

= Bowmouth guitarfish =

The bowmouth guitarfish ( *Rhina ancylostoma* ), also called the shark ray or mud skate , is a species of ray and the sole member of the family Rhinidae . Its evolutionary affinities are not fully resolved , though it may be related to true guitarfishes and skates . This rare species occurs widely in the tropical coastal waters of the western Indo -@-@ Pacific , at depths of up to 90 m ( 300 ft ) . Highly distinctive in appearance , the bowmouth guitarfish has a wide and thick body with a rounded snout and large shark @-@ like dorsal and tail fins . Its mouth forms a W @-@ shaped undulating line , and there are multiple thorny ridges over its head and back . It has a dorsal color pattern of many white spots over a bluish gray to brown background , with a pair of prominent black markings over the pectoral fins . This large species can reach a length of 2 @.@ 7 m ( 8 @.@ 9 ft ) and weight of 135 kg ( 298 lb ) .

Usually found near the sea floor , the bowmouth guitarfish prefers sandy or muddy areas near underwater structures . It is a strong @-@ swimming predator of bony fishes , crustaceans , and molluscs . This species gives live birth to litters of two to eleven pups , which are nourished during gestation by yolk . The International Union for Conservation of Nature ( IUCN ) has assessed the bowmouth guitarfish as Vulnerable because it is widely caught by artisanal and commercial fisheries for its valuable fins and meat . It is viewed as a nuisance by trawlers , however , because its bulk and thorny skin cause it to damage netted catches . Habitat degradation and destruction pose an additional , significant challenge to this ray 's survival . The bowmouth guitarfish adapts well to captivity and is displayed in public aquariums .

= = Taxonomy and phylogeny = =

German naturalists Marcus Elieser Bloch and Johann Gottlob Schneider described the bowmouth guitarfish in their 1801 *Systema Ichthyologiae* . Their account was based on a 51 cm ( 20 in ) long specimen , now lost , collected off the Coromandel Coast of India . The genus name *Rhina* comes from the Greek *rhinos* ( " snout " ) ; the specific epithet *ancylostoma* is derived from the Greek *ankylos* ( " curved " or " crooked " ) and *stoma* ( " mouth " ) . Although Block and Schneider wrote the epithet as *ancylostomus* and that form appears in some literature , most modern sources regard the correct form to be *ancylostoma* . Other common names for this species include shark ray , mud skate , shortnose mud skate , bow @-@ mouthed angel fish , and bow @-@ mouthed angel shark .

The evolutionary relationships between the bowmouth guitarfish and other rays are debated . Morphological evidence generally points to a close relationship between *Rhina* and *Rhynchobatus* , which are a group of rays known as the wedgefishes that also have large , shark @-@ like fins . Morphological analyses have tended to place these two genera basally among rays , though some have them as basal to just the guitarfishes ( *Rhinobatidae* ) and skates ( *Rajidae* ) while others have them basal to all other rays except sawfishes ( *Pristidae* ) . A 2012 study based on mitochondrial DNA upheld *Rhina* and *Rhynchobatus* as sister taxa related to the guitarfishes , but also unexpectedly found that they formed a clade with the sawfishes rather than the skates .

In terms of classification , Bloch and Schneider originally placed the bowmouth guitarfish in the order Abdominales , a now @-@ obsolete grouping of fishes defined by the positioning of their pelvic fins directly behind the pectoral fins . Modern sources have included it variously in the order Rajiformes , Rhinobatiformes , Rhiniformes , or the newly proposed Rhinopristiformes . The placement of the bowmouth guitarfish in the family Rhinidae originates from the group " Rhinae " , consisting of *Rhina* and *Rhynchobatus* , in Johannes Müller and Jakob Henle 's 1841 *Systematische Beschreibung der Plagiostomen* . Later authors have also assigned this species to the family Rhinobatidae or Rhynchobatidae . Joseph Nelson , in the 2006 fourth edition of *Fishes of the World* , placed this species as the sole member of Rhinidae in the order Rajiformes , which is supported by morphological but not molecular data .

= = Description = =

The bowmouth guitarfish is a heavily built fish growing to 2 @. @ 7 m ( 8 @. @ 9 ft ) long and 135 kg ( 298 lb ) in weight . The head is short , wide , and flattened with an evenly rounded snout ; the front portion of the head , including the medium @- @ sized eyes and large spiracles , is clearly distinct from the body . The long nostrils are transversely oriented and have well @- @ developed skin flaps on their anterior margins . The lower jaw has three protruding lobes that fit into corresponding depressions in the upper jaw . There are around 47 upper and 50 lower tooth rows arranged in winding bands ; the teeth are low and blunt with ridges on the crown . The five pairs of ventral gill slits are positioned close to the lateral margins of the head .

The body is deepest in front of the two tall and falcate ( sickle @- @ shaped ) dorsal fins . The first dorsal fin is about a third larger than the second and originates over the pelvic fin origins . The second dorsal fin is located midway between the first dorsal and the caudal fin . The broad and triangular pectoral fins have a deep indentation where their leading margins meet the head . The pelvic fins are much smaller than the pectoral fins , and the anal fin is absent . The tail is much longer than the body and ends in a large , crescent @- @ shaped caudal fin ; the lower caudal fin lobe is more than half the length of the upper .

