

LIVING WORLD

Journal of the Trinidad and Tobago

Field Naturalists' Club

admin@ttfnc.org

ISSN 1029-3299



TRINIDAD AND TOBAGO
FIELD NATURALISTS' CLUB

Homing Ability of Harvestmen Nymphs (Opiliones, Cranidaea)

Daniel N. Proud and Victor R. Townsend Jr.

Proud, D.N., and Townsend Jr., V.R. 2008. Homing Ability of Harvestmen Nymphs (Opiliones, Cranidaea). *Living World, Journal of The Trinidad and Tobago Field Naturalists' Club*, 2008, 79-80.

Homing Ability of Harvestmen Nymphs (Opiliones, Cranidae)

For harvestmen, parental care may take several forms including egg guarding, egg carrying, egg covering, and young guarding (Machado and Macías-Ordóñez 2007b). The functional significance of parental behavior has been attributed to warding off potential conspecific predators, protecting eggs from fungal infections, or preventing predation by other arthropods (Machado and Macías-Ordóñez 2007b). In particular, young guarding has been inferred generally through field observations of groups of similar size nymphs occurring in loose aggregations (Machado and Macías-Ordóñez 2007a) with one or more adults. In Trinidad, two species from the family Cranidae, *Santinezia serratotibialis* Roewer 1932 and *Phareicranaus calcariferus* Simon 1879, are known to occur. These species generally use the same microhabitats (decaying logs and palm frond sheaths) and are widely distributed on the island. While both of these species appear to be nocturnal foragers, foraging behavior and diet composition in cranid harvestmen have not been examined. Although superficially similar, we were able to identify adult male *S. serratotibialis* on the basis of the large coxal spines on leg IV and by the greater armature on the femur and tibia of leg IV (Pinto-da-Rocha and Kury 2003). In contrast, females were more difficult to distinguish, but we were able to identify females of *S. serratotibialis* on the basis of their slightly larger overall body size. Machado and Warfel (2006) provided the first observations of maternal care for this family by reporting two instances of egg guarding by adult female *S. serratotibialis* in the Northern Range. Hunter *et al.* (2006) detailed the first observations of loose aggregations of larvae and nymphs with adult *P. calcariferus*. Relatively little is known, however, about the behavioral interactions of adults and nymphs within aggregations. In this paper, we provide additional insights into the behavioral ecology of *P. calcariferus* by investigating the homing ability of displaced nymphs.

On 22 July, 2006, we located aggregations of nymphs and adults in fallen palm frond sheaths in the lower montane rainforest adjacent to Lalaja Trace in the Northern Range (10°44'47"N, 61°15'54"W; datum: WGS84; elevation: 260 m). The first aggregation consisted of a loose assortment of approximately 20 second stage nymphs and one adult female. Separated by more than 500 m, the second aggregation was composed of 15 third and 15 fourth stage nymphs with one adult female. Four nymphs were arbitrarily selected and removed from each nest and marked with a small spot of model paint on

the dorsal scute. These individuals were released into the leaf litter at distances of 1, 3, 5, or 10 m (corresponding to the color of the mark) from the original site of capture. The remaining individuals (nymphs and adults) were not disturbed. After 48 hrs, we returned to the palm frond sheaths, collected all individuals that were present, and preserved them in 70% ethanol. Voucher specimens were deposited into the invertebrate collections at the American Museum of Natural History (AMNH).

Overall, three of the eight marked nymphs returned to the palm frond sheath from which they had been captured. In the case of the first aggregation, a total of 18 nymphs were collected. Only the individual that had been released 5 m from the aggregation site was recaptured. For the second aggregation, nymphs that were displaced 1 m and 10 m were recaptured and a total of 28 nymphs were found. In both instances, virtually all undisturbed individuals initially observed occupying the palm frond sheaths were present.

The results of this field experiment provide the first demonstration of the ability of cranid nymphs to return to the same aggregation after displacement. This is a remarkable accomplishment for a group with such low vagility (Giribet and Kury 2007). Bishop (1950) proposed that harvestmen may deposit one of two types of secretion on the surface which may be used in intraspecific communication and trail marking. Individuals of *Goniosoma spelaeum* were observed to frequently travel the same route when entering and leaving their diurnal shelter within a cave (Gnaspini 1996). In our study, the ability of the cranid nymphs to relocate to the same palm frond sheath after displacement of considerable distances (5 or 10 m) indicates the possible use of some form of chemical signal. For example, this may be a chemical trail deposited on the substrate or haphazard wandering aided by the ability to detect an aggregation once in the vicinity. Alternatively, nymphs may possess an ability to navigate based on spatial memory of an area or a detailed topographic knowledge of a home range with a radius of several meters. In-depth field observations and behavioral studies are required to determine the exact mechanism used by harvestmen nymphs to relocate an aggregation following displacement. Although the aggregations used in this study were not in close proximity to one another, we did observe two aggregations that were approximately 2 m apart. Investigating whether displaced nymphs return only to their home aggregation, or whether they will simply relocate to the nearest aggregation, may provide insight

into the mechanism involved.

We are grateful to the Wildlife Section of the Forestry Division for granting us permission to conduct field research. We thank Paul Ressler and Stephen Broadbridge for assistance in the field. We are indebted to the Pacheko family for their assistance, kindness, and generosity. This research was supported by a grant from the Virginia Federation of Independent Colleges (DNP) and the Natural Science Undergraduate Research Fund at Virginia Wesleyan College. Specimens were legally collected and returned to the U.S. under export permit number 001284.

REFERENCES

- Bishop, S. C.** 1950. The life of a harvestman. *Nature*, 43: 264 - 267.
- Giribet, G.** and **Kury, A. B.** 2007. Phylogeny and biogeography. p 62 - 87. In **R. Pinto-da Rocha, G. Machado** and **G. Giribet**, eds. *Harvestmen: The Biology of Opiliones*. Cambridge, Massachusetts: Harvard University Press.
- Gnaspini, P.** 1996. Population ecology of *Goniosoma spe-laenum*, a cavernicolous harvestman from southeastern Brazil (Arachnida: Opiliones, Gonyleptidae). *Journal of Zoology*, 239: 417 - 435.
- 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, Cranidae). *Journal of Arachnology*, 35: 199 - 201.
- Machado, G.** and **Warfel, J.** 2006. First case of maternal care in the family Cranidae (Opiliones, Laniatores). *Journal of Arachnology*, 34: 269 - 272.
- Machado, G.** and **Macías-Ordóñez, R.** 2007a. Social behavior. p. 400 - 413. In **R. Pinto-da-Rocha, G. Machado** and **G. Giribet**, eds. *Harvestmen: The Biology of Opiliones*. Cambridge, Massachusetts: Harvard University Press.
- Machado, G.** and **Macías-Ordóñez, R.** 2007b. 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.
- Pinto-da-Rocha, R.** and **Kury, A. B.** 2003. Phylogenetic analysis of *Santinezia* with description of five new species (Opiliones, Laniatores, Cranidae). *Journal of Arachnology*, 31: 172 - 208.

Daniel N. Proud¹ and Victor R. Townsend Jr.²

1. Department of Biology, University of Louisiana at Lafayette, Box 42451, Lafayette, Louisiana 70504-2451, USA.

E-mail: dnp0646@louisiana.edu

2. Department of Biology, Virginia Wesleyan College, 1584 Wesleyan Drive, Norfolk, Virginia 23502, USA.

E-mail: vtownsend@vwc.edu