

Land Snails of the Bladen Nature Reserve

Belize, Central America



The Bladen Nature Reserve of Belize is one of the largest remaining lowland rainforests in Central America. The area encompasses a vast karst region containing countless caverns and towering outcrops of limestone. Forming the western boundary of the reserve and rising to over 3500 feet is the Maya Mountain Massif. Trees of great size are found in numbers along with fragments of rare elfin forest communities at the highest elevations. These diverse environments shelter a secretive yet interesting assemblage of organisms known to the Maya as caracol, or the snails. The Bladen has already surrendered close to 50 species, a measure of these likely new to science and endemic to the region. Many of the caracol found in the Bladen are rather colorful, displaying analogous bands or perpendicular stripes that visually disrupt the outline of their shells. This snail protection strategy works well at keeping potential predators confused as to the snail's location on various vegetative backgrounds. *Orthalicus princeps* an arboreal snail is the largest of the Bladen residents reaching 75 mm in length, while the smallest, *Carychium exile*, is only 1.5 mm in size.

Land snail communities are nearly world-wide in distribution with snail assemblages reported from sub-Antarctic islands harboring only one species to tropical rainforests containing more than fifty species. At least 43 land snails have been documented from a 2 ha limestone hill in the Bladen Nature Reserve. After an evaluation of the literature on snail inventories across the world, Tattersfield (1996) concluded that sites of moderate sample size (approx. <10 ha) with at least 24 land snail species are of global conservation importance.

In the past, the importance of land snails to higher order organisms has largely been ignored. Snails were considered tenuous organisms at best. Research has shown, however, that land snails provide a number of life supporting contributions to many upper echelon taxa. Live snails or their vacant shells provide a food or calcium carbonate



Orthalicus princeps



Neocyclotus dysoni

source to a variety of small mammals (Reid, 2006), numerous species of salamanders (Petranka, 1998), *Cyathine* beetles (Symondson, 2004), a range of passerine birds (Graveland et al, 1994; Graveland 1996; Tilgar et al, 1999; Mand et al, 2000) and several rather specialized snakes (Sibons) of Belize which feed primarily on land snails (Lee, 1996). Terrestrial snails are considered one of countless building blocks of the ecosystem.

Declining snail populations can have ripple effects to surrounding ecosystems. For example, populations of the great tit (*Parus major*) in the Netherlands have declined precipitously with declining land snails as a result of acid rain. A lack of snail shells in the bird's diet causes their egg shells to thin and break, therefore reducing reproductive success rates of the species (Graveland et al, 1994; Graveland, 1996). Land snails can be used as indicators of forest health, much in the same way that freshwater mussels are used to determine the quality of a stream or river. As snails feed, environmental contaminants are ingested and sequestered in their tissues (Dallinger and Wiser, 1984). The use of land snails to monitor anthropogenic pollutants reported to be accumulating in forest environments is of particular interest.



New species(?)



Chondropoma species



New species(?)

One of the most interesting aspects of the caracol is their feeding behavior and diets. Land snails sample and judge potential food by using the chemoreceptors located on their four tentacles. While primarily herbivores or omnivores, a few are predatory on other snails. Several of these marauder species (*Euglandina*) are found in the Bladen Nature Reserve. These jaguars of the land snails are swift and aggressive hunters, sometimes attacking and consuming snails more than twice their size. They will even climb trees to hunt potential food sources. Terrestrial snails are also found consuming lichens, confervoid algae, sooty molds, tree sap, mushrooms, forest detritus, aged leaves, animal scats, carcasses, nematodes, old shells of snails and snail eggs.

The Bladen snail fauna is globally significant and future research promises to bring forth intriguing details on the snails inhabiting this vast rainforest region. The Bladen Nature Reserve does not revile its secrets easily and new discoveries await the explorer into the jungle of the caracol.

(Photos and text by Dan Dourson, March 2007)



Euglandina species



Coelostremma species