Ecological fields

DRAFT VERSION: Please send comments to me [mary dot Barkworth at usu dot edu].

As with other Symbiota2 help documents, this document first explains how to complete fields in the current version of Symbiota. Each explanation is followed by a statement about changes that will be implemented in Symbiota2, if any. Some of the changes will be included in the first release of Symbiota2. The para others are planned for subsequent releases. Paragraphs describing them are preceded by "**Symbiota2+".**

Data entry form, box 4.

Figure 1 Date entry page, box 4

Fields in the fourth box of the data entry page can be described as ecological although Symbiota's data entry page lists them as "Miscellaneous". Many existing specimens do not provide information for these fields. Fields for which there is no information on the label should be left empty. Today's collectors should appreciate that providing information in these fields will increase their value of the specimens.

Symbiota uses a few terms in the ecology box that are not DarwinCore terms, , for example "substrate", because active taxonomists considered them critical to research on the group. Having a separate "substrate" field makes it easier to search for taxa growing on wood rather than rocks. The existence of the field also reminds collectors to provide the information. When the DarwinCore Archive file is created, these terms are integrated into an accepted field, for example, information in the "substrate" field is added to the "habitat" field.

Ecology fields

Habitat

> **Symbiota**: Description of the environment where the specimen was collected. It can be a well-known category (for example, mangrove forest, Acacia-*Commiphora* woodland, hot desert, oasis, low sagebrush community) or a more detailed description (e.g., in shade of trees growing along a stream, roadside, on boulder in exposed area, in crevices among rocks, in open areas of forest, under thorny/spiny shrubs).

Symbiota2+: No changes planned.

Substrate:

Symbiota: Used for organisms that grow attached to their substrate, particularly those for which knowing the substrate is important to identification, for example, bryophytes, lichens. fungi, and algae. It can be rather broad (rock, soil, carcass, dead tree) or specific (bark of *Pinus monticola*, camel skin, Fishhaven dolomite). It can asl be used for the host of a fungus or epiphyte. "Substrate" information is added to the "Habitat" field in the DarwinCore Archive file. There is often no data concerning substrate on a label.

Symbiota2+: No changes planned for the immediate future. There is a new DarwinCore field, "Resource relationship" (added in 2021), which may be of interest later. The field is designed to summarize the relationship between one organism, the one for which the record is being made, and another organism, set of organisms, or inorganic objects. How to implement it will take some discussion because, as described, it can be used for many relationships, including some that are covered by existing Symbiota fields (e.g., substrate), or are properties of taxa or locations rather than occurrences.

Associated taxa:

Symbiota: List of taxa (scientific names) occurring with or near the collected specimen. If scientific names are not provided but local/vernacular names are, they should be included in the "habitat field". if only a generic name is listed, enter it and do not follow it with "sp." or spp," even if the label does. "Associated taxa" is linked to the taxonomic backbone. This means that, if the name is in the backbone, when an entry is started, the program will suggest names that match the entry. This can be used as a spelling check. If the name is not found, it can still be entered by the network administrator should be asked to add the name.

Symbiota2+: No changes planned.

Description:

Symbiota: Comments about the appearance of the organism from which the specimen was made. Existing specimens often have no descriptive information. The comments should reflect observations made in the field, particularly those not likely to be preserved well by making the specimen. For example, for woody plants, such features as whether it was a shrub or tree and its height; for plants with large leaves, the size of the largest leaves; for stem succulents, the stem diameter when fresh; flower color; for herbaceous plants whether it was annual or perennial (which is often easier to observe in the field than on a specimen), for perennial herbs, it is useful is there is information about the underground parts. "Description" is not a DarwinCore Field it is valuable. It is named "VerbatimAttributes when the DarwinCore archive is generated.

Symbiota2+: No changes planned for the immediate future. Long term, it would be desirable to have an option that would make it easier to add descriptive information in a way that sharing such information.

Occurrence remarks:

Symbiota: Local abundance and other notes. Examples include "few specimens", "abundant", "dominant understory species", "sold as ornamental", "dead on road", "being sold as food/medicine/souvenir", "locally common".

Symbiota2+: No changes planned.

Field notes:

Symbiota: In general, this can be used for information that is on the label (or observed in the field) that does not fit in any other field. Another use is for linking the occurrence record to an online version of a collector's field notebook, If the pages have been scanned individually, and/or the location of collection numbers identified, the links can be very specific.

Symbiota2+: No changes planned for the immediate future. Providing specific fields for linking to the relevant parts of a field notebook would be useful for projects that include making the field notes available.

Life stage:

Symbiota: Particularly useful for organisms, such as insects, that go through a series of phases before dying. For perennial organisms, which cycle through a phase many times before dying, the term used to describe the reproductive state is "phenology".

Symbiota2+: No changes planned for the immediate future. A future version might draw on a generalized ability to add picklists to a field, possibly a taxon-dependent field. This would allow, for example, the use of different terms for ferns and flowering plants.

Sex:

Symbiota: Usually used for zoological collections, but potentially valuable for plants in which the breeding system is important.

Symbiota2+: no changes planned. It might be desirable to have a pick list appropriate to a network's domain of interest, but none have been established (so far as I am aware).

Individual count:

Symbiota: Frequently used by zoologists but open to all.

Symbiota2+: no changes planned. Looking ahead, this would be an important field in a version of Symbiota2+ that integrates survey and occurrence data.

Sampling protocol:

Symbiota: Most used by zoologists to specify, for example, sweep net, pit trap.

Symbiota2+: no changes planned for the immediate future. This would be an important metadata field in a version of Symbiota2+ that integrates survey and occurrence data.

Preparations:

Symbiota: This is where one can elaborate on how a "preserved specimen" is preserved, e.g., pinned; dried, 3-dimensional specimen; herbarium sheet; pickled.

Symbiota2+: No changes planned for the immediate future, Enabling creation of picklists, at different levels, might be valuable. See also the field "Disposition" in the curatorial section.

Phenology:

Symbiota: The phase of a life cycle exhibited by an organism, particularly perennial photosynthetic organisms. Used most frequently by botanists. It can be added after a specimen has been deposited. If multiple states are visible in the same sample, the most common or possibly the two most common, should be listed. Sometimes the label will suggest the common phenological state, e.g., if the description states "flowers yellow", the plant was flowering at the

time of collection. The specimen itself should be examined to be sure it does have flowers. There may be duplicate specimens that do not include a flower, only buds or fruits, or vegetative material.

Symbiota2+: no changes planned for the immediate future. This is another field that would benefit from creation of taxon-dependent pick lists.

Establishment means:

Symbiota: If it is known that the species was deliberately introduced, state that. If its origin at the locality is unknown, leave the field empty. TDWG recently (2021) recommended a list of terms for use in this field: (indigenous); native: reintroduced; introduced; introduced assisted colonization; vagrant (temporary occurrence of a taxon beyond its natural range); uncertain. Most require knowledge not evident on a specimen or in the field so the field will often be empty.

Symbiota2+: no changes planned for the immediate future. This is a field that would benefit from creation of a picklist.

Cultivated:

Symbiota: Check this box for organisms being cared for in a structured environment, such as plants in gardens or experimental/research plots, animals raised in zoos, butterfly houses, or on farms. Not used for plants or animals in large parks where the goal is to allow growth in a natural environment.

Symbiota2+: no changes planned.