** Cover the starfish's upper surface.

**Podia:** Tube feet under each arm, tipped with suction pads. They enable the starfish to walk and to open its prey. They also absorb oxygen.







*The European starfish, which is all legs and has no real head, seems a strange creature.*

*It uses its suction feet to crawl along the seabed and to grasp its prey. With these suction feet, it can even pry open mussel and clam shells.*

## FOOD & FEEDING

Some starfish filter nutritious particles from the water, but most, including the European starfish, are predators. They eat sponges, corals, worms, mollusks, crustaceans, other starfish, and small fish. They use their tube feet to detect prey from chemical signals in the water and to ensnare their victims.

The European starfish is especially fond of bivalve

*Left: A starfish uses hundreds of suction feet to creep slowly on the seabed.*

mollusks such as mussels, oysters, and clams. These creatures seal their shells tight when attacked, but the starfish wraps its body around the prey and uses its tube feet to pull the two halves of the shell slightly open. It extends its stomach outward through its mouth and into the shell itself. The starfish releases digestive juices that break down the victim's tissue. The resulting soupy mixture is absorbed into the extended stomach.



*Above: A starfish pumps digestive juice into a mussel to dissolve it.*



*Left: Even a hermit crab can fall prey to a starfish.*



## NATUREWATCH

European starfish are often found on mussel beds. Other European species include the cushion star, with stubby arms, and the sunstar,

with 10 or more arms. The dry remains on beaches are the animal's bony plates. The softer parts have usually decomposed or been eaten.

## CHARACTERISTICS

The bodies of starfish are very different from those of most other animals. The European starfish has five identical arms radiating from a flat central area, and other starfish have as many as 50 arms. The central area contains the mouth (on the bottom), the anus (on top), and the main stomach organs in between.

Bony plates in the starfish's

body give it support. All over the surface there are tiny pinners that snap shut to defend against creatures that try to settle on the starfish.

Sensitive tube feet with suction pads line the bottom of each arm. These  *podia*  detect and trap prey. To move forward, the starfish repeatedly extends its tube feet and fixes each to a new spot.

## DID YOU KNOW?

- Adult starfish consume three times their weight in food every day. Young starfish may eat 10 times their body weight.

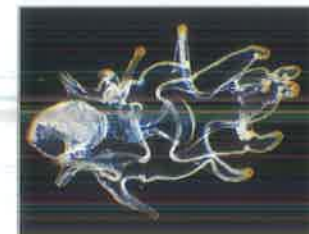
- Crown-of-thorns starfish graze on living coral. They recently destroyed large sections of Australia's Great Barrier Reef.



## BREEDING

The male and female European starfish look similar. During the spring spawning season, they produce millions of sex cells and release them into the water through special pores. When a female releases sex cells, she triggers neighboring males and fe-

*Left: A starfish usually moves only when feeding or if the seabed temperature changes.*



males to release theirs, and many of the cells intermingle.

A fertilized egg hatches into a floating, bean-shaped, symmetrical larva. It grows twelve arms and floats near the surface for several more weeks. Eventually its arms are replaced by three new arms.

The larva inverts itself and, using its three arms and a suction foot, anchors itself to the seabed. A star-shaped bud grows on the rear of the larva and eventually takes over. After a year it is a mature, but small, adult, measuring four inches across.

*Left: After weeks of floating, the larva adheres to a rock and changes into an adult.*



# ROBBER CRAB

CARD 5

GROUP 6: PRIMITIVE ANIMALS

CLASS  
Crustacea

ORDER  
Decapoda

FAMILY  
Anomura

GENUS & SPECIES  
*Birgus latro*



**The huge robber crab is the best known of all land crabs. Its name comes from its habit of stealing anything it can carry away in its large pincers.**

## KEY FACTS



**SIZES**  
Width of body: 18 in. Including tail, 30 in.  
Weight: Up to 6 lb.



**BREEDING**  
**Mating:** On land, year-round.  
**Eggs:** Several hundred laid at a time.  
**Hatching time:** Several weeks.  
**From hatching to leaving the sea:** Several months.



