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Use of Coconut Endocarp as an Oviposition Site by a Neotropical Harvestman (Opiliones: Cranaidae)

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NATURE NOTES

Use of Coconut Endocarp as an Oviposition Site by a Neotropical Harvestman (Opiliones: Cranaidae)

Field observations of oviposition sites used by harvestmen indicate that these arachnids may lay eggs within cavities of plant stems, tank bromeliads, on surfaces of leaves, moss, fallen trunks, decaying sheaths of palm fronds, leaf litter, soil, moist fallen leaves, spaces beneath rocks, snail shells, and cave walls (reviewed by Machado and Maciás-Ordóñez 2007). Although some species of harvestmen feed upon or are attracted to tropical fruits (Machado and Pizo 2000), there are no published reports of the use of fruits (fresh or decaying) as oviposition sites. On the Caribbean island of Trinidad, two species of cranaid harvestmen, *Phareicranaus calcariferus* (Simon 1879) and *Santinezia serratotibialis* (Roewer 1932), occur island-wide (Kury 2003), are syntopic, and reproduce during the wet season (Townsend *et al.* 2008a). Adults have been observed in close association with eggs, larvae and nymphs in the damp pockets among tree roots, within the sheaths of palm fronds, and in cavities within rotting tree trunks (Machado and Warfel 2006; Hunter *et al.* 2007; Townsend *et al.* 2008b). Field observations have also revealed that adults of either sex (sometimes both) may be found in the immediate vicinity of eggs or young (Hunter *et al.* 2007; Townsend *et al.* 2008b) and that nymphs have the capacity to return to shelters, even after displacement of distances up to 10 m (Proud and Townsend 2008).

On 12 July 2008, we sampled harvestmen in the early afternoon (1200 to 1400 hr) among coconuts and fronds beneath palm trees adjacent to the beach at Grand Tacaribe along the northern coast of Trinidad (10°47.761'N, 61°13.040'W). The temperature was 30°C, humidity was greater than 90%, and the sky was partially cloudy. We collected several species of harvestmen including *Prionostemma vittatum* (adults, nymphs and larvae), *Paecilaema inglei* (adults and nymphs), *Cynortula granulata* (adults), *Santinezia serratotibialis* (adults and nymphs), *Rhopalocranaus albilineatus* (adults) and *Stygnoplus clavotibialis* (adults). At 1300 hr, we found an adult male and female *Phareicranaus calcariferus* within a coconut which featured an intact mesocarp (outer husk) and endocarp (inner stone) and had a small opening (approximately 1 cm in diameter) at the base. The adults within the endocarp were discovered only after the fruit had inadvertently split open. Careful examination of the hard, dry endosperm revealed the presence of 30 yellowish white eggs (mean = 1.39 mm, SD = 0.05, range = 1.29-1.47) and two larvae (Figure 1). Immediately following exposure, the adults remained motionless and in close proximity to the eggs. However, after 10-20 s, both individuals moved and were collected and preserved in 70% ethanol. The coconut containing the eggs was carefully taken to our camp, photographed and the eggs and larvae were preserved.

Our observation represents the first report of a harvestman using the cavity within a coconut as an oviposition site. This observation is consistent with the general pattern displayed by females within the Laniatores with respect to the selection of oviposition sites. Given the relatively short ovipositor of most species, eggs are gen-

