

healthy, consuming the offered *T. ni* larvae and producing silk, until the time of death. All dead spiders were microscopically examined for the presence of *N. atypicola* mycosis.

Our experiments with *N. atypicola* satisfy Koch's postulates. Seventeen of the 20 species that were treated developed *N. atypicola* mycosis (Table 1 and Fig. 1). The three nonsusceptible species, representing four specimens from two families (Araneidae and Lycosidae), were in the genera *Cyclosa*, *Lycosa*, and *Pardosa*. We also subjected an opilionid, *Leiobunum vittatum* Say (Phalangiiidae), to the same protocol. All three individuals tested developed the mycosis, the earliest in two days following application of conidia.

There are no obvious trends in our results. The tested species represent a reasonably broad spectrum of taxonomic and ecological diversity within the spider suborder Labidognatha, as well as a member of one other arachnid order. If the results on *L. vittatum* are any indication, *N. atypicola* may attack not just spiders but arachnids generally.

All previous references to host range of this fungus have been anecdotal. Our results indicate that *N. atypicola* has a broad potential host range; determination of its importance as a mortality agent will require increased awareness on the part of collectors and field ecologists.

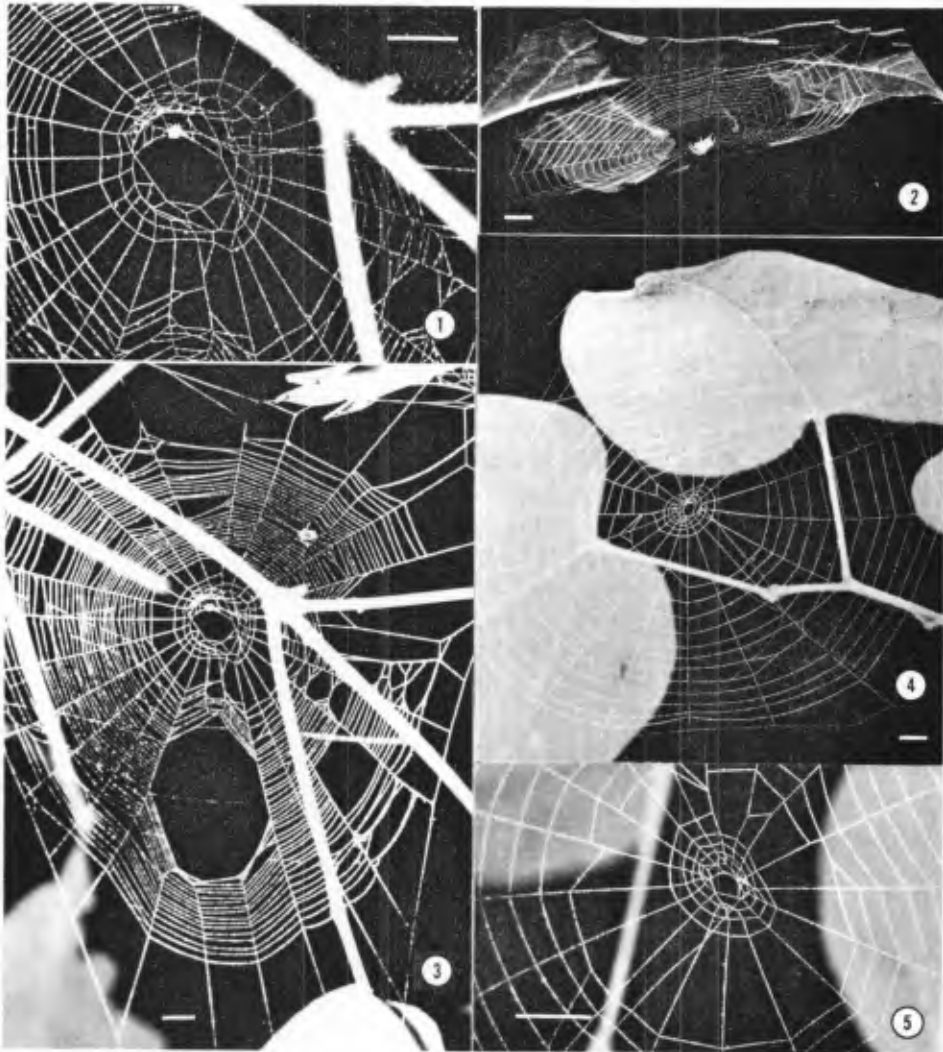
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### NOTES ON SPIDER NATURAL HISTORY: THE WEBS AND HABITS OF *ARANEUS NIVEUS* AND *A. CINGULATUS* (ARANEAE, ARANEIDAE)

