

# Carp

What should we know?

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**Species tool**

# Carp:

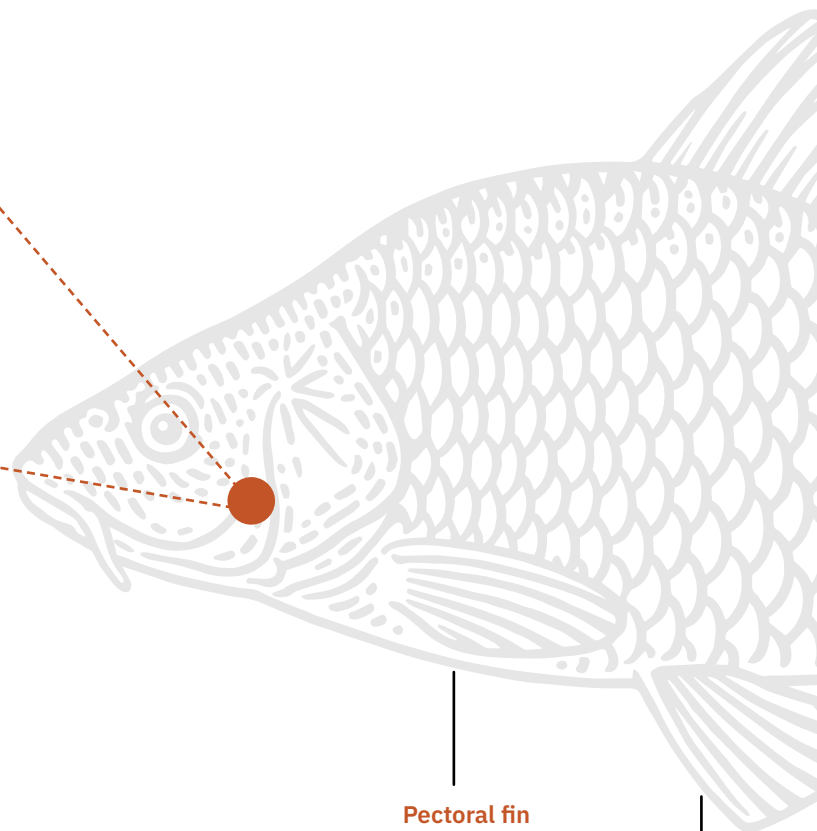
## What should we know?

Carp (*Cyprinus carpio*) belong to the extensive cyprinid family, and they were among the first fish to be farmed. It is assumed that the carp originate from the Caspian Sea area and have spread east and west through the Rhine and Danube river systems. Carp farming is an ancient form of fish breeding. It started around 2,000 years ago in China, where wild fry from rivers were stocked in closed ponds. Other species were often farmed in the same pond in a form of polyculture. In Europe, carp farming started in the Middle Ages, and they were kept in ponds by the Romans and Christian monasteries. Carp was often eaten during the fasting periods of the year. In the 19th century, carp farming progressed into a semi-intensive monoculture, whereby the carp became more domesticated. The fry were produced from the largest fish in the pond, serving as broodstock. The carp is still a popular table fish in some parts of Europe. It is a long-living fish, with some specimens known to be more than 40 years old.

Carp are found in the slower-flowing parts of rivers and canals, lakes and reservoirs and grow best at water temperatures of 20–28°C. This species prefers warmer water, feeding very little and only occasionally in the cold winter period. Carp are strong and hardy fish that can stand relatively low oxygen levels. They are omnivorous bottom-dwellers but will also feed in the middle and upper layers of the water if food is available there. Carp are known to dig into the bed of the water body with their extendable mouth in search of insect larvae and other food items. This can create murky water in smaller ponds. Apart from insect larvae, carp eat other invertebrates, like molluscs, crustaceans, worms and zooplankton. Their long digestive tract can also digest fibrous plant material. Carp, like other cyprinids, have no stomach and cannot store a lot of food. Therefore, they often have a grazing foraging style. All cyprinid species have **pharyngeal teeth** that grind their food to process it. These teeth are located in the throat. Because they lack teeth in the front part of their mouths, they have to suck the food in. To this day, carp are still farmed for consumption, but also to populate natural waters and for commercial angling lakes. The lakes in southern Europe can produce very large carp due to their longer growing season, attracting anglers from around the world.



