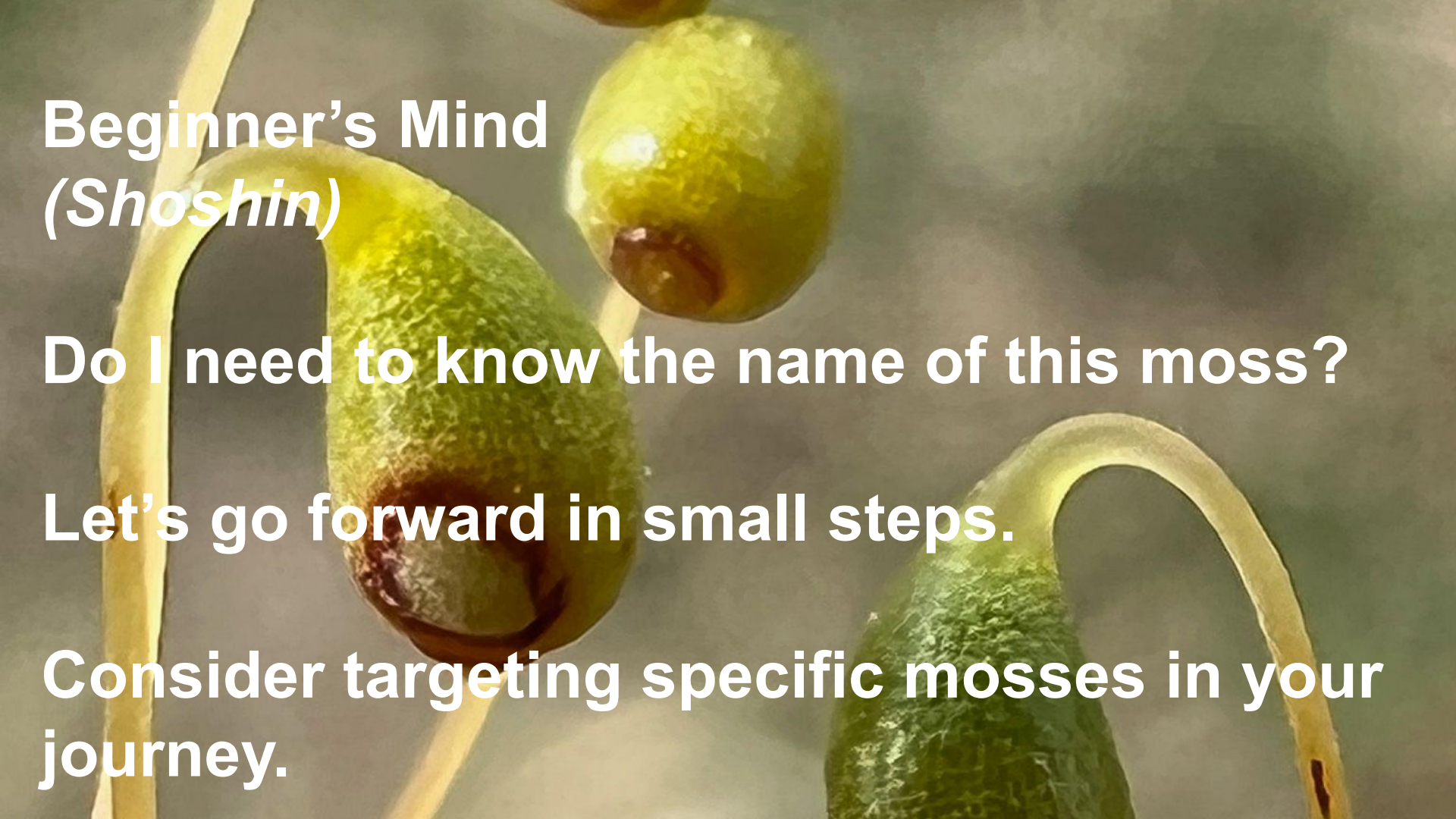
Getting Started with Kansas Mosses

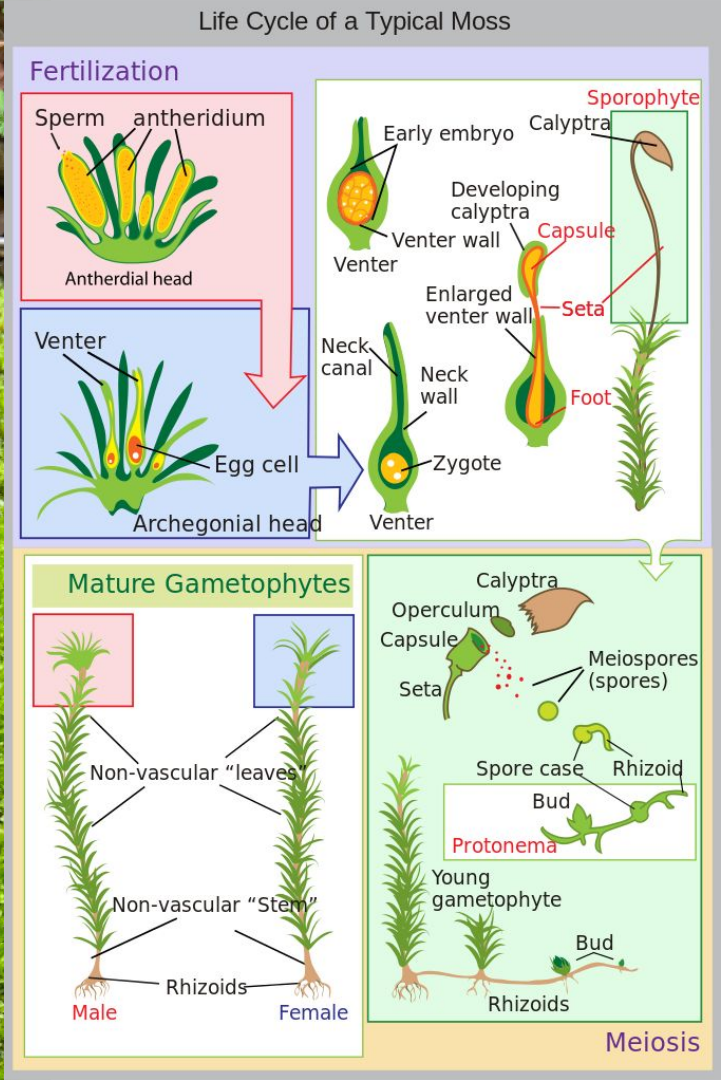
Brad Williamson
ksbioteacher@gmail.com

www.bradwilliamson.net


Introduction and Goals for Tonight


Beginner's Mind
(Shoshin)
Do I need to know the name of this moss?
Let's go forward in small steps.
Consider targeting specific mosses in your journey.

Moss Life Cycle



Questions to ask your moss

Environment that the moss is growing in?

Neighbors/communities of mosses?

Substrate?

Growth Form? Size?

Reproductive stage? Capsules/sporophytes/gemmae?

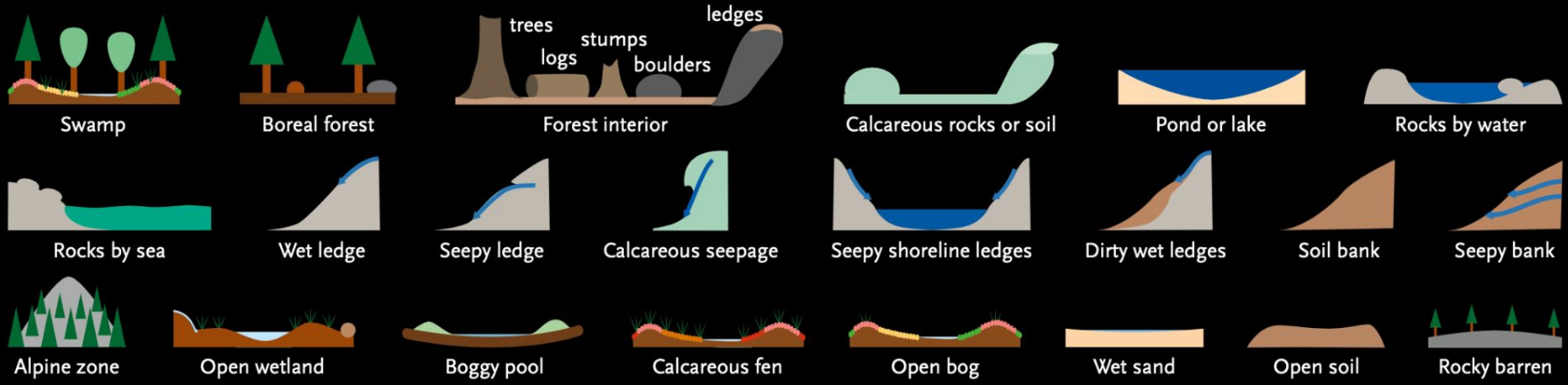
Leaf Characters?

