

The Life Cycle of the Mud Crab

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INTRODUCTION

The Department of Primary Industry, Fisheries and Mines has conducted a wide range of studies on the life cycle and biology of mud crabs (*Scylla serrata*) over the past two decades. Results from those works, together with observations on wild crabs, and captive crabs at the Department's Darwin Aquaculture Centre, have provided a wealth of information on this species. This Fishnote summarises some key findings.

MATING MUD CRAB STYLE



Figure 1. A male mud crab mating with a newly-moulted female



Figure 2. A female mud crab spawning eggs

Very few people have seen mud crabs mating in the wild. This is because the male can only inseminate the female while her shell is soft, a period of about 48 hours following moulting. The male crab can sense when the female is about to moult and pairs up with her. He climbs on top of the female, clasps her with his legs, and carries her underneath him for up to four days. The male releases the female when she begins to moult and, when the process is complete, turns her upside down to mate (see Figure 1).

The male's paired pleopods (appendages hidden beneath the abdominal flap) transfer the spermatophores to the female's oviducts, where the sperm is stored for many months. When the eggs are ripe, they pass down the oviducts and are fertilised. The stored sperm may fertilise up to three batches of eggs. Following mating, which lasts between seven to 18 hours, the male flips the female over to the upright position and holds her beneath him for a few more days while her shell hardens.

SPAWNING WITH A DIFFERENCE

When the female mud crab is ready to spawn, she creates a shallow divot in the substrate with her abdominal flap. She then releases the eggs into the depression and immediately begins to gather them up with her pleopods. 'Berried' females are rarely caught in pots because they consume little or no food when carrying eggs.

Mud crab eggs are bright orange when extruded (see Figure 3) and turn almost black by the time they are ready to hatch. The eggs are about 0.3 mm in diameter and a single batch may contain over two million eggs. While mud crabs produce large numbers of offspring, the mortality rate of larvae and juveniles is high. Hence, few crabs survive long enough to mate.



Figure 3. Berried female mud crab

LIFE IN THE PLANKTON

About 12 days after spawning, the eggs hatch, releasing the planktonic larval stage known as the zoea. Hatching is believed to occur offshore, where salinity is stable and food is abundant. The eggs take one to two hours to hatch, during which time the female stands on the tips of her legs and moves her abdominal flap back and forth in a motion that helps free the zoea.



Figure 4. First zoeal stage mud crab



Figure 5. Megalopa stage mud crab

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At the first zoeal stage (see Figure 4), the animal is just over 1 mm long. It increases in size by moulting four times over the next 12 to 15 days. During the fifth moult, the larval crab transforms into a megalopa with large (relative to its size), functional claws (see Figure 5). This stage lasts seven to nine days, during which the animal moves inshore and settles out of the plankton. The megalopa later moults into a stage one crab.

MOULTING MANIA

Stage one crabs are only about 4 mm wide, but frequent moults mean that they grow very quickly. It is thought that wild mud crabs reach 100 mm carapace width in about a year and sexual maturity in about two years. Maturation time varies according to water temperature, with higher temperatures accelerating the growth and decreasing the time taken to reach maturity. The typical life span of a mud crab is thought to be three to four years.



Figure 6. A male mud crab moulting

DIFFERENTIATING SEXES

As juveniles, male and female mud crabs are difficult to differentiate. However, differences between the sexes become more apparent as the crabs mature (see Figure 7). The abdominal flap of females is much broader than that of males and becomes heavily pigmented when the female reaches maturity. Animals with a broad abdominal flap which is not pigmented may be males infected with the parasite *Loxothylacus ihlei* and should be discarded (see Fishnote 13: 'Muddled Muddies'). Another obvious difference between the sexes is in the claws, which are much larger in males than in females.



Figure 7. The abdominal flap of a juvenile female (left), mature female (centre) and a male mud crab (right)

AN OMNIVORE'S DIET

Mud crabs are best described as opportunistic feeders; they are carnivores and herbivores, scavengers and cannibals. They will eat just about anything that they encounter, including bivalves, worms, fish, plant material and smaller crabs. Their feeding activity depends on environmental factors such as temperature and physiological factors such as moult condition.

Mud crabs use a range of senses to locate their food. The eyes of mud crabs are set on stalks, which allow them to see 360 degrees, both in and out of the water. They also have a pair of antennae, located between their eyes that can detect minute changes in water movement and water chemistry. In addition, the tips of the legs (known as the dactyls) are covered in tiny hairs that are highly sensitive to touch and taste.



Figure 8. A mud crab in defensive position

When handling food, mud crabs use the larger claw as a 'crusher' and the smaller claw as a 'cutter'. Both claws are extremely powerful. A study on a related species showed that an 80-mm crab was able to crush shells that required up to 40 kg of force to break. Mud crabs also use their claws to defend themselves (Figure 8) and can even drop a claw to facilitate escape. A new, fully functional claw will grow back in three to four months.

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