The pharyngeal teeth of the carp, were used by various prehistoric Eastern European communities for decorating clothing.

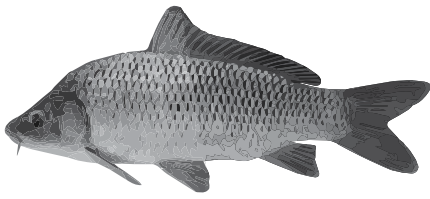


Pectoral fin

Pelvic fin

# Well-known carp species are:

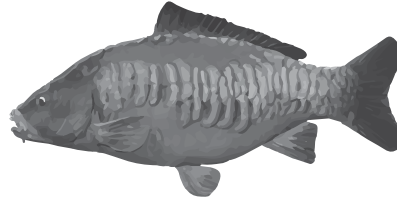
All these variants of carp are farmed for consumption but catch and release anglers like them too because they are very strong, grow to very large sizes and the partially scaled fish can be recognised by their unique scale patterns when caught again.



## Common carp

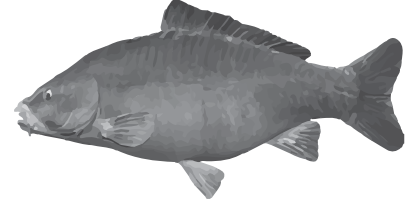
*Cyprinus carpio*

A fully-scaled, muscularly built fish with a broad tail and a long dorsal fin. These fish have four barbels at their mouth — two on each side — that contain taste buds.



## Mirror carp

This is a partly scaled variant of the common carp with irregular, scattered, large scales spread over leathery skin. Some mirror carp are fully scaled, although this is not very common.



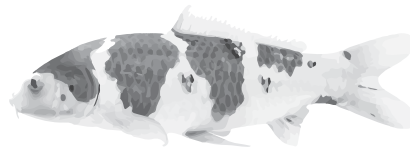
## Leather carp

This variant of the common carp has no scales at all and only has leathery skin.



## Linear carp

Another variant that is partly scaled but with the large, irregular scales covering its lateral line organ only.



## Koi

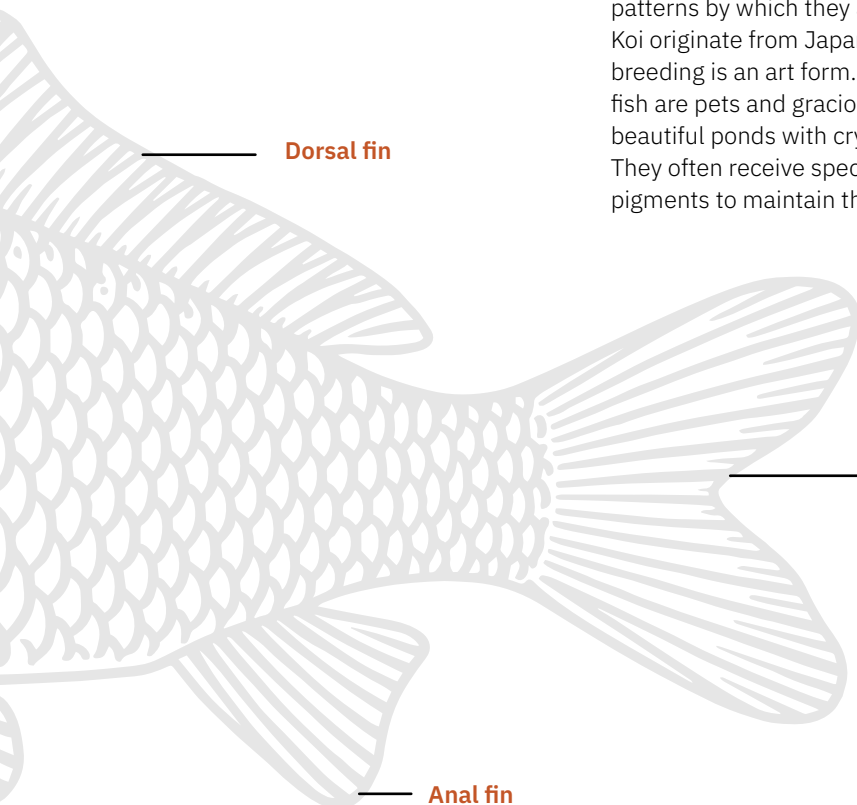
The world-famous koi is a highly appreciated garden pond fish. Koi are torpedo-shaped and have unique colour patterns by which they are classified. Koi originate from Japan, where koi breeding is an art form. These colourful fish are pets and graciously swim in beautiful ponds with crystal clear water. They often receive special diets with pigments to maintain their colour.



