Techniques to hold lace-bug for feeding, examining and photographing

Liquid nitrogen helps fix the lace-bug (Stephanitis typica) *in its feeding position while a slide-holder is used to hold it for convenient stereomicroscopic examination or photography.*

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A DETAILED study of the mode of feeding by the lace-bug *Stephanitis typica* on coconut leaflets demanded a method to fix the insect in feeding action and a device to observe it under the microscope. These two requirements were met with the development of a technique to fix the insect while feeding and a device to hold it in position for stereomicroscopic examination/photography.

New fixing technique

Methods described by earlier workers to fix insects *in situ* while feeding involved the use of toxic vapours or carbon dioxide anaesthesia, hot or cold fixatives or hot water droplets, or crushing the insect while in feeding action. H. Waters (1977) had developed a staining method to make out labial imprints to precisely locate the feeding probe of the plant hopper *Haplaxius crudus* without having to kill it[1]. These methods and efforts at narcotization with chloral hydrate, naphthalene and menthol as well as exposure to varying low temperatures in a deep freezer (−20°C) for different durations failed to yield satisfactory preparations with inserted stylets in the case of the lace-bug. Exposure to liquid nitrogen, on the other hand, killed about 30% of the insects before they could withdraw the stylets.

Lots of 10-15 lace-bugs were introduced into a 15×3 cm glass vial, close with cotton plug and starved for about one hour. A coconut leaflet removed fresh from the field with a bit of the basal rachis was then cut a few centimetres behind the tip and split into halves along the midrib. The terminal part of one-half was introduced into the glass tube, plugged with a muslin cloth-covered cotton pad and set aside with

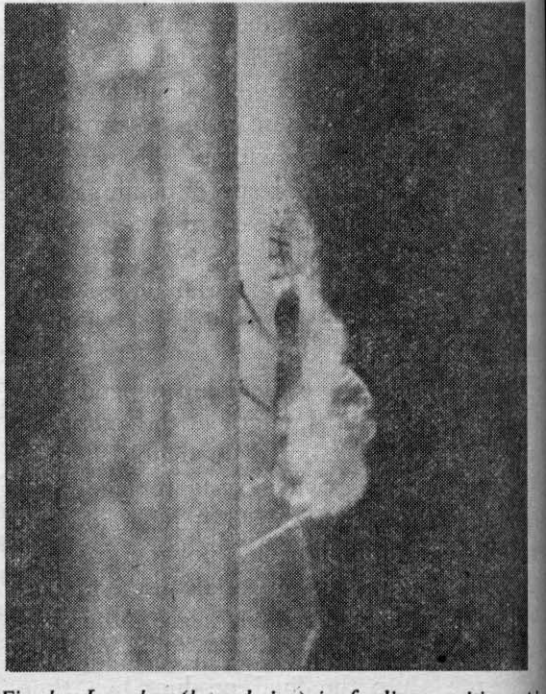

Fig. 1. Lace-bug (lateral view) in feeding position, with its stylet inserted in coconut leaflet.

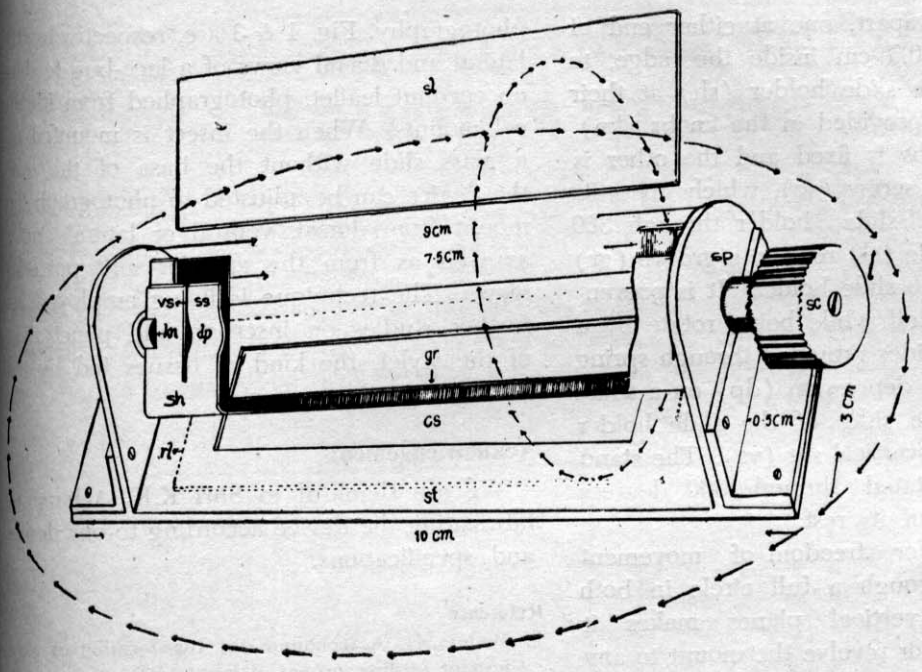

Fig. 2. Device to hold small object for stereomicroscopic examination/ photography.

the base of the leaflet dipping in water held in a jar. In about half an hour most of the lace-bugs settled on the leaflet and started feeding. The leaflet was then cut about 2 cm beyond the plug. The tube was introduced into a can holding liquid nitrogen (–190°C) with the help of a canister. It was taken out after two minutes and 3-5 insects were found to have stayed on the leaf in the feeding position with their stylets inserted (Fig. 1). Exposure for only one minute was found insufficient as the insects could withdraw their stylets after thawing; two minutes exposure discoloured the leaflet.