What mosses are found in this area?

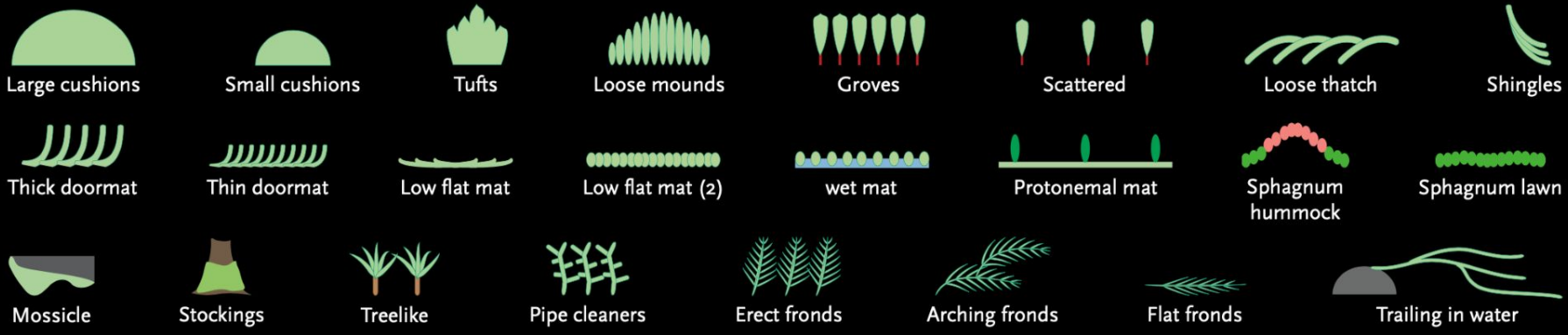
Dried or hydrated?—there is a big difference

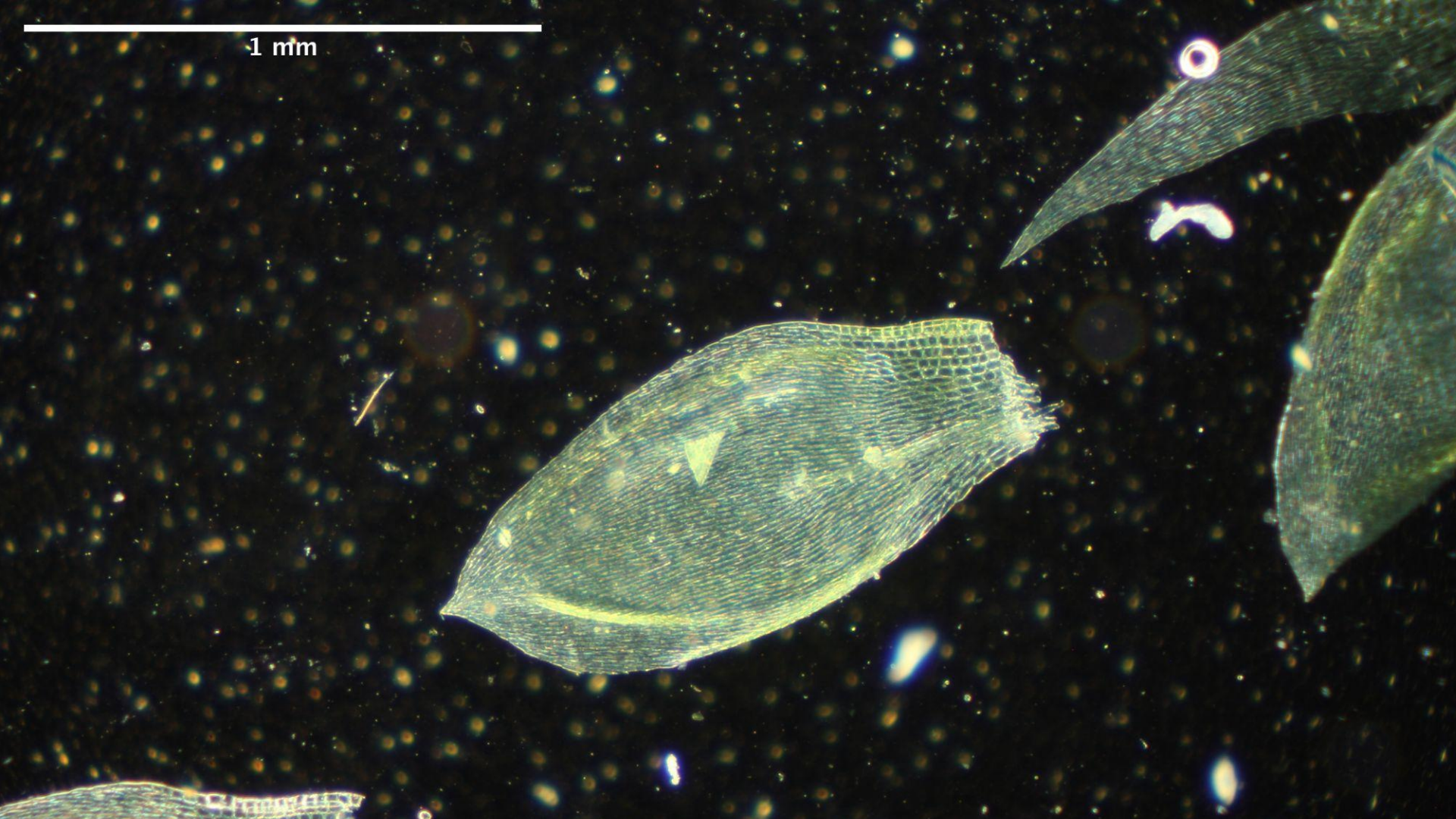
ICONS

HABITATS



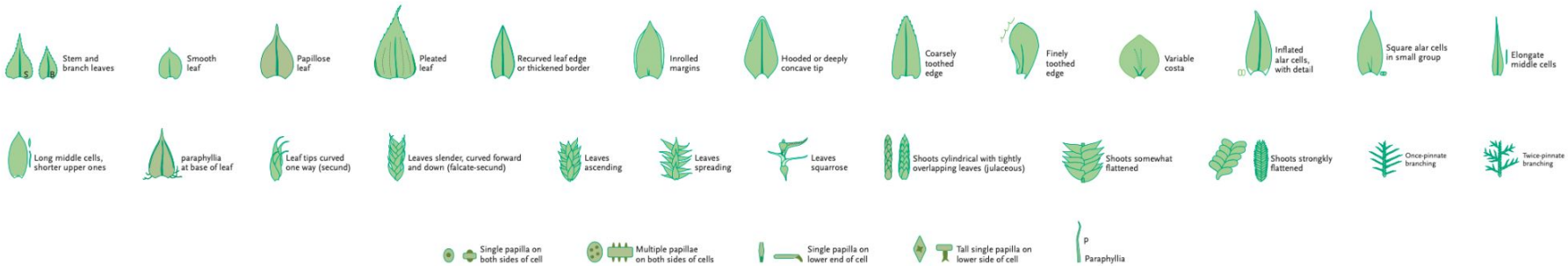
GROWTH FORMS




1 mm

MOSS GENERA OF THE NORTHERN FOREST • CHART 2 • PLEUROCARPS

JERRY JENKINS, 2016



A product of the
Northern Forest Atlas Project
and the
Wildlife Conservation Society
Adirondack Program

