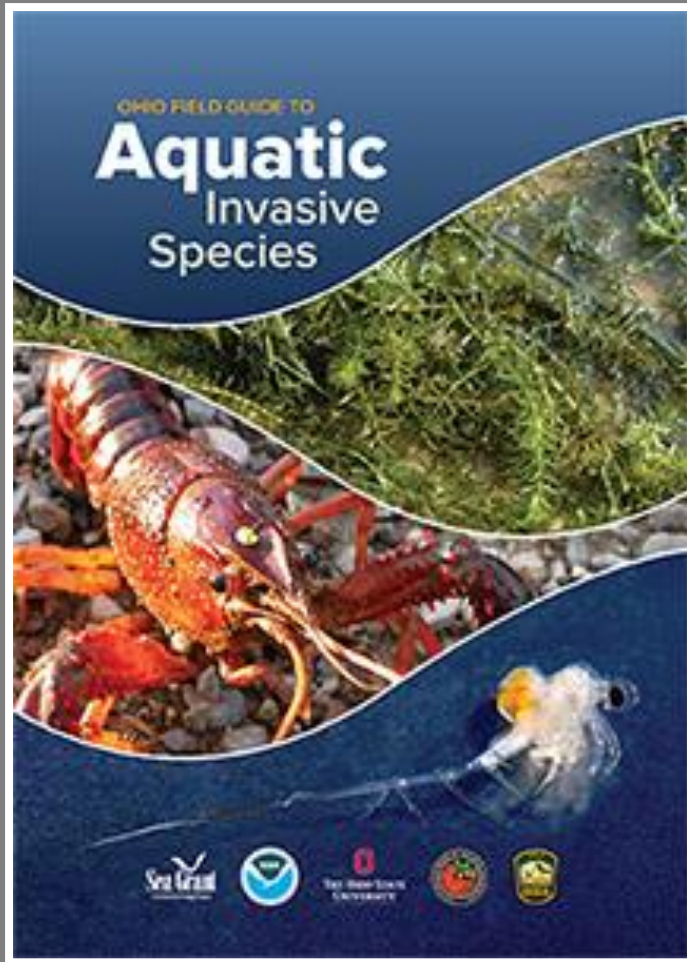


# Ohio Field Guide to Aquatic Invasive Species



- Developed by
  1. ODNR, Division of Wildlife
  2. Ohio Sea Grant
  3. The Ohio State University
- Includes the Following (61)
  1. Plants (28)
  2. Invertebrates (14)
  3. Fish (19)
- Developed as an early detection tool for aquatic invasive species

# Species Accounts

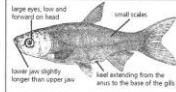
## Silver Carp

*Hypophthalmichthys molitrix*



### Species at a Glance

The silver carp is a member of the Asian carp complex, which also includes bighead, black, and grass carps. Its large size, voracious appetite, and ability to leap out of the water make it an enormous threat to the state's fisheries and recreational economies.



### Identification

This very large filter feeder averages 40–70 cm (16–28 in) in length, but can reach up to 130 cm (51 in) and weigh up to 36 kg (80 lbs). Its deep body is **laterally compressed**, with a **ventral keel** that extends forward from the anus almost reaching the base of the gills. Large eyes are located low and forward on the head. The mouth is large and **terminal**, and the lower jaw is slightly longer than the upper jaw. No barbels are present on the mouth. The short **dorsal fin**, which lacks spines, contains 7–10 rays. Scales are very small. Coloration is olive to grayish-black on the back, with silvery sides blending to white below, and darker pigmentation on the fins.



### Similar Species

While it most closely resembles the invasive bighead carp (*Hypophthalmichthys nobilis*), the silver carp is fairly uniform in color, whereas the bighead has irregular dark blotches on its back and sides. The bighead also has a less extensive keel, spanning from the **pelvic fin** to the **anal fin**. Silver carp may also resemble the common carp (*Cyprinus carpio*), which has barbels on either side of the mouth, and species of suckers (*Catostomidae*), which have thick lips containing small folds or nipple-like bumps. Small, juvenile silver carp also look superficially similar to native gizzard shad.

### Habitat

The silver carp is an exclusively freshwater fish, preferring large river systems, lakes, or impoundments with flowing water needed for spawning. It can feed in temperatures as low as 2.5°C (36.5°F) and can withstand low levels of oxygen.

### Spread

Once introduced to open waters, the silver carp readily spawns and disperses. Because juveniles resemble some common baitfish species, it may be unintentionally spread through the use of live bait. It can also spread in illegal shipments of live Asian carps, which is popular in the Asian food market.

### Distribution

Native to eastern Asia, the silver carp was intentionally introduced into the United States to control algae in aquaculture ponds. During flooding in the early 1980s, it escaped into the Mississippi River and has since moved upstream towards the Great Lakes. In Ohio it can be found in the Ohio River drainage, and there are records from Adams, Brown, Clermont, Gallia, and Hamilton counties.

