

Blue Ring Octopus, *Hapalochlaena nierstraszi*, from the Bay of Bengal along the Chennai Coast

Authors

S.N.Sethi* (Ph.D)
N.Rudramurthy

MRC OF CMFRI
Chennai - 28

*Scientist
Madras Research Centre Of CMFRI
75 ,Santhom High Road
R.A.Puram (ICAR)
Chennai - 28
Mob: 09840035925
E-mail: sethisatyanarayana@rediffmail.com
sethisatyanarayana@yahoo.co.in

On 12-08-2012, a rare occurrence of Blue ring octopus (*Hapalochlaena nierstraszi* (Adam 1938)), with a length of 82-165 mm and weight of 5.5-18 g was recorded for the first time at Kasimedu Fisheries Harbour , Chennai. It was caught by Trawl net gear at a depth of 20-30 m in Bay of Bengal along the Chennai Coast. There are about at least ten species of tiny blue-ringed octopus, which, ironically for their size, are the most deadly of all cephalopods, but only four have been formally named. All these are inhabitants of Asian-pacific waters. These are: Greater Blue-ringed Octopus (*Hapalochlaena lunulata*), Lesser Blue-ringed Octopus or Southern Blue-ringed Octopus (*Hapalochlaena maculosa*), Blue-lined Octopus (*Hapalochlaena fasciata*) and *Hapalochlaena nierstraszi*. The common names come from the bright blue rings that appear when they are alarmed or attacked.

Focal Points at a Glance

In this write-up, the authors, while telling us about the rare occurrence of the Blue Ring Octopus, *Hapalochlaena nierstraszi*, apprise us about the importance of this Octopus in relation to its venomous nature and importance from medical angle. Medical and psychological researchers are interested in the tetrodotoxin neurotoxin found in its venom for its aphrodisiac effect and its ability to block voltage-sodium channels, so action potential in neurons is inhibited or reduced. Poison from *Hapalochlaena* sp. has proven to be fatal to humans, especially to young children. There is no anti-venom for this poison, the authors say.

Taxonomic Position and Distribution of Blue Ring Octopus

Kingdom: Animalia, Phylum: Mollusca, Class: Cephalopoda, Subclass: Coleoidea, Infraclass: Octopodiformes, Order: Octopoda, Suborder: Incirrata, Subfamily: Octopodoidea, Family: Octopodidae, Genus: *Hapalochlaena*, Species: *nierstraszi*.

The Blue-Ringed Octopus is found only in a few areas around the world. These are mainly present in the Pacific Ocean and East Indian Ocean. Yet their habitat spans all the way from Japan to Australia. So much so, they have quite a presence.

Morphometric Characteristics and Habitats

Blue ringed octopus is one of the jewels of the ocean, with vivid blue rings visible over the body when hunting, courting or alarmed. They grow to a length of 12 to 20 cm (5 to 8 inches). They are considered as one of the world's most venomous marine animals. When this octopus is

agitated, the brown patches darken dramatically, and iridescent blue rings or clumps of rings appear and pulsate within the maculae. Typically 50-60 blue rings cover the dorsal (Fig.1) and lateral surfaces of the mantle. They eat small crabs, hermit crabs, and shrimp, and may bite attackers, including humans, if provoked.

The blue-ringed octopus spends much of its life hiding in crevices amongst rocks, inside seashells, and discarded bottles and stones in shallow waters. Like all octopuses, it can change its shape easily. This helps it to squeeze into crevices much smaller than itself. This helps in safeguarding the octopus from predators. In common with other octopuses, the blue-ringed octopus swims by expelling water from its funnel in a form of jet propulsion. If the blue-ringed octopus loses an arm, it can regenerate it within six weeks. Thus it has regeneration power.

Life Cycle and its venom: Blue-ringed octopus females lay only one clutch of about 50-100 eggs in their lifetime. The





Fig.1: Blue ring octopus, *Hapalochlaena nierstraszi* landed at Kasimedu Fishing Harbour, Chennai on 28-07-2012

eggs are laid, then they are incubated underneath the female's arms for approximately six months, and during this process she will not eat and dies after eggs hatch. Though of small size and relatively docile in nature, its venom is powerful enough to kill even humans. The venom is a neurotoxin called tetrodotoxin. It is also found in puffer fish and is 10,000 times more toxic than cyanide. It infected the toxin using its beak, causing motor paralysis and respiratory arrest within minutes and leading to cardiac arrest due to lack of oxygen. It carries enough venom to kill 26 adult humans within minutes. Their bites are tiny and often painless, with many victims not realising that they have been envenomated until respiratory depression and paralysis start to set in.

Clinical Symptoms of Blue ring octopus bite: Symptoms of bite are: respiratory arrest which can occur within minutes as the toxin blocks

nerve transmission. Other symptoms include vomiting, muscle weakness and paralysis of respiratory muscles. Victims are fully awake until lack of oxygen, from the inability to breathe, leads to unconsciousness.

Applications of Blue ring Octopus

Positive Values of Blue ring Octopus venom: Although other Octopodidae are used for biomedical research, behavioural research, and as a gourmet food source, *Hapalochlaena* sp. are too small and too dangerous for much of these uses. Medical and psychological researchers are interested in the tetrodotoxin neurotoxin found in its venom for its aphrodisiac effect and its ability to block voltage-sodium channels, so action potential in neurons is inhibited or reduced. They also have value as an unusual luxury item. As strange as it may seem, an individual *H. lunulata* was sold for \$4000 at an auction in

Sidney, Australia recently. (Brenner and Elgar 1999, Ellis 1991, Melki 2000).

Negative Values of Blue ring Octopus venom: Poison from *Hapalochlaena* sp. has proven to be fatal to humans, especially to young children. There is no anti-venom for this poison. Of the several human fatalities attributed to this animal, all have involved the animal being picked up. The bite itself may not even be felt. Five minutes or so later, however, the victim may complain of dizziness and increasing difficulty in breathing. The powerful venom acts on the victim's voluntary muscles, paralyzing the muscles, required for body movement and breathing. Artificial respiration is necessary to maintain life. The poison gradually wears off after 24 hrs, apparently leaving no side effects. (Campbell 2000, Environment Australia 1999, Norman 2000).

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