

3. COLLECTING LICHENS

Target Audience

9^h grade and above

Subject

Making scientific collections of lichens in the field

Objectives

Students will

1. Make a scientific collection of lichens.
2. Learn techniques for collecting lichens from different substrates.
3. Collect data about lichen collections including site and substrate information.

Time Needed

Teach preparation time: 1-2 hours

Classroom time: 45 minutes to 1.5 hours class time

Travel time: to and from the field site (variable)

Materials

1. Small brown paper bags (lunch sack size or smaller)
2. Small non-serrated pocket knife
3. Pencil
4. Small notebook
5. Shoulder bag, back pack, fanny pack, or plastic bags to carry the collections.

Activity

1. Find a site where lichens are abundant. Make general observations about the site in your notebook before collecting lichens. You can note the date, the location coordinates and describe where the site is. Make notes about the habitat by describing the plant community (trees, shrubs, ground cover, vegetation density, size, amount of downed woody debris), proximity to water, slope, aspect (direction slope is facing), elevation and any other major features (e.g. roads, cliffs, avalanche chute, etc). Aside from providing valuable habitat information, this data enables future collectors to relocate your site.
2. Choose a substrate (tree trunk, log, soil, rock) and collect lichen samples, usually 3-5 thalli for each species, representing the variety of forms for that species observed on the substrate. Collect whole thalli, or for very large lichens, enough material to represent the surface structures, lobe ages, and reproductive structures you observed in the field. Usually a

- palm-sized sample is sufficient. Place them gently in a paper bag; one bag for each substrate. Sometimes you may wish to collect the lichen with some of the substrate to avoid destroying the sample, the attachment structures, or to show the substrate. A pocket knife can be used to remove a small section of bark, wood or soil/moss mat, damaging the substrate as little as possible.
3. Once you have finished collecting from a particular substrate, give the bag that is being used for specimens a number and write a few words about the substrate (e.g. trunk of 1m diameter Douglas-fir in shade) on the bag and in your field note book next to the number of the bag. This means you will be separating lichens collected from coniferous trees from those found on hardwood trees, rotten wood vs. intact downed logs, sandy vs. organic soils, etc. Continue filling bags until you have collected from all the substrates in which you are interested. If you are collecting from more than one site, make sure your recording system allows you to figure out the sites to which your numbered bags belong.
 4. When you return to the class room, remove lichens from the bags and set them on sheets of paper to dry, sorting by collection site and substrate. Wet lichens can decompose quickly, especially in warm environments, so avoid leaving hydrated lichens in sealed plastic bags for more than a few hours. If there is no time to lay out the lichens immediately, they can be stored in a refrigerator overnight. Once lichen samples are dry, return them to their respective numbered bags for storage until curated and identified (see lesson plans "Creating a Scientific Collection" and "Lichen Identification"). Last but not least, double check that each number on each bag has a corresponding entry in the field notebook.

Vocabulary

Site: The general place where the lichen is collected.

Substrate: The type of surface on which the lichen is growing.. Common substrates of lichens include tree bark, twigs and branches; wood in various stages of decay; soil; rock and concrete.

Habitat: Lichens grow in many ecosystems, including forests, deserts, alpine, and tundra, but can be very patchily distributed.

Names of some lichen groups by substrate or habitat (followed by rough pronunciation):

Corticolous (core-tick-o-luss): on bark

Lignicolous (lig-nick-o-luss): on any organic material (wood, bark, debris, moss)

Epiphytic (ep-ee-fit-ick): on trees or shrubs (includes corticolous, lignicolous and foliicolous groups).

Saxicolous (sacks-ick-o-luss): on rock or similar substance, including concrete

Terricolous (tear-ick-o-luss): on soil

Foliicolous (fole-ick-o-luss): on leaves

Muscicolous (mus-kick-o-luss): on moss

Ethical Considerations for Collectors

To the extent possible, avoid damaging lichen substrates or collecting in places where damage to a substrate would be unsightly or offensive to others, e.g., tree trunks facing a trail. Obtain permission to collect on private land and ask permission of the land steward when collecting as a group in areas open to the public. Be aware that many plants, some bryophytes and several lichens are listed on rare, threatened, and endangered lists and avoid collecting these and other rare lichens.

Teacher Preparation

1. Read one or several introductory chapters in the resources marked with a * listed at the in the Additional Resources page to learn the vocabulary above and be able to point it out in the field.
2. First, find a suitable environment for lichens. In general, lichens like high to medium light environments with and frequent alternating wet and dry periods. Bryophytes (mosses and liverworts) tend to dominate poorly lit, continuously humid sites. Then, look for good substrates. Good substrates to search include trees, shrubs and woody debris, large boulder fields, rock cliffs, road and river banks, and stable river boulders. Bear in mind that lichens grow more slowly than most plants; freshly disturbed or eroded areas and areas lacking woody substrates or covered by fast-growing annuals, especially grasses, are likely to be lichen-poor. After the site(s) is located, get latitude and longitude coordinates using a GPS or topographic map. Coordinates can be pin-pointed from on-line topographic maps at <http://www.topozone.com> and similar websites.
3. Obtain materials for collection listed above.

Making Connections

Continue this lesson by proceeding to lesson plans “Lichen Identification” and “Making a scientific collection”. Those lessons build upon the collections made in this lesson plan.

Check for Understanding

1. What are some different patterns noticed about the growth forms of lichens on different substrates?
2. Were any lichens found only in certain habitats?
3. How many lichens were found within each preferential substrate grouping (epiphytic, corticolous, lignicolous, foliicolous, terricolous, saxicolous).
4. Were all four of the growth forms in lesson plan “What is a lichen?” (crustose, squamulose, foliose, fruticose) observed?
5. Were any lichens with cyanobacteria observed?

**See ‘Additional Resources and References’ page
for more information.**