OBSERVING LIVING CILIATES

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Many physical and chemical methods have been described for retarding the movement of ciliates in order to observe structural details [for literature see (1)]. Chemical immobilization (e. g., nickel sulfate) or physical slowing down by increasing the viscosity of the medium (e. g., methyl cellulose) are, in my experience, usually unsuitable. These procedures often change the shape of the cell or cause premortal alterations of various cell structures. The following simple method is therefore preferable (Fig. 1A - D): place about 0.5 ml of the raw sample on a slide and pick out (collect) the desired specimens with a micropipette under a compound microscope equipped with a low magnification (e. g., objective 4:1, ocular 10X). If specimens are large enough they can be picked out from a petri dish under a dissecting microscope. Working with micropipettes, the diameter of which must be adjusted to the size of the specimens, requires some training. Transfer the collected specimens, which are now in a very small drop of fluid, onto a slide. Apply small dabs of vaseline (Petroleum jelly) to each of the four corners of a coverslip. Place this coverslip on the droplet containing the ciliates. Press on the vaselined corners with a mounted needle until ciliates are held firmly between slide and coverslip. As the pressure is increased the ciliates gradually become less mobile and more transparent. Hence, first the location of the main cell organelles (e. g., nuclear and oral apparatus, contractile vacuole) and then the details (e. g., extrusomes, micronucleus) can easily be observed under low (100 - 300X) and high (oil immersion objective) magnification.

The shape of the cells is of course altered by this procedure. Therefore, specimens taken directly from the raw culture with a large-bore (opening ≈ 1 mm) pipette must first be investigated under low magnification (100 - 400X). Many species are too fragile to withstand handling with the micropipette and coverslip trapping without deterioration. Investigation with low magnification also requires some experience but it guarantees that undamaged cells are recorded. Video-microscopy is very useful at this point of investigation, especially for the registration of the swimming behaviour.

A compound microscope equipped with differential interference contrast is best for observing ciliates. If not available, use bright-field or phase-contrast; the latter is only satisfactory for very flat species.

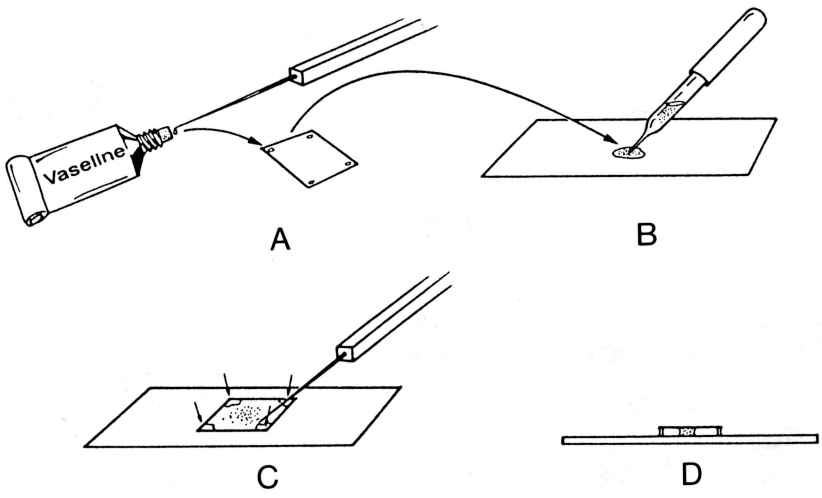

Fig. 1A - D. Preparation of slides for observing living ciliates [from (2)].

LITERATURE CITED

1. Foissner, W. 1991. Basic light and scanning electron microscopic methods for taxonomic studies of ciliated protozoa. *Europ. J. Protistol.* **27**:313-330.
2. Dragesco, J & Dragesco-Kernéis, A. 1986. Ciliés libres de l'Afrique intertropicale. *Faune tropicale* **26**:1-559.