Agenda item for Developers meeting
Univ. of Missouri at St. Louis, MO USA
December 8-9, 2003

The plan is to start with the top of the hierarchy, and then move down the hierarchy until we run out of time. We'll have three computers set up, so we can view all three ontologies at the same time. We can then discuss the comparisons point by point.

There are also a number of general issues to be addressed as we go along (see below). #s 1-3 will probably come up more or less immediately, and the others somewhat later. I suggest we address them in the context of solving particular structural problems in the ontologies, rather than try to come up with an abstract solution a priori.

I. The top of the hierarchy All three ontologies start with "whole plant", although MDB calls it "whole organism." It means the same thing, although presumably we need to indicate somehow that "organism" = "plant."

The first substantive problem comes at the level below whole plant (organism):
Gramene:
- i embryo
- i fruit
- i gametophyte
- p plant cell
- p plant tissue
- p root
- i seed
- p shoot

TAIR:
- p cell type
- i embryo
- i gametophyte
- p meristem
- p organ
- p root
- i seed
- p shoot
- p tissue and tissue systems

MDB:
- p cell type
- p organ
- p tissue

What do we want this first division to be, and what are the practical consequences (if any) of this?

General issues

1. The goal of the ontologies is to have a set of terms that is applicable to all flowering plants, so the same structure has the same name wherever it is found. (A counter here might be that that is not realistic; language does not work that way, but is highly context dependent. If I am working on Helianthus, I know that receptacle refers to an expanded flattened inflorescence axis, whereas if I am working on Magnolia, it is a floral axis. Although it is true that workers in the two areas know what they are talking about, the confusion comes when they move outside their areas, or when students try and understand botanical terms.)

2. Plants being plants, what is meant by "the same" is not necessarily" strictly homologous" (in the most narrowly definition of the term, identical by common descent). Thus petals in Alismataceae and those in Brassicaceae are almost certainly of independent origin; cf. also stipules, etc, etc. Things that are "the same" might still satisfy all three of Remane's criteria (position, intermediates, special qualities).

3. Given (1) above, how far do we want to draw on terms that are more commonly used outside flowering plants? An example: "Megasporangium" for "nucellus" - as is used in Judd et al. (2002).Other general issues that will arise in particular parts of the ontology:

4. How do we deal with serial homology? "Prophyll" is a generic term that includes things like bracteoles (possibly straight synonyms), and also the first two scale leaves at the bottom of the axillary buds on an oak tree.(Maybe add an extra field in the definition?)

5. How do we deal with terms that differ only because the stage of the life cycle? Example: outer integument (ovule) = testa (seed coat).

6a. How do we deal with the problems caused by things like inferior ovaries? Example 1: blueberries and tomato(e)s both have fleshy "fruits" with lots of seeds, but the fleshiness in blueberries comes from the tissue that makes the ovary inferior, not from the ovary wall. Example 2(slightly more complicated): dehiscent fruits. Some taxa with inferior ovaries dehisce down the sides of the fruit below the calyx (e.g.Lobelioideae) and some open by slits above the calyx (Campanuloideae(canterbury bell), Myrtaceae (bottle brush)). The latter are dehiscing inexactly the same way as say, Celastraceae (bittersweet) which has a superior ovary.

6b. Analogous problems are caused when we are thinking about fruits derived from separate carpels (custard apple family - Annonaceae), or fruits derived from ovaries with parietal placentation (pansies, Arabidopsis).