

Handling specimens in liquid preservative: adding and removing the liquid paraffin overlayer

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Received: 1 November 2010 / Accepted: 28 January 2011 / Published online: 25 February 2011
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Abstract Adding a overlayer of liquid paraffin to formalin and subsequently removing it with oil-absorbent sheets in order to observe the specimen are very useful procedures when handling specimens preserved in formalin.

Keywords Formalin · Preserved specimen · Type specimen

The authors reported the status of type specimens of *Cordyceps* and *Torrubiella* described by Dr. Yosio Kobayasi (Sato et al. 2010a, b). Most of these specimens were preserved in formalin. Generally, formalin was found to be very useful for preserving the morphologies of specimens during the long-term preservation of *Cordyceps* specimens. Formalin vaporizes, however, and the periodic application of additional formalin was necessary to maintain an appropriate volume of preservative.

To diminish the additional labor associated with curating species in liquid preservatives, an overlayer of liquid paraffin was added to the formalin more than 10 years ago. The paraffin layer prevented the preservative from vaporizing and the formalin levels in all specimen bottles remained high enough to completely submerge the specimens, even though the specimen bottles were sealed with cork plugs. While the liquid paraffin worked well for preventing vaporization, it was also difficult to remove the specimen without contaminating it with the liquid paraffin. We tried several items to absorb the paraffin: filter paper, tissue paper, etc. The most effective item was found to be an oil-absorbent sheet for machine maintenance (T-151J 3M). We now describe the handling procedure using the absorbent sheet:

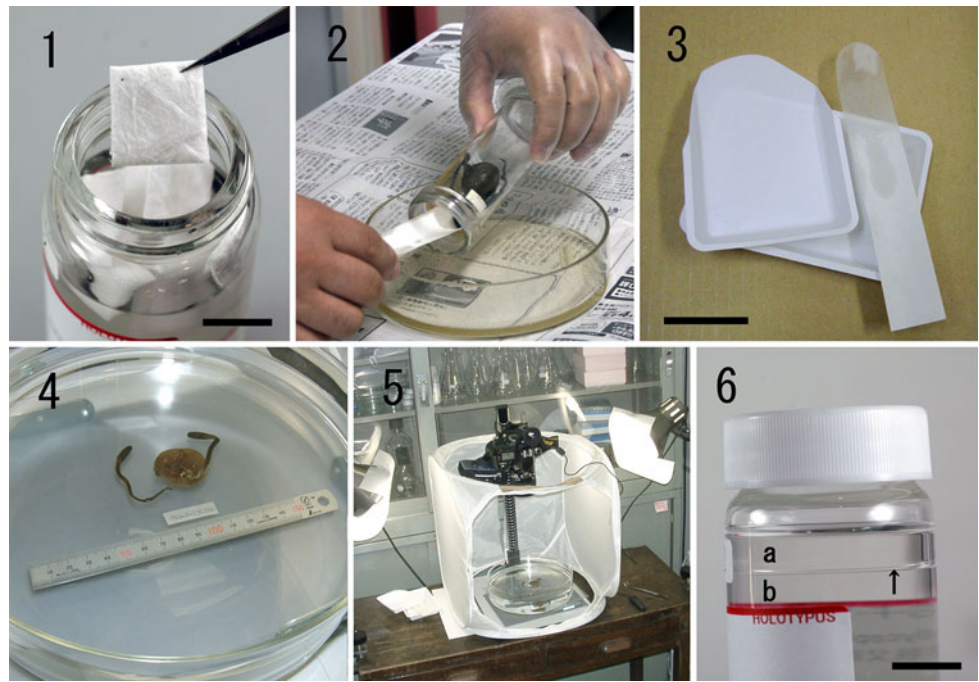
1. The sheet was cut into ca 1 cm × 1 cm squares from its original size (43 cm × 48 cm).
2. Several pieces of the absorbent were placed onto the liquid paraffin layer (Fig. 1).
3. The pieces were removed when they soaked up paraffin, and new pieces were added until the overlaid paraffin was removed completely. Finally, the pieces were discarded.
4. The specimen was removed from the bottle (Fig. 2) and the bottle was plugged. Special hand-made spatulas (e.g., thick paper or a plastic tray) were sometimes used to transfer the specimen (Fig. 3).
5. To photograph the external morphology, the specimens were submerged in distilled water to prevent excess reflection by lighting (Figs. 4, 5).
6. After the specimen was placed back in the formalin, another overlayer of liquid paraffin was added to the surface (Fig. 6).

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Figs. 1–6 Handling of formalin-fixed collections. **Fig. 1** A cut oil-absorbent sheet being placed into a specimen bottle. **Fig. 2** A type specimen taken out from the original bottle after absorbing liquid paraffin. **Fig. 3** Special hand-made spatulas. **Fig. 4** A type specimen submerged in distilled water. **Fig. 5** A photographic system. **Fig. 6** Two-layers of liquids in a specimen bottle. Liquid paraffin (**a**) and formalin (**b**). An arrow shows the borderline between the two liquids. **Bars 1, 6** 1 cm, **3** 5 cm



In conclusion, adding an overlayer of liquid paraffin to formalin and subsequently removing the liquid paraffin with oil-absorbent sheets for specimen observation are very useful procedures when handling specimens stored in formalin.

Acknowledgment The author (HS) expresses deep gratitude to Dr. A. E. Hajek for reviewing this manuscript and providing invaluable comments on it. We also thank Dr. Y. Doi, the former curator of TNS, for adding liquid paraffin to the specimens of insect pathogenic fungi.

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