### Environmental Impacts

The silver carp consumes vast amounts of plankton and **detritus** each day, competing with native filter feeders and juvenile fish for food. In addition, when startled by boat motors or other equipment, the silver carp can leap up to 3 m (10 ft) out of the water, posing a risk of injury to boaters and water-sport enthusiasts.

### Ohio Distribution



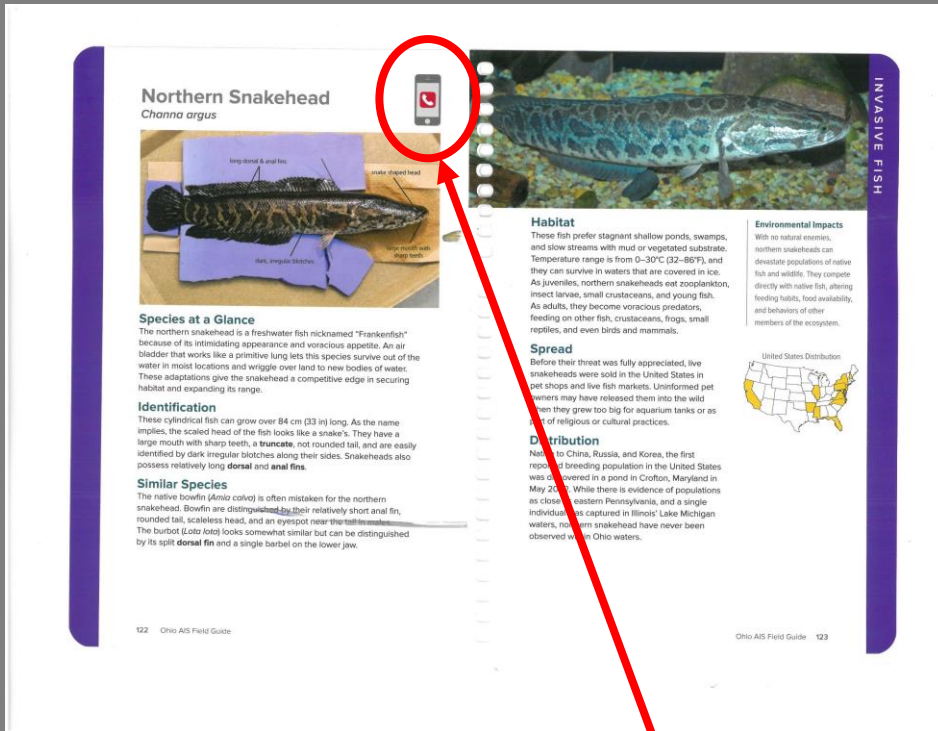
### United States Distribution



INVASIVE FISH

- Species at a glance
- Identification
- Similar Species
- Habitat
- Spread
- Environmental Impacts
- Distribution in Ohio and Nationally

# How to Use The Guide



- Sent to People in the Field:
  1. ODNR Biologists and Law Enforcement
  2. Ohio EPA
  3. County SWCD's
  4. USFWS
  5. Universities
  6. Consultants
- Printed on waterproof paper and spiral bound (durability)
- Public version pending

- Phone Icon Indicates that you should report your find to the ODNR Division of Wildlife at <http://ohiodnr.gov/ais/reporting>



## Silver Carp

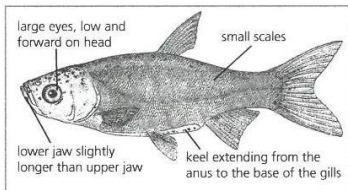
*Hypophthalmichthys molitrix*

IN LAKE ERIE BASIN



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Ohio Distribution



United States Distribution



# Oriental Weatherfish

*Misgurnus anguillicaudatus*



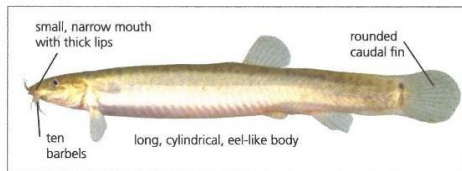
## Species at a Glance

The oriental weatherfish, also called the dojo and Chinese loach, is a small eel-like fish

that gets its name from its ability to “forecast the weather.” It is sensitive to changes in barometric pressure, so increases in activity and swimming in fast circles can indicate that major weather changes are imminent. This species is also popular in the aquarium trade because it is hardy and has a voracious appetite that can help keep tanks clean. Unfortunately, the release of this species into natural waterways has caused negative impacts to water quality, native species, and the food web.

## Identification

The oriental weatherfish has a long, cylindrical, eel-like body with greenish-gray-brown marble markings on the dorsal side, and pale silver sides and underbelly. Many specimens have a large pigmented spot located above the base of the **caudal fin**. The mouth is small and narrow with thick, fleshy lips surrounded by ten barbels. The **lateral line** is short and doesn't extend past the **pectoral fins**. Each **pectoral fin** has a stout spine, and the **caudal fin** is rounded. Average size is up to 28 cm (11 in). This species exhibits sexual size **dimorphism**, with the average length of the female being considerably larger than that of the males.



