

Efficacy of anuran trapping and monitoring techniques in the tropical forests of
Bioko Island, Equatorial Guinea

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Abstract. Anurans are of particular importance in monitoring the ecosystems of tropical environments. Existing literature reveals little standardization in methodology, and many of the techniques that have been shown to be effective in deciduous environments, such as polyvinyl chloride (PVC) refuges and pitfall traps, are either inadequate or too difficult to implement in tropical environments. This study evaluated three anuran trapping and monitoring techniques for use in a tropical environment: PVC pipe refuges, pitfall traps, and anuran census. Prior research validated the use of PVC refuges and pitfall traps in deciduous forests, but their use outside of the Americas has not been thoroughly examined. PVC refuges failed to attract anurans in this study, likely due to the abundance of natural refugia characteristic of tropical environments with dense foliage. Pitfall traps utilizing 19-liter buckets are difficult to implement in rocky soil and were shown to be ineffective utilizing buckets small enough to implement in this research. The modifications to the pitfall traps made in this research allowed for effective use with smaller, easier to install buckets. The anuran census described in this study utilizes established trails or paths for a continuous census. This study shows evidence for the effective utilization of both modified pitfall trapping and anuran census in monitoring population densities, assessing species richness, and detecting the presence of rare or cryptic species.

Keywords: amphibian census, pitfall traps, PVC refuge, West Africa

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Supplementary material

Figure S1. Pitfall Trap Side View: A figure representing how the bucket and drift fence of the original and redesigned pitfall traps are implemented.

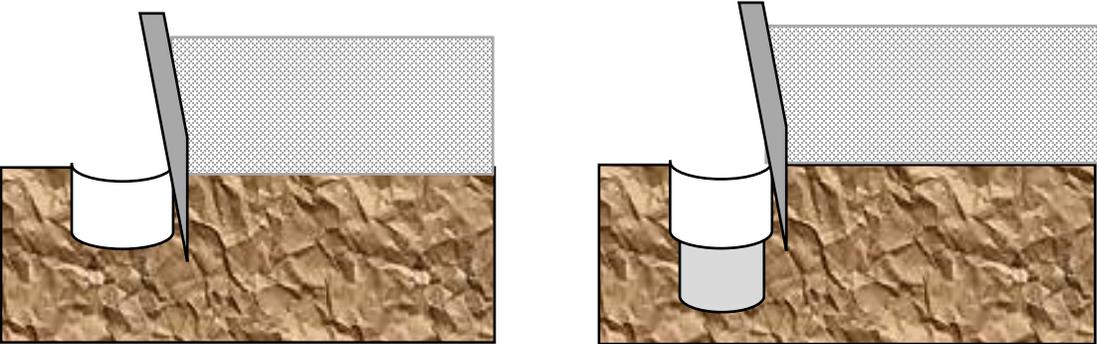


Figure S2. Y-shaped Pitfall Trap Array: A figure representing how the Y-shaped pitfall trap array was implemented.

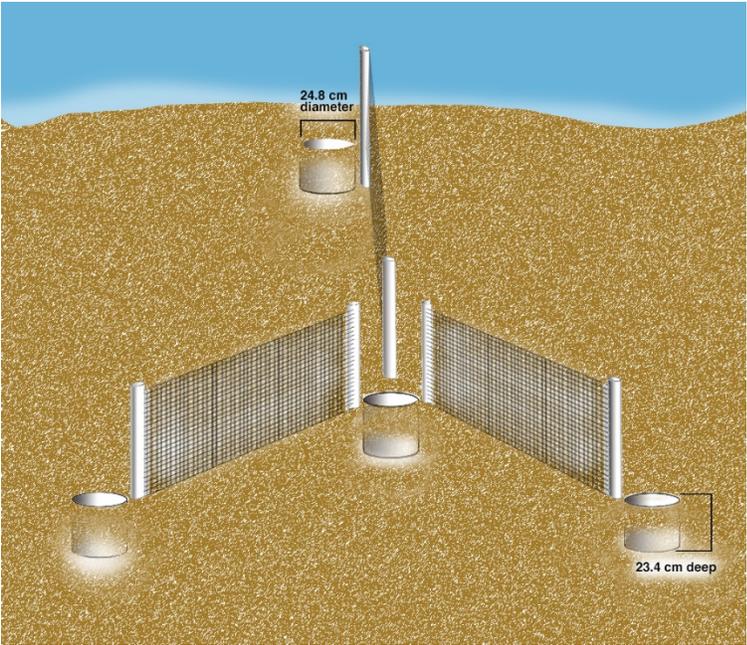


Figure S3. Top View of a Pitfall Trap Bucket Before Modification: The original pitfall trap design contained a sponge and aluminum screening.



Figure S4. Redesigned Pitfall Trap: The redesigned pitfall trap with 19 cm extension bucket.

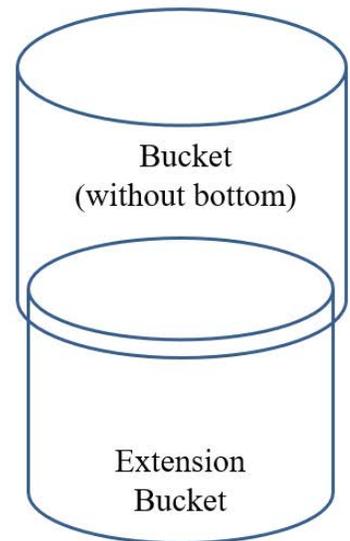
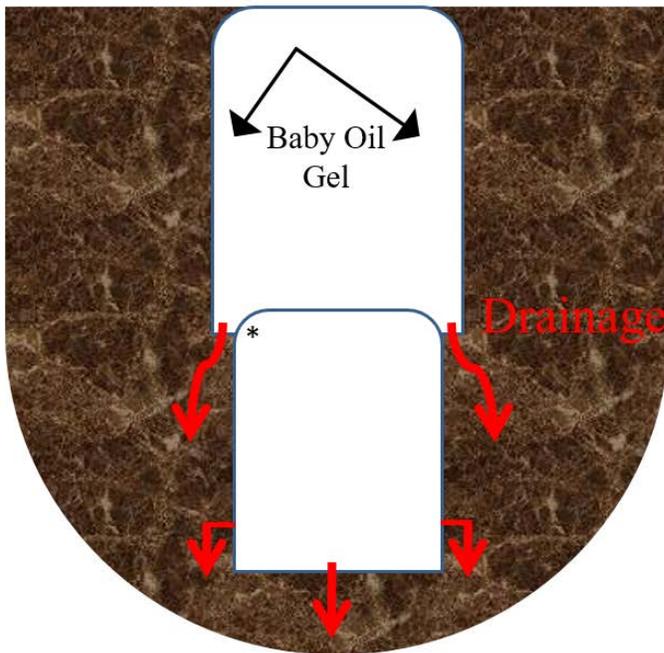


Table S5. Encounter Rates During Anuran Census (anuran encounters/km): Table S5 represents the encounter rate of each genera of anurans. Unidentified refers to anuran sighting that researchers were unable to identify by sight and were unable to capture for identification.

	Total Anuran	<i>Arthroleptis</i>	<i>Amietophrynu</i>	<i>Phrynobatrachus</i>	<i>Hyperolius</i>	Unidentified	Other Species
Balacha North	7.49	6.88	0.24	0.06	N/A	0.5	0.02
Balacha South	2.76	2.18	0.18	0.03	N/A	0.33	0.03
Lake Biao	3.87	0.06	2.14	N/A	1.49	0.16	0