SCIENTIFIC NOTES

A SIMPLE INEXPENSIVE CAGE FOR USE IN ENTOMOLOGICAL RESEARCH[1]

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ABSTRACT - A method to construct cages that are inexpensive and rapid to build is described. The cost of 35 cages was estimated to be one ORTN of November 1985 (Cr$ 63,547.22), and one person built about 50 cages in a day. Cages built in this manner were used to enclose spittlebugs on grass plants grown in pots. However, the cages could also be used for studies on different crops with various insects.

UMA GAIOLA SIMPLES E BARATA PARA USO NA PESQUISA ENTOMOLÓGICA

RESUMO - É descrito um método de construir gaiolas baratas e rápidas de fazer. O custo de 35 gaiolas foi estimado em uma ORTN de novembro de 1985 (Cr$ 63.547,22), e uma pessoa pode fazer cerca de 50 gaiolas por dia. Foram usadas gaiolas feitas desta maneira para engaiolar as cigarrinhas-das-pastagens capturadas em capins crescidos em vasos. Entretanto, as gaiolas também podem ser usadas para os estudos em diferentes culturas com outros insetos.

In entomological research, cages are often required for various kinds of studies: host plant resistance, biological control, life history, insect damage, insect rearing, etc. Most entomologists have their "own way" of making cages. The cages use up a relatively big portion of the already scarce research funds. In most cases, the cages are abandoned once the research project is complete. To conduct host plant resistance studies on spittlebugs, I first used cages that were expensive and time consuming to build and thus the numbers I could construct were very limited. However, I needed hundreds of cages built quickly and cheaply to enclose spittlebugs on potted grass plants. After experimenting with various cages I came up with one design which met my requirements. To my knowledge this type of cage design has not been reported in the literature.

The description of a cage 50 cm tall that will fit over a grass plant in a 20 cm diameter pot is given here. The frame is made of a single 1.4 m long fence wire (number 14). The tenacity of this wire is such that an average person can bend it without much effort. However, a pair of pliers is useful. The wire is bent at about half the length to make a right angle. About 5 cm from the beginning of the angle, one side of the wire is bent in a circular fashion until the circle is complete. The left over wire (usually 1-2 cm) is fastened by twisting two or three times at the point where the circle began (Fig. 1A). This circle forms the top portion of the frame.

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The cage is made of 15 mesh nylon cloth. To make a cylindrical cage, two sides of a 70 cm x 70 cm piece of cloth are stapled using a common office stapler with 26/6 size staples. The ends to be stapled are folded to form a narrow strip of 4 - 6 layers. The staples are placed close enough to avoid escape of any insects.

The straight end of the frame is pushed into soil at about the center of the pot. The frame remains sturdier if the part to be pushed in the soil is twisted to make a "V". The cage is placed over the frame and the bottom portion of the cage is closed by tying a string or rubber band around the pot (Fig. 1B). After placing the insects inside the cage, the top portion is also tied with a string. At times spittlebugs get trapped in folds of cloth formed after tying. This can be avoided by stapling the top portion similar to the sides of the cage. The insects could be introduced through a small hole cut at the top of the cage. The grass blades may grow through the nylon cloth, and this may create escape holes for the caged insects. To avoid this, one may clip the tips of blades trying to pass through the cloth. After one season's use (about 5-6 months) the cloth generally deteriorates and may need replacing.

The advantages of the cage reported here include: a) Very little obstruction of light, b) insects can be easily observed, c) good aeration, d) temperature inside the cage varies only ± 0.5^{o}C as that of the outside, e) the frames and covering require extremely little storage space, f) the cages can be built rapidly. For example, 2 persons with little practice can build about 100 cages in a day, g) probably the biggest advantage is that the cages are quite cheap. The cost for the cage to fit over a 20 cm diameter potted grass plant mentioned earlier is as follows: Cr$ 122 for the fence wire (1.4 m or 36 gm at the rate of Cr$ 3.150/kg) + Cr$ 1.480 for 0.5 m^{2} of the nylon cloth + about Cr$ 198 for staples, or a total of Cr$ 1.800 for an entire cage. Thus, for 1 ORTN of November 1985 (Cr$ 63.547,22 = approximately 7 US dollars) one could build about 35 cages. The labor cost is not included in the calculation.

Over a four-year period, entomologists working with spittlebugs at CNPGC, EMBRAPA, have used hundreds of these types of cages to enclose grass plants grown in 10 - 30 diameter pots. This design could also be used for bigger diameter pots and the top of the frame could be molded in a shape of square if needed. Using the design described here, 1 m tall cages were built; however, frames of a many of such cages tended to bend. Half meter tall cages were also used to cage spittlebugs over rice plants for six weeks. Although this was a success, the cages tended to bend somewhat due to high velocity winds. This could be remedied by using a more tenacious wire. In rare cases the cloth may tear also. Thus one should use discretion when using these cages under field conditions. The cages are more suited for use in a screenhouse or greenhouse.

Clearly, this cage could be used for studies on different crops with various insects. Some insects (grasshoppers, caterpillar, etc.) may chew through the cloth, therefore it may be necessary to use a stronger cloth; however, the same frame could be used.

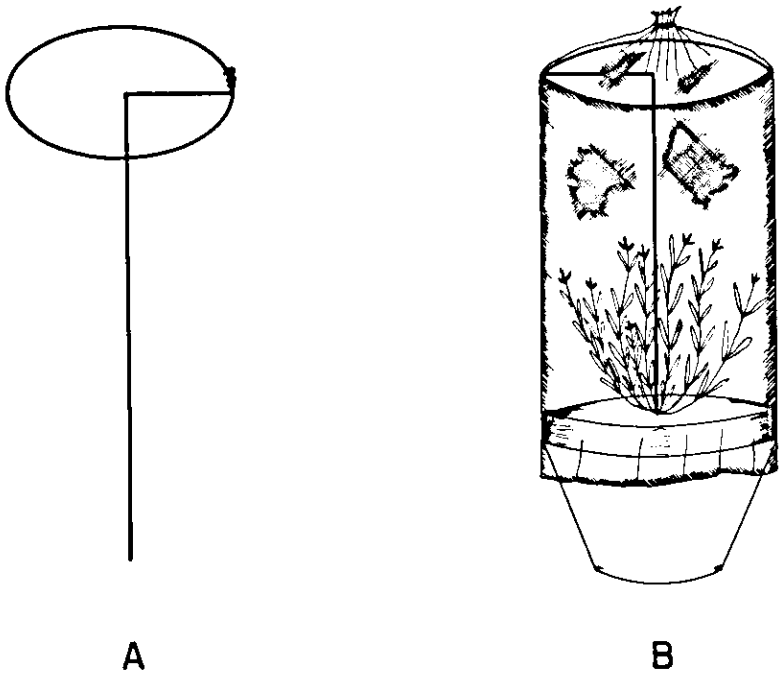

FIG. 1. The wire frame (A), and a potted grass plant enclosed in the cage (B).