

BOOK REVIEW

Spider Communication, mechanisms and ecological significance. Edited by P. N. Witt and J. S. Rovner. Princeton University Press, Princeton, New Jersey 08540. \$30.00, 441 pages, illustrated, 1982.

The book opens with a short introduction by Witt and closes with a short epilogue by Rovner. Between, are nine chapters, each by an author (or two) whose researches have occupied the past 10 or 15 years. Whereas brief mention is made of the pioneering works in this field, one can see from the publications listed in the 40 pages of Literature Cited, that most, possibly 90%, of the contributions were published since the nineteen sixties. There is an index. Communication is discussed in its broadest sense, referring to any direct or indirect exchange of information. The mechanisms include visual, vibratory (transmitted through the substratum), acoustic, tactile, and pheromones, both airborne and contact. Each chapter closes with an indication of those questions for which future research may find answers.

Krafft, in his chapter, introduces us to the activities of various pheromones, particularly how these may function in the behavior of social spiders, his special research area. This includes not only the sexual pheromones, but others, such as that responsible for the mutual tolerance of one's conspecifics.

The next chapter, by Barth on vibrating signals, is the longest in the book (56 pages). The detailed anatomy of trichobothria and of slit sensillae, is described with illustrations. Evidence is presented to indicate that the trichobothria detect particle movement, airborne stimuli. The single slit just behind the tarsal claws apparently perceives sound, and the compound slit (or lyriform) organ at the distal end of the metatarsus is a vibration receptor. Much evidence as to how these organs function is adduced from the elegant experiments (some not heretofore published) described in this chapter.

Uetz and Stratton discuss acoustic communication, of which they consider three types. Best known is stridulation, and they supply a drawing showing the different places on a spider's body where stridulating organs may be found. That percussion too is used by many spiders has been known for many years, but that some spiders may produce sounds by the vibration of a leg (as bee or fly wings do) is a recent discovery. While the use of sounds is best known to us in courtship behavior, it is pointed out that sound may be involved in agonistic behavior too. It has also been shown that for species related morphologically, and which may even have identical genitalia, the sounds made during courtship are different. Interbreeding presumably does not occur because of this difference.

In Lyn Forster's chapter on visual communication in salticids she first supplies detailed descriptions of the eye anatomy, based principally on the work of Homann and of Land. She also goes into great detail in describing the many events during courtship, step by step. It is further pointed out "that the popular assumption that jumping spiders uniformly enjoy bright sunlight is mistaken, and that many live in very dimly lit habitats."

Most of Jackson's chapter is devoted to summarizing his researches on *Phidippus johnsoni*. These have been very extensively reported in detail, and from the literature list

one can see that from 1976 through 1981 he has published 14 papers on this species. As Jackson points out, other sensory modalities (auditory and olfactory) may play a part as well as visual, and he has shown that even a non-visual courtship (his type two) may occur.

The chapter by Tietjen and Rovner is concerned principally with chemical coordination in lycosids. Presumably the receptors include the tarsal organ, and also the curved, blunt-tipped steeply inserted hairs found concentrated on the distal portion of the appendages, being especially abundant on the male pedipalp. Besides the pheromone made by females which incites the male to court, there may even be one produced by males which enables recognition of conspecifics, so that the female's predatory behavior is inhibited.

The chapter by Riechert on communication versus coercion concerns intraspecific competition (for mates, for space territoriality, and rank position). The mechanisms are best known in *Agelenopsis aperta*.

Bergess and Uetz supply the chapter on social spacing strategies. This includes close aggregations which may be temporary (as in hibernating; with spiderlings; and the mother-spiderlings association) or those which are regularly social. Different stimuli may be involved, vibrating signals being most commonly used. In some species conspecifics are tolerated at closer distances in areas where food is abundant. Most employ agonistic behavior like leg jerking and web shaking to maintain space. Rovner's recent work with lycosids has shown that tactile stimuli are provided to the offspring by the special spiny knobbed abdominal hairs of the mother.

The final chapter, by Riechert and Luczak, concerns behavioral responses to prey. This includes "valuable information on spider behavior and ecology that applies some of the material discussed earlier [in this book] on sensory physiology and modes of signalling." All araneologists will find the book of interest; those working with the ecology and ethology of spiders will find it especially useful.

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