**LIFESTYLE**  
**Habit:** Terrestrial. Mainly nocturnal on inhabited islands.  
**Diet:** Fruit and *carion* (dead animals).  
**Lifespan:** Unknown, probably long-lived.



**RELATED SPECIES**  
The robber crab's closest relative is the hermit crab, which it resembles when young because it lives in other animal's shells.



Range of the robber crab.

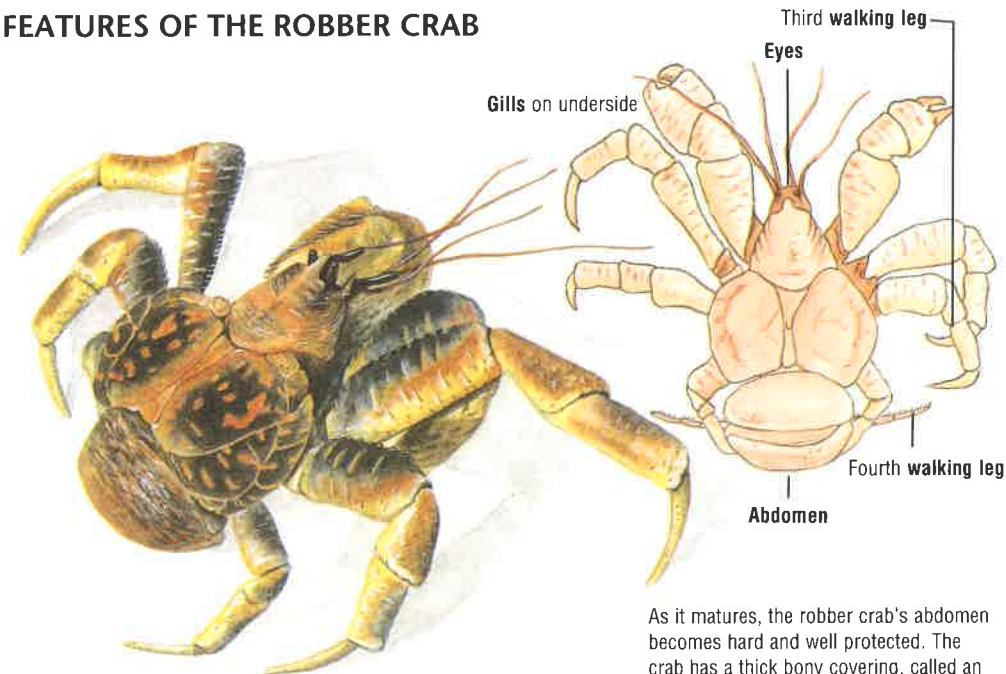
### DISTRIBUTION

Found mainly on islands in the Indian and Pacific oceans. Range extends east from Zanzibar to the Gambier Islands.

### CONSERVATION

Numbers are constantly decreasing on heavily inhabited islands because of loss of habitat. On more remote islands, pollution is the greatest threat to the crab's survival.

## FEATURES OF THE ROBBER CRAB



As it matures, the robber crab's abdomen becomes hard and well protected. The crab has a thick bony covering, called an *exoskeleton*, which helps conserve precious water.





*The robber crab is also called*

*the "coconut" crab because it sometimes feeds on coconuts. It is also known as the "terrestrial hermit" crab because of its habit of living in shells when it is young. Still, it does not belong to the same family as the true hermit crab.*

### HABITS

Although the robber crab hatches in the water, it spends most of its life on land, where it lives in rocky crevices or shallow burrows.

The robber crab climbs trees to escape predators or to find shade when it is very hot. The crab has no special adaptations that enable it to climb. It simply grasps the trunk with the sharp, pointed claws located on each leg and hauls itself up.

The crab climbs backward down trees, and it can walk backward on land as well.

It was once believed that the robber crab fed on coconuts by cutting them down with its pincers and then breaking the shell. But it is now known that the crab cannot break open coconuts. Instead, it feeds on those that are on the ground and already split apart.

### DID YOU KNOW?

- The robber crab has become so adapted to living on land that it will drown if it is submerged in water for more than a few minutes.
- The robber crab grows much larger than the hermit crab, possibly because it does not need to find a shell to accommodate its growing body as it matures.
- The world's largest crab has a leg span of over six feet. It lives deep in the ocean and never comes to the surface.
- Robber crabs steal cooking utensils and cutlery from campsites. One was even seen dragging a camp stove into the bush, while another was found pulling a whiskey bottle behind it.