## Grass carp

*Ctenopharyngodon idella*

Have torpedo-shaped bodies, are dark greenish and have a herbivorous lifestyle. It is cultivated in China for food production and was introduced in Europe and the United States for aquatic weed control.



Dorsal fin

Caudal fin

Anal fin

Carp farming is an ancient form of fish breeding. It started around 2,000 BC in China

# Carp farming

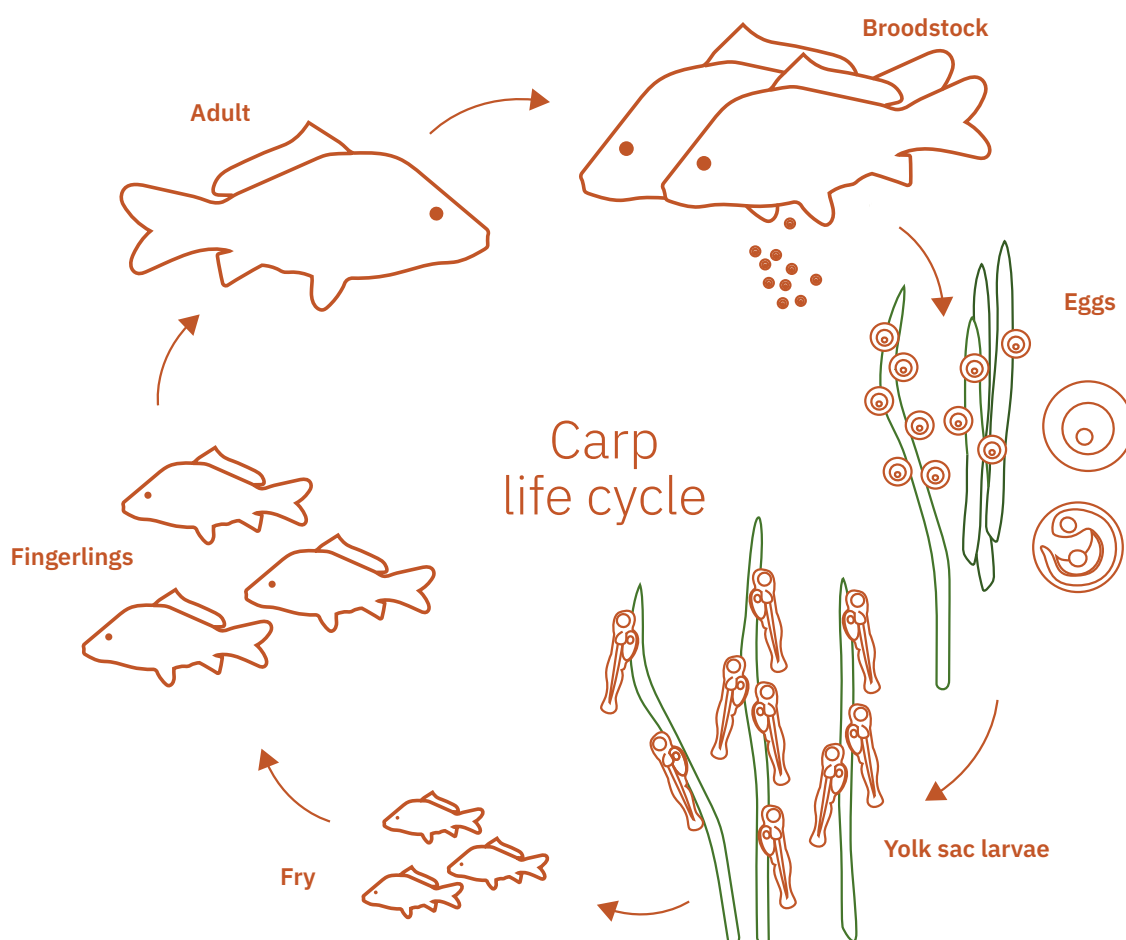
## Hatchery

European carp are ready to spawn in spring when the water temperature reaches 18°C, usually somewhere from May–June. A female carp can produce 100,000–200,000 eggs per kg of body weight. The diameter of the eggs varies between 1.5–2.5 mm. After the eggs are released by the females and fertilised by the males, they become sticky so that they can adhere to aquatic plants or other substrates, which prevents them from suffocation in the sediment on the waterbed. After hatching, the larvae have to swim up to swallow air to fill their swim bladder. The yolk sac phase lasts 7–9 days, after which the larvae can feed on the available plankton.