Holding device

The photograph (Fig. 1) was made with the help of a device (Fig. 2) developed for holding a small object for microscopic observation. It is a simple tool consisting of a basal stand (st) made of aluminium plate (10×3 cm) with a central slit (cs) to let in light from below. The slit can be cut off by a removable lid (rl) when not required –for example, when an epi-light is used. Two semicircular thin plates (sp) are fixed

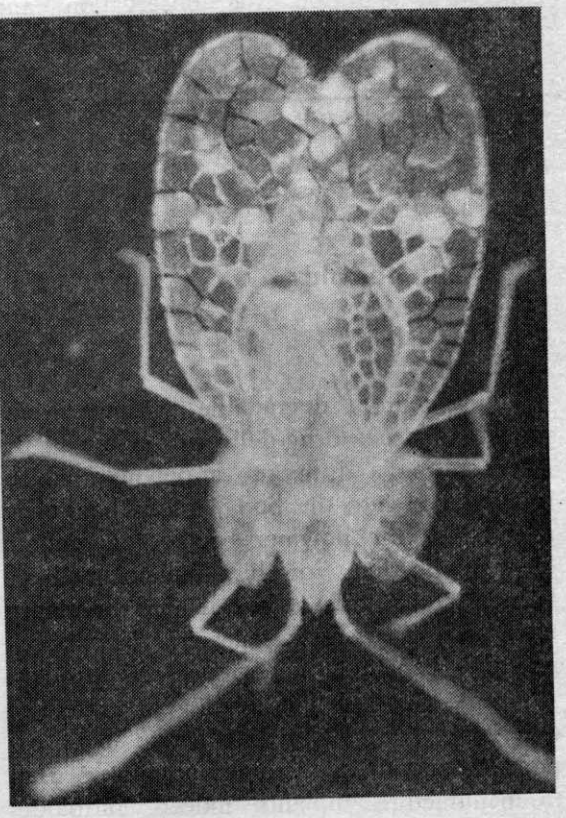

Fig. 3. Lace-bug (dorsal view).

vertically 9 cm apart, one at either end of the stand and 0.5 cm inside the edge, to accommodate the slide holder (sh) at their centres in holes provided in the knobs (kn). One of the knobs is fixed and the other is connected to a screw (sc), which permits rotation of the slide holder through 360 degrees. The slide (sl) rests in a groove (gr) at the base of the slide holder. It is prevented from falling off while being rotate by a firm grip at the sides provided through spring action of a slight depression (dp) on a small strip (ss) on the sides of the slide holder with the aid of a vertical slit (vs). The stand itself can be rotated through 360 degrees along the plane of its rest.

The provision for freedom of movement of the object through a full circle in both horizontal and vertical planes makes it possible to rotate or revolve the mount to any convenient position for observation and photography. Fig. 1 & 3 are, respectively, the lateral and dorsal views of a lace-bug feeding on coconut leaflet, photographed from identical mounts. When the insect is mounted on a glass slide without the base of the leaf, the device can be adjusted to photograph the mount from dorsal, ventral or lateral angles as well as from the anterior and posterior views. The technique is being employed for further studies on insertion and penetration of the stylet, the kind of tissues fed by the insect and other aspects.

Acknowledgement

We are thankful to Shri K.K. Achary for fabricating the device according to our design and specifications.

Reference

1. Waters, H. 'A technique for the location of plant hopper feeding probes using labial imprint's, *Ann Appl. Biol.* 1977, 85:309—311.

New joints for old

(*Continued from page 175*)

The advent of degradable polymers has provided new drug-delivery systems. By incorporating a drug into a polymer, which is implanted into the body, it can be slowly released as the polymer becomes degraded. Most applications of this technology have been in other areas of human and veterinary medicine, but such systems will be of considerable benefit in tomorrow's orthopaedics. A simple development would be to reduce the risk of post-operative infection by incorporating antibiotics into the polymers used to manufacture implants; indeed, antibiotic-impregnated acrylic cements are already available.

Further into the future it may be possible for an implant to carry substances that stimulate surrounding tissues to grow into the surface of the device, thereby accelerating natural fixation, or substances which help new bone to replace a degradable prosthesis. Surgeons could then implant devices which are a suitable cocktail of degradable materials, growth stimulants and other pharmaceuticals which serve as temporary replacements for diseased or damaged tissue while stimulating the complete replacements for diseased or damaged tissue while stimulating the complete regeneration of the bone or joint as the implant becomes degraded.