

Siamese fighting fish

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The **Siamese fighting fish**, also sometimes colloquially known as the **betta** (*Betta splendens*), is a species in the gourami family which is popular as an aquarium fish. They are called *pla-kad* (biting fish) in Thai or *trey krem* in Khmer. They tend to be rather aggressive.

This species is native to the Mekong basin of Laos, Cambodia, Vietnam and Thailand, the latter formerly known as Siam. The fish can be found in standing waters of canals, rice paddies and floodplains.^[1]

In January 2014 a large population of the fish was discovered in the Adelaide River Floodplain in the Northern Territory, Australia.^[2] As an invasive species they pose a threat to native fish, frogs and other wildlife in the wetlands.^[2]

Siamese fighting fish or betta



Selectively bred halfmoon male displaying his flared opercula.

Conservation status

Domesticated

Scientific classification

Kingdom:	Animalia
Phylum:	Chordata
Class:	Osteichthyes
Subclass:	Actinopterygii
Superorder:	Acanthopterygii
Order:	Perciformes
Family:	Osphronemidae
Subfamily:	Macropodusinae
Genus:	<i>Betta</i>
Species:	<i>B. splendens</i>

Binomial name

Betta splendens

Regan, 1910

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Description

B. splendens usually grows to a length of about 6.5 cm (2.6 in).^[1]

Although aquarium specimens are known for their brilliant colors and large, flowing fins, the natural coloration of *B. splendens* is a dull green, browns and gray, and the fins of wild specimens are relatively short.

Diet

Betta splendens feeds on zooplankton, crustaceans, and the larvae of mosquitoes and other water-bound insects.^[3]

Reproduction and early development



A pair spawning under a bubble nest in a breeder's tank



Betta splendens fish build bubble nests of varying sizes.

Male bettas flare their gills, twist their bodies, and spread their fins if interested in a female. The female darkens in colour, then curves her body back and forth as a response. Males build bubble nests of various sizes and thicknesses at the surface of the water. They do this regularly even if there is no female present.

Plants or rocks that break the surface often form a base for bubble nests. The act of spawning itself is called a "nuptial embrace", for the male wraps his body around the female; around 10–40 eggs are released during each embrace, until the female is exhausted of eggs. The male, in his turn, releases milt into the water, and fertilization takes place externally. During and after spawning, the male

uses his mouth to retrieve sinking eggs and deposit them in the bubble nest (during mating the female sometimes assists her partner, but more often she simply devours all the eggs she manages to catch).

Once the female has released all of her eggs, she is chased away from the male's territory, as she will likely eat the eggs.^[4] The eggs remain in the male's care. He carefully keeps

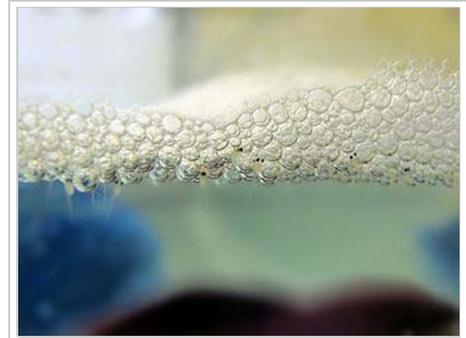
them in his bubble nest, making sure none falls to the bottom, repairing the bubble nest as needed. Incubation lasts for 24–36 hours; newly hatched larvae remain in the nest for the next two to three days until their yolk sacs are fully absorbed. Afterwards, the fry leave the nest and the free-swimming stage begins. In this first period of their lives, *B. splendens* fry are totally dependent on their gills; the labyrinth organ which allows the species to breathe atmospheric oxygen typically develops at three to six weeks of age, depending on the general growth rate, which can be highly variable. *B. splendens* can reach sexual maturity at an age as early as 4–5 months.

History

Some people of Thailand and Malaysia are known to have collected these fish prior to the 19th century from the wild.

In the wild, bettas spar for only a few minutes or before one fish backs off. Bred specifically for fighting, domesticated betta matches can go on for much longer, with winners determined by a willingness to continue fighting. Once one fish retreats, the match is over.

Seeing the popularity of these fights, the king of Thailand started licensing and collecting these fighting fish. In 1840, he gave some of his prized fish to a man who, in turn, gave them to Dr. Theodor Cantor, a medical scientist. Nine years later, Dr. Cantor wrote an article describing them under the name *Macropodus pugnax*. In 1909, the ichthyologist Charles Tate Regan, realizing a species was already named *Macropodus pugnax*, renamed the domesticated Siamese fighting fish *Betta splendens*.^[5]



One-day-old larvae in a bubble nest, their yolk sacs have not yet been absorbed: Betta fry rely entirely on their gills to breathe.



