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CURATION OF SOIL LICHENS

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Lichens occurring on soil are poorly known, in part because of poor curation and the resulting lack of good specimens for comparison identification. There is not a single correct way to curate soil lichens, but several, depending on the specimen, the soil type, and the materials available. The following methods are suggested in the hope that they will encourage more people to collect soil lichens and that the resulting specimens will be well preserved. This will advance the knowledge of soil lichens.

COLLECTION

Ensuring good results starts in the field at collection time. Moist lichens are more flexible and are less likely to be broken. If the lichen to be collected is very dry, it is helpful to spray it with water. Sprayers which produce a fine mist seem to work best. Those with a coarse spray tend to erode the soil specimens quickly. If a mister is available at collection time, the specimen can be inverted, sprayed, and the bottom trimmed so that it is as flat as possible. Particularly delicate soil crusts should be wrapped in several layers of paper (wax paper, tissue paper, newspaper...no plastic), time and weather permitting, and then placed in folded paper packets, paper bags or in firm containers such as film canisters or cardboard boxes. Taking extra time and patience at this stage reduces the chance of returning to the lab with nothing but bags of loose soil mixed with fragments of indistinguishable lichen.

PREPARATION

Schneider (1898), Savile (1973) and Hale (1979) describe pressing lichens in a plant press after moistening. These methods are suitable for most foliose and fruticose lichens, but those occurring on soil need addition preparation and care. Dust and soil on the surface of lichens can usually be removed just by blowing on them. Excess soil around the edges and on the bottom can be trimmed with a knife. Misting the specimen with water will help prevent crumbling. Be sure to leave enough soil to bind the lichen thallus together. This will vary depending on the soil type, but usually the final specimen will be anywhere from 1-20 mm thick. The undersurface should be flat to facilitate gluing to cards later.

The most durable soil lichens can be immersed briefly in water and placed in a plant press until air dry. If your tap water contains a lot of minerals, use distilled water instead, as minerals may affect chemical identification tests (Thomson, 1967). When using plant dryers, avoid temperatures above 25°C or lichen acids may discolor the specimen. Most soil crusts are fragile and should not be pressed. Instead, go directly to the reinforcing glue process. The lichen thalli may be firmed up with glue for sectioning if so desired (Ryan & McWhorter, 1986), but most herbarium collections are discolored and devalued by the direct application of glue.

REINFORCING GLUE

Now it is beneficial to reinforce the soil supporting the lichen thallus to prevent breakage. When doing so, use a water-based brown (wood) glue, such as LePages, or herbarium glue from a botanical supply company such as Carpenter/Offutt Paper Company. Such glues should be diluted at a 4:1 water to glue ratio. The ratio of water to glue depends on the type of soil the lichens are occurring. Brown glue is more viscous, dilutes more readily and has a lower surface tension than white glue. White glues such as Elmer's are less suitable because the higher surface tension does not allow it to penetrate the soil as rapidly. However, such glue diluted 1:1 with water can be used if the specimens are moist or have been misted. Other suitable glues include library paste or "runny" paste.

The glue can be applied in any of several methods. One method is to apply the diluted glue to the underside of the lichen/soil clump using a sponge applicator. These applicators are tubes with a removable end that contain a small 1x2 cm sponge, and are used by businesses to moisten envelopes and stamps during mass mailings. One brand name is Pres-to-Seal moistener (IDL Corp., 730 Garden St., Carlstadt, NJ 07072). They can be purchased at office supply stores. In a second method, soil clumps are placed in a small pool of glue poured onto a nonabsorbent surface such as waxed paper, acetate, glass, or other similar material. This glue will permeate the soil by capillary action and forces adhesion and cohesion. Allow the soil to absorb a generous amount of glue, but avoid moistening the lichen thallus itself. The third method is to moisten the soil clumps by spraying dilute glue on their bottom surfaces.

In each of the three methods an additional purpose for the thin reinforcing glue is to form a seal to keep the thicker mounting glue (the next procedure) from penetrating the lichen. Glue can also be mixed in one of the ubiquitous film canisters and applied with inexpensive water color brushes (thoroughly rinsed after use). This method is particularly effective with thick specimens as it allows better sealing of the side of the specimen. Diluted Elmer's glue can also be dispensed right from an Elmer's glue bottle.

If the soil is hydrophobic to the dilute glue mixture, pure water should first be applied by a fine mist, followed with the diluted glue. The finer the soil texture the more dilute the glue/water mixture needs to be.

Some lichens occur on small pedestals or mounds of soil. Once these soil mounds are thorougly moistened, apply pressure with your finger(s) to flatten them. Often one will also have to moisten the lichen thallus on the top of the clump with pure water before attempting to flatten the soil mound. This makes it more pliable to work with, hopefully leaving the thallus intact and fracturing only where the soil holds it together. The mound may only partially flatten, but this is usually enough to decrease its thickness sufficiently to accommodate the curating envelope.

Glued specimens should be allowed to air-dry overnight at room temperature on a non-adhesive surface. Both brown and white glues are water-based so can be soaked loose at a later time. The plastic glues used in some herbaria are not as expedient, as they are permanent and produce harmful fumes.

MOUNTING GLUE

Now the lichen is ready to mount on a flat white card. If specimens are glued to cards it is important to use cards without a fluorescent-sensitive surface since their vivid fluorescence will mask the subtler colors found in lichens and will necessitate removing the specimen from the card before examination. Average card size is 9 x 12 cm with a thickness of 0.5-1.0 mm. Thick cards will give more support to a curated solid crust and insure a longer herbarium life. The more fragile the soil, the thicker the card, is a good general rule.

A water-based white glue such as Elmer's Glue-All, is preferred for attaching the lichen/soil specimen. Generously coat the base of the soil clump and set on the card, concentrating material in the center. Thick material near the edge of the card interferes with folding the specimen packet. If large amounts of glue are used, it may be necessary to weight the edges of the card to prevent warping. Metal washers, 5-8 cm in circumference, work well for this purpose. Specimens glued to cards should be thoroughly dried before placing in specimen packets.

PACKAGING

To help eliminate breakage of the crust when filed or stacked, strips of styrofoam packing material or small corks (5 x 10 mm) may be glued to the card around the specimen's perimeter. These should be slightly thicker than the mounted specimen so that the surrounding packet rests on them rather than on the specimen. It also helps to buttress the edges of specimens with white glue to prevent breakage from handling or when they become brittle with age. In doing so, avoid gluing the lichen thallus.

Additional protection, if desired, is obtained by covering the specimen with a piece or cotton or gauze cut to the appropriate size. A good source is SOF-ROL cast padding, a Johnson & Johnson product that comes in 4" x 4 yd rolls. This, or other brands of cast padding, can be purchased from medical supply distributors. Quantities of padding may be cut after wrapping around an appropriately sized card.

After all the above steps are completed and the lichens are numbered and identified, it is useful to include certain data such as as the collection number, spore details, chemical tests, and TLC results directly on the card. This data could also be on the outside of the packet. If more than one species occurs within the collection, indicate the selected one named on the label with arrows. Secondary taxa can also be indicated in this fashion and indicated by using "a", "b", etc. This allows cross-referencing of less common species.

In conclusion, it is hoped that well curated soil lichens will encourage lichen students and other scientists to more fully appreciate and know this rich and interesting flora.

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