PRESERVATION OF INSECTS

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Preferred methods of preservation of insets and mites vary from group to group ad within groups, but the main purpose is always to preserve complete specimens in good condition. All specimens should therefore be handled with great care to avoid distortion, breakage or loss of antennae, legs, wings, heads, scales, setae or other parts that may be essential for identification. Specimens should be as clean as possible. Do not use the same killing jar for both Lepidoptera and other Orders, as scales from Lepidoptera easily attach to other specimens and may be obscure important characters.

The preferred killing agent for adult insects is the vapour of ethyl acetate as this leaves the specimens relaxed. Cyanide gas and the fumes of carbon tetrachloride should not be used as they are both hazardous to their users and tend to leave specimens rigid. If adult insects and other arthropods are to be preserved in 80% ethyl alcohol (not formalin), they can be killed in this fluid. However, for Coleoptera, killing with ethyl acetate first is preferred as the specimens are less likely to unfold their flying wings. Many immature insects, because of their softer structure, are normally killed and preserved in alcohol. However, larvae and pupae should be killed first in boiling water (for one minute).

Most adult insects may be preserved dry on pins. Large and medium sized specimen are often pinned directly on long pins (35-40 mm). Smaller specimen are either pinned with fine, headless micro-pins (10-12 mm) which are then staged on plastozone or polyporus strips on long pins or are very carefully glued with water-soluble gum to the tips of triangular cards or celluloid points or onto oblong card or celluloid mounts, which are then staged on long pins for convenience in handling and labeling. Stainless steel pins should always be used to pin specimen, because other types of pins may corrode. It is also possible to preserve adult insects in dry paper envelopes or packets, or loosely packed between layers of cullose wadding or tissue paper (but not cotton wool) in boxes, but these methods should only be used when there is no alternative. It is essential to dry specimens thoroughly before

storage; this is especially important in the humid tropics to prevent growth of moulds and the development of mites and other organisms that will rapidly destroy specimens.

Most mites, many small, soft-bodied and fragile adult insects and most larvae and pupae cannot be easily dealt with in this way, and are therefore preserved in ethyl alcohol (usually 80%) or in other fluid preservatives (but nor formalin) in glass or plastic tubes. These tubes should not be too large as this makes searching for very small specimens, like mites very difficult. When this method is used, the specimens should be gently wedged in the tubes with cellulose wadding, tissue paper or polyfilm (but not cotton wool, which tangles with claws, spines and setae) to prevent movement which will break fragile specimens. The tubes should be completely filled with fluid, to exclude air bubbles, and should be securely closed, preferably with screw-on or snap-on caps but not with corks as they may soon deteriorate.

DETAILED REQUIREMENTS FOR EACH TAXONOMIC GROUP

The following summary indicates the stages that are required and the main methods of preservation preferred for the main groups of insects, mites and their arthropods.

ORTHOPTERA (grasshoppers, locusts, crickets and bush crickets).

Adults pinned through the rear of the prothorax slightly to the right of the mid-line and with wings spread on left side only or packed in cellulose wadding. Dry the specimens thoroughly and rapidly to prevent decay.

PHASMIDA (stick and leaf insects).

Adults pinned through the thorax or packed in cellulose wadding. Dry the specimen thoroughly and rapidly to prevent decay.

DICTYOPTERA (cockroaches and praying mantis)

Adults pinned through the thorax or packed in cellulose wadding.

DERMAPTERA (earwigs)

Adults pinned through the right regimen and dried, or in 80% alcohol in tubes.

EMBIOPTERA (web-spinners)

Adults especially males in 80% alcohol in tubes.

ISOPTERA (termites)

Adult workers, soldiers (and alates, if possible) in 80% alcohol in tubes.

PSOCOPTERA (psocids, bark and book lice).

Adults especially males in 80% alcohol in tubes or if scaly winged, preserve dry on layers of cellulose wadding.

THYSANOPTERA (thrips)

Adults in 60% alcohol, (preferably mixed with glycerine and acetic acid in the ratio 10:1:1) in tubes.

HOMOPTERA (plant-bugs, aphids, scale insects e.t.c.)

Aphidoidea (aphids, adelgids and phylloxerids)

Adult alates and/or apterae in 95% alcohol in tubes or macerated, cleared and correctly mounted on microscope slides.

Coccoidea (coccids, scale insects and mealybugs)

Young adult females, preferably attached to parts on the host plant in 80% alcohol in small tubes or macerated, stained, cleared and mounted on microscope slides. Well prepared specimens on microscope slides can be identified more quickly. Older adult females sometimes become too heavily sclerotized for satisfactory slide preparation and winged adult males cannot be identified, but may be retained for future study. Do not scrape scale insects off plant materials as it damages them.

Aleyrodoidea (white flies)

Pupal cases attached to parts of the host plant in 80% alcohol in small tubes or macerated, cleared and mounted on microscope slides. Winged adults cannot be identified at present but may be retained for future study.