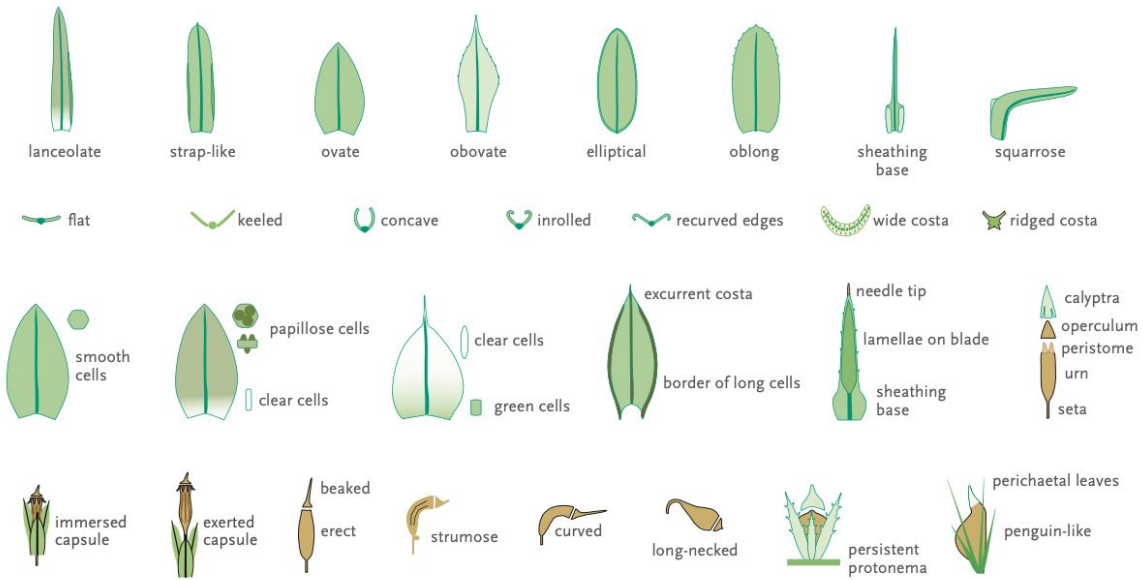
WCS

Adapted from Jenkins, 2006, *Graphic Guide to Northeastern Mosses.*

MOSS GENERA OF THE NORTHERN FOREST

CHART 1: ACROCARPS

JERRY JENKINS, 2016



NFA

A product of the
Northern Forest Atlas Project
and the
Wildlife Conservation Society
Adirondack Program

WCS

CONSORTIUM OF BRYOPHYTE HERBARIA

- building a Consortium of Bryophytes and Lichens as keystones of cryptobiotic communities -

- Search Collections
- Map Search
- Exsiccatae
- Dynamic Species List
- Dynamic Identification Key
- Taxonomic Explorer

Search Taxon

Search

ophyte Herbaria serves as gateway to plant biodiversity data for mosses, liv . The aim of the Consortium is to unite bryophyte specimen records from ar g personal collections and research observations, and serve as a gateway to di s to the public. The Consortium began with a focus on North American he s all herbaria to join the Consortium to share specimen records with the international research community via this platform. We currently serve the data through an English and Spanish language interface; a French version is in development.

We offer tools to locate, access and work with a variety of data, including specimen records, field observations, dynamic and static checklists, images, interactive keys, and a taxonomic thesaurus. If you are new to the site, please create an account. Contact us if you are interested in contributing, either as individual user or as a collection manager of an institution that would like to join: BryophyteConsortium@gmail.com. Previously-created accounts in CNABH will continue to function.

HIDE CAPTION

Ulota crispa. Image by: Charles DeLavoi.

ASU Biodiversity Knowledge Integration Center, Arizona State University | iDigBio Integrated Digitized Biocollections | NSF | GLOBAL

This project made possible by National Science Foundation Awards: #1115116, #2001500, #2001394

38.88458 -94.80076 within 25 km *Games*

more detail

Families: 17
Genera: 25
Species: 28
Total Taxa: 28

Page **1** of **1**: **1**

AMBLYSTEGIACEAE
Amblystegium serpens
Hygroamblystegium varium

ANOMODONTACEAE
Anomodon minor

BRACHYTHECIACEAE
Brachythecium acuminatum
Brachythecium albicans
Brachythecium laetum
Claopodium rostratum
Oxyrrhynchium hians
Rhynchostegium serrulatum

BRYACEAE
Bryum argenteum
Ptychostomum pallescens

DICRANELLACEAE
Dicranella varia

DITRICHACEAE
Ceratodon purpureus

ENTODONTACEAE
Entodon cladorrhizans

FISSIDENTACEAE
Fissidens subbasilaris

FUNARIACEAE
Funaria hygrometrica
Physcomitrium eurystomum
Physcomitrium pyriforme

LESKEACEAE
Leskea gracilescens
Lindbergia brachyptera

MNIACEAE
Plagiomnium cuspidatum

NECKERACEAE
Pseudanomodon attenuatus

ORTHOTRICHACEAE
Orthotrichum pumilum

POTTIACEAE
Syntrichia laevipila
Weissia controversa

PYLAISIACEAE
Homomallium adnatum

PYLAISIADELPHACEAE
Platygyrium repens

THELIACEAE
Thelia asprella

Johnson County

38.88458 -94.80076 within 25 km *Games*

more detail

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Page **1** of **1**: **1**

AMBLYSTEGIACEAE
Amblystegium serpens
Hygroamblystegium varium

ANOMODONTACEAE
Anomodon minor

BRACHYTHECIACEAE
Brachythecium acuminatum
Brachythecium albicans
Brachythecium laetum
Claopodium rostratum
Oxyrrhynchium hians
Rhynchostegium serrulatum

BRYACEAE

38.79142 -95.17018 within 25 km *Games*

more detail

Families: 33
Genera: 61
Species: 94
Total Taxa: 94

Page **1** of **1**: **1**

AMBLYSTEGIACEAE
- *Amblystegium serpens*
- *Campylium chrysophyllum*
- *Hygroamblystegium varium*
- *Leptodictyum riparium*

ANOMODONTACEAE
- *Anomodon minor*

AULACOMNIACEAE
- *Aulacomnium heterostichum*

BARTRAMIACEAE
- *Bartramia pomiformis*
- *Philonotis longiseta*
- *Philonotis marchica*

BRACHYTHECIACEAE
- *Brachythecium acuminatum*
- *Brachythecium laetum*
- *Bryoandersonia illecebra*
- *Claopodium rostratum*
- *Koponeniella graminicolor*
- *Oxyrrhynchium hians*
- *Rhynchostegium serrulatum*

BRUCHIACEAE
- *Bruchia flexuosa*

BRYACEAE
- *Bryum argenteum*
- *Gemmabryum caespiticium*
- *Ptychostomum creberrimum*
- *Ptychostomum pseudotriquetrum*
- *Rhodobryum ontariense*
- *Rhodobryum roseum*

CLIMACIACEAE
- *Climacium americanum*

DICRANACEAE
- *Dicranum condensatum*
- *Dicranum scoparium*

DICRANELLACEAE
- *Dicranella heteromalla*
- *Dicranella varia*

DIPHYSCIACEAE
- *Diphyscium foliosum*

DITRICHACEAE
- *Ceratodon purpureus*
- *Ditrichum pallidum*
- *Pleuridium subulatum*

ENTODONTACEAE
- *Entodon cladorrhizans*
- *Entodon seductrix*

FABRONIACEAE
- *Fabronia ciliaris*

FISSIDENTACEAE
- *Fissidens bryoides*
- *Fissidens dubius*
- *Fissidens minutulus*
- *Fissidens obtusifolius*
- *Fissidens taxifolius*

FONTINALACEAE
- *Fontinalis hypnoides*
- *Fontinalis sphagnifolia*
- *Fontinalis sullivantii*

FUNARIACEAE
- *Funaria flavicans*
- *Funaria hygrometrica*
- *Physcomitrium eurystomum*
- *Physcomitrium pyriforme*
- *Physcomitrium serratum*
- *Pyramidula tetragona*

GRIMMIACEAE
- *Grimmia laevigata*
- *Schistidium agassizii*
- *Schistidium apocarpum*

HEDWIGIACEAE
- *Hedwigia ciliata*

HYPNACEAE
- *Taxiphyllum deplanatum*
- *Taxiphyllum taxirameum*

LESKEACEAE
- *Haplocladium virginianum*
- *Leskea gracilescens*
- *Leskea obscura*
- *Leskea polycarpa*
- *Lindbergia brachyptera*

LEUCOBRYACEAE
- *Leucobryum glaucum*

MNIACEAE
- *Plagiomnium affine*
- *Plagiomnium ciliare*
- *Plagiomnium cuspidatum*
- *Pohlia nutans*
- *Pohlia wahlenbergii*

NECKERACEAE
- *Pseudanomodon attenuatus*

ORTHOTRICHACEAE
- *Orthotrichum diaphanum*
- *Orthotrichum pumilum*
- *Orthotrichum pusillum*

POLYTRICHACEAE
- *Atrichum altecristatum*
- *Atrichum angustatum*
- *Atrichum crispulum*
- *Atrichum undulatum*
- *Pogonatum brachyphyllum*
- *Pogonatum pensilvanicum*
- *Polytrichastrum ohioense*
- *Polytrichum commune*
- *Polytrichum juniperinum*

