



Common Florida Fiddler Crabs (*Uca* spp.)

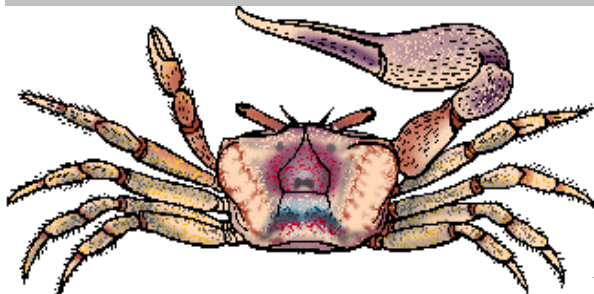
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Introduction



Walking through the marsh and sand beach you can't help but notice the fiddler crabs and their abundant burrows. Fiddler crabs get their name from the male's large claw. They use the claw to defend their burrows and to attract mates. These crabs tend to be between 10 and 35 mm wide and like all crabs, are decapods -- which means they have 10 legs. Eight of these legs are called "walking legs," and the first two legs are not really "legs" *per se*, but rather are claws -- technically, they are called chelipeds (chela="claw" and ped="foot") (Appendix fig 1.). Males have a highly ritualized combat of arm-waving, bobbing of the body, and standing with an open, upright stance. However combat rarely gets physical as there is too much risk of injury to both crabs. Three common species of fiddler crabs are found in Florida: the red-jointed fiddler *Uca minax*; the marsh fiddler *U. pugnax*; and the sand fiddler *U. pugilator*.

Ecological and Environmental Importance of Fiddler Crabs



Fiddler crabs play important roles in many marsh processes. They are not only important regulators of cordgrass- derived production and decomposition (bacteria and fungi), but also important to the food web, eaten by many larger predators, such as the blue crab, rails, egrets, herons and raccoons. Fiddler crabs are also avid burrowers. Their activity can erode or undermine marshbanks. Their burrowing and feeding affect the aeration, and hence the growth of marsh grasses. They stimulate the turnover and mineralization of important nutrients. They are also a good environmental indicator and sensitive to environmental contaminants especially insecticides. Their population densities are an example of the high productivity of our vital wetlands. Coupled with the crab's role in marsh processes, gives good reason to conserve ecologically important species that are so critical to our own food web. Fiddler crabs live on sandy and muddy beaches that are uncovered during low tide. Each crab lives in a hole it digs for itself. The hole can be closed with a mud cap so that, when inside, the crab remains hidden. At low tide, it abandons its dwelling to search for food, but never strays very far unless it is to court some female, or scare away a nosy neighbor. At the slightest danger, it disappears into its hole and doesn't come out for some time. If fiddler crabs become disoriented, they are easy prey for pecking birds.

Biology of Fiddlers

Female fiddlers have two tiny cheliped, that look almost like pincers. These claws are very little in relation to the body size of the crab, and are used to pick up small amounts of sediment. This is how fiddler crabs eat -- they ingest particles of sand or mud (depending on the species, crabs specialize on sand grains of a certain type). They use their mouthparts to scrape food materials (decaying organic matter, unicellular plants such as algae, etc.) from the sediment, and then deposit the sediment back down on the ground as a "feeding pellet."

The chelipeds are not used to grip or crush things, the way most crabs use their chelipeds.

Male Fiddlers have one chelipeds that is at least four times larger than the other. The large cheliped can be as much as 50% as massive as the rest of the male crab combined! (In other words, an 800 mg crab might have a cheliped that weighs 400 mg -- the total weight of the crab would be $800+400=1200$ mg). This giant cheliped is generally *not* used in predation but forms a kind of sound box, which the male uses to produce sounds. It does this by waving the pincer in the air, causing it to rattle. In this way, it marks its territory and makes its presence known to all the other dwellers in the limited surroundings. Males fiddlers, like females, ingest particles of sediment, and the large cheliped is useless for that purpose. Adult males cannot eat with their fiddle claw so they must eat twice as fast. The male doesn't eat/crush larger prey items, and although they occasionally use the large cheliped to batter opponents (usually other male crabs), most of the time it does not serve such a purpose. If adult males lose their fiddle claw, their remaining claw will grow to equal the size of the lost claw. The claw they regenerate will be small.