Psylloidea (psyllids, suckers and jumping plant lice)

Adults and larvae in 95% alcohol in tubes or card-pointed, galls dry in paper or cellulose wadding.

Auchenorrhyncha (cicads, leafhoppers, planthoppers, froghoppers. Lantern flies)

Adults, especially males, pinned through the prothorax and dried or in 80% alcohol in tubes with a few twisted pieces of paper to prevent movement in transit. Smaller species may be micro-pinned or card-pointed).

HETEROPTERA (Shield bugs, squash-bugs, lygaeids, mirids, reduviids e.t.c.)

Prepare the same was as for Auchenorrhyncha

NEUROPTERA (lacewings, alder flies, ant-lions e.t.c.)

Adults pinned through the thorax and dried, or in 80% alcohol in tubes if small.

MECOPTERA (scorpion flies)

Adults, especially males, pinned through the thorax and dried or in 80% alcohol in tubes.

TRICHOPTERA (caddis flies).

Adults pinned through the thorax and dried, or in 80% alcohol in tubes if small.

LEPIDOPTERA (butterflies and moths)

Adults, especially males, pinned through the thorax with wings spread and dried. Never preserve adult Lepidoptera in alcohol, because it destroys taxonomically important wing patterns. Do not send dry specimens with rubbed, de-scaled wings unless they are of great importance. Larvae and pupae may be preserved in 80% alcohol in tubes and whenever possible, they should be sent with reared dry-pinned adults.

DIPTERA (mosquitoes, midges, house-flies, tachnids, flesh-flies e.t.c)

Adults, pinned laterally through the thorax with the pin at a slight angle, so that it enters just below and behind the wing base and emerges just below and in front of the other winged base. Specimens pinned dorsally through the thorax slightly to one side of the mid-line are acceptable, provided vital characters are not damaged. Micro pins should be used for all but the larges specimens. Small adults (less than 3 mm long) in 80% alcohol in tubes or carefully cleared, dissected and mounted on microscope slides. All larvae in 80% alcohol in tubes, please note that Tachinidae should be labeled with the full scientific name and their host, or with data cross-referencing the to host specimens included in the same collection.

HYMENPTERA (bracenids, ichneumonids, chalcids, bees, wasps, sawflies, ants)

Parasites (bracenids, ichneumonids, cynipids, chalcids)

Small adults (up to about 8 mm long) in 80% alcohol in tubes. Alternatively, small chalcids may be card mounted on their side. Medium sized adults carefully glued on card points with wings free and both dorsal and internal surface visible. Larger adults pinned through the anterior thorax. Medium to large adults can also be stored and dispatched in 80-90% alcohol in tubes.

Vespoidea (wasps) and **Apoidea** (bees), **Symphyta** (sawflies)

Adults pinned through the anterior thorax and dried small insects micro-pinned

Formicidae (ants)

Adults (all castes) in 80% alcohol in tubes.

COLEOPTERA (beetles)

Adults to be pinned through the anterior third of the right wing case (see fig. 1c) in small, double mounted with a micropin or carefully glued to standard sized cards or card points so that both upper and lower surfaces are visible (see fig. 2). Use minimum quantities of water or alcohol soluble glue to enable removal for dissection, if necessary. Small adults may be and all immature stages should be submitted in 80% alcohol I tubes, a series of specimens is generally required to ensure that both sexes are present. Primary and secondary sexual characters are important for the accurate identification of beetles.

STREPSIPTERA

Adult males in 80% alcohol in tubes.

ACARINA (mites and ticks)

Adults of both sexes, in 80% alcohol in tubes or cleared and mounted on microscope slides.

Other ARTHROPODA (spiders, scorpions, millipedes, centipedes e.t.c.)

Adults in 80% alcohol in tubes.

Labelling

All specimens submitted for identification should be clearly labeled with basic information on the country, locality (including the nearest place likely to be recorded on maps and in gazettes), altitude (if appropriate), scientific name of host plant for phycophagous species or of host organisms for parasitic and predaceous species, other relevant biological information (e.g. ‘reared from gall, parasitizing larvae/pupa, feeding on maize in store), data collected (in the form 4.xi.1983 or Nov. 1583, not 4.11.83), name of collector for organization if appropriate) and an individual or series reference number. Do not abbreviate place, names or genetic names of hosts.

If necessary, use more than one label, spaced on the pin so that they can be read without difficulty. Labels should not be too large, and should be neatly hand written or printed in card with permanent ink such as Indian ink. This is particularly important when labels are inserted in alcohol, as non-permanent inks such as in ‘biro’ or bill point pens will dissolve. If permanent ink is not

available, labels for tubes should be written clearly in pencil. Micro-computers, (including personal computers) and other computers can be used to generate labels from subscript or superscript characters.