

University of Southern California Sea Grant Program

Garibaldi Territory



I. Background Material

If you were to peek under the waters of Santa Catalina Island and areas of the Southern California coast you might see a brilliant orange fish about a foot long, poised by a red algae-covered rocky outcropping, swooping and making loud “thumping” noises and putting on quite a show...for whom and why?

The garibaldi, or ocean goldfish, is the largest member of the damselfish family, and one of the few species that resides in the cooler temperate waters from central Baja California north to Monterey. Almost all other members of the damselfish family are found in tropical reefs around the world and are less than 8 inches long. The garibaldi is the state marine fish of California.

One of the most interesting things about garibaldi is their courtship and mating behavior. Males work hard to attract females and end up guarding the eggs and ‘raising the kids’ by themselves. There are many reasons that this behavior is helpful to this fish species.

The next level asks questions...take a moment and think about the answers that make sense to you, write them down, and then check your answers to see if you are right!

II. Garibaldi Questions: What do you know? What can you figure out?

Male garibaldi compete with one another to attract females. Take a moment to think about:

Q. What ways or means would a fish like a male garibaldi have to attract a female?

A.

Q. What would be of interest to her and why would she choose him?

A.

Write down your ideas and questions!

III. Garibaldi Questions: What do you know? What can you figure out?

Q. Why would the male go to all this trouble?

A. If you answered because there was an advantage to being able to have more successful breeding and successful births...you would be right! The more females he can attract the greater possibility that the eggs will be laid. And the greater the number of eggs successfully hatched makes it more efficient for the amount of energy this has cost him. This idea of energy 'conservation' is important in the big picture of reproduction for garibaldi and many other fish. Because the male does not need to put a lot of energy into making sperm....he produces huge quantities in comparison to his size....he then has more energy available for guarding the nest. It's the opposite for the female garibaldi. She has to put a lot of energy into making eggs. If she also had to guard them, she would not only be spending more energy, but be too busy to eat the amount of food needed to produce as many, or as high of a quality eggs. So, this behavior may, in the long run, enable parents to raise more 'babies' or offspring, than they would otherwise, with less energy wasted.

Q. Do the males ever eat the eggs? Why do you think they might do that?

A. This may not make sense at first, since the poor guy goes to so much trouble, but you were correct if you answered "Yes!" Can you think of a reason why? If you answered that it either gave him energy because he cannot go out to eatyou would be a little bit right...but that is not the real reason. If you thought that it gave him some advantage for more females and more eggs you would be right on!

This is a bit more complicated....but the male will eat the older eggs, because the female does not choose to lay her eggs near the older ones. Exactly why females prefer nests with the youngest freshest eggs is another one of those unsolved mysteries. But scientists have learned that in other species males often put more effort in caring for larger broods or families. If the female deposits her eggs with other eggs that are similar in age then all of those eggs will develop and hatch fairly close together. Thus eggs in larger broods may benefit from a safety-in-numbers effect! Researchers have found that since females won't lay eggs near old clutches of eggs, 'egg-laying' space in the nest is wasted if old eggs remain. Therefore, in order to maximize the potential number of eggs, the male will eat the older ones and keep the area inviting for the new ones (this also gives him some added energy, since he is so busy he can't go 'out to eat' much!).

Q. What about the babies? Do they stay with the father?

A. No, after the eggs hatch...about two to three weeks after they are laid...the tiny fish larvae enter the sea of plankton (tiny to microscopic, plant and animal 'drifters') and are swept up by the prevailing currents. As 'drifters' they are transported to other areas never to be seen by the parent again. When they grow big enough to be able to swim by themselves they find their own territories in which to live.

If you've answered all the questions, you now should have a better understanding of how the whole picture works. The female finds a suitable male. She deposits her eggs on the algae mat in a clump, then the male releases his sperm over the eggs to fertilize them. Then the female garibaldi moves on to lay more eggs at another nest of her choice, and the male stays and guards his nest and clumps of eggs until they hatch and the tiny fish are carried away in the current.

VI. What else would you like to know?

Q. How long does the male keep up this breeding behavior?

A. About 10 years! The nest is re-used continually and is even taken over by another garibaldi when the owner dies, or moves on when he is no longer sexually active.

Q. What does a baby garibaldi look like?

A. Juvenile garibaldi are orange with iridescent blue spots. It is thought that the spots serve as a sign to mature male garibaldi that this is a young fish (not sexually mature) and not a potential threat or competition for mating or territories. Thanks to their 'identification spots' juveniles can safely hang out in the same area with adult garibaldi without being attacked.

Q. Have garibaldi ever "hurt" people?

A. Yes, occasionally divers get bitten by a frantic father! In fact the author of several articles, the well-known researcher Paul C. Sikkel whose articles are referenced here, started his 'love affair' with a garibaldi when the first one he ever saw swam up and clamped onto his cheek in a valiant attempt to protect his territory from such a large 'foe'!

VI. Other interesting aspects about fish biology to learn about:

Now that you know something about garibaldi behavior, here are some other ideas to investigate:

How is this behavior of garibaldi different from or similar to humans and other animals?

Did you know that in many fish species fish start off as one sex and change to another?