The entire dorsal surface of the bowmouth guitarfish has a grainy texture from a dense covering of tiny dermal denticles . A thick ridge is present along the midline of the back , which bears a band of sharp , robust thorns . There are also a pair of thorn @- @ bearing ridges in front of the eyes , a second pair running from above the eyes to behind the spiracles , and a third pair on the " shoulders " . This species is bluish to brownish gray above , lightening towards the margins of the head and over the pectoral fins . There are prominent white spots scattered over the body and fins , a white @- @ edged black marking above each pectoral fin , and two dark transverse bands atop the head between the eyes . The underside is light gray to white . Young rays are more vividly colored than adults , which are browner with fainter patterning and proportionately smaller spots .

#### = = Distribution and habitat = =

While uncommon , the bowmouth guitarfish is widely distributed in the coastal tropical waters of the western Indo @- @ Pacific . In the Indian Ocean , it is found from KwaZulu @- @ Natal in South Africa to the Red Sea ( including the Seychelles ) , across the Indian subcontinent and Southeast Asia ( including the Maldives ) , to Shark Bay in Western Australia . Its Pacific range extends northward to Korea and southern Japan , eastward to New Guinea , and southward to New South Wales . Found between 3 and 90 m ( 10 and 300 ft ) deep , this ray spends most of its time near the sea floor but can occasionally be seen swimming in midwater . It favors sandy or muddy habitats , and can also be found in the vicinity of rocky and coral reefs and shipwrecks .

#### = = Biology and ecology = =

The bowmouth guitarfish is a strong swimmer that propels itself with its tail like a shark . It is more active at night and is not known to be territorial . This species feeds mainly on demersal bony fishes such as croakers and crustaceans such as crabs and shrimp ; bivalves and cephalopods are also consumed . Its bands of flattened teeth allow it to crush hard @- @ shelled prey . Curiously , two bowmouth guitarfishes examined in a 2011 stable isotope study were found to have fed on pelagic rather than demersal animals , in contrast to previous observations .

The tiger shark ( *Galeocerdo cuvier* ) is known to prey on the bowmouth guitarfish . The ray is protected by the thorns on its head and back , and it may ram perceived threats . Parasites documented from this species include the tapeworms *Carpobothrium rhinei* , *Dollfusiella michiae* , *Nybelinia southwelli* , *Stoibocephalum arafurens* , and *Tylocephalum carpanulatum* , the leech *Pontobdella macrothela* , the trematode *Melogonimus rhodanometra* , the monogeneans *Branchotenthes robinoverstreeti* and *Monocotyle ancylostomae* , and the copepods *Nesippus vespa* , *Pandarus cranchii* , and *P. smithii* . There is a record of a bowmouth guitarfish being cleaned by bluestreak cleaner wrasses ( *Labroides dimidiatus* ) .

Reproduction in the bowmouth guitarfish is viviparous , with the developing embryos sustained to

term by yolk . Adult females have a single functional ovary and uterus . The litter size varies between two and eleven pups , and newborns measure 45 ? 51 cm ( 18 ? 20 in ) long . Sexual maturity is attained at lengths of 1 @. @ 5 ? 1 @. @ 8 m ( 4 @. @ 9 ? 5 @. @ 9 ft ) for males and over 1 @. @ 8 m ( 5 @. @ 9 ft ) in females . Females grow larger than males .

= = Human interactions = =

Throughout its range , the bowmouth guitarfish is caught incidentally or intentionally by artisanal and commercial fisheries using trawls , gillnets , and line gear . The fins are extremely valuable due to their use in shark fin soup , and are often the only parts of the fish kept and brought to market . However , the meat may also be sold fresh or dried and salted , and it is highly esteemed in India . When caught as bycatch in trawls , the bowmouth guitarfish is considered a nuisance because its strength and rough skin make it difficult to handle , and as the heavy ray thrashes in the net it can damage the rest of the catch . In Thailand , the enlarged thorns of this species are used to make bracelets .

The International Union for Conservation of Nature ( IUCN ) has assessed the bowmouth guitarfish as Vulnerable . It is threatened by fishing and by habitat destruction and degradation , particularly from blast fishing , coral bleaching , and siltation . Its numbers are known to have declined substantially in Indonesian waters , where it is one of the large rays targeted by a mostly unregulated gillnet fishery . The IUCN has given this species a regional assessment of Near Threatened in Australian waters , where it is not a targeted species but is taken as bycatch in bottom trawls . The installation of turtle excluder devices on some Australian trawlers has benefited this species . Since it is rare and faces many conservation threats , the bowmouth guitarfish has been called " the panda of the aquatic world " .

It is a popular subject of public aquariums and fares relatively well , with one individual having lived for seven years in captivity . In 2007 , the Newport Aquarium in Kentucky initiated the world 's first captive breeding program for this species . Newport Aquarium announced in January 2014 that the female , " Sweet Pea " , had become pregnant and given birth to seven pups . By February 2014 , all seven pups had died . On January 7 , 2016 , Sweet Pea gave birth to nine shark pups which were eating on their own and still gaining weight by February 10 , 2016 . Newport Aquarium later announced that the pups would be moved into a coral reef exhibit where they can be viewed by the public starting on June 24 .