## Natural spawning is still used today for fry and fingerling production.

In that case, broodstock (often 3–4 males per female) are stocked in shallow spawning ponds with a lot of aquatic vegetation. The exact spawning takes place depending on the seasonal conditions. The fry can be collected from the spawning ponds after two or more weeks, depending on the desired size for stocking in the nursery ponds.

Under more controlled conditions in a hatchery, hormonal stimulation is often used for timing the egg release and the eggs are stripped and collected. The collected eggs are then de-sticked and incubated in Zuger or McDonald Jars, where they are left until they hatch. The larvae, after their yolk sac phase, can be fed with plankton from outside ponds and artemia, after which they are weaned to dry feed.

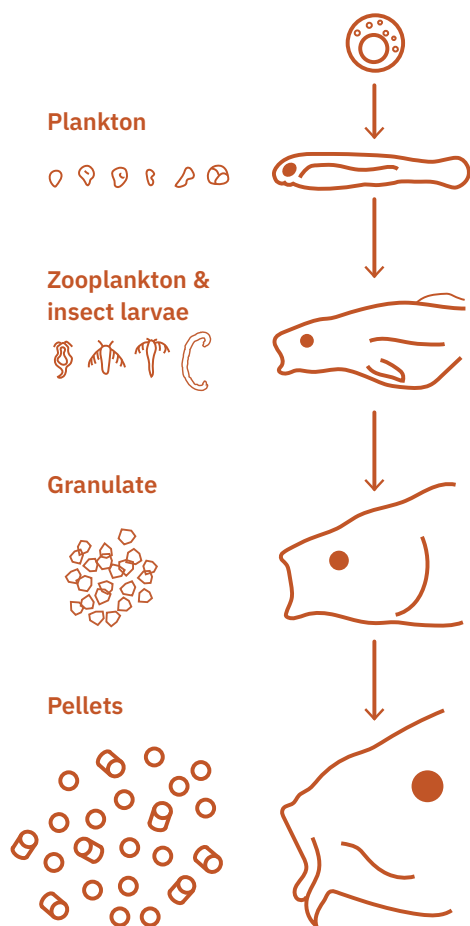


## Nursery

After two or more weeks, the fry can be grown to fingerlings in nursery ponds. These ponds are enriched with manure fertiliser and sometimes inoculated with plankton to provide sufficient natural food. Supplementary feed can be given as well to increase production. At the end of the summer, the farmed carp can weigh 30–50 grams and are called K1. Avoiding colder months, the growing season is limited from spring until autumn.

