ADHESIVE TECHNIQUE FOR CAPTURE OF BURROW-DWELLING SPIDERS

The suitability of *Geolycosa* spp. for field studies has been recognized and exploited in investigations of demography, wasp predation, activity patterns, metabolism and thermoregulation (Humphreys 1974, 1975a, 1975b, 1978; Gwynne 1979; McQueen 1978, 1979, 1980, 1983; McQueen and Culik 1981). Adult spiders of this group inhabit tubular burrows which extend straight down 20-40 cm, terminating in a slightly enlarged side chamber at the bottom. Humphreys (1974) employed traps to capture *G. godeffroyi* (L. Koch), but noted less than 100% success in all populations studied. McQueen (1978) experimented with numerous capture techniques for *G. domifex* (Hancock) ((= *G. missouriensis* (Wallace 1942)) and resorted to use of a medical otoscope for monitoring burrow occupants.

During an experimental field study of *Geolycosa rafaelana* (Ch.), I developed a technique for capture of adults without damage to the spider or its burrow. The capture device employed adhesive strips cut from the inner surface of Raid Roach Traps (© 1980, S. C. Johnson and Son, Inc.). The adhesive was wrapped around the end of a paper clip, which was suspended into the burrow with string. A termite or ant was placed on the adhesive as bait, stimulating the spider to grasp with its chelicerae, and thereby becoming firmly embedded in the adhesive. Following extraction from the burrow, the spider was released by brushing a drop of corn cooking oil against the adhesive surface.

This technique was used to capture more than 150 adult spiders for marking and release during a two year period. Capture success was 100% except during April-May, when females bearing egg cases were unreceptive to capture, and would actively extrude the device from their burrows. Commercial adhesive for trapping insects (Tangle-Trap) was found to be too thin for effectively embedding the spider's chelicerae. Passive traps employing adhesive strips placed within the burrow entrance succeeded in snaring some individuals by one or more legs, but leg loss (and resultant escape of spider) occurred when the strip was removed from the burrow.

This study was supported in part by a grant from Sigma Xi, The Scientific Research Society, and was conducted within an area designated for the purposes of a National Science Foundation Long Term Ecological Research project at a Chihuahuan Desert site near Las Cruces, New Mexico, USA. I thank Walter G. Whitford and Walt Conley for advice and aid, Vince Roth and G. B. Edwards for reviews of the manuscript, and June Peyton for manuscript typing.

LITERATURE CITED

Gwynne, D. J. 1979. Nesting biology of the spider wasps (Hymenoptera; Pompilidae) which prey on burrowing wolf spiders (Araneae: Lycosidae, *Geolycosa*). J. Nat. Hist., 13:681-692.

Humphreys, W. F. 1974. Behavioral thermoregulation in a wolf spider. Nature, 251:502-503.

Humphreys, W. F. 1975a. The food consumption of a wolf spider, *Geolycosa godeffroyi* (Araneae: Lycosidae), in the Australian Capital Territory. Oecologia, 18:343-358.

Humphreys, W. F. 1975b. The influence of burrowing and thermoregulatory behavior on the water relations of *Geolycosa godeffroyi* (Araneae: Lycosidae), an Australian wolf spider. Oecologia, 21:291-311.

Humphreys, W. F. 1978. The thermal biology of *Geolycosa godeffroyi* and other burrow inhabiting Lycosidae (Araneae) in Australia. Oecologia 31:319-347.

McQueen, D. J. 1978. Field studies of growth, reproduction, and mortality in the burrowing wolf spider *Geolycosa domifex* (Hancock). Canadian J. Zool., 56:2037-2049.

McQueen, D. J. 1979. Interactions between the pompilid wasp *Anoplius relativus* (Fox) and the burrowing wolf spider *Geolycosa domifex* (Hancock). Canadian J. Zool., 57:542-550.

McQueen, D. J. 1980. Active respiration rates for the burrowing spider *Geolycosa domifex* (Hancock). Canadian J. Zool., 58:1066-1074.

McQueen, D. J. 1983. Mortality patterns for a population of burrowing wolf spiders, *Geolycosa domifex* (Hancock), living in southern Ontario. Canadian J. Zool., 61: 2758-2767.

McQueen, D. J. and B. Culik. 1981. Field and laboratory activity patterns in the burrowing wolf spider *Geolycosa domifex* (Hancock). Canadian J. Zool., 59:1263-1271.

Wallace, H. K. 1942. A revision of the burrowing spiders of the genus *Geolycosa* (Araneae, Lycosidae). Amer. Midl. Nat., 27:1-62.

Manuscript received October 1984, revised January 1985.

Marsha Reeves Conley, Department of Biology and Department of Mathematics, New Mexico State University, Las Cruces, NM 88003.

FUNCTIONAL WEBS BUILT BY ADULT MALE BOWL AND DOILY SPIDERS

It is generally accepted in the arachnological literature that adult female web-building spiders build species-typical webs while adult males do no web-building other than that required for courtship and sperm induction (e.g. Savory 1928, Opell 1982), though there is at least one published report that adult male uloborid spiders sometimes construct webs (Eberhard 1977). Immature bowl and doily spiders (*Frontinella pyramitela,* Linyphiidae) of both sexes as well as adult females have long been known to build relatively complex sheet webs consisting of a bowl-shaped horizontal sheet, an underlying flat sheet (the doily), and a barrier meshwork of silk that is above the bowl and doily.

We observed web-building by adult males while we were investigating the behavioral effects of the chemical constituents of webs built by *F. pyramitela* (Suter and Hirscheimer in press). In the course of those studies, we collected spiders of all ages and both sexes from webs in Poughkeepsie and Millbrook, New York, during May and June 1984. In the laboratory, the spiders were placed on glass or wooden hexapods in 3.8 l plastic jars where each could build a web (for details of techniques, see Suter 1985). Usually within a day or two after a spider built a web, the spider was removed from the web and placed on a new hexapod, and the web was stored for subsequent testing. All spiders were maintained in the laboratory on a diet of fruit flies (*Drosophila melanogaster*).

We recorded the data of construction of all webs and the molt dates of every individual spider. These data allowed us to determine the last day on which male