Courtship Display of fiddler crabs have an extremely elaborate (for crabs). Male fiddler crabs, during the breeding period (which happens every 2 weeks for most of the summer) maintain small, cylindrical burrows which they defend vigorously from other males. This is not remarkable in itself, since all fiddlers, males and females, dig small burrows at high tide and use them for shelter from the incoming water. However, the defended burrows (called mating burrows) are larger and better-maintained than typical burrows of fiddler crabs, and the male spends much effort trying to seduce females into his burrow. The manner of doing this is actually rather cute. Male fiddler crabs stand at the edge of their burrows, usually many of them lined up together with burrows only a few centimeter apart. As females return from foraging during low tide, they move among the males and "check them out," almost like it's a crab singles bar. The males try to attract the females by waving the

very large cheliped, and if the females like what they see, they will then stop and stare at the male who has attracted their attention. The male then waves much more vigorously, and if the female appears to remain receptive, the male will run toward her, and then back to the burrow, then back to her, and then the burrow. This serves to show her where his "pad" is, and if she still likes what she sees, the female will then approach the burrow. When she is right near the lip of the burrow entrance, the male crab will slip inside a few cm, and then he will use his large cheliped to drum rapidly against the sides of the burrow. The female then "feels the vibrations," and if she still likes what she feels, she will enter the burrow. The male will guide her down to the terminal chamber of the burrow, then slide back up to the burrow entrance and plug it up with sand or mud -- kind of like closing the door. The two then mate, and two weeks later, the female, after incubating her eggs for the night, will return to the surface and release her eggs into the water, where the baby crabs develop.

Immature Fiddlers have five zoeal larval stages and a megalops stage, and with a total development time 6-8 weeks. The zoeals are predatory, capturing prey on or between the telson spines by violent flapping of the abdomen, whereupon flexure of the body brings food to the mouth. The megalops larvae swim at first, but gradually adopt a benthic existence.



Figure 1. Inside of large claw of male, lacking oblique ridge

Description of Three Common Fiddler Crab Species (*Uca* sp.) in Florida

Sand fiddler (*Uca Pugilator*) (Bosc) is usually yellowish white in color. The color of displaying males is fleeting purplish violet patch on cardiac region. The major chela is yellowish white with pale orange base. The carapace color of non-displaying phases variously marked in semi-reticular patterns of brown, or completely brown with small gold or light brown spots. The measurement of carapace in male is 17mm in length and 26mm in width and in female is 14 and 19 respectively. The carapace subquadrilateral is up to 1.5 times as wide as long, widest behind outer orbital angles, very convex, smooth; shallow H-shaped depression near center of carapace and narrow, flattened shelf behind orbit. Lateral margin strongly curved outward behind orbit, continued backward and inward as low, well-defined ridge across entire front-orbital width. Eystalk is long, slender. Antennule and antenna small. Merus of second maxilipeds with 150 to 200 spoon-tipped hairs arranged in about 10 rows on inner side. Chelipeds in male are very unequal, in females equal and small. Merus of large chela with short, granulated, rugose lines above and isolated dark hairs proximally, nearly smooth outside, lower margins granulate. Merus of small chelipeds have scattered hairs. Carpus and outer surface of large hand have tubercles diminishing to granules on lower face of hand. Inner surface of palm has no oblique tuberculate ridge as in *U. minax* and *U. pugnax*, but with tuberculated ridge running along fixed finger from tip proximally on internal distal border; surface granulate, granules coarser on thickest part of palm. This species occurs in countless numbers on sandy and muddy beaches bordering marshes and along banks of tidal creeks. Burrows may have any shape but are unbranched and usually dug at an angle to the surface of the ground. Length of the burrow is dependant upon amount of moisture in the ground. The crab plugs the opening as soon as they feel the water level rising in the burrow with the tide.