### FOOD & FEEDING

Robber crabs feed on *carrion* (dead animal matter), as well as various types of fruit. They locate food primarily by smell, sometimes from several yards away. They even consume the remains of other robber crabs. Sometimes they chase other crabs to their burrows, where they pull off and eat the claws that the crabs use to defend themselves.

The meat of the coconut fruit is one of the robber crab's favorite foods. When the fruit is plentiful, the crab eats enough to grow to its maximum size. The robber crab often carries its food great distances to a hiding place before eating it.

**Right:** A robber crab climbs a papaya tree.



### BREEDING

Robber crabs mate on land. The female carries the eggs under her abdomen, waiting until low tide to release them in shallow water so she won't be swept away by the tide.

When the eggs hatch, the larvae barely resemble crabs. They spend much of the time

floating among plankton. Most of the larvae are eaten by aquatic animals that feed on plankton, so only a tiny proportion survives.

The larvae eventually shed their skin, or *molt*, and begin to resemble crabs. They crawl out of the surf and onto the

beach, where they remain for the rest of their lives. At this stage their bodies are still soft, so they crawl into tiny, empty mollusk shells for protection. After molting several times, they become fully mature and abandon their shells.

**Right:** A female robber crab heads to the sea to lay her eggs. When the eggs hatch, most of the larvae are eaten by predators.



### SPECIAL ADAPTATIONS

The robber crab is uniquely adapted to life on land. It withstands extreme drought by absorbing water from the moist earth and by sealing its burrow to keep it damp.

The robber crab breathes through gills, like other crabs. But its gills are modified for use on land. They are surrounded by spongy tissue that contains many blood vessels, similar to lungs. The crab keeps its gills moist by dipping its brushlike hind legs in water and stroking them over the bronchial tufts within the gill cavity.

The robber crab drinks by picking up water droplets with its claws and transferring them to its mouth.



# FIDDLER CRAB

CARD 4

GROUP 6: PRIMITIVE ANIMALS

CLASS  
Crustacea

ORDER  
Decapoda

FAMILY  
Ocypodidae

GENUS & SPECIES  
*Uca* var.



J.Nielson/Biophoto

**The male fiddler crab has one claw that is much larger than the other. It makes him look as though he is carrying a fiddle and a bow and gives him his name.**

## KEY FACTS



**SIZES**  
Length: Up to 1-2 in.  
Length of male's claw: Up to 2 in.



**BREEDING**  
Sexual maturity: 1-2 years.  
Mating: Several times a year, depending on species, location, and the tides.  
No. of eggs: Several hundred.  
Incubation: About 7-10 days. Eggs hatch into tiny planktonic larvae.



**LIFESTYLE**  
Habit: Solitary, shore-living.  
Diet: Organic particles scraped from grains of sand or mud.



**RELATED SPECIES**  
There are many different types of fiddler crab belonging to the genus *Uca*. Some species can be identified by the particular form of their mating display.



Range of the fiddler crab.

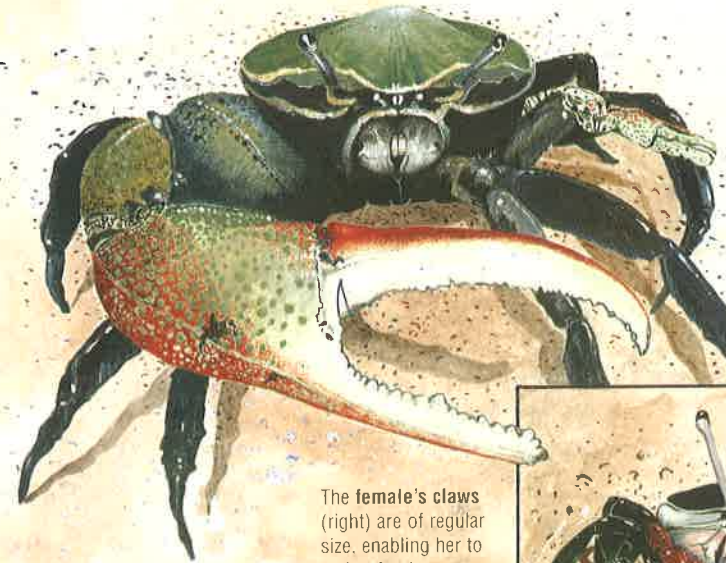
### DISTRIBUTION

Found throughout the warmer areas of the world, including the shore of the Pacific Ocean, the South Atlantic, and the Mediterranean.

