

Spotlight

Shrimp goby species can often be very colorful - this is the Yellow Shrimp Goby *Cryptocentrus cinctus*. Note the commensal alpheid shrimp standing by its side.



THE SECRET SOCIAL LIFE OF SHRIMP GOBIES
TWO IS A COMPANY

The complex relationship between several species of gobies and their commensal shrimps offers a fascinating example of marine symbiosis

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Several species are little known and easily confused - this is a Black Shrimp Goby *Cryptocentrus fasciatus* with its attendant alpheid shrimp.

We have a fetish for shrimp gobies. They admittedly are an acquired taste – a bit like our own English Bull Terriers – since one must know them well to fully appreciate their beauty and curious habits, but once it's got you you're done for good. We started being intrigued by them during our countless dives in the shallow waters of the Ligitan Reefs of Borneo. Japanese divers – always sensitive to beauty that requires a great deal of patience – are very fond of them, and it was their frequent visits there that gradually spread the passion about these little gems so commonly observed around their own island of Okinawa. Most divers however simply ignore the majority of shrimp gobies or won't even see them at all, since these bottom-dwelling little fish are very shy and alert, and always ready to bolt down their tunnel dug in the substrate at the earliest sign of disturbance: but those who are shown them and take the time to patiently observe their antics will usually and easily fall for them.

IT'S ALL ABOUT SHARING

Shrimp gobies are so called because they usually share their oblique burrow with a blind alpheid shrimp, which first digs the tunnel and then keeps it in good shape and clean of debris; this association is species-specific (ie gobies belonging to a certain species will usually be found together with shrimps

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The Metallic Shrimp
Goby *Amblyeleotris fasciata* is one of the most colorful species belonging to this group of fascinating, small-sized benthic fish.





Clockwise, from top left: Yellow Shrimp Goby *Cryptocentrus cinctus*; top right, Diagonal Shrimp Goby *Ambyeleotris diagonalis*; bottom right, Ray-fin Shrimp Goby *Tomyamichthys* sp.; bottom left, Broad-banded Shrimp Goby *Ambyeleotris periophtalma*.

■ *Showy, unmistakable and larger than most shrimp gobies, this is the beautiful Orange-spotted Shrimp Goby *Amblyeleotris guttata*.*

of a particular species, and vice versa) and while being commonly observed, it is still far from being fully understood. First of all, when does it start? And, like the chicken and the egg story, which comes first? Does the goby look for his shrimp or is it the opposite? We have occasionally observed extremely small gobies (ie less than two centimeters long) already sharing a miniature

burrow with an equally tiny shrimp, so their relationship must start at a very early age. From what we have seen it would seem logical to deduct that – once settled on the substrate after leaving the larval stage – the tiny shrimp digs a small burrow and then openly advertises its “for rental” sign, hoping to attract a young goby looking for a house. It is also very common to

observe one single goby sharing its burrow with not one but two shrimps (presumably a pair), and yet it is much rarer finding two gobies sharing their tunnel with a single shrimp.

SILENT COMMUNICATION

The symbiotic behavior of the two small creatures is quite fascinating to watch.

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One of the most striking and easily identified Indo-Pacific species of shrimp gobies - this is the Sailfin Shrimp Goby *Amblyeleotris randalli*.

■ The stunning Black Sailfin Shrimp Goby *Flabelligobius* sp. is very rarely observed by divers and it is usually found in pairs.



More variations on a common theme: right, top, Diagonal Shrimp Goby *Amblyeleotris diagonalis*; right, bottom, Red Margin Shrimp Goby *Amblyeleotris gymnocephala*; far right, top, a *Cryptocentrus* sp.. Note attendant alpheid shrimps, all belonging to different species.



The blind (or semi-blind) shrimp frantically and industriously moves around, in and out of the little tunnel, reinforcing its perennially crumbling walls and cleaning its opening from fallen grains of sand and little bothersome pebbles, looking at all effects like a busy and very tidy caterpillar/prime mover/housekeeper (some actually believe the burrow is fully rebuilt every day); while the often wildy colorful goby commonly sits out in the open just in front of the opening of the burrow, perching on its ventral fins and keeping its little frog-eyed head well proud and high, attentively scanning the surroundings for any sign of intruders or impending danger. In fact, a good trick you can learn from us old hands is to check for the presence of

gobies from high above, hovering a few meters off the substrate and carefully scanning the sand below for the tell-tale foot-long shallow trenches left in the soft bottom by the skipping of the goby.

