SIMPLE NESTS FOR CULTURING IMPORTED FIRE ANTS[1, 2]

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ABSTRACT

Disposable nests for red imported fire ants, *Solenopsis invicta* Buren and black imported fire ants, *Solenopsis richteri* Forel, were made by liquefying a dental casting material, pouring it into plastic petri dishes, and allowing it to harden. The ants in the nests were supplied moisture through plastic tubing attached to an external bottle reservoir or from a water-saturated sponge.

Growth and development of colonies in the new nests was the same as for the Wilson nests previously used. The new nests require less maintenance, provide a cleaner environment for the colonies, and are considerably cheaper, ranging from ca. 34 - 42 cents each as compared to $12-20 each for the Wilson nests.

Key Words: Imported fire ants, *Solenopsis invicta, Solenopsis richteri,* nests, rearing

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The present investigations into the biology and control of the red imported fire ant, *Solenopsis invicta* Buren and the black imported fire ant, *Solenopsis richteri* Forel, require that many colonies of the ants be maintained in the laboratory. Fire ants require high humidity for survival and for proper growth and development of the immatures. Therefore, since 1970, Plexiglas® nests fabricated by the design of Wilson (1962), which provide for maintenance of high humidity, have been used for housing ants for many of our laboratory studies (Banks *et al.* 1973, Adams *et al.* 1976, Stringer *et al.* 1976). These nests, though they provide satisfactory housing for the ants, have several disadvantages. Cost is high ($12-20/unit), the nests become increasingly brittle with age and thus break very easily, and the nests must be removed, cleaned, and the cotton padding in the base must be replaced every 2-3 weeks to eliminate fungal growth that is detrimental to the colonies. To overcome these disadvantages of the Wilson nests, we constructed two nests from disposable plastic petri dishes which provide suitable housing for the ants and are sufficiently cheap to be used once and discarded.

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[1] Hymenoptera: Formicidae.

[2] Mention of a proprietary product does not constitute an endorsement by the U.S. Department of Agriculture.

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MATERIALS AND METHODS

Two designs were used for the disposable ant nests. The basis of the 1st nest (the Bishop nest) was a 150X15 mm plastic petri dish. First, 45 cm of crochet yarn was drawn through 30 cm of 2-mm-ID X 5-mm-OD clear plastic tubing with a loop of thin wire so ca. 10 cm of yarn extended beyond the tubing at one end and 5 cm at the other. The tubing was then pulled through a hole made at the junction of the bottom and the wall of the petri dish so the end of the tube with the 5 cm of yarn was near the center of the bottom of the dish. Next, the yarn was formed into a loop, and the end of the tubing was secured to the dish with cellophane tape positioned so it covered the end of the tubing and a portion of the yarn. Ca. 5 cm of the opposite end of the tubing was forced through a 4-mm hole drilled in the cap of a 125-ml PVC plastic bottle that served as a water reservoir; the yarn was pulled taut and secured in a split made in the end of the tubing. If the yarn is not secured in this manner, it will bunch in the tubing and impede water flow to the nest. A good quality bottle can be reused for at least 100 successive nests, which reduces the cost of the bottle to less than 0.5 cents/use.

The basis of the 2nd design (the Williams nest) was two petri dishes, one 150X25 mm and the other 100X10 mm. A piece of plastic sponge was cut and fitted inside the smaller dish. Four small holes were made in the top of the small dish with a soldering iron and after the sponge was saturated with water, the top was placed on the dish and the dish placed top up in the large dish.

After all components for each nest were in place, ca. 80 g of dental labstone was liquefied with distilled water (2 parts labstone: 1 part H_2O) and poured into the petri dish to a depth that completely covered the small petri dish (12-14 mm) or the yarn and tubing (7-8 mm). The labstone must be stirred thoroughly to eliminate lumps and to form a smooth slurry before it is poured into the dish. Better mixing of the labstone was usually attained if sufficient material for 8-10 nests was mixed in one batch. After the labstone had cured (1 h. or more), it formed a smooth arena for the ants and slowly wicked moisture up from the yarn or from the sponge to keep high humidity in the nest.

