A COLLAPSIBLE MOSQUITO CAGE FOR FIELD USE

R. T. COLLINS

World Health Organization, c/o W. R. India, Rooms 533-35, 'A' Wing, Nirman Bhawan, New Delhi—110001, India

ABSTRACT. The relatively inexpensive collapsible field cage described in this article has proven extremely practical for entomology work in distant locations. Frequent field use and continuous employment in a modest laboratory for more than a decade attests to the strength and durability of the design.

Entomologists working in developing countries often must travel long distances by jeep, boat or aircraft in order to carry out field activities in remote areas. For such situations, a compact, easy-to-pack, collapsible insect cage is a valuable accessory. The cage described here was designed from observing those being used by local entomologists in Vietnam, the Philippines and Indonesia, but most of the ideas came from collapsible field cages seen in the Philippines. However, the Philippine versions were flimsy and wobbly, consisting of frames fashioned out of bamboo strips, which were lashed together simply by taking several tightening turns of elastic bands at their intersections. The substitution of aluminum parts, securely fastened together by wing nuts and bolts, make the current design a very light-weight, sturdy and durable model, which can be easily and quickly assembled for use, or disassembled for cleaning and packing (Figs 1–3). Prolonged usage has proven the cage to be extremely practical to employ, either in the field or in rudimentary laboratories.

Long strips of 1 cm aluminum angles, of the type frequently used to protect the edges of store counters or breakfast tables, etc., are used for the frame. These angles supply strength and durability to the assembled unit and these, plus all other metal parts, stack very snugly together when everything is disassembled. Twenty wing nuts and bolts are used to fasten the frame together. The wing nuts and bolts are stored inside a small cloth bag, which has a drawstring closure and packs nicely within the stacked angles. The dimensions of the outer frame that supports the cloth cage are presented in Fig. 1.

The top and sides of the cloth cage are made of fine-mesh white nylon netting and the bottom of the cage is made of white cotton cloth. The dimensions are 4 cm less in all directions than those shown in Fig. 1 for the frame. There is no standardized size for an insect cage, so the dimensions of the frame and the cage may be proportionately increased or decreased considerably according to requirements. However, if the size is increased too greatly, it might become necessary to provide additional strength by using larger-sized angles. All corners of the cage are reinforced and 8 cm of elastic material is stitched to form a loop at each corner. When these loops are passed over the frame and around 4 of the corner wing nuts, the cage is stretched tautly, so that it is slightly suspended within the frame.

A sheet of white bond paper the same size as the cotton cloth is rolled up and introduced through the sleeve opening to provide a protective "carpet" over the cotton cloth. The entire cage unit can be removed very easily and laundered periodically to keep it clean. Flat aluminum strips 2.5 cm wide × 19 cm long are laid across the bottom of the frame and these rest on the flanges of the lower, lengthwise angles to form a "floor." This supports items that are placed within the cage, such as food or oviposition containers, etc. (as shown in the cage at the background of Fig. 3). A framework of flat aluminum strips is arranged in a tick-tack-toe pattern; this is held in place by wing nuts and bolts at each intersection. This framework is laid on top of the cage, so that it supports a wet towel, which is draped over the top and sides of the cage without touching it and ensures high humidity. A sleeve at the front of the cage provides accessibility to the interior and 4 shallow alu-

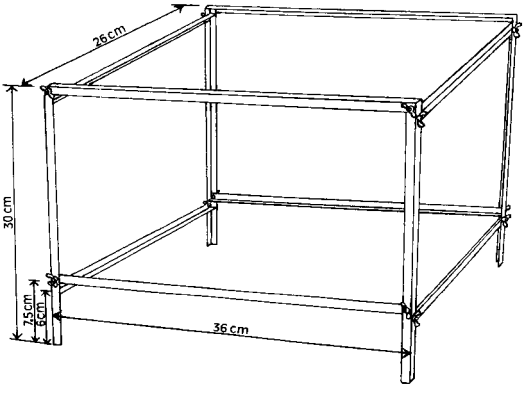

Fig. 1. Diagram of assembled frame for collapsible cage.