POTTIACEAE
- *Barbula unguiculata*
- *Hyophila involuta*
- *Syntrichia laevipila*
- *Tortula acaulon*
- *Tortula obtusifolia*
- *Weissia controversa*
- *Weissia muhlenbergiana*

PYLAISIACEAE
- *Homomallium adnatum*

PYLAISIADELPHACEAE
- *Platygyrium repens*

SEMATOPHYLLACEAE
- *Brittonodoxa subpinnata*
- *Sematophyllum demissum*

THELIACEAE
- *Thelia asprella*
- *Thelia lescurii*

THUIDIACEAE
- *Thuidium delicatulum*

TIMMIACEAE
- *Timmia megapolitana*

Southern Douglas County

38.79142 -95.17018 within 25 km *Games*

more detail

Families: 33
Genera: 61
Species: 94
Total Taxa: 94

Page **1** of **1**: **1**

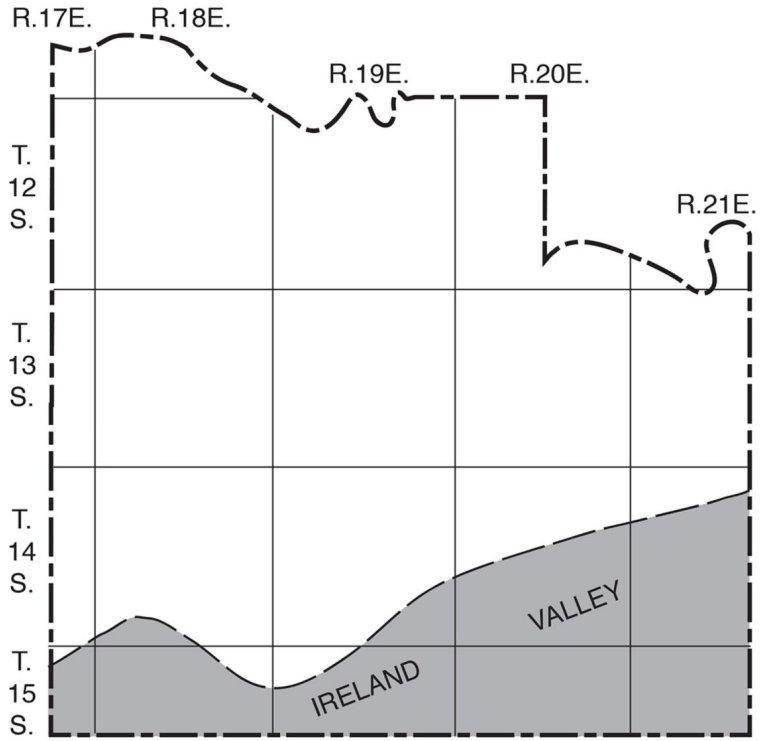
AMBLYSTEGIACEAE
- *Amblystegium serpens*
- *Campylium chrysophyllum*
- *Hygroamblystegium varium*
- *Leptodictyum riparium*

ANOMODONTACEAE
- *Anomodon minor*

AULACOMNIACEAE
- *Aulacomnium heterostichum*

Why the difference?

Figure 5.--Generalized map of Douglas County showing location of ancient valley in which Ireland Sandstone member of Lawrence Shale was deposited.



https://www.kgs.ku.edu/General/Geology/Douglas/index.html

Let’s Question some Moss (30 minutes)

- 10 or so moss specimens in numbered plastic containers
- Images from the collection sites for each numbered moss are at www.bradwilliamson.net
- See if you can find answers to some of the earlier suggested questions for mosses you chose. You’ll need your hand lens, your notebook and a measuring device.
- Discuss with partners and other groups.
- These questions can guide our search for the mosses identities and unlock moss stories.

Moss Genera

Platygyrium
Entodon seductrix
Weissia
Bryum
Anomodon minor
Pseudoanomodon attenuatus

Fissidens
Funaria
Plagiomnium
Orthotrichum
Syntrichia

Leafy liverwort (possibly Frullania)

Where do we go from here?

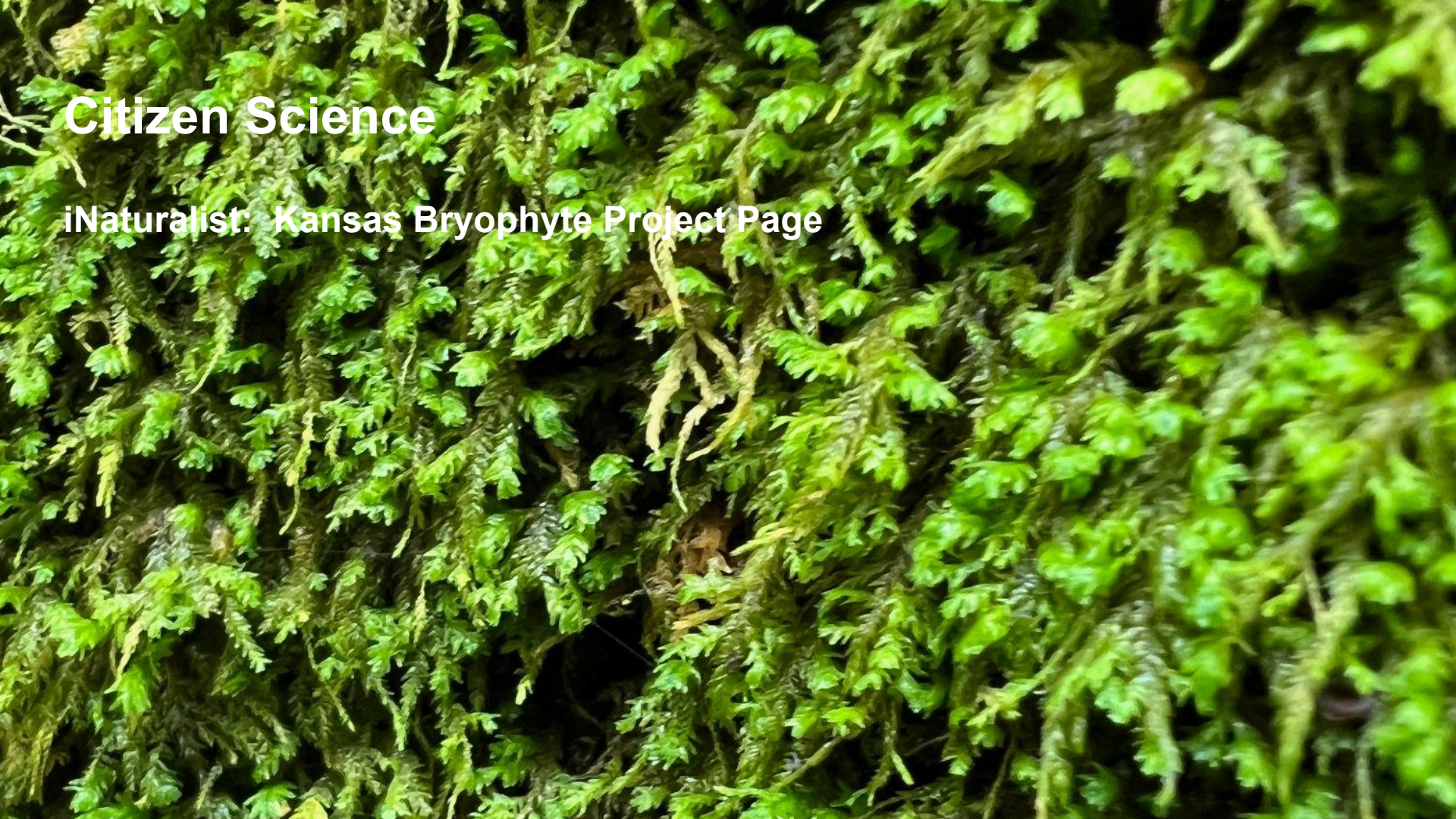
Maybe a bit of Citizen Science

or

Maybe a bit of JoCo MasterNaturalist service

Citizen Science

iNaturalist: Kansas Bryophyte Project Page



Applications in Plant Sciences
Official publication of the Botanical Society of America

Protocol Note | Open Access

iNaturalist as a tool to expand the research value of museum specimens

J. Mason Heberling, Bonnie L. Isaac

First published: 07 November 2018 | https://doi-org.www2.lib.ku.edu/10.1002/aps3.1193 |
Citations: 50

Abstract

Premise of the Study

Innovative approaches to specimen collection and curation are needed to maximize the utility of natural history collections in a new era of data use. Associated data, such as digital images from the field, are routinely collected with recent herbarium specimens. However, these data often remain inaccessible and are rarely curated alongside the associated physical specimens, which limits future data use.

