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What happens to sea lampreys if catfish move in?

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Abstract

Sea lampreys travel through many of the rivers in Europe and North America as they *migrate* between the places where they lay eggs and the ocean. Now they face a new threat: the enormous European catfish people have brought to the rivers where sea lampreys have always traveled. So what happens when sea lampreys meet these catfish? To answer this question, we attached sensors to sea lampreys: one that would let us track their movements in the Garonne and Dordogne Rivers in France and one that would tell us if they were eaten by another fish. We found that many sea lampreys are eaten by European catfish, and these new fish pose a serious threat to the survival of sea lampreys in their native habitat.

Introduction

Sea lampreys (*Petromyzon marinus*) are a very old species, present on Earth long before dinosaurs. They are long, snake-like fish that suction onto other fish to suck their blood. Sea lampreys *migrate* each year, swimming from the North Atlantic Ocean to the rivers where they hatched. Once they arrive upstream, they lay their eggs to make babies. It is a dangerous journey for the adult sea lampreys to return to the river. They must face dams, fishermen, polluted water, and rivers that are warmer and drier because of a changing climate. Because of all these threats, sea lampreys are now *endangered* in many of the rivers where they have always traveled to lay their eggs.

More recently, sea lampreys have faced a new threat in the rivers: European catfish (*Silurus glanis*). People brought this enormous kind of fish to many of the rivers where sea lampreys migrate, and European catfish are now widespread in western and southern European rivers. They can grow huge – up to 2.7 meters long and 130 kg in weight – and they are known to eat sea lampreys. Until the arrival of the catfish, the sea lamprey had few or no predators in rivers. How big a risk do European catfish actually pose to sea lampreys migrating in rivers? We wanted to find out.

Sea lampreys are long, jawless fish that migrate from the North Atlantic ocean up rivers in Europe and North America to lay their eggs.
Source: C. Krueger, GLFC

Methods

During the sea lamprey migration in the Dordogne and Garonne Rivers in France (Fig. 1) in April and May of 2019, we caught 49 sea lampreys. We anesthetized them so we could add two sensors under the skin of each: one that would tell us the sea lamprey's location and another that was coated in a special material that would dissolve in acid. The second sensor would let us know if the sea lamprey was eaten by a big fish, like a European catfish, because the inside of their stomach is very acidic and would cause the sensor coating to melt. This causes the sensor's code to change, indicating a predator ate the sea lamprey. After we attached the sensors, we released the sea lampreys back into the river.

We kept track of each of the sea lamprey's movements, as well as whether or not they were eaten by a bigger fish, for 25 to 50 days. Whenever a sea lamprey sensor showed that it had been eaten, we assumed that it was eaten by a European catfish, because they are the main predators for sea lampreys in these rivers.

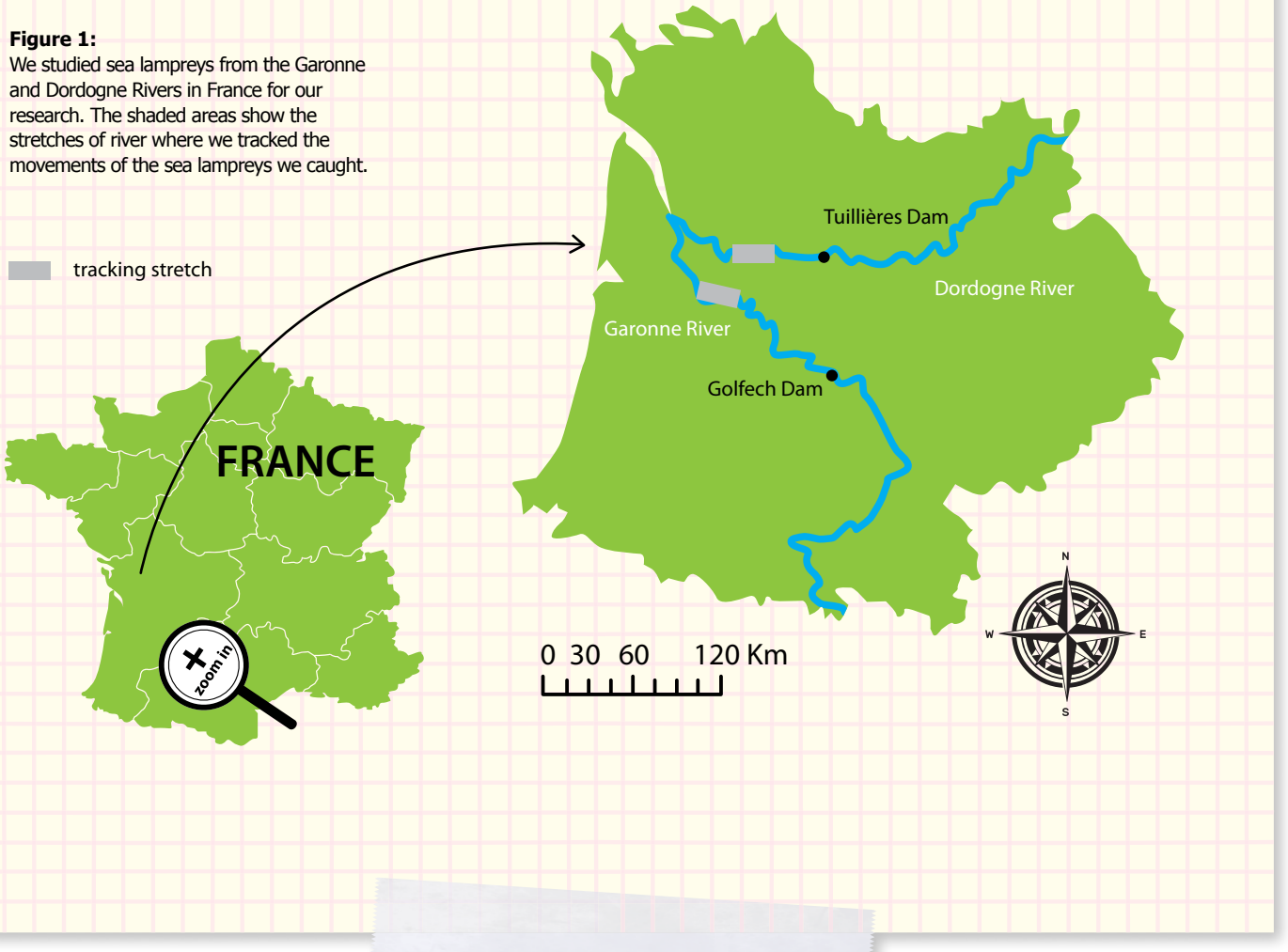
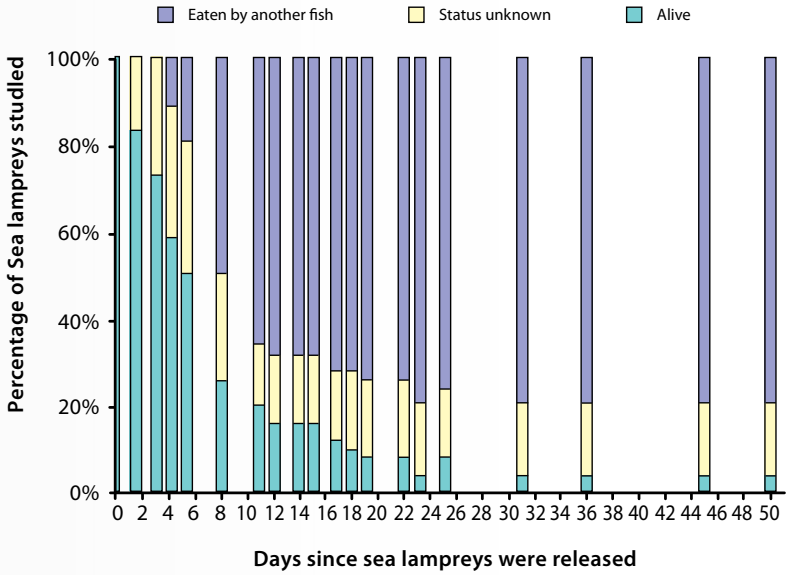


