

NOTES ON SPIDER (THERIDIIDAE, SALTICIDAE) PREDATION
OF THE HARVESTER ANT, *POGONOMYRMEX SALINUS* OLSEN
(HYMENOPTERA: FORMICIDAE: MYRMICINAE),
AND A POSSIBLE PARASITOID FLY (CHLOROPIDAE)

William H. Clark¹ and Paul E. Blom²

Key words: *Pogonomyrmex salinus*, *harvester ants*, *Euryopsis formosa*, *Xysticus*, *spider predators*, *Incertella*, *parasite*.

Spiders are known predators of ants. Pressure exerted by consistent spider predation can alter the behavior of ant colonies (MacKay 1982) and may be a selective pressure contributing to the seed-harvesting behavior of *Pogonomyrmex* (MacKay and MacKay 1984). We observed the spider *Euryopsis formosa* Banks (Araneae: Theridiidae) capture and transport workers of the harvester ant (*Pogonomyrmex salinus* Olsen [Hymenoptera: Formicidae, Myrmicinae]) in southeastern Idaho. Additional observations revealed a crab spider of the genus *Xysticus* preying on *P. salinus* and the presence of a chloropid fly (*Incertella*) that may have been parasitizing the moribund prey subdued by the spider.

STUDY SITE

One collection site is located along Road T-20 (Butte County, T4N, R31E, S6) on the Idaho National Environmental Research Park (INERP) in the cold desert of southeastern Idaho. The second set of observations was made on the INERP (Clark County, T7N, R31E, S34, along Highway 28). Voucher specimens of all species have been deposited at the Orma J. Smith Museum of Natural History, Albertson College of Idaho, Caldwell, Idaho 83605 USA (CIDA).

RESULTS AND DISCUSSION

On 3 July 1988, 1020 h, at the Butte County collection site we collected a single individual of *Euryopsis formosa* Banks (Araneae: Theridiidae)

that was carrying a worker of *Pogonomyrmex salinus* Olsen (Hymenoptera: Formicidae, Myrmicinae) across a large area of basalt rock. The ants were actively foraging in the area. The air temperature (shaded) was 31 C and the soil surface (in the sun) was 39.5 C. No other spiders of this species were encountered. Prey capture was not observed.

On 31 August 1991 at 1725 h at the Clark County site we observed a crab spider of the genus *Xysticus* preying on *P. salinus* about 20 cm from the ant nest entrance. The ants were still actively foraging at this time. One spider was riding on the ant in the shelter of an isolated clump of Indian ricegrass (*Oryzopsis hymenoides*) at the edge of the ant mound. The ant was initially very active, walking around an old grass stem, while the spider made periodic attacks on the ant. As time progressed, involuntary spasms in the ant increased. The spider was generally oriented toward the posterior of the ant, biting it at the base of the petiole. Sometimes the spider was perpendicular to the ant, holding on to the ant with only its mandibles. After five minutes the ant fell onto its side and movements slowed. At 1740 h only its antennae were moving slightly, and a minute later the spider moved the ant under a small stick. Two small flies approached the ant and one flew onto its head. Occasional movements (jerks) of the ant's legs were observed at 1751 h. At this time we collected the spider, the ant, and one of the flies (WHC #9170). The fly is a female *Incertella* (Diptera: Chloropidae) and may represent an undescribed species. Brown and Feener (1991)

¹Orma J. Smith Museum of Natural History, Albertson College of Idaho, Caldwell, Idaho 83605 USA; and Department of Plant, Soil, and Entomological Sciences, University of Idaho, Moscow, Idaho 83843 USA.

²Department of Plant, Soil, and Entomological Sciences, University of Idaho, Moscow, Idaho 83843 USA.

have found the phorid *Apocephalus paraponerae* selectively parasitizing moribund workers of *Paraponera clavata*. It may be that these *Incertella* flies are seeking a similar host and opportunistically exploiting the spider prey. The flies were not observed to interact with living, active ants.