## Ongrowing

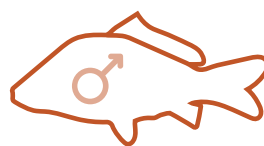
Pond farming is the leading farming practice for common carp and is mostly found in eastern European countries because they have a strong tradition of eating freshwater fish. On-growing takes place in large ponds that can be fertilised for larger natural food production. Supplementary feed is often given in the form of grains, press-pelleted feed and, for the more productive farms, extruded feed. After two summers (K2), farmed carp can weigh 250–500 grams, and after three summers (K3), 1.2–1.5 kg can be reached. This is the usual harvest size.



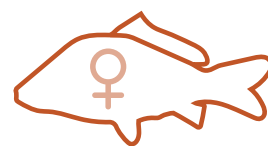
## Broodstock

In Europe, carp are sexually mature at around 4 years of age and 40–45 cm. The males are ready to spawn after 3–4 years and females after 4–5 years. The best growers are selected to become the future broodstock. Through this selection process, strains have been developed that are more domesticated and adapted to the conditions on-farm and, therefore, better production results are possible. The partially scaled carp strains have especially high shoulders and grow fast. Several European countries have developed their own strains of carp to suit their farming conditions best.

Ready to spawn  
at 3–4 years



Ready to spawn  
at 4–5 years



Several European countries have developed their own strains of carp to suit their farming conditions best.

## Harvest

Today, carp are harvested mostly in autumn and towards Christmas, which is when people traditionally eat this fish. The algae have disappeared at this stage, and the taste of the meat is at its best. Moreover, the carp are in prime condition at this time after the rich summer feeding. Usually, fish of around 1.5 kg are preferred, but some markets take fish of 3 kg.





# Commercial products

Carp can be prepared in many ways. One common way is filets of carp in a beer batter fried in oil with a potato salad, which is a classic in the German kitchen. Another classic is carp in blue cooked in water or fish stock with vinegar. But more contemporary recipes serve pan-fried filets of carp with seasonal vegetables or whole oven-baked carp. Carp fits into a healthy diet, with high-quality protein and a good amount of omega-3 fatty acids, although less than marine species.



# Challenges in carp production



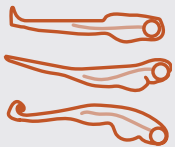
## Seasonal influences

Seasonal fluctuations are a challenge in carp farming. In cold summers, the carp grow slowly, and in hot summers, water quality issues sometimes arise. Obviously, carp do not grow in winter and can lose condition and weight. Algae can cause off flavour problems in the ponds and lakes where the carp are grown on to market size. Predators like herons, cormorants and, in some places, otters are also an issue.



## The market

The market is restricted to countries that have a tradition of eating carp. In some places where carp is popular, it is even limited to primarily elderly people that were brought up eating it regularly. There is a lack of marketing and promotion to reach the younger consumers and push the health and locally and sustainably produced angles that appeal to modern diets. The industry could also invest in providing carp in ready-to-eat meals that only need to be heated up at home.



## Deformities in carp larvae

Carp larvae reared in hatcheries without access to live food are sensitive to deformities of the head, operculum and tail. Most dry starter diets seem to lack essential, available nutrients for healthy tissue and skeletal development.



## Growth performance

Carp farming relies on natural food and supplementary feeds like grains, but these do not promote fast growth. Press-pelleted feeds can give slightly better results, but it is with extruded feeds that the growth rate and FCR can be considerably improved.



## Koi pigmentation

To bring out the colours of koi, pigments are used, but it can be difficult to achieve the right colours without tainting the white skin areas.