Before a nest was used, four holes ca. 3-mm were opened in the side walls of the bottom ½ of the petri dish, 90° apart and just above the top of the labstone, to permit ingress and egress by the ants. The holes can be made in a variety of ways; however, we found that a soldering iron with a small tip or a 6^d nail heated sufficiently to melt through the plastic works well. The water bottle for the Bishop nest is filled at the time the nest is placed in use. The Williams nests are placed in a refrigerator to retard drying of the sponge if they are not used shortly after fabrication. Water in the Williams nest is replenished by drilling a small hole through the bottom of the nest into the sponge area, rewetting the sponge by using a syringe and hypodermic needle and then resealing the hole with heat or methylene chloride.

RESULTS AND DISCUSSION

Figure 1 shows the components for each of the nests; Figure 2 shows the completed nests; and Figure 3 shows a Bishop nest occupied by a colony of fire ants.

The disposable nests have proven superior to the Wilson nests in the ca. 2 years we have used them in our laboratories. We had expected a useful life of 4-6 wk for the nests; however, the average life has been 12-15 wk with some nests remaining in use for 6 months.

No difference has been noted in developmental times for colonies in the disposable nests as compared to the Wilson nests. Survival of young colonies appears to be somewhat better in the disposable nests, probably because the labstone does not provide as suitable an environment for growth of detrimental fungi or bacteria as does the cotton padding in the Wilson nest.

Maintenance time is substantially reduced since the only maintenance required during the useful life of the nest is replacement of the water supply by refilling the water bottle (Bishop nests) and assuring continued flow of water to the nest by an occasional squeeze of the bottle. Water for Williams nests must be replenished by the technique previously described.

We found that care must be taken to insure a snug fit of the tubing through the cap of the water bottle for the Bishop nest. Also that the cap on the bottle must be tight to prevent too rapid ingress of air into the bottle with consequent flooding of the nest.

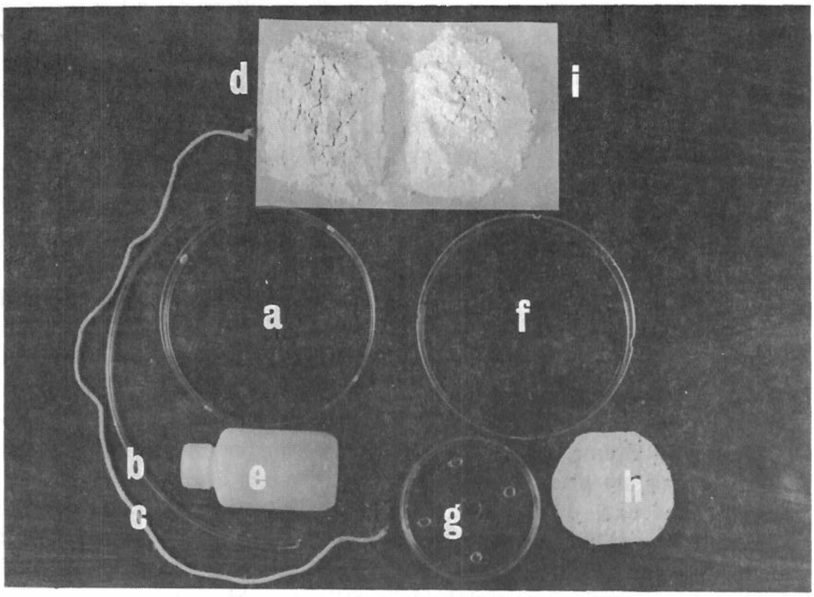

Fig. 1. – Components of disposable ant nests. Bishop nest - a. 150X15 mm plastic petri dish, b. plastic tubing, c. crochet yarn, d. dental labstone, e. water bottle. Williams nest - f. 150X25 mm plastic petri dish, g. 100X10 mm plastic petri dish, h. plastic sponge, i. dental labstone.