Mud fiddler *Uca Pugnax* (Smith) is usually brown, sometimes whitening to pale gray at least on branchial

regions, but display whitening poorly or not at all developed. Anterior parts of third maxillipeds are often blue to blue-green. Walking legs dark and banded. The carapace measurement of adult male is 15mm in length and 23mm in width and female is 13mm in length and 18mm in width. The carapace subquadrilateral is about 1.5 to 1.75 times as wide as long, widest behind outer orbital angles, very convex anteroposteriorly, lower edge of front and upper margin of orbit invisible in dorsal view, smooth. A shallow H-shaped depression is near center of carapace, pit on branchial region in line with gastrocardiac sulcus, and pit behind middle of orbit. Chelipeds in males are very unequal and equal of small size in females. Large cheliped of male is rough, merus with granulate rugose lines outside, lower margins granulated. Carpus and palm are tuberculate outside, inner surface of palm with oblique row of granules leading from lower margin to carpal cavity; short row leading down from ridge on proximal half of upper margin. Walking legs have carpal and propodal articles hairy. This species are normally found in protected intertidal mudflats (on the edge of a salt marsh). They dig burrows that can be up to three feet deep, and usually end in a "room." The mudflats where their burrows are found become totally submerged twice a day with the high tide. Before this happens, the fiddlers plug the openings to their burrows with mud to avoid being flooded out. They also stay in their burrows all winter long in a kind of hibernation. As the tide recedes the fiddler crabs excavate their way out of their burrows to forage for food. They eat detritus and algae that get trapped in the roots and blades of salt marsh grasses. Since their habitat is so muddy, they must eat in a puddle of water--it helps separate the good food from the mud.



Figure 2. Large claw of male with oblique ridge

Red-jointed or brackish water fiddler *Uca minax* (LeConte) is chestnut brown and become gray in front. Chelipeds have red spots at articulation. The legs are olive or grayish brown. The carapace subquadrilateral is about 1.3 times as wide as long, widest behind outer orbital angles, convex in both directions, finely granulate, except somewhat coarsely so nears anterolateral angles. A H-shaped depression near center of carapace, and horizontal depression behind orbit. Chelipeds in male are very unequal and equal of small in females. Large chela of male has upper surface of merus sparingly granulate with inner edge denticulate and outer edge granulate. This species occurs in marshes at some distance from water of high salinity. It is usually found on muddy substrate where flooding with freshwater occurs. We also can find the species on mud and sand substrate with marsh phanerogams and at the edge of low woodlands. The crabs dig 2-5 cm diameter burrows to various depths with the maximum 60cm (2ft) deep. The burrow openings are often considerably above high-tide level, and the bottoms reach to ground-water level.

Key to the Three Common *Uca* Species

1. Major palm with oblique tuberculate ridge on inner surface extending from lower margin to carpal cavity (males); merus of last legs with upper margin curved; 75 or fewer spoon-tipped hairs on inner meral surface of second maxilliped.....2
1. Major palm without oblique tuberculate ridge on inner surface extending from lower margin to carpal cavity (males); merus of last legs with upper margin straight; more than 100 spoon-tipped hairs on inner meral surface of second maxilliped*U. pugilator*
2. Joints of major cheliped bordered by red patches, especially near condyles of carpus and merus (fresh male

specimens); merus of second and third walking legs with sparse ventral rows of stiff hairs to bristles, as long as on carpus and propodus; 0-20 (usually 0-15) spoon-tipped hairs on inner meral surface of second maxilliped.....*U. minax*

2. Joints of major cheliped bordered by yellow or yellow-brown color (fresh male specimens); merus of second and third walking legs ventrally with patch, row, or paired rows of dense velvety pubescence as well as sparse rows of stiff hairs on ventral edge (mainly distal half); 0-75, (usually 15-60) spoon-tipped hairs on inner meral surface of second maxilliped.....*U. pugnax*

Appendix I. Figures.