## Similar Species

Because of its eel-like body, the oriental weatherfish may be confused with species of lamprey; however, lampres are typically thinner, have no **pectoral** or **pelvic fins**, and don't have the characteristic barbels on the mouth.

## Habitat

This species is very hardy and can survive a wide range of temperatures and environmental conditions. It is typically found in slow or still waters with muddy or silty bottoms abundant with aquatic plants. It feeds on bottom-dwelling animals, insect larvae, snails, and worms. The oriental weatherfish can breathe atmospheric oxygen by using its intestine as an accessory respiratory organ, allowing it to live in oxygen-poor waters and to bury itself in soft substrates to survive long droughts.

## Spread

Commonly used as bait and sold in the aquarium trade, the oriental weatherfish is released when aquariums are dumped or when bait buckets are emptied. Its popularity as a food-fish is also linked with its purposeful introduction into the wild to create harvestable populations.

## Distribution

Native to eastern Asia, the oriental weatherfish was most likely introduced to natural waters in the United States by fish farm and aquarium escapes. It is found in both eastern and western parts of the United States, and has established in eastern Illinois, western Indiana, and central Michigan within the Midwest.

## Environmental Impacts

The oriental weatherfish can negatively impact native species by predation and competition for food, habitat, and spawning sites. It can also increase **turbidity** and nitrogen levels in standing water, which can negatively impact water quality.

United States Distribution





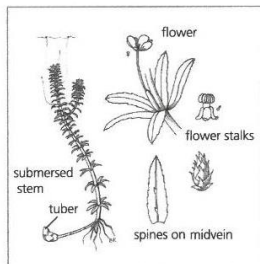
# Hydrilla

*Hydrilla verticillata*



## Species at a Glance

*Hydrilla* is a **submerged** aquatic perennial that could be considered nature's "perfect weed." It comes in two forms, **dioecious** and **monoecious**. Both forms grow and spread at a very fast rate, covering the surface of water bodies and restricting boating, fishing, swimming, and other recreational uses. Stands of **dioecious** *Hydrilla* in Florida constitute the only aquatic plant known to have developed resistance to an herbicide.



## Identification

**Leaves:** While morphological characteristics can vary, leaves are typically strap-like and pointed, with small sharp teeth on the edges that are difficult to see with the naked eye. Spines or conical bumps are sometimes found on the mid-rib on the underside of the leaf; however, these are not always present. The underside of the **mid-rib** can also be red. They are generally 2–4 mm (0.08–0.2 in) wide, 6–20 mm (0.2–0.8 in) long, and occur in **whorls** of 3–8.

**Flowers:** Small (10–50 mm [0.4–2 in] long), white flowers which float on the water's surface are attached at the leaf **axils** and are clustered towards the tips of the stems.

**Stems/Roots:** Long and branching stems form intertwined mats at the water's surface. Plants are usually rooted to the lake bottom, growing upward from the substrate in water up to 3.7 m (12 ft) deep. During the late growing season, small white **tubers**, which are used for energy storage, are formed on the plants root's, allowing it to overwinter.



## Similar Species

*Hydrilla* closely resembles Brazilian waterweed (*Egeria densa*) and common elodea (*Elodea canadensis*). Brazilian waterweed typically has **whorls** of 3–6 leaves, is usually 2–3 cm (0.8–1.2 in) long, and has minute teeth on the **margins** with no conical bumps on the **mid-rib** below. The native common elodea has leaves that occur in **whorls** of three and is usually a much smaller plant. Neither common elodea nor Brazilian waterweed produces the **tubers** or **turions** found on *Hydrilla*.

## Habitat

*Hydrilla* grows in a wide variety of still and flowing water, including freshwater lakes, ponds, rivers, impoundments and canals. It tolerates a wide range of pH, nutrient, and light levels and is somewhat winter-hardy, but optimum temperature for growth is 20–27°C (68–81°F).

## Spread

Because *Hydrilla* reproduces primarily vegetatively, even the smallest living plant fragment can float downstream and form a new plant. While it was imported to the United States as an aquarium plant, recreational activities now help it spread.

## Distribution

While it is unknown where *Hydrilla* originated, possible native ranges include Asia, Africa, and Australia. It continues to spread and is listed as a federal noxious weed in the United States. While the **dioecious** form appears to spread from South Carolina south, the **monoecious** form is spreading both north and south and is typically the form found north of North Carolina. The Ohio range map data is incomplete; it was first reported in the Cleveland area and has now spread along the Ohio waters of the Ohio River. Care should be taken by boaters on the river to not inadvertently transport this aggressive invasive plant.

## Environmental Impacts

*Hydrilla*'s dense thick mats interfere with commercial activities by clogging water intake pipes and filters and hindering irrigation. It also restricts recreational uses and prevents sunlight from reaching other species growing beneath it. As the mats die and decay, bacteria deplete oxygen from the water, impacting fish and other aquatic organisms.

Ohio Distribution



United States Distribution



# We Need a Refresh

- **Species:**
  1. What to add
  2. What to remove
- **Edits:**
  1. Content
  2. Maps
- **Reviewers:**
  1. Eugene, Tory, John, Mark
  2. Others Interested?