Methods and Results

We leveraged the widely used citizen science platform, iNaturalist, to permanently associate field-collected data to herbarium specimens, including information not well preserved in traditional specimens. This protocol improves the efficiency and accuracy of all steps from the collecting event to specimen curation and enhances the potential uses of specimens.

Conclusions

iNaturalist provides a standardized and cost-efficient enhancement to specimen collection and curation that can be easily adapted for specific research goals or other collection types beyond herbaria.

Volume 6, Issue 11
November 2018
e01193
This article also appears in:
Celebrating 10 Years of *Applications in Plant Sciences*
Low-Cost Methods in the Plant Sciences Virtual Issue
Plants Day Collection

Figures References Related Information

A

B

PLANTS OF PENNSYLVANIA

LILIACEAE

Erythronium americanum

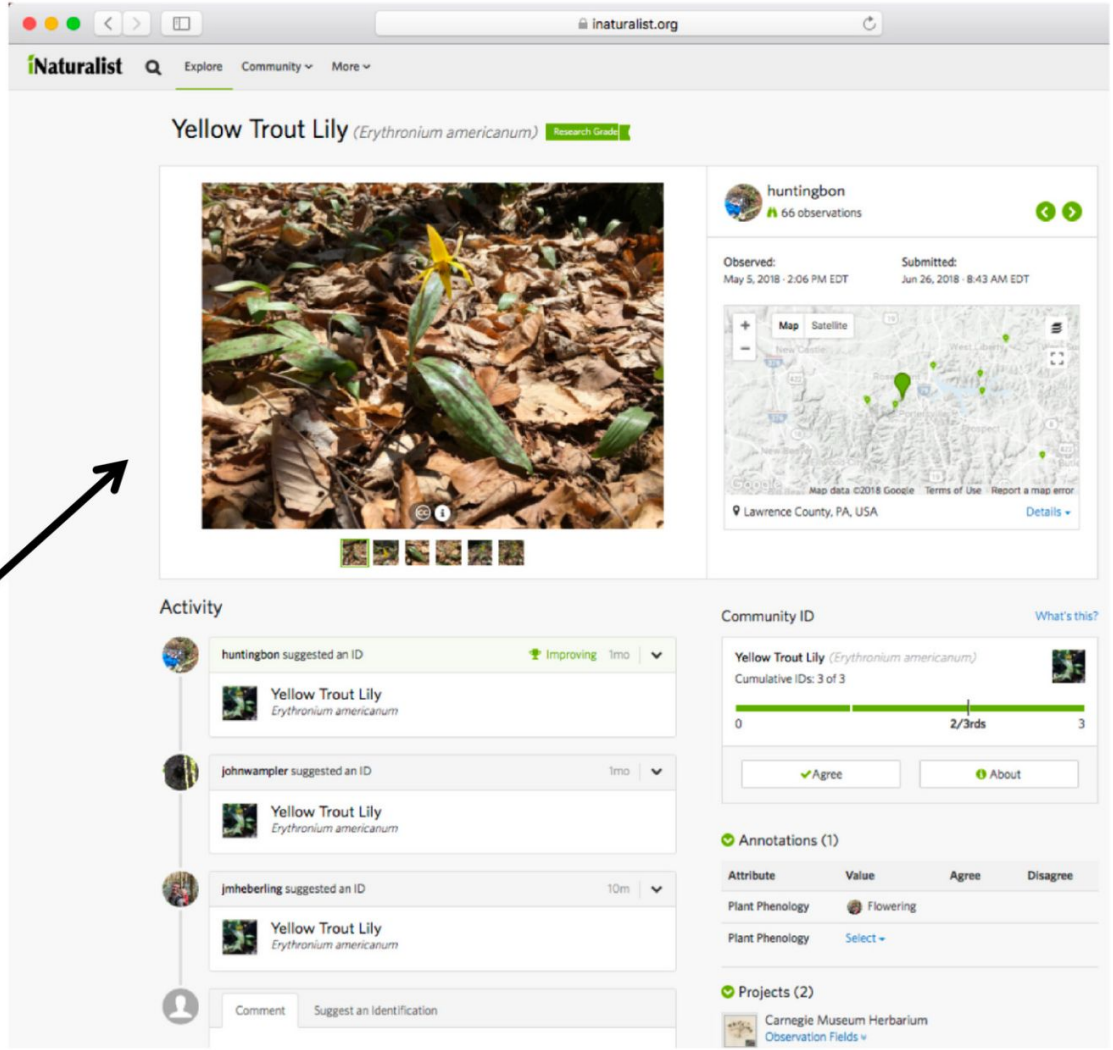
Identified by· B.L. Isaac 2018

United States: Pennsylvania. Lawrence County· 7.3 mi WNW of Prospect, along Slippery Rock Creek, McConnells Mill State Park. wooded slope along floodplain. Flowers yellow Lat/Long: 40.93906, -80.177894 WGS84

Bonnie L. Isaac 25026 with Joseph A. Isaac — 5 May 2018

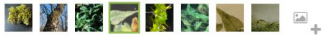
HERBARIUM, CARNEGIE MUSEUM (CM), PITTSBURGH, PA

C



Lindberg's Maple-Moss (*Lindbergia brachyptera*) Research Grade

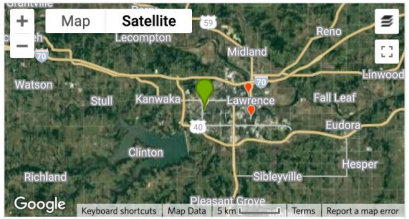
Edit



ksbioteacher
108 observations

Observed:
Sep 5, 2021 · 10:35 PM UTC

Submitted:
Jan 19, 2022 · 3:40 PM CST



Quail Run, Lawrence, KS 66049, U... Show Details

Be the first to fave this observation!

Activity

ksbioteacher suggested an ID — Improving 2y

Lindberg's Maple-Moss
Lindbergia brachyptera
Compare

shaunpogacnik95 suggested an ID — 9mo

Lindberg's Maple-Moss
Lindbergia brachyptera

Comment | Suggest an Identification

Preview

Leave a comment

Community Taxon

What's this?

Lindberg's Maple-Moss (*Lindbergia brachyptera*)
Cumulative IDs: 2 of 2

0 — 2/3rds — 2

Agree | Compare | About

Annotations

Attribute	Value	Agree	Disagree
Sex	Select		

Projects (1)

Add to a Project

Kansas Botany

JOCO Parks Online Moss Trails?

inaturalist.org/observations/179447552

iNaturalist | Search | Explore | Your Observations | Community | Identify | More | Upload

Ontario Rhodobryum Moss (*Rhodobryum ontariense*) Research Grade

Edit

ksbioteacher
108 observations

Observed:
Aug 2, 2020 · 4:14 PM CDT

Submitted:
Aug 20, 2023 · 7:20 PM CDT

Overland Park, KS, USA Details

Be the first to fave this observation!

Activity

ksbioteacher suggested an ID — Improving — 5mo
Ontario Rhodobryum Moss
Rhodobryum ontariense
Compare

mjpapay suggested an ID — 4mo
Ontario Rhodobryum Moss
Rhodobryum ontariense

Community Taxon

What's this?

Ontario Rhodobryum Moss (*Rhodobryum ontariense*)
Cumulative IDs: 2 of 2

0 — 2/3rds — 2

Agree | Compare | About

Annotations

JOCO Parks Online Moss Trails?

Kansas Native Plant Society’s Field Trip at Hillsdale Lake

Columbia Audubon Cell Phone Moss Trail

Discussion?

Self-guided moss walk: Wild Haven Nature Area

Date/time of your choice

View By Category

Wild Haven Nature Area

Have you taken the time to examine mosses close up? And to think about the relationships between mosses and birds? We're excited to announce a new, self-guided moss walk at Wild Haven Nature Area that encourages you to do just that!

The trail guide is formatted to be easily read on a mobile device (with the goal of saving paper; *please* don't print it).

Navigation directions: Continue to the far edge of the pond; you should see another white trail maker with an arrow. The first featured moss species is the one you're probably standing on.

Moss 1: Kneel, and look closely at a leaf. Does the branching pattern remind you of something? The resemblance to ferns is the source of this moss's common name: delicate fern moss (*Thuidium delicatulum*). But the resemblance is superficial. True ferns are vascular plants, as are trees, shrubs, wildflowers, and grasses: all of these have tissues that can transport water and nutrients from their roots to their leaves. In contrast, this "fern" moss, like other mosses, is nonvascular. Mosses must receive their nutrients directly from water and air. This results in an enforced smallness, but as you'll see today, small doesn't mean boring.

