

REARING METHODS FOR SPIDERS

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ABSTRACT

A rearing method is reported which provides spiders with a continual supply of food and water. Using this method, spiders have been reared from egg to adult with low mortality. Other rearing methods for spiders are reviewed.

Rearing and maintaining spiders in captivity is often a rather laborious task, especially when large numbers are involved. Three basic problems must be dealt with: providing food and water, preventing cannibalism, and minimizing maintenance time. Numerous rearing and maintenance methods for spiders have been described in books on spiders, in papers on rearing spiders, and in the methods sections of papers on original research. I will review a number of these and describe a convenient rearing method which I have used for jumping spiders (Salticidae). Of course, the optimal rearing method will depend on the species of spider and the interest of the researcher; also new methods will undoubtedly be continually designed. The review and method presented in this paper should offer a useful source of ideas.

The most common rearing method seems to consist of confining the spider in a container of some sort, opening the container from time to time to add food and water. The containers used have included: a. glass jars and tumblers covered by wire screen (Bonnet, 1930), cheesecloth (Burger, 1937), mosquito netting (Crane, 1948), and cotton cloth (Hollis and Branson, 1964); jars with holes in the metal lids (Rovner, 1968); and jars stoppered with either polyurethane foam or cotton wrapped in cheesecloth (Kaston, 1972); b. glass vials and tubes stoppered with corks (Bonnet, 1930; Branch, 1942; Cooke, 1962), cotton (Branch, 1942; Peck and Whitcomb, 1967; Nakamura, 1968; Miyashita, 1969), and polyurethane foam (Kaston, 1970); c. finger bowls covered by glass (Rovner, 1968); d. plastic boxes (Cooke, 1962; Miyashita, 1968); e. cardboard ice cream containers covered by petri dishes or glass plates (Whitcomb and Eason, 1965); f. for orb weavers (Araneidae), aluminum frames with removable glass doors (Witt, 1971).

Maintaining each spider in a separate container has been the most commonly used means of preventing cannibalism. Live insects, usually house flies (*Musca domestica*) and *Drosophila*, have been used for food most often, although some work has been done with artificial diets (Peck and Whitcomb, 1968). Feeding methods frequently include anesthetizing the flies for sorting and transferring, although Brown (1946) described a useful method for transferring individual *Drosophila* without using anesthesia. Depending on the species, water for drinking (Parry, 1954) and/or humidity may be important.

Some provisions include placing the following items inside the spider's container: a glass dish filled with water (Bonnet, 1930), a wet cork (Brown, 1946), wet cotton (Hollis and Branson, 1964), wet cotton covered with filter paper (Nakamura, 1968), a wet cotton roll (dental wad) (Crane, 1948), small vials and tubes filled with water and plugged with cotton (Miyashita, 1968; Rovner, 1968), wet plaster of Paris (calcium sulfate) (Edgar, 1971), and wet plaster of Paris mixed with sand (Cooke, 1962). Another method used by Bonnet (1930) was to fill the bottom of jars with water. A ring of cork floating in the water, or a stick of wood propped against the inside of the jar served as a substrate for the spider. Parry (1954) kept spiders in glass covered flower pots containing soil. Soil wetness was maintained by keeping the flower pots in trays of water. Burger (1937) used cheesecloth covered glass tumblers. Food and water were introduced through a thistle tube inserted in a hole in the cheesecloth. Cooke (1962) stoppered glass tubes with corks in which there were two holes. Each hole contained a smaller glass tube. One was filled with water and stoppered with cotton at both ends. The other tube, used for ventilation and introduction of prey, was stoppered at one end with cotton.

Concurrent with a study (in progress) of the reproductive biology of a jumping spider *Phidippus johnsoni* Peckham, a rearing cage was designed which provides a continual food and water supply to the spider without frequent opening of the cage (Fig. 1). Using these cages, large numbers of spiders have been conveniently reared from egg to adult with low mortality. For example, in a life history study (in progress) data were kept on 39 individuals from the time they departed from the egg cocoon. Nine either escaped, were accidentally killed, or were intentionally killed and preserved. Of the remaining 30, 26 lived to become adults.

