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### INSIDE

- News from the ASG
- Regional Updates
- Global Focus
- Recent Publications
- General Announcements
- And More.....

Spotted Treefrog *Nyctixalus pictus*. Photo: Leong Tzi Ming



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# New Beginnings — A First Report on Frog Research in Timor-Leste

By Hinrich Kaiser, Zito Afranio Soares & Mark O'Shea

**A**s Southeast Asia's newest nation (independence was achieved only in 2002), Timor-Leste is the last of the countries in the region to begin developing biological research and environmental management programs. With a geographic position at the presumed intersection of Southeast Asian and Australo-Papuan faunal elements, it may also be one of the most interesting places to study.

Given its 500-year colonial history and a location just a few hundred miles off the north coast of Australia, we were astonished to learn when we began our investigations in Timor-Leste that the extent of frog research on Timor Island as a whole, and the area of the sovereign nation Timor-Leste in particular, was essentially nil. Very limited frog material was collected by intermittent expeditions to Indonesian West Timor, most notable among them those made by Malcolm Smith from the British Museum (Smith 1927). Based on a thorough survey of museum collections worldwide in 2010, the only catalogued frog specimens from the area of what is now Timor-Leste we could locate are housed in the collections at the University of Papua New Guinea, representing fieldwork by James Menzies in the mid-1980s (see Menzies 1987 for an account). Small collections made by Colin Trainor (Charles Darwin University) and Stephen Richards (South Australian Museum) have been deposited in Australian institutions and will be accessioned shortly. As part of our comprehensive amphibian and reptile survey of Timor-Leste (Kaiser et al. 2011), we have assembled a collection of frogs from many localities in all 13 districts, which is housed in the U.S. National Museum of Natural History, Smithsonian Institution, Washington, D.C. As a consequence of the dearth of specimens from Timor-Leste, it will be impossible to conduct the types of historical analyses that

have been used to trace chytrid infections in many of the world's regions.

The diversity of the frog fauna in Timor-Leste is currently limited to five confirmed species (*Duttaphrynus melanostictus*, *Fejervarya verruculosa*, *Limnonectes timorensis*, *Litoria everetti*, *Polypedates leucomystax*) and the unconfirmed *Litoria infrafrenata*. However, our recent fieldwork indicates that this list underestimates the true diversity of *Fejervarya* and *Polypedates*, and analyses are ongoing. Recent preliminary work by ZSA shows that there is a significant effect of habitat moisture on the diversity and distribution of frogs at medium elevations (200–700 m) near Maliana, Bobonaro District (Afranio Soares 2011), with the invasive toads comprising a lesser component of the fauna at sites with higher moisture and at less disturbed sites. For a first glance at key species for conservation concern in Timor-Leste we wish to single out the only confirmed single-island endemic, *Limnonectes timorensis*, and the recently introduced toad *Duttaphrynus melanostictus*.

## *Limnonectes timorensis* (Smith 1927)

The Timor river frog (Fig. 1) is a species apparently restricted to habitats in the immediate proximity of rivers and streams. It appears to be patchily distributed, though it seems to be relatively common where it occurs. Smith (1927) found the specimens of his type series in Djamplong (elev. ca. 200 m) and Soë (elev. ca. 800 m) in West Timor, whereas our specimens come from a single site near Eraulo, Ermera District, Timor-Leste (elev. ca. 1200 m). Our site is a streambed of width varying between 5–25 m with seasonally divergent water levels. Frogs were seen active by night among the rocks in the center of the streambed, and hiding by day

along the decaying foliage and rocky debris at the stream's edge. There appears to be sexual size and color dimorphism, with females 50% larger than males, and with males having a darker overall ventral coloration. Based on the differences in altitude between these sites, the species displays a distinctive cold tolerance. As the only single-island endemic frog on Timor Island, *L. timorensis* is of considerable interest both from a conservation standpoint and for biogeographic reasons.

## *Duttaphrynus melanostictus* (Schneider 1799)

The common Asian toad (Fig. 2) was introduced into Timor-Leste fairly recently, probably during the staging of the international peacekeeping force in the transition period from Indonesian occupation to independence (1999–2002). During this time, migration of a considerable number of people between West Timor and Timor-Leste also took place, which may have sped up the inadvertent



Fig. 1. Adult male individual Timor river frog (*Limnonectes timorensis*) from the Meleotegi River near Eraulo, Ermera District, Timor-Leste (elevation 1225 m). Several individuals were discovered under flat rocks in the muddy interface between land and water at the edge of the river. Photo: Mark O'Shea.

spread of toads (see Trainor 2009 for a more detailed account of the species' presumed origin). Two recent reports (Kaiser et al. 2011, Trainor 2009) detail the expansion of the species and its misidentification as the invasive Australian toad, *Rhinella marina*. Breeding populations of *D. melanostictus* are currently known to occur in the Oecusse exclave at the western extreme of Timor-Leste, and in the contiguous districts of the country to at least east of the town of Manatuto, Manatuto District on the north coast and the village of Uma Boot, Viqueque District on the south coast, covering over half the country's area. Our surveys have revealed no toads in Lautém District (far eastern Timor-Leste in the area of the towns of Com, Lospalos, Iliomar, and Tutuala, and near Loré village). It appears that the distribution of the species is relatively patchy, indicating that its most likely mode of transportation is via the agency of humans. We have seen the species in all manner of anthropogenic areas, ranging from towns to rice paddies and coffee forest, and in roadside ditches along most roads. Monitoring of the further expansion of the species, as well as its predicted impact on populations of other animals, is a conservation priority.

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Fig. 2. Amplexing pair of the common Asian toad (*Duttaphrynus melanostictus*) from near Maliana, Bobonaro District, Timor-Leste (elevation 197 m). Photo: Zito Afranio Soares.

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