

Conspicuous asymmetry and correlation: Fiddler crabs

Fiddler crabs (genus *Uca*, see Textbox) are very interesting because of the conspicuous asymmetry exhibited by the males (Fig. 12).



Figure 12. *Uca pugnax*.

From: De Kay (1844) in Rosenberg (2007).

True crabs have five pairs of limbs and four pair are used for walking, these are the *ambulatory* legs. The two clawed limbs are called the *chelipeds*. On male fiddler crabs, the larger cheliped is called the *major cheliped*, and the smaller is called the *minor cheliped*. Female fiddler crabs have two small chelipeds that are similar to the minor cheliped in the males (Rosenberg, 2007). Both chelipeds grow allometrically with respect to carapace size (Huxley, 1932), but each has a different growth trajectory (Rosenberg 1997). The major cheliped is used in antagonistic (male-male combat) and courtship behaviours (Takeda and Murai, 1993). In some species there is additional asymmetry, as the side bearing the major cheliped has larger ambulatory legs and this is related to the type of courtship waving display (Takeda and Murai, 1993).

Fiddler Crabs:

This information is from Rosenberg (2007) www.fiddlercrab.info

Classification:

Kingdom	Animalia
Phylum	Arthropoda
Class	Crustacea
Sub-class	Malacostraca
Order	Decapoda
Infraorder	Brachyura
Superfamily	Ocypodoidea
Family	Ocypodidae
Subfamily	Ocypodinae
Genus	<i>Uca</i>

There are 97 recognized species/subspecies in the genus *Uca*.

The common English name “Fiddler Crab” comes from the feeding of the males, where the movement of the small claw from the ground to its mouth resembles the motion of a person moving a bow across a fiddle (the large claw).

Procedure:

- A. Plot a scatter diagram for carapace width vs. major cheliped length
- B. Calculate correlation coefficient and test for significance.
- C. State your conclusions.



Figure 13. The major and minor chelipeds of a typical male *Uca* crab.

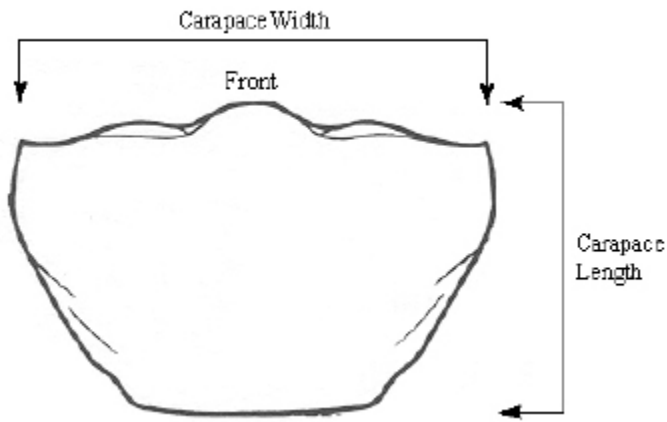


Figure 14. The carapace of a typical Fiddler Crab.
(Modified from Rosenberg 2007).

Some example Fiddler Crab data. All measurements are in *mm*.

Crab ID	Carapace width	Large claw length	Small claw length
1	1.9	3.4	0.8
2	2	3.2	0.7
3	1.9	3	0.8
4	1.9	3.2	0.8
5	1.8	2.9	0.7
6	1.7	2.9	0.7
7	1.7	2.8	0.6
8	1.7	2.5	0.7
9	1.7	2.6	0.7
10	1.9	2.6	0.9
11	1.6	2.7	0.8
12	2.1	3.9	0.7
13	1.7	2.6	0.5
14	2.1	3.1	0.8
15	1.8	3.3	0.5
16	2.1	3.5	0.8
17	1.7	2.8	0.7
18	2.05	3.6	0.8
19	1.8	3.1	0.8
20	2	3.5	0.8
21	1.7	2.7	0.7