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An unusual nest built by *Hypaeus cucullatus*, a jumping spider (Araneae, Salticidae) from Costa Rica

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Summary

Adult females of *Hypaeus cucullatus* Simon, a pluridentate salticid from Costa Rica, build large tubular nests with a unique silken brace across them. These nests are made from especially tough silk. The nests of juveniles and males are simple tubes. Other unusual silken devices of salticid spiders are reviewed.

Introduction

Salticids, having unique, complex eyes and acute vision (Blest, 1985; Land, 1985), are primarily cursorial spiders which, instead of spinning webs for prey-capture, stalk and leap on active insects. Most salticids use silk to build nests, in which they moult, oviposit, and sometimes mate; and they tend to stay in their nests at night and during other periods of inactivity. In this paper a unique kind of nest, built by *Hypaeus cucullatus* Simon from Costa Rica, is described.

Materials and Methods

Hypaeus cucullatus was observed in primary rainforest at Finca La Selva, a research station operated by the Organization for Tropical Studies in Costa Rica. Captive specimens were also observed in the laboratory at La Selva (for basic methods for maintenance and observation, see Jackson & Hallas, 1986a).

Observations

Two kinds of nests were seen in the field — simple tubes, much the same as those known for many other salticids, and tubes with a strong brace across the top, either about at right angles to (Figs. 1 & 2) or, more often, diagonally across (Fig. 3) the long axis of the tube. Sometimes there was a fan (an array of threads stretched taut from the brace across the tube and fastened broadly to the substrate beside the tube). The fan could extend more or less symmetrically from either side of the brace or, more often, extend from only one side (Fig. 2).

Nests were always under large leaves in the rainforest, especially *Diffenbachia* (Fig. 2) and palm (Figs. 1 & 3) leaves. Compound nests (i.e., tubes plus braces) were always large (tube *c.* 40 mm long and *c.* 30 mm wide; brace *c.* 50 mm long); simple nests (i.e., tubes without braces) were always smaller (generally about three times the spider's body length long and about twice its body length wide. Adult *H. cucullatus* were 7-8 mm in body length.

Each simple nest was occupied by a juvenile or by an adult male, but never by an adult female. Each compound nest was occupied by an adult female, an adult female plus a group of small juveniles, or by one or more (up to 5) small juveniles without an adult female present. When more than one juvenile shared a nest, sizes sometimes varied considerably, the largest individual sometimes being more than twice the body length of the smallest. Sometimes males and subadult females were found cohabiting in two-chambered simple nests.

In captivity, only adult females built compound nests; juveniles and males built only simple nests. To build a compound nest, the female first built a simple nest, then added the brace. Sometimes the brace was not added until several days after the simple nest had been built.

Extracting *H. cucullatus* from its nests could be difficult. Nests — both simple and compound — were made from unusually tough silk. The brace was especially tough, and it was tightly attached to the leaf (Fig. 3). To tear open these nests (e.g., using forceps) required considerable force. The spider was reluctant to leave the nest when pressure was applied to entice it out; and if an attempt was made to tear the nest open, the spider, at some point, suddenly ran and jumped quickly away.

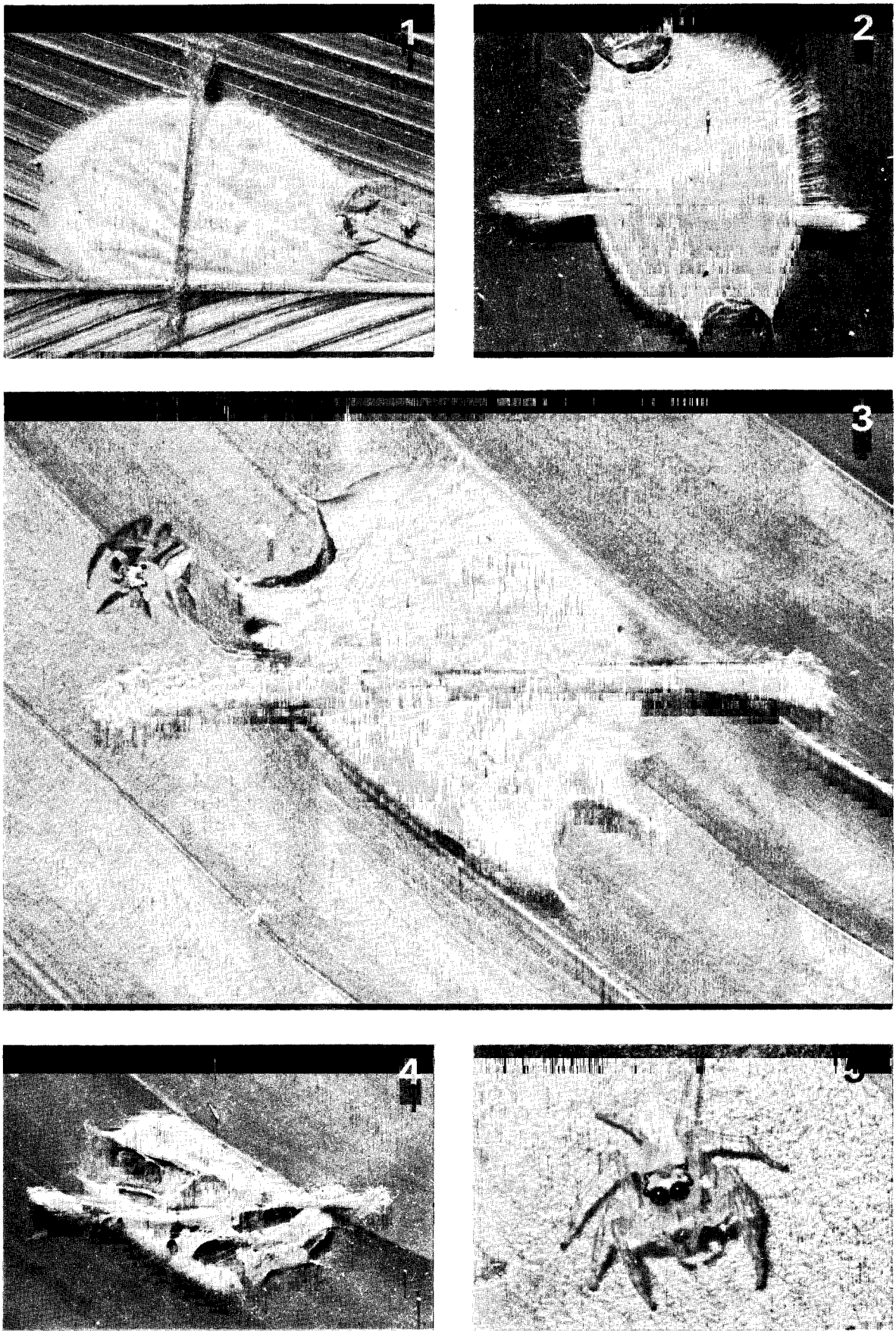
Often nests were torn and tattered, but still occupied (Fig. 4). Evidently, these nests had been torn into by some other animal and subsequently repaired by the *H. cucullatus*.