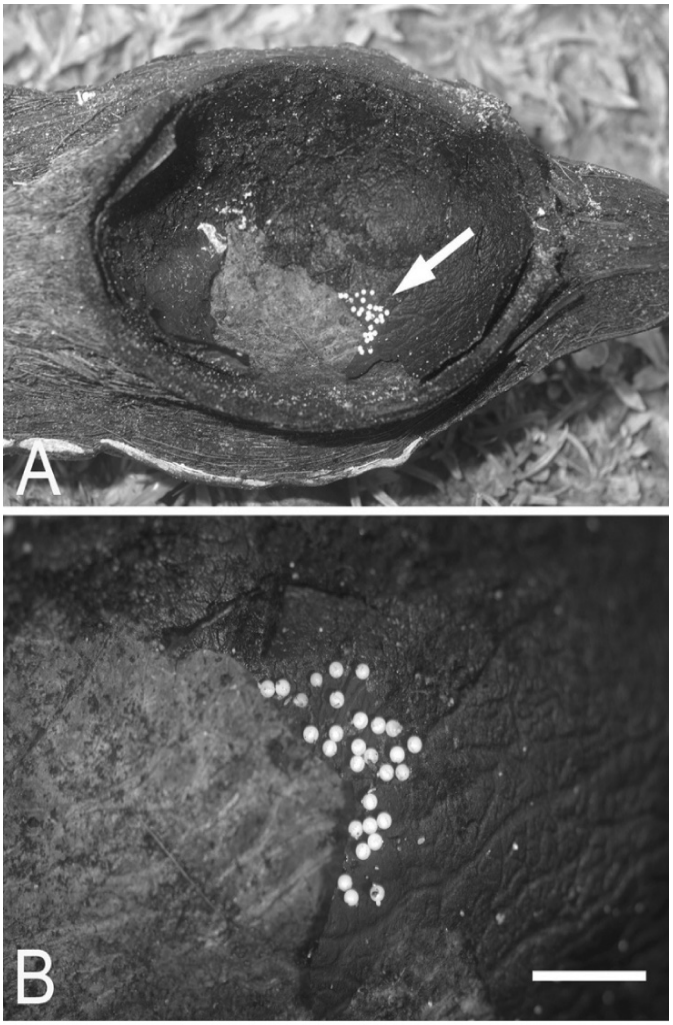

Fig. 1. A, Mesocarp and endocarp of coconut with eggs (arrow) of *P. calcariferus* and **B,** Eggs within endocarp of coconut. Scale bar = 18mm.

erally laid in natural cavities or covered with soil or other debris (Machado and Maciás-Ordóñez 2007). For species living near coastal areas, coconuts may confer several advantages over other oviposition sites, including protection of eggs from unfavorable environmental conditions (heavy rain, wind and salt spray) and potential predators (ants, conspecifics, etc.). The cavity within the coconut may also represent a relatively stable, favorable microclimate that is advantageous for embryonic development.

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REFERENCES

Hunter, R. K., Proud, D. N., Burns, J. A., Tibbetts, J. A. and **Townsend Jr., V. R.** 2007. Parental care in the Neotropical harvestman *Phareicranaus calcariferus* (Opiliones: Laniatores: Cranaidae). *Journal of Arachnology*, 35: 199-201.

Kury, A. B. 2003. Annotated catalogue of the Laniatores of the New World (Arachnida: Opiliones). *Revista Ibérica de Aracnología, vol. especial monográfico*, 1: 1-337.

Machado, G. and **Maciás-Ordóñez, R.** 2007. Reproduction. p. 414-454. *In* **R. Pinto-da-Rocha, G. Machado** and **G. Giribet,** eds. Harvestmen: The Biology of Opiliones. Cambridge, Massachusetts: Harvard University Press.

Machado, G. and **Pizo, M. A.** 2000. The use of fruits by the Neotropical harvestman *Neosadocus variabilis* (Opiliones: Laniatores: Gonyleptidae). *Journal of Arachnology*, 28: 357-360.

Machado, G. and **Warfel, J.** 2006. First case of maternal care in the family Cranaidae (Opiliones: Laniatores). *Journal of Arachnology*, 34: 269-272.

Proud, D. N. and **Townsend Jr., V. R.** 2008. Homing ability of harvestmen nymphs (Opiliones: Cranaidae). *Living World*, 2008: 79-80.

Townsend Jr., V. R., Rana, N. J., Proud, D. N., Moore, M. K., Rock, P. and **Felgenhauer, B. E.** 2009. Morphological changes during post-embryonic development in two species of Neotropical harvestmen (Opiliones: Laniatores: Cranaidae). *Journal of Morphology*, 270: 1055-1068.

Townsend Jr., V. R., Proud, D. N. and **Moore, M. K.** 2008b. Harvestmen (Arachnida: Opiliones) of Trinidad, West Indies. *Living World*, *Journal of The Trinidad and Tobago Field Naturalists' Club*, 2008: 53-65.

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