Navigation directions: Follow the white trail markers down the hill to the creek crossing. Stop before you cross the creek. Notice the large stand of moss covering the hill to your right. This is the first of three species we'll look at near the creek crossing. Take a look!

Safety notes:

- This stream only rarely floods, but crossing during high water is dangerous. The secondary parking site (see trail map) provides access to the western portion of trail when the stream is too high to cross.
- Beware of uneven and slippery footing when navigating the creek bed.

On your own—some suggestions

1. Make a list of what has been found in your area.
2. Target a few “common” species until you are comfortable.
3. Take lots of close up photos (through your lens) and distance photos (auto-database)
4. Consider iNat for a first round of suggestions–your candidate mosses. (assuming you are starting from scratch)
5. Scout the internet for images of the candidate mosses.
6. Add the observation to iNat and perhaps you’ll get a confirmation/perhaps it will be incorrect.
7. Cherish each moss that you confidently identify and equally cherish the lessons you learn from the ones you don’t.

inaturalist.org/observations/upload

iNaturalist

+ Add ✖ Remove Combine Duplicate Select All

Editing **1** observation:

Details

Species name

2022/01/14 11:23 AM

Woodson County, KS, USA

Notes

Location is public

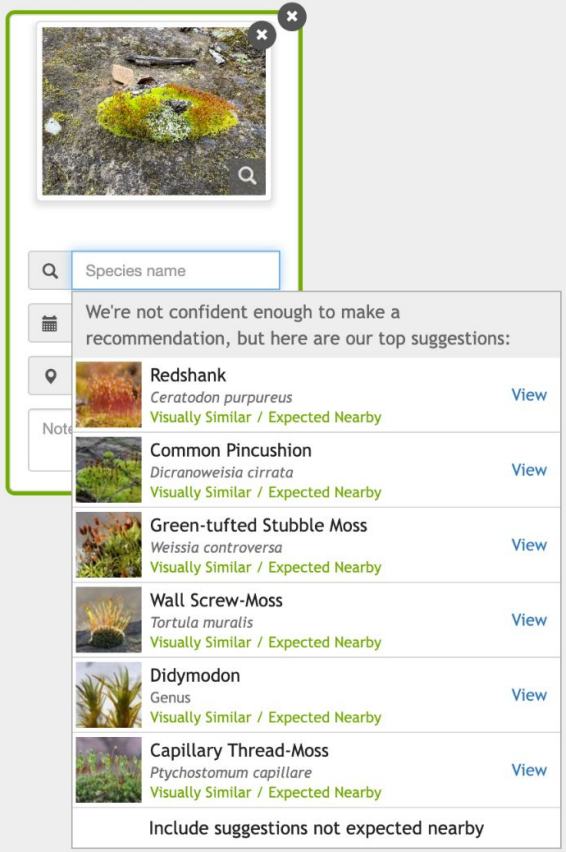
Captive / Cultivated

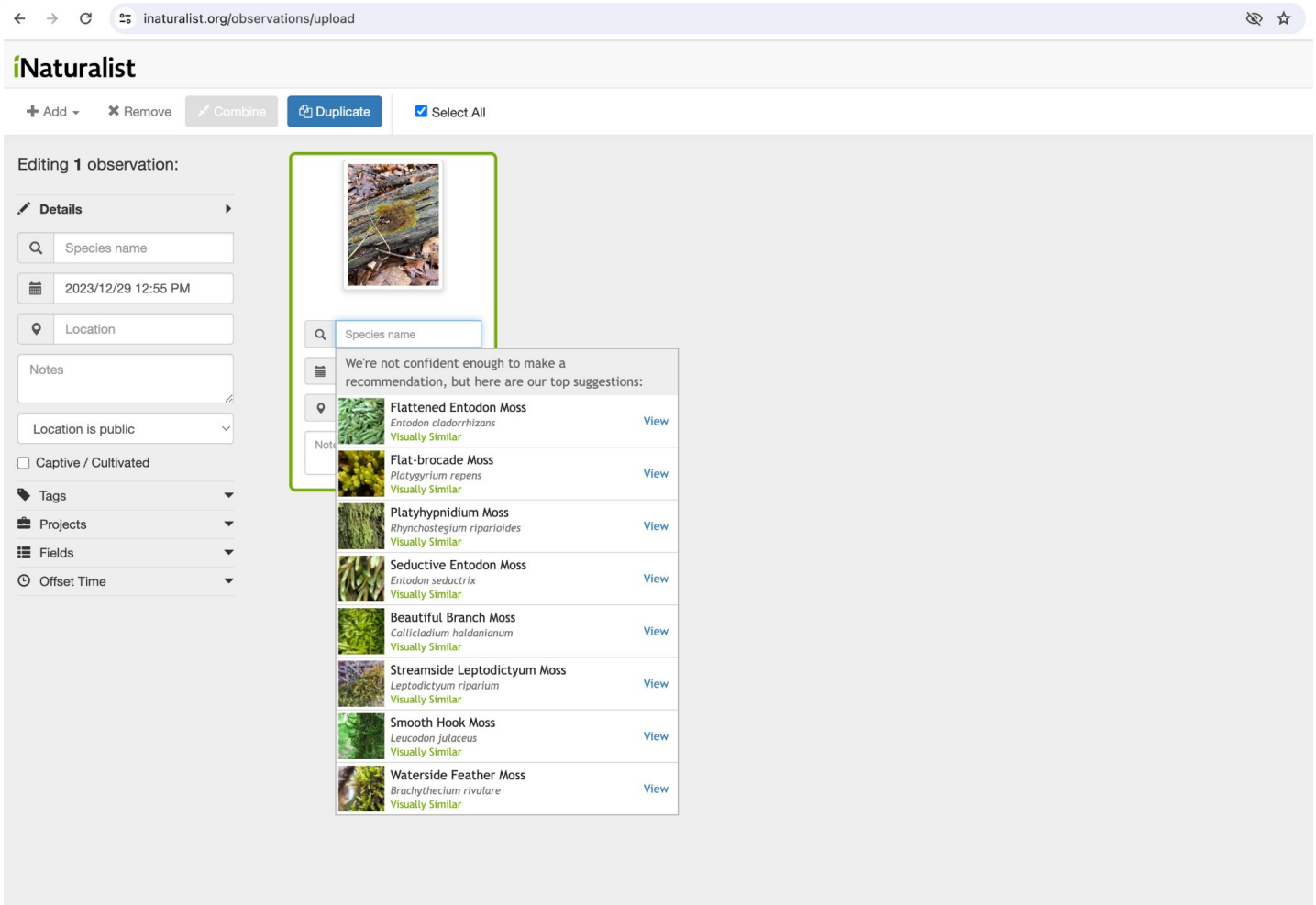
Tags

Projects

Fields

Offset Time

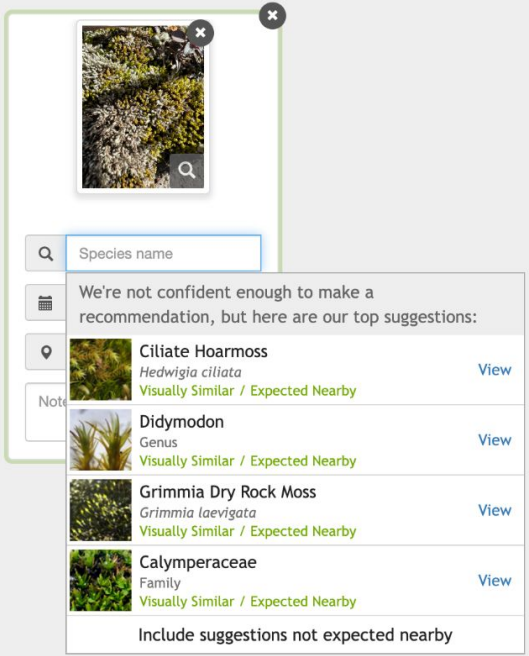