Males, females, and especially juveniles were almost transparent (Fig. 5) and seemed to be rather delicate spiders. They were readily injured when taken into captivity.

Discussion

The nests of *H. cucullatus* are made from unusually tough silk, and those of adult females have idiosyncratic braces strung across them. Aberrant silk structures are built by some other salticids. *Pellenes nigrociliatus* (L. Koch) suspends snail shells by silk lines from vegetation and builds its nest inside (Mikulska, 1961). Adult females of *Euryattus* sp. indet. suspend rolled-up leaves from vegetation or rock ledges and use them as nests, but the juveniles of *Euryattus* spin webs (Jackson, 1985a). *Pellenes* sp. (Lopez, 1986), *Simaetha paetula* (Keyserling), *S. thoracica* Thorell (Jackson, 1985b), *Spartaeus spinimanus* (Thorell) (Jackson, unpubl. data) and five studied species of *Portia* (Jackson & Hallas, 1986a; Forster & Murphy, 1986) are also known to spin webs. All studied species from the genera *Asemonea, Goleba, Lyssomanes* and *Onomastus* (Hallas & Jackson, 1986; Jackson, unpubl. data) spin sheets of silk, which could be described as rudimentary webs, across spaces on the undersides of broad leaves. Studied species of *Brettus, Cyrba* and *Phaeacius* (Jackson & Hallas, 1986b; Jackson, unpubl. data) also build web-like resting devices. Two studied species of *Thiania* make nests by binding pairs of leaves together using silk rivets (Jackson, 1986).

It is interesting that *Pellenes* is the only one of these spiders which is unidentate. *Simaetha* and *Euryattus* are fissidentate, and the others, including *Hypaeus*, are



Figs. 1-5: *Hypaeus cucullatus*. **1** Compound nest on underside of palm leaf. Brace about at right angles to long axis of tube. Spider with forelegs and anterior edge of cephalothorax protruding from nest at right. **2** Compound nest on underside of *Diffenbachia* leaf. Brace at right angles to long axis of tube. Fan above brace on right side. **3** Compound nest on underside of palm leaf. Brace diagonally across tube. Juvenile *H. cucullatus* on leaf in upper left of photograph. Note attachment of brace to leaf (beside spider). **4** Torn and tattered compound nest. Brace runs almost parallel to long axis of torn tube. Holes torn in the nest have been repaired by the *H. cucullatus*. **5** Juvenile standing on a *Diffenbachia* leaf. Note: spider almost transparent.

pluridentate. The phylogenetic relationships between salticid groups are generally unclear; however, cheliceral dentition has been considered as a character with some phylogenetic significance, with pluridentate being primitive, unidentate being advanced, and fissidentate being intermediate (see Wanless, 1984). Especially many examples of aberrant silken devices come from the subfamilies Spartaeinae (*Brettus, Cyrba, Portia, Phaeacius* and *Spartaeus*) and Lyssomaninae (*Asemonea, Goleba, Lyssomanes* and *Onomastus*), which have additional characters identifying them as primitive, such as the large functional posterior median eyes of most genera in these two subfamilies and the complex palpal organs of many species (Wanless, 1980, 1984). These observations suggest that it is especially among the primitive salticids that aberrant spinning behaviour is likely to be found.

The nest of adult females of *H. cucullatus* is perhaps the least aberrant of these examples, being basically a tube with a modification — the brace — to make it unusually tough. These seemingly delicate spiders, and their eggs, are probably especially difficult prey for predators, such as birds, to extract from their nests.

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