### CONSERVATION

Fiddler crabs are found in large numbers throughout their range. The main danger to their survival is the increasing level of marine pollution worldwide.

## THE FIDDLER CRAB'S CLAWS



The male fiddler crab's claw (left) is greatly enlarged and brightly colored. By displaying his claw to a female, the male hopes to lure her into his burrow to mate. By waving his claw at other males, he warns them to stay away from his territory; he also uses it when fighting with rival males.

The female's claws (right) are of regular size, enabling her to gather food more easily than the male.



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B.P. Kent/Oxford Scientific Films



*There are several different species of fiddler crab found throughout the warmer parts of the world. They are generally quite small, about the size of a walnut, and can be very brightly colored—especially the male of the species.*

### HABITS

Fiddler crabs spend most of their time out of the water, feeding on the shore when the tide is out. Staying close to the long burrows they excavate in the sand, the crabs retreat into the holes at the sign of any danger.

When the tide is in, the crabs bury deep into their individual burrows, safe inside a pocket of air. Although fiddler crabs spend all of their time on land, they breathe through fish-like gills that need to be kept moist.

### PREDATORS

At its larval stage, the fiddler crab is eaten by a wide variety of predators, such as the flamingo, which scoops up the larvae by the thousands.

Adult crabs also have many predators. Birds, such as the

frigates and terns, swoop down and snap them up. The whimbrel chases the crabs across the beach, breaking off their legs before eating them. Foraging mammals dig them out of their burrows.

### DID YOU KNOW?

- In certain species of fiddler crab, the males have an enlarged right claw, while in others, they have an enlarged left claw (see below).
- As the fiddler crab grows, it must shed its outer shell, or *molt*. Because the crab's new shell is still soft while molting, it seeks the shelter of its burrow, where it is safe from most predators.
- The world's largest crab is the giant spider crab, which lives at great depths off the coast of Japan. Its shell is only 12 inches across, but its legs can stretch as wide as 6 feet.



### FOOD & FEEDING

Fiddler crabs use their front claws to feed by scooping up sand and mud, which they pass to their mouthparts. They eat the algae, which they separate from the grains of sand and mud. The inedible parts are ejected on the seashore in the form of tiny, pea-sized pellets. Because sand and mud contain very little organic material, the fiddler crab must feed continually to survive.

Male fiddler crabs spend twice as long feeding as the females.

R. Smith/T. Stack & Associates



*Left: Fiddler crabs in the Everglades search the mud for the minute particles of food on which they depend.*

*Far left: Male fiddler crab in a typical stance.*

### BREEDING

The male fiddler crab uses his large, brightly colored claw to attract females. He will display his claw to a female and then retreat into his burrow, where the female follows him to mate.

After mating, the female carries several hundred eggs

attached to her abdomen. Within two weeks, the eggs are fully developed and are deposited into the sea. The larvae soon hatch and spend the first part of their lives as part of the *plankton* (microscopic plants and animals) that floats in the ocean. As the

larvae grow and molt, they begin to resemble tiny crabs and are eventually washed up on the beach.

Young fiddler crabs excavate their own burrows, but will not mate until they reach full size, becoming sexually mature at 1 to 2 years old.