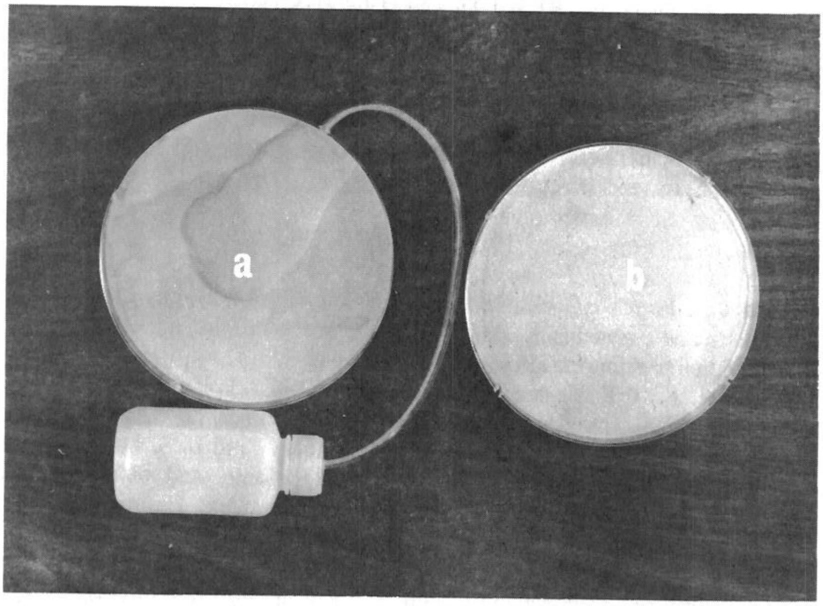

Fig. 2. – Completed ant nests ready for use. a. Bishop nest b. Williams nest.

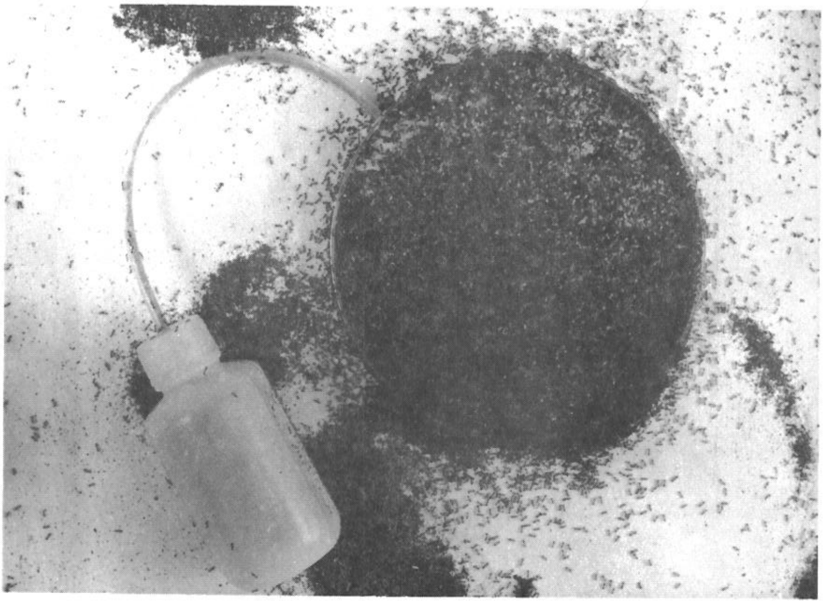

Fig. 3. – Disposable Bishop ant nest occupied by colony of *Solenopsis invicta.*

We also found that the Williams nests are more satisfactory in a laboratory where the humidity is high. Ambient humidity affects the Bishop nests also, but the bottle reservoir compensates when it is low.

Costs of assembling either of these nests vary slightly depending on the source of materials; however, current costs are ca. 41 cents each for the Bishop nests, exclusive of labor and the water bottle, and 34 cents for the Williams nests, exclusive of labor.

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