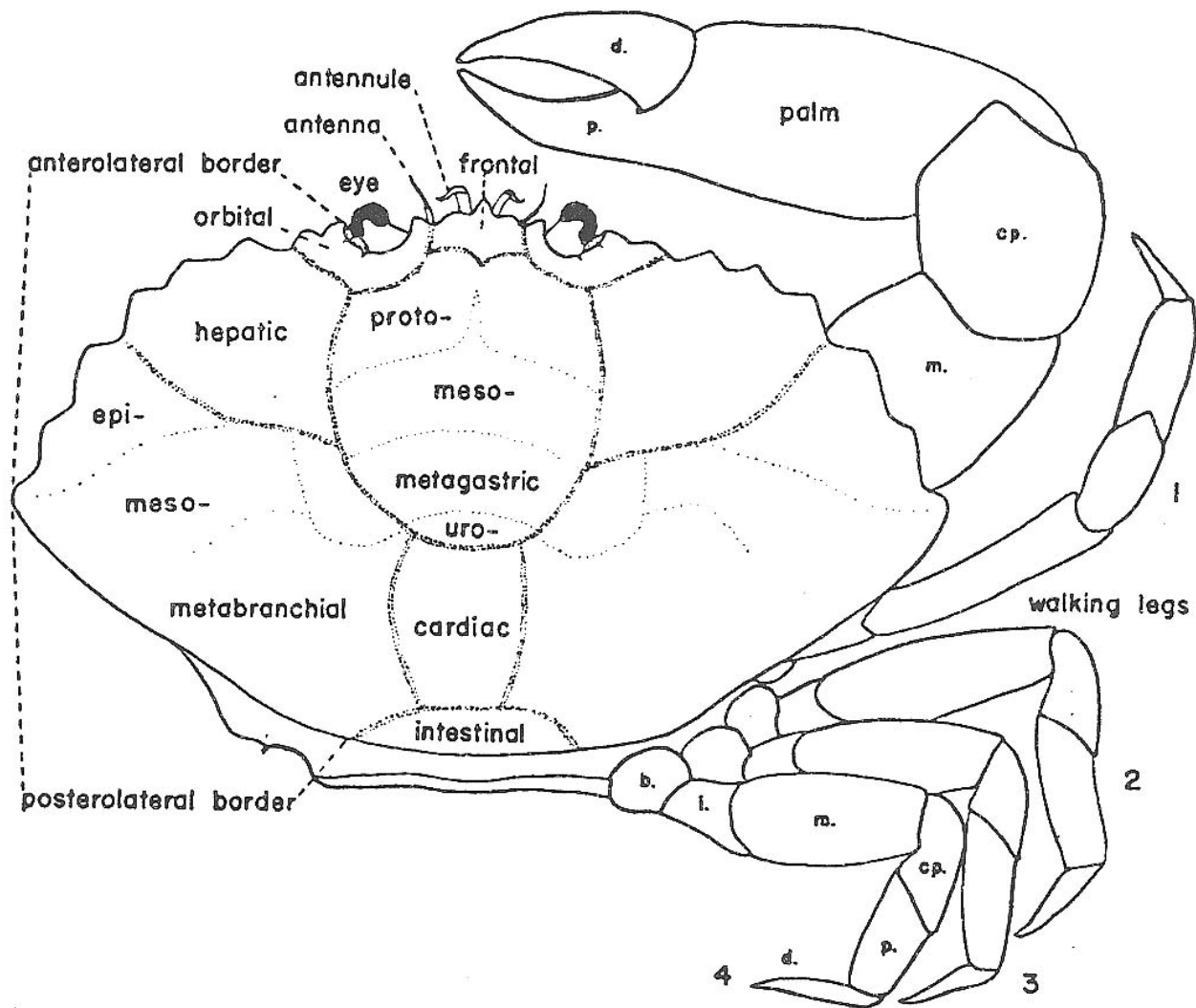
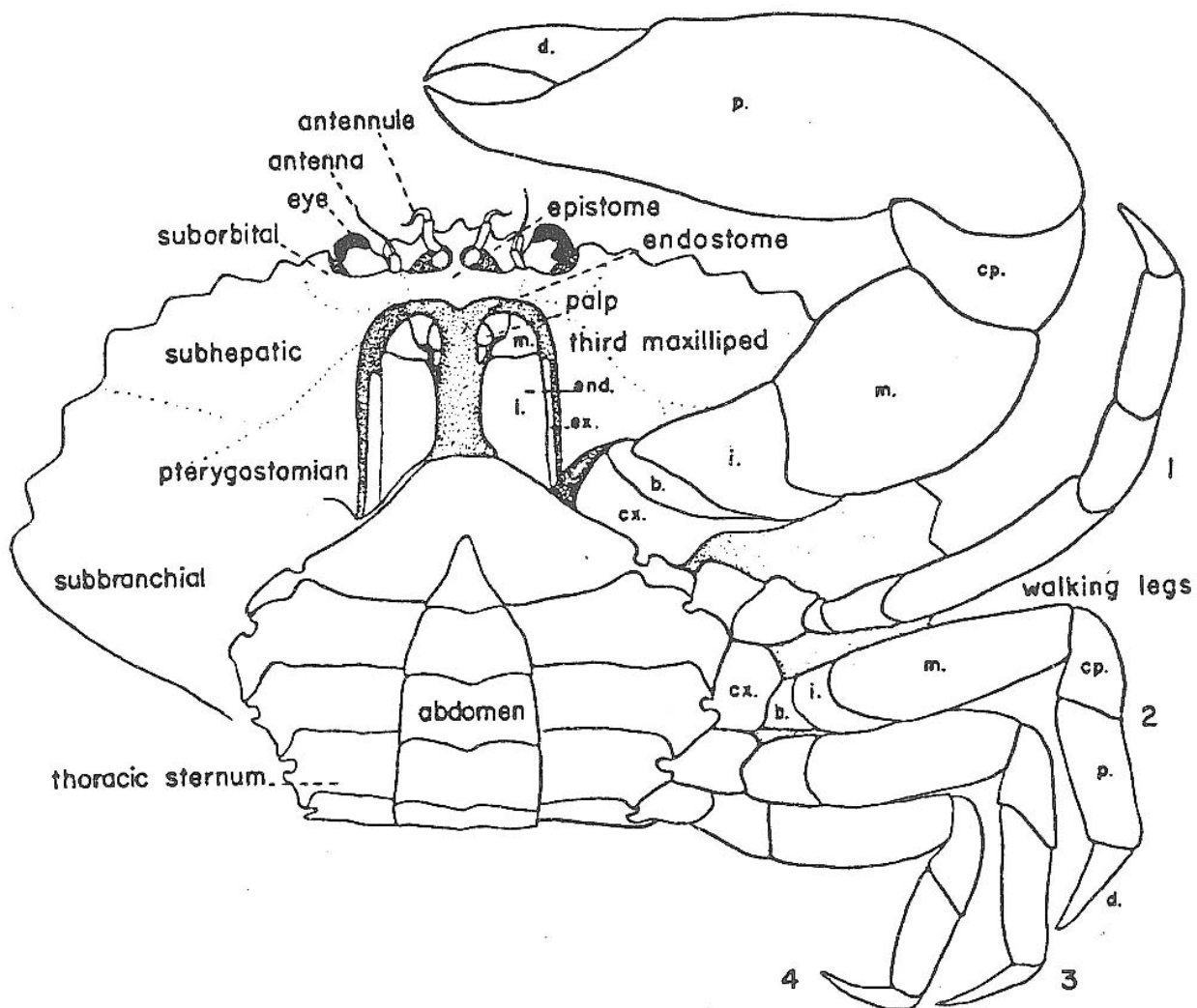


Figure 3. [above] Schematic Drawing of Brachyuran Crab for Taxonomy Terminology of Crabs.



Figure

4. [above] Dorsal view of brachyuran crab; areas of carapace indicated; legs of right side only shown; b, basis; cp, carpus; d, dactyl; i, ischium; m, merus; p, propodus.

Reference

Williams, A. B., 1984. Shrimps, Lobsters, and Crabs of the Atlantic Coast of the Eastern United States, Maine to Florida. Smithsonian Institution Press, Washington, D.C. 550 pages.

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