

## Gobiodon citrinus, one of the "coral gobies" most popular

Text & photos: *José María Cid Ruiz*

The genus *Gobiodon* (Perciformes, Gobiidae), comprises 31 species<sup>1</sup> of small gobies distributed over wide tropical areas of the Indian and Pacific oceans. They are small species (between 3 and 6.5 cm in total length), with attractive colour patterns. These gobies typically live attached to branches and nooks of different corals both "hard" (e.g. *Acropora spp*) as 'soft' (e.g. *Sarcophyton spp.*), which rarely leave.

Like all gobies, these species have merged its pelvic fins, in this way transformed into an organ of attachment, which allows them to remain strongly adhered to the surface of the coral, even in areas of strong current. They are sedentary fishes with limited radius of action, which basically consists in going ("jumping" rather than swimming) from a coral branch to another section. These gobies rarely leave its coral host for venturing into open waters. They are known popularly as "coral gobies".

### **Gobiodon citrinus, biology and acclimatization to aquarium**

One of the species most commonly kept in aquarium is *Gobiodon citrinus* (Rüppell, 1838). It is a species with large distribution areas including: southern Red Sea (Eritrea, Ethiopia), the entire east coast of Africa bordered by the Indian Ocean to Mozambique. Additionally, in the Pacific Ocean, it



is located in places as far apart as in northern and southern Japan, Samoa, Micronesia and Australia (both south and north, in the Great Barrier Reef). *G. citrinus* present a small size (6.5 cm the larger specimens). Juveniles have bright yellowish tones (with some darker variations according to geographic origin of the population in question). With the age their color darkens. In aquarium, sometimes they show a pale colour, due to any lack of carotenoids in the diet, which does not provide the yellow pigment.

The species show no appreciable sexual dimorphism with a naked eye. In nature, found in pairs or small groups.

Field studies<sup>2</sup> have shown that these groups are led by a specimen that stands by their larger size (a male) and several somewhat smaller specimens (all females). The species produces a toxic mucus<sup>3</sup> that covers its body and protects them from being eaten by large predatory fish species.

As already mentioned, its activity is concentrated around coral host in which they live (mainly of the genus *Acropora*), rarely venturing into open waters (it is a species that has absolutely no swim bladder). It is debated whether its relationship with the coral is a symbiosis (arguing that repels species whose feed is based on coral polyps and also was verified that in the stomach contents of some species of this genus there was filamentous algae which would have injured to the coral). But others authors believe that it is a mild form of parasitism (due to they found remains of coral polyps and coral mucus in its stomach contents). Its bathymetric distribution<sup>4</sup> ranges from 2 to 20 meters.

When planning its maintenance in captivity, we must remember that this is a planktivorous species and as such, requires a frequent feeding in small amounts. Some individuals may refuse to accept frozen food (*Artemia*, *Mysis*, *Daphnia*) or flake and requires a period of adaptation of several weeks, during which you mix these foods with live crustaceans (*Artemia salina* mainly).



Additionally, keep in mind that this is a vulnerable species when competing with others species for food, since they rarely go to mid-waters in search of food. Therefore, it is very appropriate its maintenance on aquariums dedicated to invertebrates, reef aquariums, aquariums with small and quiet benthic species or directly keep them in specific aquariums targeted to its reproduction.

Regarding the size of the aquarium and despite its modest size and peaceful behavior towards others species, do not underestimate its intraspecific aggressivity, because is common in small aquariums, watch aggressions by getting the best territories with corals placed strategically.



Aquariums of 150 liters can accommodate a couple or a threesome properly. The aquarium should contemplate living coral, preferably genus *Acropora*, or coral skeletons or artificial corals, definitely an environment and a relief that reflect their natural habitat.

### Breeding in captivity

*G.citrinus* is a hermaphroditic species. In nature, when a group loses its leader male, one of the females (generally the biggest) evolves into a male and starts to lead the group again. This feature of their biology is useful for breeding in captivity, because if we acquire a pair or trio, once well acclimated to the aquarium, it is highly likely that one of the specimens evolves to male, while the others remain as females.

The reproductive pattern that I have followed for this species was based on placing two groups of 6 specimens in two specific aquariums 300 and 400 l respectively. The evolution of both groups was similar, being formed after about a month a couple in both tanks (largest specimens with bright colors: reddish head and lemon-yellow tones on flanks). Both couples control a preferential area, where they interact together. The relationship between the components of each pair is large tolerance. From the epicenter of their territories, each pair is projected to pursue other specimens, but in all cases were not long or obsessive persecution, as have been observed in other species.

*Gobiodon citrinus*, one of the "coral gobies" most popular



Cohabitation was stable in both groups over several months without any casualties taking place. However, it was noticeable a certain level of stress in specimens living on the periphery of territories defended in each aquarium by one of the couples.

In aquarium, if they are well acclimated and their quality of life is high, it is not uncommon to watch spawnings. My two couples began to make their first spawnings at about the same time, four months after the initial formation of the two groups. The species spawns on a branch of the live or artificial coral which is the center of their territory. The female deposits the eggs in rows of circular outline, in an area that has previously been cleaned by the male. The male then proceeds to fertilize the eggs and cares about its surveillance until hatching.