At 1740 h we noticed a second spider, *E. formosa*, on the same ant mound. This spider oriented uphill on the side of the mound, facing the ant nest entrance. At 1742 h an ant walked over and slightly past the spider, apparently failing to recognize the predator's presence. The spider remained motionless as the ant passed, then spun around and mounted the ant's gaster. The spider released the ant and moved to face it. The ant began convulsing at this time, while the spider sat 1 cm away from the ant (facing away from the ant). By 1745 h no motion was observed in the ant and at 1746 h the spider climbed onto the ant. The ant was on its side with the spider on top facing the gaster. A fly similar to those mentioned above moved onto the head of the ant. At 1747 h the spider was dragging the ant across the mound using a web sling, as previously described by Porter and Eastmond (1982) for the spider *E. coki* in southeastern Idaho. The spider dragged the ant to the edge of the mound and into the grass clump mentioned earlier. Several other worker ants were observed strung up in the grass clumps. At this point we collected the spider (WHC #9171).

The spider genus *Euryopsis* is known to prey on ants (Levi 1954, Carico 1978), including harvester ants of the genus *Pogonomyrmex* in North America (MacKay 1982, Porter and Eastmond 1982). MacKay (1982) has reported *E. californica* preying on *P. rugosus* in southern California.

Prey of *E. formosa* has not previously been reported (Levi 1954), nor has the spider been reported from the INERP (Levi 1954, Allred 1969). Levi (1954) gives the distribution of the species over most of Idaho except for the southwestern corner, so its presence here was expected. Allred (1969) reported a related species, *Euryopsis scriptipes* Banks, from the southeastern border of INERP during July. *Pogonomyrmex salinus* is the dominant seed-harvesting ant on the INERP, occurring in almost all of its plant communities (Blom et al. 1991).

Porter and Eastmond (1982) found *Euryopsis coki* Levi to be a common predator of *Pogonomyrmex owyheeii* (= *P. salinus*) in southeastern Idaho during July and August. These

small gray spiders capture ants on their mounds and drag them away by a web sling attached to the ant and to the tip of the spider's abdomen. *Euryopsis formosa* is found from central California north to British Columbia and east to Wyoming (Levi 1954). *E. formosa* may also be an important predator of *P. salinus* at this site and of *Pogonomyrmex* species in the western United States. The relatively greater precision and speed with which *Euryopsis* subdued and transported the *P. salinus* prey suggests an established predator-prey relationship.

ACKNOWLEDGMENTS

This work was conducted under the INEL Radioecology and Ecology Programs sponsored by the Office of Health and Environmental Research, and the Division of Waste Products through the Fuel Reprocessing and Waste Management Division, United States Department of Energy. O. D. Markham, T. D. Reynolds, and J. B. Johnson have provided assistance. J. McCaffrey and H. W. Levi provided spider determinations. C. W. Sabrosky identified the *Incertella* specimen and B. V. Brown assisted. This paper is published as Idaho Agriculture Experiment Station Paper No. 91767.

LITERATURE CITED

- ALLRED, D. M. 1969. Spiders of the National Reactor Testing Station. *Great Basin Naturalist* 29: 105-108.
- BLOM, P. E., W. H. CLARK, AND J. B. JOHNSON. 1991. Colony densities of the seed harvesting ant *Pogonomyrmex salinus* (Hymenoptera: Formicidae) in seven plant communities on the Idaho National Engineering Laboratory. *Journal of the Idaho Academy of Science* 27: 28-36.
- BROWN, B. V., AND D. H. FEENER, JR. 1991. Behavior and host location cues of *Apocerphalus paraponerae* (Diptera: Phoridae), a parasitoid of the giant tropical ant, *Paraponera clavata* (Hymenoptera: Formicidae). *Biotropica* 23: 182-187.
- CARICO, J. E. 1978. Predatory behavior in *Euryopsis funeris* (Hentz) (Aranea: Theridiidae) and the evolutionary significance of web reduction. *Symposium of the Zoological Society of London* 42: 51-58.
- LEVI, H. W. 1954. Spiders of the genus *Euryopsis* from North and Central America. *American Museum Novitates* 1666: 1-48.
- MACKAY, W. P. 1982. The effect of predation of western widow spiders (Araneae: Theridiidae) on harvester ants (Hymenoptera: Formicidae). *Oecologia* 53: 406-411.
- MACKAY, W. P., AND E. E. MACKAY. 1984. Why do harvester ants store seeds in their nests? *Sociobiology* 9: 31-47.
- PORTER, S. D., AND D. A. EASTMOND. 1982. *Euryopsis coki* (Theridiidae), a spider that preys on *Pogonomyrmex* ants. *Journal of Arachnology* 10: 275-277.

Received 6 February 1992
Accepted 10 September 1992