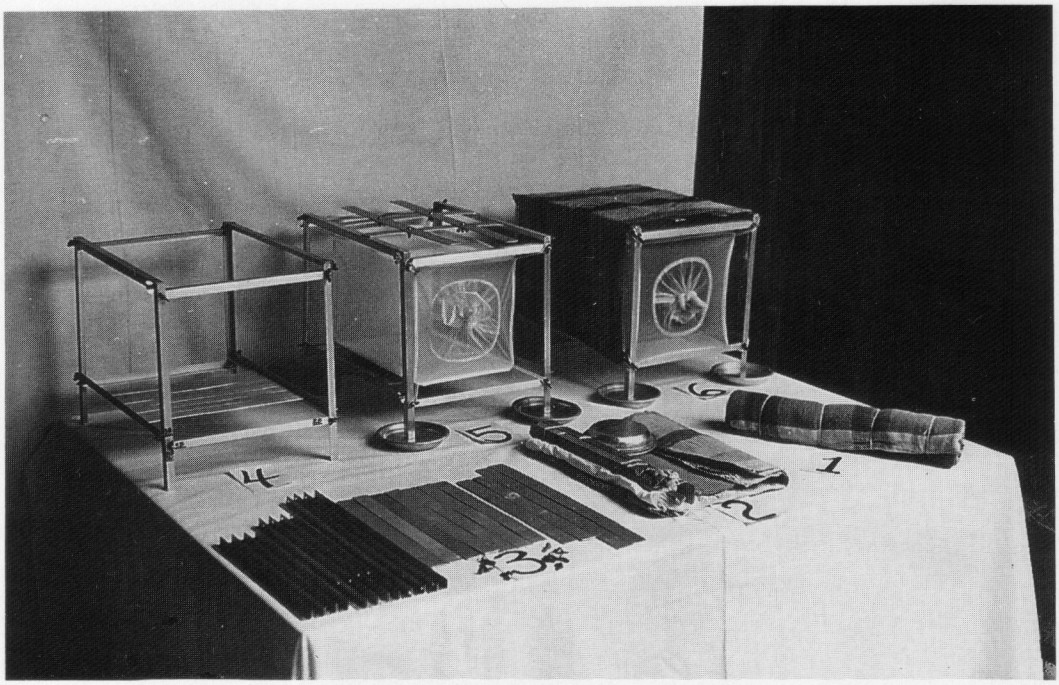

Fig. 2. Collapsible cage, in various states of assembly. 1. All parts* of collapsible cage rolled up inside towel (held by 4 elastic bands) and ready for packing in suitcase. 2. Roll opened, showing stacked parts held by elastic bands, atop folded nylon cage. Aluminum saucers also are shown. 3. Aluminum parts, right to left: 4 flat strips of platform, 7 flat strips of "floor" and 12 angles of frame. A few wing-nuts and bolts are in foreground (around no. 3). 4. Assembled frame, with "floor" in place. 5. Platform (to support towel), cage and saucers are added. 6. Collapsible cage, fully assembled, covered by wet towel. * Except for 4 aluminum saucers, which are packed separately.

minum saucers placed under the legs of the frame (which are then filled with water, to which a few drops of liquid detergent have been added), to protect the cage from invasion by ants and other insects. It requires only about 30 min to unpack the parts and fully assemble the cage.

Most insect cages such as Moran's "colony cage" and the Pollard, McCray or Gillett cages are suited only for laboratories. Collapsible cages (Gerberg 1970) consist of large panels that are quite unwieldly to handle and are awkward to pack. Even the Barraud cage, which has been used extensively in the field, is small, has a bulky, noncollapsible frame, and a flat bottom, so it must be elevated on blocks set in saucers of water in order to make it ant-proof. The AMBI cage (American Biological Supply Co., Baltimore, MD 21228) is fully collapsible, but like the Barruad cage, it has no legs, so it is necessary to improvise ant-proofing and conditions that ensure high humidity. In the tropics low humidity is a primary cause of field cage mortality.

Several of the collapsible cages featured in this article were constructed personally by the writer in Indonesia over 15 years ago, and they are still in good condition, except for the nylon netting and cloth parts, most of which have been replaced. The total cost at that time was about U.S. $8.00 for each cage, excluding labor. Today it should be possible to construct the same cage for about $20.00. The cages have been used on several islands of Indonesia and elsewhere, to rear adult mosquitoes for susceptibility and bioassay tests, for gathering information on mosquito taxonomy and bionomics, or simply for mass-collecting large numbers of mosquitoes in the villages, which would later be sorted out in the field laboratory. In India these cages have served similar activities, as well as being employed for the past 8 years in the Bhubaneswar Gel Diffusion Laboratory for maintaining colonies of *Aedes aegypti* (Linn.) to obtain control smears of human and cow antigen for gel diffusion tests to identify the source of blood meals.

The author expresses sincere thanks to all the

Fig. 3. Completely assembled cage at no. 5 in foreground containing *Aedes albopictus*. Cage at no. 4 in background with interior exposed to show small saucer and short, wide-mouth bottle inside cage, resting on "floor."

Entomology Officers of Vietnam, the Philippines and Indonesia who served with him during the 1960s and 1970s. These men contributed a plethora of ideas that contributed to the design of the collapsible cage described in this article.

REFERENCES CITED

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