THE ODD COUPLE

But back to our odd couple. As soon as another goby approaches, our very territorial and pugnacious little fish will defiantly display in all its iridescent glory, jumping up and down, greatly agitated, flaring its gills, widely opening its dorsal fins and stretching its mouth open in the effort to intimidate its adversary: it may even happen that the two competitors will lock jaws and enter in a strong-arm contest, frantically

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Restricted to silty bottoms in turbid waters, the Singapore Shrimp Goby *Cryptocentrus singaporensis* is a rarely encountered, spectacularly-marked species of relatively large size.





Beautiful but more shy than other species, this is the spectacularly-patterned Flag-tail Shrimp Goby *Amblyeleotris yanoi*.

pushing each other in a swirl of mud and sand, dangerously oblivious of any passing predator, but most disputes are normally solved by displaying alone. These brief contests offer great opportunities to patient photographers! If however the intruder is not another conspecific goby but a larger creature (or a diver), our little fish will immediately alarm its shrimp partner, invariably waiting for it to disappear first down the tunnel before following it in a flash. Careful observation of the behavior of the two species will reveal

that communication between them occurs by the continuous use of antennae (by the shrimp) and the caudal fin (by the goby). The alarmed or puzzled shrimp will delicately and repeatedly touch the back of the alert goby with its long antennae, as questioning its partner about the situation; the fully alerted goby will then communicate its state of excitement to the shrimp by using a fast series of almost imperceptible tail movements, which will most often prelude to the disappearance of both down the


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Another bejewelled, finely ornamented species is the beautiful Steinitz's Shrimp Goby *Amblyeleotris steinitzi*. As most other superficially similar species, it features a pale, dark-barred livery.



■ A Metallic Shrimp Goby *Amblyeleotris fasciata* caught outside of its burrow. Notice how in gobies the specialized ventral fins are used to perch on the substrate.

Top right,  Gorgeous Shrimp Goby *Amblyeleotris wheeleri*; bottom right, a displaying Yellow Shrimp Goby *Cryptocentrus cinctus*, whose dark phase demonstrates the difficulties encountered when trying to identify shrimp goby species in the field; far right, top, a spectacular Black Sailfin Shrimp Goby *Flabelligobius* sp.



burrow (in which, by the way, both spend the night, comfortably sealed in by the daily masonry of the industrious shrimp). Isn't it amazing? These two completely different and unrelated species actually talk to each other! We would like to see some detailed studies on the tail movement patterns, as we are convinced the goby can and will pass completely different messages, depending on the situation and "alert" status. Some patterns actually even seem to reassure the shrimp of a past danger, being the equivalent of a human pat on the shoulder. Shrimp gobies are commonly found on soft, sand or silt substrates, from very shallow to very deep but always in sheltered areas. Several species are exquisitely camouflaged for living on

coral rubble bottoms, others are spectacularly marked with colorful – usually red – banding and iridescent metallic green, blue and gold dotting. Some species are quite gregarious and live in spread-out colonies with sharply defined ranges, others seem to prefer deeper water or current-swept areas. Prime hunting areas in the central Indo-Pacific area for goby-obsessed divers and photographers include most of Sabah's shores (Kota Kinabalu, Mantanani, Matakang, Lankayan, Mabul and Kapalai), Manado and the Lembeh Strait in Northern Sulawesi, Bali and several locations in the Philippines, but the truth is they're found almost anywhere on shallow sand or silt bottoms, even close to brackish estuaries and mangrove forests.

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■ The Broad-banded Shrimp Goby *Ambyeleotris periophtalma* - albeit extremely variable in its livery - is one of the most commonly encountered species in Indo-Pacific coastal waters.

Like several other deep-dwelling species restricted to turbid waters and very silty, muddy bottoms, this dazzling *Vanderhorstia* sp. is stunningly iridescent. Such species are very uncommonly observed by non-specialized divers.



UNDERWATER PHOTOTIPS

Observing and photographing shrimp gobies requires a Zen-like attitude and great psychological focusing, and this is why the Japanese are so good at it. These small benthic fishes are extremely wary subjects, and they often take a long time to reappear after they have been spooked into their burrow, so it is quite common to devote one full dive to photographing just one or two of them. You will need to be alone and to be ready to lie down on the sand for long periods, minimizing breathing and movement, using every air intake and subsequent rise in buoyancy to push yourself a little further. Some can be surprisingly compliant, but be prepared for a lot of frustration, as most will wait for you to be ready to click before disappearing in a flash down their tunnel. All require a great deal of patience and almost complete immobility on the bottom for extended periods of time to be fully observed and photographed, but their beauty and interesting habits have few rivals in the macro realm of underwater critters. ●

■ A very unusual sight as two Yellow Shrimp Gobies *Cryptocentrus cinctus* share a burrow and even two commensal shrimps - this is a foursome!