Figure 1:
We studied sea lampreys from the Garonne and Dordogne Rivers in France for our research. The shaded areas show the stretches of river where we tracked the movements of the sea lampreys we caught.

Results

80% (39 of 49) of the sea lampreys we studied were eaten by other fish as they swam in the river. Most of the sea lampreys we studied did not last long in the river: many of them were eaten within the first week of being released (Fig. 2) and they did not get far from where we released them (averaging about 5.5 kilometers).

Figure 2:
The percentage of sea lampreys that we caught and studied in the Garonne and Dordogne Rivers that were eaten after we released them.



What percentage of sea lampreys were eaten in the first 8 days? What percentage were still alive after 3 weeks?

Discussion

Our research shows that European catfish are dangerous predators for sea lampreys. European catfish like to eat at night, which is when sea lampreys like to swim. In addition, sea lampreys are slower swimmers than European catfish. When the water level in the river is low, sea lampreys are especially easy *prey*, because low flows cause sea lampreys to swim slower than European catfish.

European catfish ate so many of the sea lampreys in our study that we think that European catfish pose a serious risk to the ability of sea lampreys to safely continue their migration patterns, especially when they also have to deal with fisherman, dams, pollution, and a changing climate. To help save sea lampreys, we need to find ways to lower the numbers of European catfish in these rivers. We can also protect sea lampreys by limiting how much people fish for them and by helping keep rivers clean.

Conclusion

People brought European catfish to the rivers where sea lampreys live – and now that we know they are a problem, we can take action to protect sea lampreys from these new predators. In general, introducing a new species to a *habitat* can often cause problems. In fact, sea lampreys themselves became *invasive species* in the Great Lakes of North America after they traveled up a series of human-made canals to get there from the ocean. We can help keep wild animals safe from new predators by not taking them from their *native habitat* to introduce them to new places.

Glossary of Key Terms

Anesthetize – Take away feeling or cause to go to sleep (usually to avoid causing pain).

Endangered – At risk of going extinct.

Habitat – The environment or place where a creature lives.

Invasive species – Living creatures that are not native to an ecosystem and cause harm to the environment and other animals that live there.

Migrate, migration – Seasonal movements of an entire population of animals from one place to another.

Native habitat – The environment or place where an organism originally lived.

Predators – Creatures that get food by killing and eating other creatures.

Prey – A creature that is hunted and killed for food by another animal.

Check your understanding

1. How did the researchers know that the sea lampreys in their study were eaten by European catfish?

2. What percentage of the sea lampreys in our study were eaten by predators? Why were they eaten so quickly?

3. To save sea lampreys, we need to find ways to lower the numbers of European catfish in these rivers. How do you think we should do that?

4. Can you think of any other species of animal besides European catfish that might pose problems if humans brought them to a new place and released them? Why?

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