*Right: A female fiddler crab piles mud around her burrow while the male tries to attract her attention by displaying his claw. If he succeeds, they will mate in his burrow.*



C.B. Firth/Bruce Coleman



# PORTUGUESE MAN-OF-WAR

CARD 3

GROUP 6: PRIMITIVE ANIMALS

CLASS  
*Coelenterata*

ORDER  
*Siphonophora*

FAMILY  
*Physalidae*

GENUS & SPECIES  
*Physalia physalis*



*Sailing where the wind takes it in the warm oceans of the world, the iridescent beauty of the Portuguese man-of-war disguises its deadly sting.*

## KEY FACTS



**SIZES**  
**Length:** Body, 3-14 in.; tentacles usually 45 in.; in rare instances, tentacles may grow to 150 in.



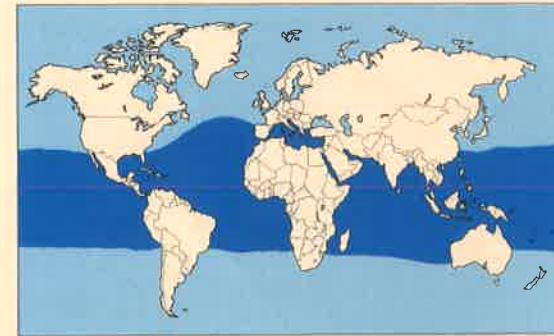
**BREEDING**  
**Reproduction:** Usually by asexual budding; polyps break away from the main colony to form new, separate colonies.



**LIFESTYLE**  
**Habit:** Marine wanderer; may be found in large groups.  
**Diet:** Any small fish.  
**Lifespan:** A few months.



**RELATED SPECIES**  
Numerous species in the genus, many known as Portuguese men-of-war (at least 20 different species recorded in the Mediterranean area alone); close relatives include the by-the-wind-sailor.



Range of the Portuguese man-of-war.

### DISTRIBUTION

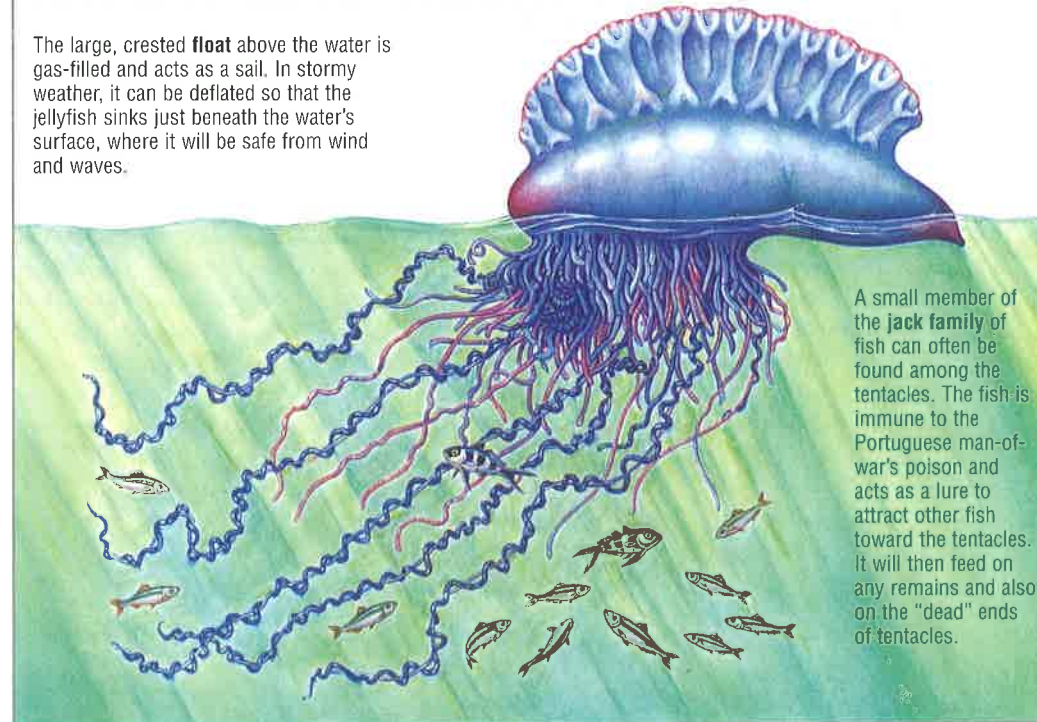
Found throughout warm seas of the world, most commonly in the Gulf Stream of the northern Atlantic and the Indian and Pacific oceans.

### CONSERVATION

Little is known about the susceptibility of the Portuguese man-of-war to oceanic pollution and reduced fish stocks, but at present, the species is in no danger.

