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DEVELOPMENT OF THE TWO CAGES
FOR WORK WITH LEAF SURFACE FEEDING MITES

by

A. Ashok Reddy * and Y. D. Pande **

INTRODUCTION

One of the main problems encountered in studying phytophagous mites is that of suitable rearing cage. An ideal cage should be escape proof and conditions inside it should be close to the environment. There should also be ease of observation and manipulation of mites in the cage. The cages commonly used at present by acarologists for studying the biology of phytophagous mites, particularly Tetranychids, are those of the entomologists as such or with little modifications (RAHMAN and SAPRA, 1946; HUFFAKER, 1948; BALLARD, 1953; BHATNAGAR and AGARWAL, 1970; among others). These cages suffer from one or other serious drawback and, therefore, their application has been very restricted, sometimes only with the inventor. The present day situation is that no cage is free from drawbacks.

The present paper describes the method of preparing the two types of cages and their scope in rearing the Tetranychid mites.

MATERIALS AND METHODS

The procedure adopted in preparing the cages is as given below:

1. Glass Cover Cage (Fig. 1): A roll of plastic sticker (a) of one cm width was taken. A six cm long plastic strip was reeled out from the roll and its loose end was held with finger tips of left hand. Then it was punctured at several places (Fig. 2A except for 1.5 cm at both the ends, with the help of a long needle (b). It was punctured from the lower surface on which the adhesive was pasted, so that adhesive-free surface could become rough. The other end was cut from the roll with the help of scissors. Immediately after cutting the strip was stuck on a polythene sheet (c) of 10 cm² area placed flat on a plain surface. Another strip in the same way was stuck on the polythene sheet, parallel to the first strip leaving a distance of 1 cm between the two (Fig. 2B). Then a third strip was placed across, just 0.5 cm away from the center of the first and the second strips. Finally, a fourth one was placed parallel to the third leaving a distance of one cm between the third and fourth strips (Fig. 2C). Thus at the center of all strips one cm² space was left on the polythene sheet.

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A plastic ring (d) with a diameter of 3 cm, height of 1 cm and 0.2 cm thickness was put over the strips in such a position that the space left between the strips should come in the center of the plastic ring (Fig. 2D). Before this, the ring was given a knife cut (e) across the wall so that it could be loosened when the distance between the ends at the cut increased. One metallic cylinder (f) of 1.2 cm diameter, 4 cm or more in length and with a flat bottom was then placed vertically in the center of the plastic ring, its bottom covering completely the space left between the strips (Fig. 2E). The distance between the cylinder and the ring was about 0.6 cm.

A burning wax candle (g) was held above the ring so that the melted wax would dribble drop by drop into the space between the ring and the cylinder (Fig. 2F). The candle was moved around the cylinder to cover the entire surface left between it and the ring. After raising the wax level up to a height of 0.5 cm, the process of adding wax drops was stopped.

After the wax had solidified the cylinder was removed carefully without causing any damage. Then the plastic ring was loosened and removed.

Before use, the cage was separated from the polythene sheet without disturbing the delicate attachement between the wax block and the base of the plastic strips. A place was chosen on the ventral surface of the leaf where the veins were thinner. The cage was then glued to it. Care was taken to see that no spaces were left between the strips and the leaf surface. Mites were then released inside the wax block, using a fine camel hair brush. A glass cover slip of about 2 cm diameter was held 2.5 to 4 cm above the spirit lamp for a few seconds, and then placed flat over the wax block. Because of the heat sustained by the cover slip the wax melted slightly and acquired firm contact with the cover slip (Fig. 1). This arrangement prevented the mites’ escape from the cage.

2. Polythene Cover Cage : This was a slight modification of the previous one. In this, after the wax poured in the ring, drop by drop, the cylinder was taken out. An excised round polythene
piece with a diameter of 2 cm was taken and kept in the center over the wax block which was already in a solid state inside the plastic ring. Again the cylinder was placed over the excised round polythene piece, vertically on its bottom. The wax level was further raised by 0.3 cm thickness. The cylinder and the ring were removed after the wax had solidified. Then there was no chance of leakage between the polythene and the wax.

For use, the cage was separated from the polythene sheet and glued over the leaf surface. A puncture was made in the round piece of polythene with the help of a sharp needle, through which adult mites were released into the cage. After releasing the mites, a drop of melted wax from the candle was dropped exactly over the puncture, so that it could be sealed completely. For aeration minute punctures in the polythene cover were made.

**Observations**

Both the cages developed were found to be escape-proof and with them biology can be studied both under the natural and laboratory conditions. However, a microclimate inside the cage is created, which is, perhaps inevitable in all the escape-proof cages.
In case of the glass cover cage, the problem of gaseous exchange cropped up. That was the point which led to the development of the polythene cover cage, in which the exchange of gases was made possible by puncturing the polythene cover with the help of a very fine needle.

In the glass cover cage the mites could be studied under binocular microscope initially, but the water vapours which accumulated on the underside of the cover slip gave a blurred vision. There is a need, therefore, to change the glass cover frequently, which also facilitates the gaseous exchange. The polythene cover cage is not suitable for the study of the mites under binocular microscope.

In both the cages it is not possible to manipulate the mites. However, this can be done by replacing the covers. The leaves which were used to glue the cages remained fresh and healthy for long periods. The cages reported in the present paper are, however, not suitable for use in case of hairy leaves.

The results obtained after rearing the red cucurbit mite, Tetranychus neocaledonius André (Acarina: Tetranychidae) in these cages on ridge gourd (Luffa acutangula Roxb.) are encouraging. These cages may also be successfully employed for rearing other leaf surface feeding mites and both under laboratory and field conditions.

One of the greatest merits of these cages is that they can be economically prepared without using any sophisticated equipment and material.

**Summary**

A suitable rearing cage continues to be a serious problem in the study of phytophagous mites. Two types of rearing cages, viz. the glass cover cage and the polythene cover cage were developed, and the procedure for preparation is discussed. The advantages, disadvantages and the scope of the two cages are also discussed.

**Résumé**

La fabrication de cellules d'élevage convenables aux Acariens Phytophages pose un sérieux problème. Deux types de cellules, l'une en verre, l'autre en polyéthylène sont décrits. Leurs avantages, leurs inconvenients et leurs limites sont également discutées.

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**References**


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