In his revision of the *Araneus pagnia* (Walckenaer) species group of North America, H. W. Levi (1973. Bull. Mus. Comp. Zool., 145:473-552) acknowledged the help of spicid wasps that had collected a critical portion of the material forming the basis of his revision. Several new or rare species appeared in the otherwise well-known New England fauna, and Levi attributed their rarity to the habit of living in tree-tops, where the wasps foraged. This note reports several observations suggesting that Levi was correct, and includes for the first time photographs of the webs of *Araneus niveus* (Hentz) (Figs. 1-3), and *A. cingulatus* (Walckenaer) (Figs. 4-5).



Figs. 1-3.—*Araneus niveus*: 1, close-up of open hub, showing loose non-sticky spiral; 2, adult female web; 3, different adult female web spanning several leaves. Figs. 4-5.—*A. cingulatus*: 4, adult female web spanning two leaves; 5, close-up of open hub and loose spiral. Scale lines = 1 cm.

These nocturnally active species were all taken about 1 h after sundown during July 9-16, 1985 from newly constructed webs in the crown of a wind-thrown oak (*Quercus alba*, estimated height 15 m), in mesic hardwood forest of Rock Creek Park, Washington, DC. The tree had fallen a few days before during a thunder storm. About 20 animals had built webs in the crown, and a few more in the shrub layer immediately surrounding the fallen crown. None were found far from the fallen tree. All evidence suggested that the spiders resided in the standing tree canopy and had "ridden" it to the ground when it fell. Despite a wide diversity of potential web sites, many webs of both species spanned the lobes of single oak leaves (Fig. 2), or a few parallel leaves (Fig. 4). The web planes were parallel to the lower leaf surface (Fig. 2), suggesting that these webs were placed to intercept insects landing or taking off from the underside of the leaf. Thus a guild of

canopy-dwelling orb weavers may exist, which spins webs across the undersurface of leaves to capture aerial prey.

The web architectures of all three species are similar to other published photos of *Araneus* webs (e.g., Levi, H. W. 1971. *Bull. Mus. Comp. Zool.*, 141:131-179; Levi, 1973, cited above; Witt, P. N., & R. Baum. 1960. *Behaviour*, 16:309-318): a slightly elliptical form, a messy, open hub surrounded by an irregular, loosely spiralled remnant of the non-sticky spiral; moderate numbers of radii (R) and sticky spirals (SS) (*niveus*: 17-26R, 13-43SS,  $n = 4$ ; *cingulatus*: 16-20R, 12-23SS,  $n = 3$ ) no signal line, and spider at the hub. These web features may characterize the genus *Araneus*, or at least, a monophyletic group including *Araneus*. The description of *A. cingulatus* by Levi (1973) agreed well with the living animals, but live *A. niveus* had a salmon or pink dorsal patch on a greenish-white abdomen, whereas Levi mentioned a black patch in a similar position. He did not see live animals.

The ability to identify species by field characters or habits has been a crucial step in the development of many disciplines in natural history. Our knowledge of spider natural history would prosper more quickly if specialist knowledge, equipment, and preserved specimens were not a prerequisite. Much information is already available on web architecture, and it seems better to share it now rather than to hoard it in anticipation of some larger project, such as a comprehensive field guide. I would like to thank Claudia Sobrevila for help in the field, and H. W. Levi for suggesting improvements to the manuscript.

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## **OBSERVATIONS ON COMMENSAL DIPTERA (MILICIIDAE AND CHLOROPIDAE) ASSOCIATED WITH SPIDERS IN ALABAMA**

A number of commensal Diptera feed simultaneously with spiders on fluids coating the exterior of spider prey (Robinson, M. H. and B. Robinson. 1977. *Psyche*, 84:150-157; Sivinski, J. and M. Stowe. 1980. *Psyche*, 87:337-348). Some of these Diptera were observed on prey of three species of spiders in Lee Co., Alabama during 1979-1983 (Table 1). On 18 October 1979 an adult green lynx spider, *Peucetia viridans* (Hentz), was found feeding on a honey bee, *Apis mellifera* L., in an old field near Auburn, Alabama. A single *Desmometopa m-nigrum* (Zetterstedt) was feeding on fluids on the bee. On 12 November 1979, in the same location, four *D. m-nigrum* were found feeding on another honey bee captured by a green lynx spider. These two prey with commensals were among 20 prey of green lynx spiders collected in the old field habitat in 1979, a 10% incidence of commensalism. These two instances were the only observations of