## FEATURES OF THE PORTUGUESE MAN-OF-WAR

The large, crested **float** above the water is gas-filled and acts as a sail. In stormy weather, it can be deflated so that the jellyfish sinks just beneath the water's surface, where it will be safe from wind and waves.



A small member of the **jack** family of fish can often be found among the tentacles. The fish is immune to the Portuguese man-of-war's poison and acts as a lure to attract other fish toward the tentacles. It will then feed on any remains and also on the "dead" ends of tentacles.



*The Portuguese man-of-war is a complex form of life.*

*It is an entire animal colony, composed of several types of polyps. Each has a special function, and they work together to swim, feed, and reproduce.*



*Left: A jellyfish releases a deadly cloud of poisoned barbs from stinging cells called nematocysts.*

*Right: Once a fish is caught, it is drawn up by the muscular, stinging tentacles to be eaten by the jellyfish's feeding polyps.*

### HABITS

These jellyfish normally live in the offshore waters of warm seas throughout the world. They can often be found together in large groups. During the warmer months, they tend to drift poleward.

The Portuguese man-of-war's translucent, iridescent float extends 6 inches above the surface of the water and acts like a sail. It can even maintain a course in the same way a sailboat does.

### DID YOU KNOW?

- A deadly relative of the Portuguese man-of-war is the bluebottle (*P. utriculis*), found in the Pacific and Indian oceans.
- Portuguese men-of-war are

related to corals and sea fans.

- This jellyfish was given its name by 18th-century sailors who reported sighting a creature that looked like a Portuguese ship.

### HABITAT

Beneath the Portuguese man-of-war's float are clusters of polyps, called a colony. Many tentacles hang from the colony, and some contain stinging cells that paralyze small fish swimming close by. The man-of-war's muscular, stinging cells then lift the prey up into the colony. Special feeding polyps in the colony digest the fish.

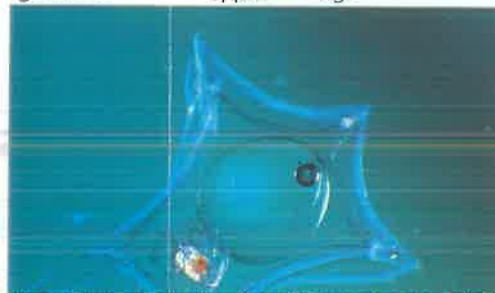
The Portuguese man-of-war is not a selective eater. It will eat any fish small enough to be quickly overcome. However, it usually does not attack the small fish of the jack family that help it to lure and trap prey (see back cover).

### BREEDING

The reproductive system of the Portuguese man-of-war is not fully understood. It is known that the polyps within the colony are responsible for reproduction. New colonies are generated

asexually from these polyps. In this way, each Portuguese man-of-war can reproduce itself many times over. This capability is thought to be the reason why they appear in huge numbers.

**Right:** Produced from tiny cells, the Portuguese man-of-war larvae soon grow to resemble miniatures of the adults.



### SPECIAL ADAPTATIONS

The Portuguese man-of-war is armed with a great number of tiny, stinging cells, called *nematocysts*. Each cell contains a coiled, hollow tube tipped with barbs. Any pressure on the cells causes the barbs to be released. The barbs shoot into the prey like miniature harpoons and remain attached to the tentacles. The sting contains a powerful poison similar to cobra venom. Stung fish die quickly.



*Above: Closeup of the stinging cells on tentacles.*



*Left: A Portuguese man-of-war drifts in the warm waters off of Mozambique. Its trailing tentacles mean certain death for any small fish that may carelessly brush past.*



# GARDEN SNAIL

CARD 2

GROUP 6: PRIMITIVE ANIMALS

ORDER  
*Gastropoda*

FAMILY  
*Stylommatophora*

GENUS & SPECIES  
*Helix aspersa*



Recognized by its sluglike body and the spiral-patterned shell that it carries on its back, the edible garden snail is considered a delicacy by many people.