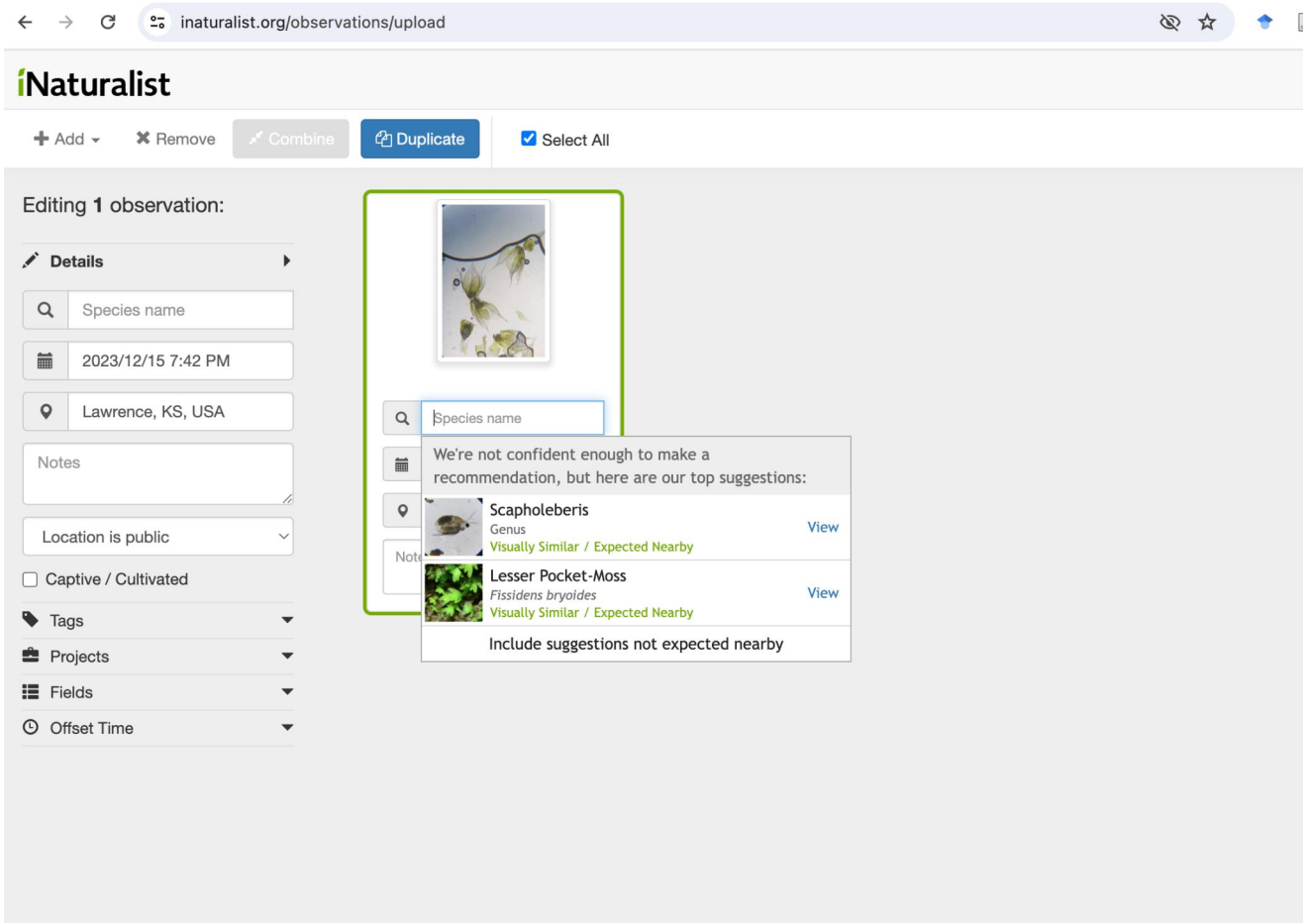

inaturalist.org/observations/upload
iNaturalist
Add
Remove
Combine
Duplicate
Select All
Editing 1 observation:
Details
Species name
2023/12/29 12:55 PM
Location
Notes
Location is public
Captive / Cultivated
Tags
Projects
Fields
Offset Time
Species name
We're not confident enough to make a recommendation, but here are our top suggestions:
Flattened Entodon Moss
Entodon cladorrhizans
Visually Similar
View
Flat-brocade Moss
Platygyrium repens
Visually Similar
View
Platyhypnidium Moss
Rhynchostegium riparioides
Visually Similar
View
Seductive Entodon Moss
Entodon seductrix
Visually Similar
View
Beautiful Branch Moss
Callicladium haldanianum
Visually Similar
View
Streamside Leptodictyum Moss
Leptodictyum riparium
Visually Similar
View
Smooth Hook Moss
Leucodon julaceus
Visually Similar
View
Waterside Feather Moss
Brachythecium rivulare
Visually Similar
View

iNaturalist

+ Add | Remove | Combine | Duplicate | Select All

Select Observations to Edit...




inaturalist.org/observations/upload
iNaturalist
+ Add
Remove
Combine
Duplicate
Select All
Editing 1 observation:
Details
Species name
2023/12/15 7:42 PM
Lawrence, KS, USA
Notes
Location is public
Captive / Cultivated
Tags
Projects
Fields
Offset Time
Species name
We're not confident enough to make a recommendation, but here are our top suggestions:
Scapholeberis
Genus
Visually Similar / Expected Nearby
View
Lesser Pocket-Moss
Fissidens bryoides
Visually Similar / Expected Nearby
View
Include suggestions not expected nearby

iNaturalist

+ Add ✖ Remove Combine Duplicate Select All

Editing **1** observation:

Details

Species name

2023/12/22 12:52 PM

Location

Notes

Location is public

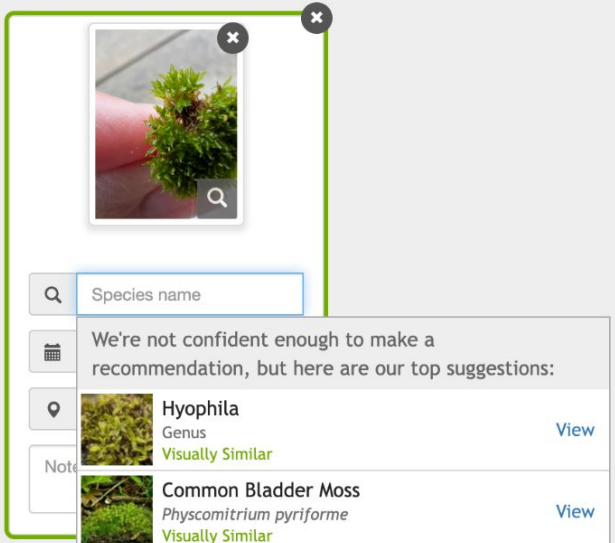
Captive / Cultivated

Tags

Projects

Fields

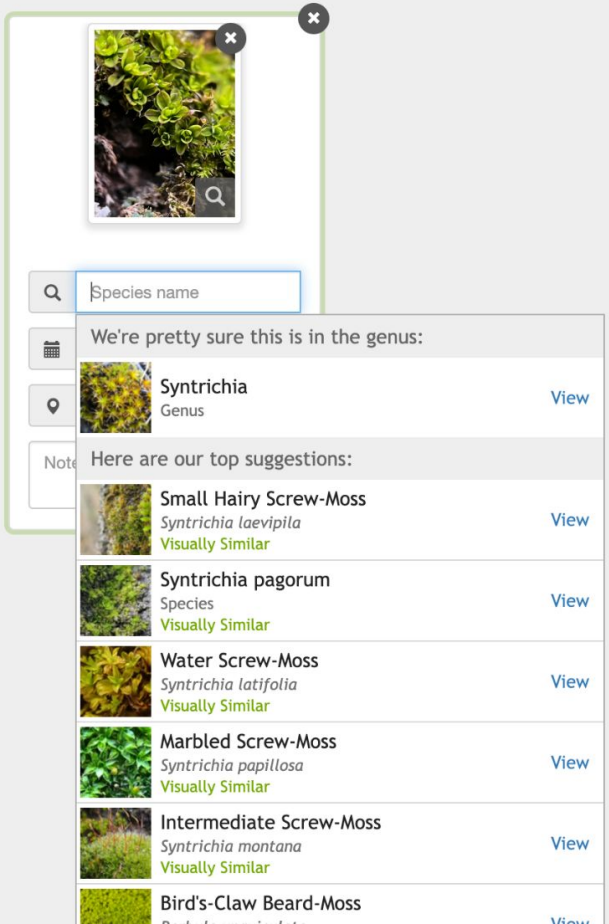
Offset Time



iNaturalist

+ Add ▾ | ✖ Remove | Combine | Duplicate | ☐ Select All

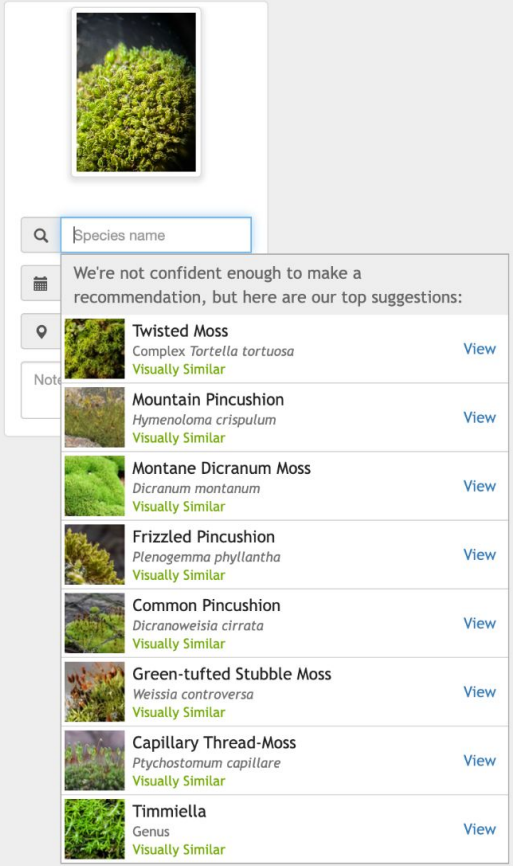
Select Observations to Edit...



iNaturalist

+ Add | Remove | Combine | Duplicate | Select All

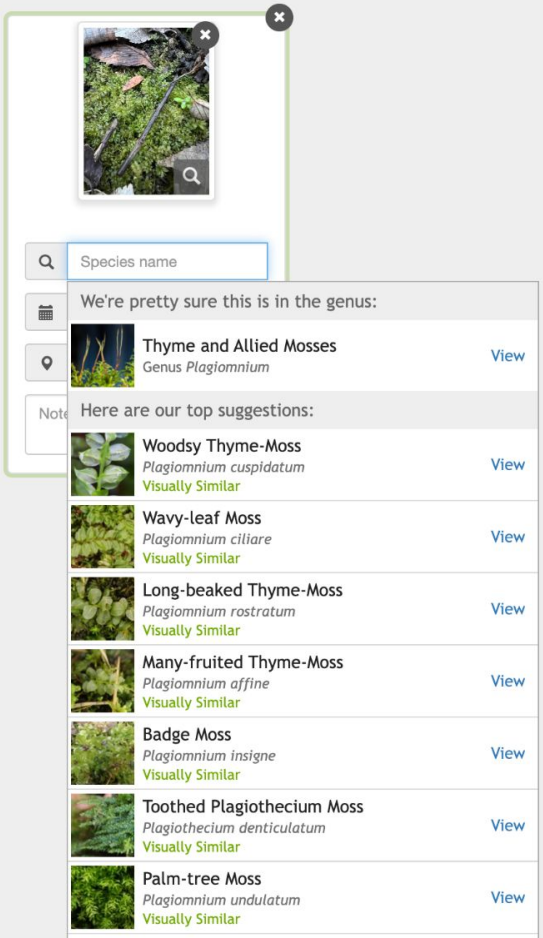
Select Observations to Edit...



iNaturalist

+ Add ▾ | ✖ Remove | Combine | Duplicate | ☐ Select All

Select Observations to Edit...



inaturalist.org/observations/upload

iNaturalist

+ Add | iNaturalist | Remove | Combine | Duplicate | Select All

Editing **1** observation:

Details

Species name

2023/12/16 4:27 PM

Location

Notes

Location is public

Captive / Cultivated

Tags

Projects

Fields

Offset Time

Species name

We're pretty sure this is in the genus:

Anomodon
Genus
View

Here are our top suggestions:

Dwarf Anomodon Moss
Anomodon minor
Visually Similar
View

Tree-skirt Moss
Pseudanomodon attenuatus
Visually Similar
View

Rambling Tail-Moss
Anomodon viticulosus
Visually Similar
View

Fan Moss
Forsstroemia trichomitria
Visually Similar
View

Yellow Yarn Moss
Claopodium rostratum
Visually Similar
View

Common Thelia
Thelia hirtella
Visually Similar
View

iNaturalist

+ Add | ✖ Remove | Combine | Duplicate | Select All

Select Observations to Edit...

Species name

We're pretty sure this is in the genus:

Scapania
Genus
View

Here are our top suggestions:

Grove Earwort
Scapania nemorea
Visually Similar
View

Water Earwort
Scapania undulata
Visually Similar
View

Dilated Scalewort
Frullania dilatata
Visually Similar
View

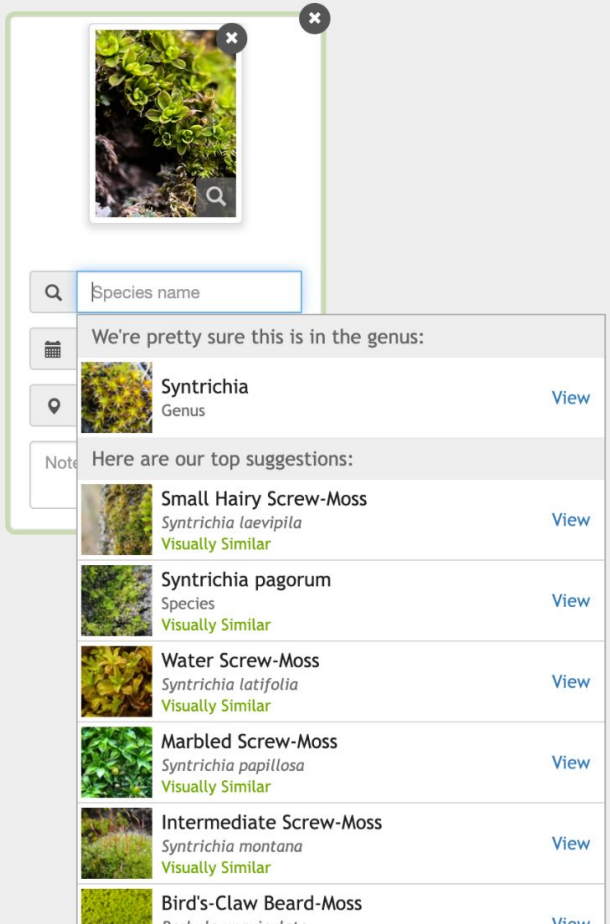
Mueller's Pouchwort
Calypogeia muelleriana
Visually Similar
View

Asa Gray's Scalewort
Frullania asagrayana
Visually Similar
View

iNaturalist

Add | Remove | Combine | Duplicate | Select All

Select Observations to Edit...



inaturalist.org/observations/upload

iNaturalist

+ Add ▾ | ✖ Remove | Combine | Duplicate | ☑ Select All

Editing **1** observation:

Details

Species name

2024/01/07 5:16 PM

Location

Notes

Location is public

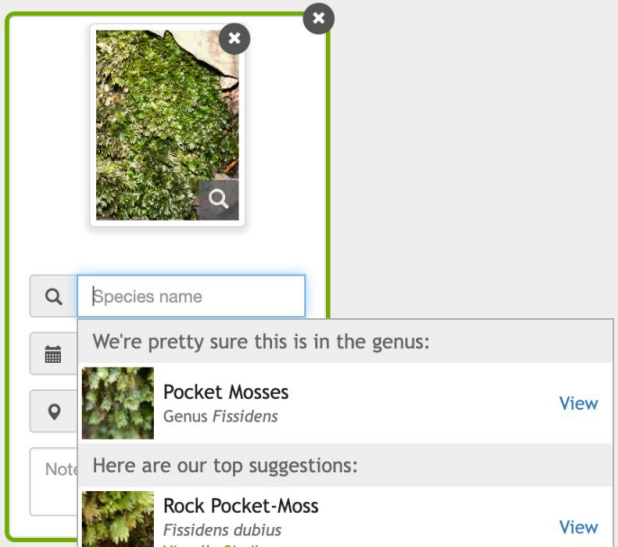
☐ Captive / Cultivated

Tags

Projects

Fields

Offset Time



Resources (I am creating a moss resource page on my web site–stay tuned.

Tools: Lens, forceps, microscopes, etc.

Water spray bottles

Books

Free Online resources

iNaturalist

Northern Forest Atlas

Ohio and Illinois moss pages

Plants of the Gila Wilderness

Online eflora

Northern Forest Atlas

iNat

Ohio

Illinois

Princeton Guide

Bryophyte portal

Ecology of Bryophytes

British bryophyte help

Online glossary(s)

iNat micromoss project