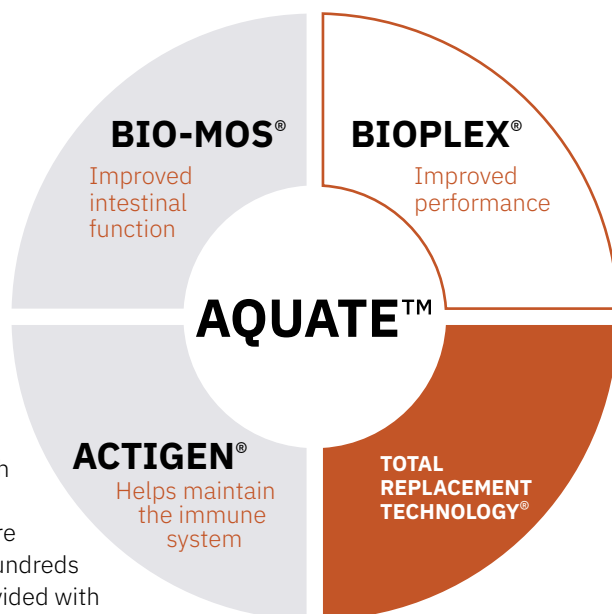
# Solutions:

## Extruded feeds with the inclusion of Aquate

Extruded feed developed for carp with the right composition can optimise the growth and FCR of carp farms. This will lead to higher productivity. Alltech Coppens offers extruded feeds designed for optimal growth performance in traditional pond farming and more intensive production systems.

These feeds contain **AQUATE™**, including **BIO-MOS®**, **ACTIGEN®** and **BIOPLEX®** chelated minerals. Bio-Mos supports digestive function, mucus barrier protection, immune response and optimises growth. Actigen also supports fish growth and robustness. Bioplex chelated minerals have a much higher bioavailability than inorganic minerals, and this helps to make sure that the fish's requirements are more easily met. Minerals play hundreds of roles in the fish's metabolism, and with Bioplex, the fish is provided with minerals in the ideal form without unnecessary pollution.

With the feeds Alltech Coppens supplies, the carp not only grow well but are better prepared for the colder winter, starting it with a very good condition.



## Essence, special feed for carp larvae

The Alltech Coppens Aqua Centre (ACAC) has addressed challenges related to carp larval rearing. Carp larvae have difficulties digesting and absorbing some nutrients due to their lack of a stomach and slowly maturing digestive tract. This has resulted in the well-known larval feed called Essence. Essence contains the right amount of available nutrients for skeletal development and minimises deformities. Essence is used in larval rearing for carp, koi and other cyprinids.



## Pigmenting koi

Alltech Coppens specialises in carotenoids for pigmenting koi while keeping the white skin pure white. Additionally, advice can be given as to how to use the different feeds of the Alltech Coppens koi feed program for the best results. The **AQUATE™ premix** plays an important role in keeping koi in excellent condition.



## Research & development

With 30 years of experience researching, developing and producing high-quality catfish feeds, Alltech Coppens offers on-farm assistance through our dedicated sales team and technical support team, ensuring optimal farm performance.

Alltech Coppens formulates feed on the 4 Pillars of Fish Nutrition: **Palatability**, **Performance**, **Pollution Control** and **Planet**.

All four pillars are important and taken into the balance of sourcing new/alternative raw materials:



### 1. Palatability

To ensure the best growth and performance of fish, optimal feed intake is vital. Fish must be attracted to the smell and taste of the feed.

### 2. Performance

Our feeds must perform well. This means that they must generate healthy growth and ensure efficient feed utilisation. This is a decisive factor in the profits of fish farmers.

### 3. Pollution Control

To maintain water quality and secure optimal fish health and performance, it is crucial that all our feeds are highly digestible, thereby decreasing the risk of pollution.

### 4. Planet




The environmental sustainability of the feed.









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