Phyllomedusa trinitatis (Leaf-nesting Frog)

Family: Hylidae (Tree Frogs)
Order: Anura (Frogs and Toads)
Class: Amphibia (Amphibians)

Fig. 1. Leaf-nesting frog, *Phyllomedusa trinitatis.*

[http://eol.org/pages/330420/details, downloaded 13 November 2014]

TRAITS. *Phyllomedusa trinitatis* is known as the leaf-nesting frog, it is also called the Trinidadian leaf frog and the Trinidadian monkey frog. The males are approximately 76mm in length while the females are approximately 92mm in length (Barrio-Amorós, 2010). The eggs are a pale cream colour and 2.3mm in diameter (Ogilvy, 2011). As seen in Fig. 1 the dorsal

surface of the leaf-nesting frog has a bright green leaf colour to a green olive brown. There can be variation in the frogs colour depending on the environment and thermoregulation. The eyes have a gold iris that contains a reticulate (net-like) pattern and a pupil with a vertical shape. The ventral surface of the frog has a characteristic chin pattern that helps identify it. It is a white to a pinkish colour and the intensity of the pink increases towards the hind legs (Smith, 2001). The frog has expanded terminal toe pads known as adhesive pads with a disc-shape at the tip. There is little to no webbing between the toes. The first fingers and toes are opposable which gives it a characteristic movement pattern (Smith, 2001). There is also an additional skeletal element which allows the frog to contact more of the surfaces it stops on during movement. Both the forelimbs and hind limbs of the frog have four toes however those of the hind limb are larger (Downie et al., 1999).

ECOLOGY. This frog can be found in Trinidad and Venezuela; it has not been seen in Tobago (Downie et al., 2013). In Trinidad it has been sighted at many locations including Arima, Chatham, and the Northern Range. It is a terrestrial species than lives near freshwater. Its natural habitats are moist and include lowland forest, the edges of forest and montane rainforest (Cassini et al., 2006). The animal has also been seen in secondary forests by ditches. At these locations it dwells in slender bushes near the borders of ponds. The animal constructs nest in trees by using the tree's leaves to place the eggs above a stagnant water supply which may or may not be manmade. For example, it is reported to have built nests above water tanks. The water supply below the nest may also be polluted. The animal is seen most frequently during the wet season and as low as 100m above sea level (asl) in Trinidad. In Venezuela it has been seen at 1300m asl. It feeds primarily on invertebrates such as field crickets (Read, 2014).

SOCIAL ORGANIZATION. This animal tends to live on its own in trees and interacts with females during the mating season. The males which use calling sounds have larger spaces between them than males which use little to no calling sounds (Smith, 2001).

ACTIVITY. It is an arboreal frog that can use its hind legs to help it jump as well as its adhesive toe pads to help it climb trees and move across branches. It is a nocturnal species and is found over still water that is about 2m wide (Smith, 2001). It is hardly seen during the day because it sleeps between bushes and is able to produce a waxy substance that prevents desiccation from the sun (Gray, 2012).

FORAGING BEHAVIOUR. In Trinidad, the animal has been reported foraging in the road under a street light feeding on insects attracted to the light source. The animal remains in the same position during this time and therefore is quite vulnerable while foraging (Maharaj, 2009). The animal may rest on green leaves in its habitat and consume insects such as moths when they pass by. The colour of the frog allows it to be camouflaged on the leaves making it harder for its prey to sense it (Read, 2014).

COMMUNICATION. This species like many other frogs communicates via calling songs. The males use these calls to attract females and ward off other males. The calls may be made above or near a water source such as a pond. Frogs usually move more when making vocal communication in comparison to males which are not making any sound. However some males are stationary when making these songs. The frogs which use this method of communication are

often larger than silent males (Smith, 2001). Thus calling sounds usually help indicate the size of the frog to the female. Vocal communication is not only used to communicate within the frog species however. These sounds also transfer signals to predators which as a result increase the predation on the frogs. The closeness of calling frogs to each other, and the rapidness of this communication, also increase the frogs' likelihood of being captured by predators. This helps explain why calling males usually maintain a greater distance from each other compared to silent males (Smith, 2001). Male frogs also communicate with each other using "leg waving". This is done to indicate the level of physical strength between males. If males after this action believe they are evenly matched they will begin to fight however males that are significantly larger than other males do not fight after this action (Smith, 2001).

SEXUAL BEHAVIOUR. The Trinidadian leaf frog usually mates during the late dry season to the first few months of the rainy season. They mate late at night to early in the morning. On nights with high moon illumination the males are separated by greater distances (Smith, 2001). They perch near water on leaves and branches of bushes and trees that do not affect their calls' projection. When there is heavy rainfall the males perch higher in trees and therefore at greater distances from the water. The males may fight if another male enters their perching site. This involves grappling and pushing while hanging by the hind legs on trees or while standing on hind legs. The first male that falls loses the fight and leaves the area. Fighting occurs after 'leg waving' and males that are in amplexus are not attacked (Smith, 2001).

The males mainly use calling sounds to attract females to mate. When the two frogs come into contact with each other they climb into a living tree or bush above water and use one or more leaves (usually living and green) to completely or partially cover their eggs. When a single large leaf is used fewer eggs are exposed. The nest may be 3-300cm above the water and does not have a characteristic shape in this species. Also there is variation in the number of eggs per nest. There are eggless jelly capsules in the leaves and jelly plugs to the top and bottom of leaves. The female frog releases these jelly plugs into the leaves that were folded by her and her mate's limbs. She also releases unfertilized eggs as well as the eggless jelly capsules; the male then fertilizes the eggs (Downie et al., 2013). Fertilization can occur by one or more males however this is uncommon in this species. Multiple-male fertilization occurs more frequently when there are few females. There are also males that are silent when another male is calling, these males intervene when the pair is amplexed and attempt to fertilize the eggs released by the female (Smith, 2001).

JUVENILE BEHAVIOUR. After 10-14 days tadpoles are developed and the eggs hatch. These tadpoles fall from the leaves into the water under them (Gray 2012). The hatching of eggs stimulates surrounding eggs to hatch. In addition, if any eggs did not hatch prior to falling into the water they are then stimulated to do so. During their development these eggs gradually increase in size while they develop and the eggless jelly capsules that are among them reduce in diameter. It is unknown how these organisms respire as they develop to become tadpoles. The tadpoles have a dark brown colour and feed on various organisms in the water that they occupy. They may take 2-3 months to develop into minute frogs depending on the water temperature. At this point the frog lacks the poison secreting gland but has markings on its flanks and thighs that are bright orange (Gray, 2012).

ANTIPREDATOR BEHAVIOUR. The animal can jump away from approaching predators and can release a poison through the glands on the dorsal sides of its back to prevent it from being consumed by predators such as bats and snakes. It also makes calling songs at larger distances from males when the nights are bright because of moonlight to reduce the risk of predators. Some males also remain silent which further reduces the likelihood of being captured. The frog is also camouflaged on surrounding leaves (Smith, 2001). The laying of eggs in leaves reduces the probability that the eggs will be eaten during development. Furthermore, since the eggs are not in the water they cannot be eaten by fishes and other aquatic organisms. Eggs which are exposed to water before full development hatch prematurely which also reduces the organisms' chances of being eaten when it is an egg (Downie et al., 2013).

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