A 15-day-old, free-swimming fry is infected with *Piscinoodinium* sp. (velvet disease), a common killer of betta fry in captivity.

1892 this species was imported to France by the French aquarium fish importer Pierre Carbonnier in Paris, and 1896 the German aquarium fish importer Paul Matte in Berlin, imported the first specimens to Germany from Moscow.^[6]

In the aquarium

Betta species prefer a water of around 23°C-27°C but have been seen to survive at the extremes of 20°C-30°C though their life quality may be diminished at these extremes of the betta's tolerance. They have an organ known as the labyrinth organ which allows them to breathe air at the water's surface. This organ was thought to allow the fish to be kept in unmaintained aquaria,^[7] but this is a misconception, as poor water quality makes all tropical fish, including *Betta splendens*, more susceptible to diseases such as fin rot.

Properly kept and fed a correct diet, Siamese fighting fish live about seven years in captivity, and up to 10 years in rare cases.

Varieties

B. splendens can be hybridized with *B. imbellis*, *B. mahachaiensis*, and *B. smaragdina*, though with the latter, the fry tend to have low survival rates. In addition to these hybrids within the *Betta* genus, intergeneric hybridizing of *Betta splendens* and *Macropodus opercularis*, the paradise fish, has been reported. A fairly recent variety to hit the markets is the king betta, a variety of largely unknown provenance which may or may not be derived from crossing *B. splendens* with *B. raja*.^[8]

Breeders around the world continue to develop new varieties. Often, the males of the species are sold preferentially in stores because of their beauty, compared to the females. Recently, breeders have developed in females the same range of colors previously only bred in males. Females almost never develop fins as showy as males of the same type and are often more subdued in coloration, though some breeders manage to get females with fairly long fins and bright colors. .

Colors

Wild fish exhibit strong colors only when agitated. Breeders have been able to make this coloration permanent, and a wide variety of hues breed true. Colors available to the aquarist include red, orange, yellow, blue, steel blue, turquoise/green, black, pastel, white ("opaque" white, not to be confused with albino), and multi-colored fish. The shades of blue, turquoise, and green are slightly iridescent, and can appear to change color with different lighting conditions or viewing angles; this is because these colors (unlike black or red) are not due to pigments, but created through refraction within a layer of translucent guanine crystals. Breeders have also developed different color patterns such as marble and butterfly, as well as metallic shades through hybridization^[9] like copper, gold, or platinum (these were obtained by crossing *B. splendens* to other *Betta* species).



A dalmatian orange male

A true albino betta has been feverishly sought since one recorded appearance in 1927, and another in 1953 . Neither of these was able to establish a line of true albinos. In 1994, a hobbyist named Kenjiro Tanaka claimed to have successfully bred albino bettas.^[10]

Some bettas will change colors throughout their lifetime (known as marbling), attributed to a transposon.^[11]

Finnage variations

Breeders have developed several different finnage and scale variations:

- Veil tail (extended finnage length and non-symmetrical tail; caudal fin rays usually only split once) the most common tail type seen in pet stores.
- Crown tail (fin rays are extended well beyond the membrane and consequently the tail can take on the appearance of a crown; also called fringetail)
- Comb tail (less extended version of the crown tail, derived from breeding crown and another finnage type)
- Half-moon ("D" shaped caudal fin that forms a 180° angle, the edges of the tail are crisp and straight)
- Over-half-moon (caudal fin is in excess of the 180° angle, byproduct of trying to breed half-moons, can sometimes cause problems because the fins are too big for the fish to swim properly)
- Rose tail (halfmoon variation with so much finnage that it overlaps and looks like a rose)
- Feather tail (similar to the rose tail, with a rougher appearance)
- Short-finned fighting style (sometimes called "plakat")
- Half-moon plakat (short-finned half-moon, plakat and half-moon cross)
- Double tail (the tail fin is duplicated into two lobes and the dorsal fin is significantly elongated, the two tails can show different levels of bifurcation depending on the individual)
- Delta tail (tail spread less than that of a half-moon with sharp edges)
- Half-sun (combtail with caudal fin going 180°, like a half-moon)
- Elephant ear (pectoral fins are white, and much larger than normal, resembling the ears of an elephant)
- Spade tail (caudal fin has a wide base that narrows to a small point)