In the following discussion, refer to Fig. 1 for explanation of abbreviations appearing in parentheses. The cages were made from $11 \times 8 \times 6$ cm clear perplex freezer dishes (sandwich boxes). A 45 mm diameter ventilation hole (H) was covered by mesh No. 40 milk strainer cloth (brass screen). Moisture was continually provided to the interior of the cage by means of a 10×75 mm cotton roll (dental wad) (CR), the top of which protruded into the cage through a hole in the cage and the bottom of which was set in a 45×85 mm glass jar filled with water (JW). Sometimes mold growth appeared on the cotton roll. When this occurred, the cotton roll was easily discarded and replaced by a new one. The top of a 25×95 mm shell vial (V) protruded through a hole in the cage. The bottom of the vial was set in a 45×85 mm jar which supported the cage. Usually a single spider was kept in each cage. When the cage was used for a small spiderling, vestigial winged *Drosophila melanogaster* were reared in the shell vial, using Instant *Drosophila* Media (Carolina Biological Supply Co.) plus yeast. A strip of paper was placed in the vial to enable the *Drosophila* to more easily climb into the cage. With this method, emerging adult *Drosophila* were continually present in the cage with the spiderling. By exchanging the vials, old *Drosophila* cultures were easily replaced by new ones as needed. Usually this was necessary no more than once every two weeks. Larger spiderlings and adults were fed houseflies (*Musca domestica*). The shell vials were then provided with sugar cubes as a source of food for the houseflies, and new houseflies were introduced as necessary to maintain a supply of 3 to 8 in the spider's cage at all times. Using this procedure, new flies had to be provided no more than once or twice a week. Adult houseflies were obtained from our Entomology Department, and maintained on sugar and water in a $125 \times 155 \times 155$ mm metal, screen box. Flies were taken from the box individually by hand with a piece of cheesecloth and introduced into the spider's cage through a 10 mm diameter cork hole (CH). Holding the cheesecloth between one's thumb and fingers, a fly

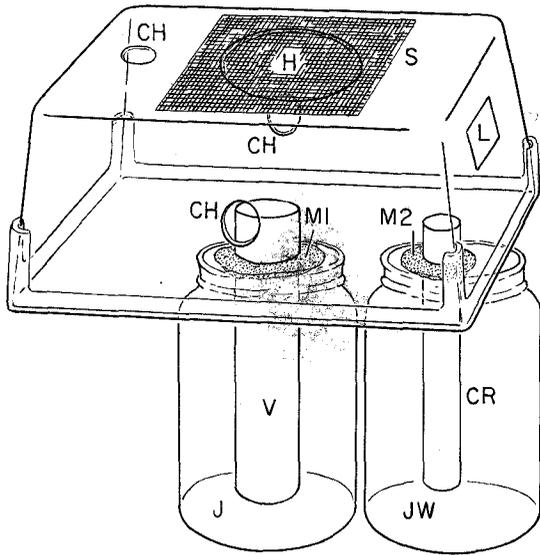


Fig. 1.—Rearing cage. CH, cork hole; CR, cotton roll (dental wad); H, ventilation hole; J, glass jar; JW, glass jar filled with water; L, label; M1, modeling clay around hole for vial; M2, modeling clay around hole for cotton roll; S, brass screen (milk strainer).

could be pinned to the side of the box and picked up without anesthesia and with no obvious injury to the fly. The cage had more than one cork hole. When the spider built its nest (retreat) on one of the corks, the flies could be introduced through a different cork hole without damaging the nest.

Modeling clay (plasticene) was used to hold the shell vial and cotton roll in position. Holes for corks and cotton rolls were burned through the plastic with a soldering iron. The larger holes for the vial and ventilation were burned through with heated metal pipes. The brass screen was fastened by melting the plasticene with a soldering iron and allowing it to solidify around the screen.

In addition to *P. johnsoni*, these cages have been used for rearing two other jumping spiders from egg to adult, *P. regius* C. L. Koch and *Plexippus paykulli* Andouin. However, this rearing method should be readily adaptable to a wide variety of spider species. Numerous modifications of this basic design are possible. For example, larger cages (100 X 265 X 400 mm) with two cotton rolls and three shell vials have been used for maintaining more than one spider in a single cage.

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