In my tanks despite the abundant corals and rocks provided (perhaps due to a failure in choosing the elements over the bottom), they have often done the spawnings on the walls of the aquarium. Usually they have chosen little bit visible and accessible locations next to the center of their territory (they have come to spawn on the curved glass of the heater). The couple located in the aquarium of 300 liters has performed spawnings with an average of 100 to 150 eggs, while the couple placed in the 400 liters aquarium got an average between 60 and 80 eggs by spawning.

Spawning is frankly hard to be observed, due to that the couples do not change its behavior or coloration in the preliminary days. Once spawning occurs, we can see how one of the specimens (male) always stays taking care about the eggs, while the other (female) assumes the role of keeping out the other gobies.

The eggs are attached to the substrate by one of its two poles, through a set of



*Gobiodon citrinus, macho protegiendo puesta*

© José María Cid

adhesive filaments. The male with its pectoral fins, is fanning continuously the eggs. He is also dedicated to effectively remove infertile eggs (in my couples, the infertile eggs average was around 5%).

The egg, observed microscopically, has an elliptical outline and very similar appearance to the eggs of Amphiprion (Pomacentridae), but is much smaller, almost half (Lt: 1.1-1.2 mm). Males of the two couples bite with determination the "syringe" I use to suck eggs.

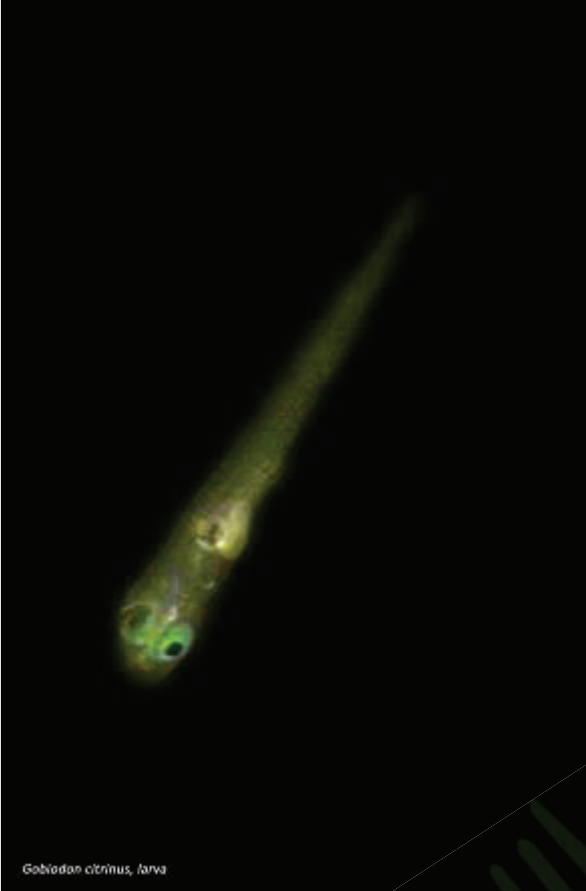
Embryonic development has had an average duration of four days at 26.5 ° C. The eggs were extracted at the end of the third day in a proportion of 80%, leaving a portion of it to the care of the male until hatching. Extracted eggs were placed in an incubator of eggs (conical) with sea water passed through sterilizer and a mild dose of bactericidal under moderate aeration.



© José María Cid

*Gobiodon citrinus, aspecto embrión dentro del huevo (x40)*





The pelagic larvae of *G. citrinus* are really tiny, not exceeding 2.4mm Lt at birth and have a very small yolk sac whitish. In my experience, it was not possible to develop the hatched larvae in my tanks with *Brachionus plicatilis* rotifers "type-L" (300  $\mu$ ). Probably higher chance of success can be achieved with smaller rotifers as *B. rotundiformis* or *Colurella adriatica* (150  $\mu$ ) or nauplii (60  $\mu$ ) of calanoid copepods as those belonging to the genera *Oithona* and *Parvocalanus*, among others. Copepod cultures require proper nutrition with unicellular algae *Isochrysis sp.* and rotifers should be enriched with phytoplankton, mixing the two unicellular algae *Isochrysis sp.* and *Nannochloropsis sp.* in the right proportion to achieve an intake of essential omega-3 fatty acids DHA and EPA in a ratio of 2: 1. ©

For more information or to contact the author: [www.aquaticnotes.com](http://www.aquaticnotes.com)

#### Trabajos citados

- 1: "FishBase" and "Catalog of Fishes" (A. of Sciences, California U.), review April,2014
- 2: Debelius H. 2001 "Coral Gobies" Rev. Today's Aquarium 23-25
- 3: Randall, J.E. and M. Goren, 1993. "A review of the gobioid fishes of the Maldives" . Ichthyol. Bull. J.L.B. Smith Inst. Ichthyol. (58):1-37
- 4: Baensch, H.A. and H. Debelius, 1997. Meerwasser atlas. Mergus Verlag GmbH, Postfach 86, 49302, Melle, Germany. 1216 p. 3rd edition.