Purple and blue female



A metallic, double-tail male



A crowntail male

Behavior

Males and females flare or puff out their gill covers (opercula) to appear more impressive, either to intimidate other rivals or as an act of courtship. Other reasons for flaring is when they are startled by movement or change of scene in their environments. Both sexes display horizontal bars (unless they are too light a color for this to show) if stressed or frightened; however, such a color change, common in females of any age, is very rare in mature males. Females often flare at other females, especially when setting up a pecking order. Flirting fish behave similarly, with vertical instead of horizontal stripes indicating a willingness and readiness to breed (females only). In fact, the fish flare their fins and gill covers as a sign of aggression or flirting with other fish. Bettas sometimes require a place to hide, even in the absence of threats. They may set up a territory centered on a plant or rocky alcove, sometimes becoming highly possessive of it and aggressive toward trespassing rivals.



A male attacking and flaring at his reflection in a mirror.

The aggression of this fish has been studied by ethologists and comparative psychologists.^[12] These fish have

historically been the objects of gambling; two male fish are pitted against each other in a fight and bets are placed on which one will win. One fish is almost always killed as a result. To avoid this, male Siamese fighting fish are best isolated from one another. Males will occasionally even respond aggressively to their own reflections in a mirror. Though this is obviously safer than exposing the fish to another male, prolonged sight of their reflection can lead to stress in some individuals. Not all Siamese fighting fish respond negatively to other male fish, especially if not too many of them are present.

Name

Although commonly called a betta in the aquarium trade, especially in North America, that is the name of a genus not only containing this fish, but also other species. *B. splendens* is more accurately called by its scientific name or "Siamese fighting fish", to avoid confusion with the other species in the genus.

In popular culture

- In the 1963 James Bond movie *From Russia with Love*, the strategy of the criminal organization SPECTRE is compared to three Siamese fighting fish in the same tank: Two will fight each other to the death while the third will wait its turn to fight the exhausted victor, symbolizing the conflict between the USA and the Soviet Union, with SPECTRE as the fish that waits.
- The title of S.E. Hinton's 1975 novel, *Rumble Fish*, is an eponymous reference to what two brothers call the breed. In Francis Ford Coppola's 1983 film adaptation, everything appears in black and white except the Siamese fighting fish.
- A 2006 episode of *Cold Case* ("Saving Sammy") features a boy with a pet Siamese fighting fish.
- The Siamese fighting fish has been used as the default background in the beta and release candidate versions of the 2009 Windows 7 operating system, in an apparent reference to the name "Betta". A similar wallpaper and boot screen also was used in the prereleases of Windows 8.
- A Siamese fighting fish features as a clue in a murder in the 2009 film *Bad Lieutenant: Port of Call New Orleans*.
- Milo, one of the main characters in the Disney Channel's 2010 series, *Fish Hooks*, is a Siamese fighting fish.
- In the BBC children's series *M.I. High*, the plot of one episode involves causing the children to have their minds altered to that of a fighting fish by use of brainwaves distributed in a Van de Graaff generator.
- In a season 4 episode of FX's animated series "Archer" ("Live And Let Dine") character Pam Poovey is shown to have a pet Siamese fighting fish named Germaine. Although she is quite attached to him, he is proven to be very poor at his job, (illegal fish fighting) having driven Pam \$14,000 into debt.
- A Siamese fighting fish named Juice Lee is featured in "To the Rescue (Part 2)", an episode of *Chip 'n Dale Rescue Rangers*.



Several females in a community tank with mollies and rainbowfish

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Further reading

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- Thompson, T (1966). "Operant and Classically-Conditioned Aggressive Behavior in Siamese Fighting Fish". *American Zoologist* **6**: 629–741. doi:10.1093/icb/6.4.629 (<https://dx.doi.org/10.1093%2Ficb%2F6.4.629>).

External links

- International Betta Congress (<https://ibcbettas.org/>)
- Betta Fish Care (<http://japanesefightingfish.org/>)
- How To Breed Bettas (<http://www.allaquariuminfo.com/2011/11/how-to-breed-bettas-siamese-fighting.html>)
- Bettas (https://www.dmoz.org/Recreation/Pets/Fish_and_Aquaria/Freshwater/Species/Labyrinth_Fishes/Bettas) at DMOZ
- BettaFishCaretaker.com (<http://bettafishcaretaker.com/>)



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