

Developing Protocols For Assessing The State Of Preservation Of Herbarium Material, Using Plants From The Lewis And Clark Expedition

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Plants that are used for research are generally preserved by drying them out while they are being pressed flat for easy storage. This pressed plant material, is placed in a herbarium, in a phylogenetic order, based on the species, genus, family and order designations.

Herbaria are essential for the study and verification of plant classification, the study of geographic distributions, and the standardizing of taxonomic nomenclature. The key to these studies is the state of preservation of the plant material. The preservation of the vegetative and reproductive morphology (hairs, stomata, cuticle, etc.), anatomy (vascular tissue size and arrangement) and genetic material is essential to make accurate observations, to collect representative data and answer pertinent research questions. To date, no criteria or protocols exist to evaluate the state of preservation of herbarium material. The purpose of this study is to develop protocol for the microscopic examination of the external and internal features of herbarium material in order to determine its state of preservation.

Plant material from eleven specimens was selected from the herbarium material collected by the Lewis and Clark Expedition (1804-1806). Preliminary microscopic examination of the surfaces has revealed exquisite preservation at the cellular level for most samples. Further, detailed examination of the internal anatomy will be conducted and compared to modern herbarium material of the same species. Several of the taxa examined are presented below.

Silver Buffaloberry [*Shepherdia argentea* (Pursh) Nutt.]



Figure1. Leaf surface showing midvein and epidermal features. [scale in mm.]



Figure 2. Leaf surface close up, showing tightly packed peltate trichomes. These structures prevent water loss and are adaptations to a xeric or dry environment. [Scale in mm]

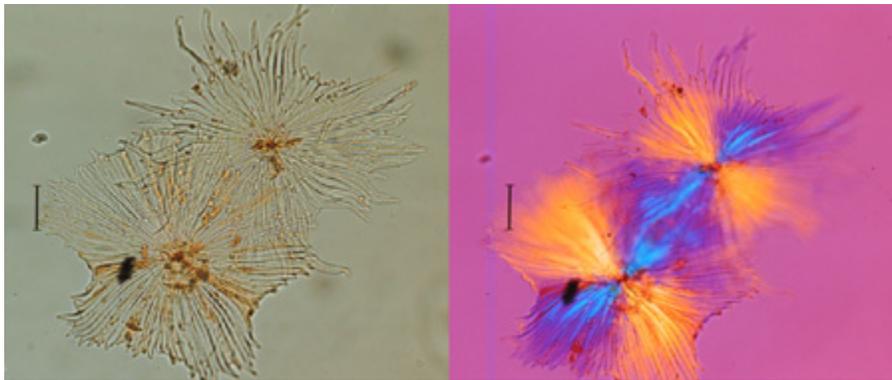


Figure 3. Light micrograph images of the peltate trichomes in regular light (left) and circular polarized light (right).

Indian Tobacco (*Nicotiana quadrivalvis* Pursh)



Figure 4. Leaf surface. [scale in mm]



Figure 5. Leaf surface close up, showing delicate trichomes

Bigleaf Maple (*Acer macrophyllum* Pursh)



Figure 6. Leaf surface showing major and minor veins [scale in mm]

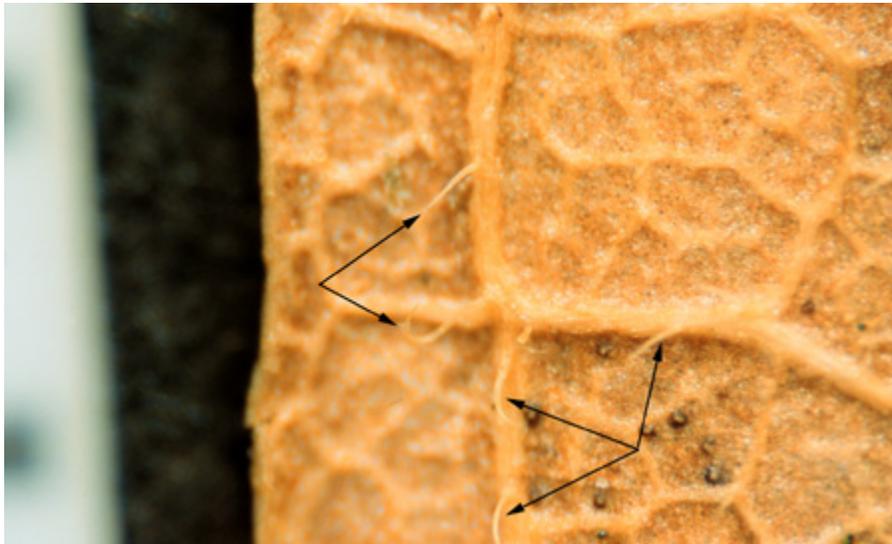


Figure 7. Leaf surface close up, showing minor veins and delicate trichomes. [scale in mm]

Oregon Boxwood [*Paxistima myrsinites* (Pursh) Raf.]



Figure 8. Leaf surface. [scale in mm]



Figure 9. Leaf surface close up, showing several glands on the surface.

Scarlet Globemallow [*Sphaeralcea coccinea* (Nutt.) Pursh]



Figure 10. Leaflets. [scale in mm]



Figure 11. Leaflet surface close up, showing densely packed, stellate (branched) trichomes which make up the "fuzzy" surface.

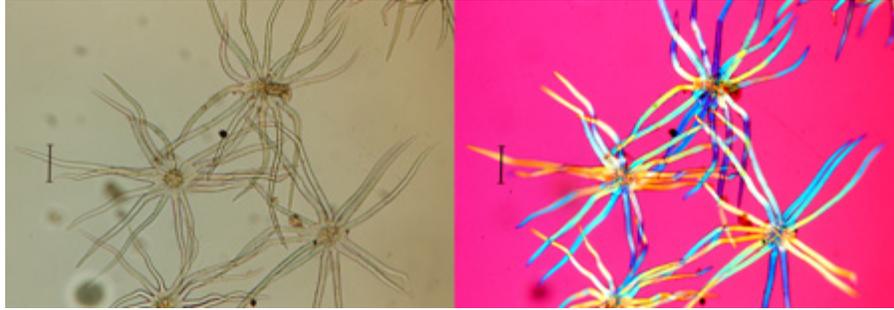


Figure 12. Light micrograph images of the stellate (branched) trichomes in regular light (left) and circular polarized light (right).