## KEY FACTS



**SIZES**  
Shell: Up to 2 in. wide and 1 in. high.  
Body: 3-4 in. long.



**BREEDING**  
Sexual maturity: Can be up to 2 years in large-shelled specimens.  
Mating: Warm nights in summer.  
No. of eggs: 20-50 per batch.  
Hatching time: 1 month.



**LIFESTYLE**  
Habit: Hibernates in winter; dormant on hot summer days.  
Diet: Leaf and plant matter.  
Lifespan: Can live as many as 10 years, but this is rare.



**RELATED SPECIES**  
There are about 80,000 species of snail in the world. They are found on land and in both fresh and sea water.



Range of the garden snail.

### DISTRIBUTION

Native to Great Britain, in the Mediterranean eastward to the Black Sea, and in western Europe as far north as Germany. Introduced to Southern California, Louisiana, and the Carolinas.

### CONSERVATION

There is no immediate threat to the survival of the garden snail.

## THREE GARDEN SNAILS

The term garden snail can be quite confusing; in the past, it has also been used to refer to two other types of snail—the white-lipped and brown-lipped banded snails, *Cepaea hortensis* and *Cepaea nemoralis*.



**Left:** The garden snail has a brown shell flecked with black.

**Top right:** A brown-lipped snail's shell is usually some shade of brown, pink, or yellow. It either is plain or has from one to five dark brown bands.

**Bottom right:** A white-lipped snail has a smaller shell, usually a yellowish color with a white lip. The shell may have five dark bands.



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*Not confined solely to gardens, snails are found in a variety of habitats, from coastal cliffs and dunes, to hedges, woods, and parks. Like most land snails, they prefer damp places with plenty of shade.*



#### NATUREWATCH

During the day, garden snails can be found withdrawn into their shells in damp, dark crevices in yards. They are commonly found in flower pots and wooden flower boxes. When snails are hibernating, they tend to gather together in large numbers at favored spots, such as under stones and leaves, or among the stems of ivy.

In the summer, snails are more visible because they come out of their hiding places at night. Brown-lipped snails can be seen attached to the tops of plants and dead stems, where they remain until the first rains arrive.

#### HABITS

Snails spend the day withdrawn inside their shells, hidden among crevices or under decaying plant matter. At night, they come out of their hiding places to feed.

Snails in temperate climates hibernate in the winter. During the long, hot, dry spells in the summer, they are in a state of *aestivation*—that is, in an inactive state. In both instances, the garden snail withdraws into the security of its moist inner shell. It then further fortifies itself by secreting one or more layers of mucus, which hardens over the hole of the shell to form a protective seal.

Right: Snails produce a frothy substance as a form of defense.

#### HABITAT

Most snails eat the leaves of plants such as primrose, nasturtium, and, particularly, lettuce. Still, snails usually do less damage to gardens than slugs. After foraging for food, their strong homing instinct will lead them back to their roosts.

In captivity, snails have shown distinct preferences for dandelion leaves and nettles, but they will eat a wide range of leafy plants, as well as lichens and



*The garden snail (above) and the white-lipped snail (right) move by gliding on their flat, muscular foot.*

algae. Some species of snail are carnivorous and eat small insects and even other snails.

#### DID YOU KNOW?

- The snail's shell is made of a lime-rich substance. For this reason, large numbers of snails are found on alkaline soils, which have high lime content.
- Banded snails vary greatly in color and pattern. Brown and

- pink forms are more common in woodland, where they blend in with dead leaves. Yellow and striped forms predominate in open land, where they blend in with sun-bleached grass.



#### BREEDING

All snails are *hermaphrodites*—that is, they have both male and female sex organs. However, although all snails can both produce sperm and lay eggs, they must still mate before reproduction can take place.

Mating takes place on warm, damp summer nights. The two individuals rear up and press their undersides together before releasing sperm into one another. After mating is completed, the snails lay their eggs in the ground. Snails may lay several batches of eggs, each of which is fertilized with the sperm of a single mating. Sperm can be stored in their bodies for future use.

The tiny, newly hatched snails have fragile, transparent shells. As the snail grows, its shell gets bigger and becomes more spiral in shape.

Top right: Snails mate and mutually impregnate one another. Center: Tiny, pearl-like eggs are laid and buried in the ground. Right: Hatchlings are very fragile and transparent.

