

SYMBIOTA: Interactive Field Guides for Teaching Biodiversity

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Teaching Biodiversity

What are the best methods for teaching youth about the organisms around us? Symbiota is an information portal designed with the central purpose of teaching students and the general public about regional biodiversity. Web-based data management tools allow the scientific community to collaboratively build a solid foundation of biological resources. Educators and the general public can then use this quality maintained dataset as an educational resource specifically geared to their local community. The flexibility of this system has enormous potential as it can be customized to meet a full spectrum of needs – from the middle school student just being introduced to local species to the professional taxonomist who expects a highly comprehensive dataset.

Interactive Multistate Plant Key

Step 1: Select a geographic checklist. Biologists assist teachers and students in building site-based checklists.

Step 2: Limit species list to a taxonomic group, if possible

Step 3: Reduce possible identifications using morphology

The screenshot shows the 'Symbiota Web-Key: Arizona - Mozilla Firefox' browser window. The URL is 'http://seinet.asu.edu/seinet/symbiota/key.php'. The page title is 'SEINet Southwest Environmental Information Network'. Below the navigation bar, there's a 'Welcome Back Edward!' message and a 'Logout' button. The main content area is titled 'Symbiota Home > Symbiota Intro > Symbiota Key'. It features a 'Checklist:' dropdown menu set to 'Cholla High School' with a 'map view' link. Below that is a 'Taxon:' dropdown set to 'All Species' and 'Submit Criteria' and 'Reset' buttons. There are also 'Languages' and 'Show All Characters' options. The 'Plant habit' section has checkboxes for 'herb', 'shrub' (checked), 'tree', and 'cactus-like / desert succulent'. The 'Leaf type' section has checkboxes for 'simple' (checked), 'pinnatifid-pinnatisect', 'alternate', 'opposite', 'whorled', 'fascicled/clustered along stem', and 'blade margin' (checked). The 'blade margin' section has checkboxes for 'entire' and 'toothed'. On the right side, there's a list of plant families and species, including 'Cholla High School', 'Species Count: 9', 'Apocynaceae', 'Nerium oleander', 'Asteraceae', 'Baccharis sarothroides', 'Porophyllum gracile', 'Xanthisma spinulosum', 'Euphorbiaceae', 'Argythamnia neomexicana', 'Fouquieriaceae', 'Fouquieria splendens', 'Malvaceae', 'Sphaeralcea ambigua', 'Sphaeralcea emoryi', 'Ulmaceae', and 'Celtis pallida'.

Step 4: Selecting a scientific name will open the species profile page featured to the left. Checklists can be displayed by scientific or common name.

Other Interactive Features

Personalized Checklists

- Organize and maintain an on-going list of all the plant species you have seen
- Build custom plant lists of species seen within your property or another area of special interest

Teaching Resource

- Teachers create a small list of plants found within the school yard
- This list is used with the interactive keys to teach basic identification skills
- New species and morphological characters are added to the key as the students' knowledge increases

Benefits of Scientific Collections

- Species lists can be generated dynamically from specimen data (e.g. List all species collected within 10 miles of a given point of interest)
- Using collection data, create an identification key for almost any locality

Species Profile Page

The screenshot shows the 'Cirisium arizonicum (A. Gray) Petrak.' species profile page. It includes the family 'Asteraceae' and the Arizona Division. The page features a main image of the plant with a butterfly, several smaller images of different parts of the plant, and a distribution map of Arizona. The text provides detailed botanical information: 'Plant: Perennial 2-10 dm, taproot or woody stem erect, often + 1 from base, thinly tomentose or glabrous. Leaves: + tomentose (especially below), becoming a glabrous, lower 1-2 dm, tapered to long-narrow petioles, oblong-obovate, a lobed, lobes generally further lobed or toothed, main veins 5-15 mm, middle and upper not strongly reduced, clasping or short-decurrent. Inflorescence: primary inflorescence a head, each resembling a flower, heads discoid, generally few, short-peduncled, a closely subtended by uppermost leaves, involucre 3-4 cm, 1.5-2 cm diam when fresh, tubular or narrowly ovate, sparsely tomentose, glabrous linear or linear lanceolate, entire, generally erect or ascending, outer and middle tipped with spines 10-20+ mm, inner with long flat or short spread, straight, often red or purple, pubescent. Flower: scattered, corolla 30-34 mm, red, tube 7-8 mm, slender, throat 11-14 mm, lobes linear, 1.2-1.3 mm, anther bases sharply sagittate, tips oblong, style tip with slightly swollen collar, septum(s) (above) round long, cylindrical, branches very short. Flowering time: Jul-Aug. Fruit: Fruit 4-6 mm, a compressed, stem brown, oval, glabrous, scar slightly angled, diameter 24-28 mm, slender, many, glabrous. Habitat: Open forests, sagebrush scrub. Distribution: 2400-3700 m.

Species Distributions



What the Future Holds!

Custom Field Guides

- Print at home to use in the field
- Possible sample guides:
 - Lichens of the Grand Canyon
 - Shrubs of Maricopa County
 - Plants I have found in my backyard

Educational Games & Quizzes:

- Identify random images
- Match image with name

Built and Managed by Scientists

Source data and images are supplied and managed by the scientific community. Data management via web interface enables worldwide collaboration of biologists in order to ensure a foundation of high quality data.



SEINet Virtual Flora

<http://seinet.asu.edu/seinet/index.php>

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