Introduction to the Tropics

1. Tropics: Physical, geographic, & climatic definitions
2. Some truths about the tropics
3. Some types of tropical forests
4. Biological diversity: there's a lot more stuff in the tropics
5. Broad differences between temperate and tropical forests

1. What are the tropics?

23.5: the magic number for life on Earth

2. Some truths about the tropics

Does Manaus, Brazil (on the equator), Olympia, WA, or the North pole get more hours of daylight every year?

True or false: If it's hot in the middle of Kansas in August, it must be unbearable in Ecuador. (See Chapin chap 2 for an in-depth discussion of climatic influences.)

True or false: There aren't any seasons in the tropics.
(First we need to know: What is a season?)

3. A few types of tropical forests: lowland evergreen rainforest

freshwater periodic swamp forest

cloud forest (Called "montane rainforests" by Whitmore)

In lowland rain forests, water falls as rain; in cloud forests, water is suspended in droplets, often at ground level. Cloud forests tend to have more mosses, and trees are generally more covered in epiphytes. In rainforests, vines & lianas are more prevalent.

seasonal karst forest

4. Tropical biodiversity

There are more species the closer you get to the equator. This is a pattern that has long been recognized, but is still poorly understood, although there have been plenty of hypotheses to explain it. This is remarkable: arguably the largest pattern in ecology—***why are the tropics more diverse?***—is still not answered after more than 100 years of formal investigation.

What follows this pattern, what doesn't?

> The pattern of tropical diversity holds on land and in water; in plants, animals, and fungi; across habitat and phylogeny. Major exceptions to the gradient include: salamanders, annual plants, conifers, parasitoid wasps, ungulates.

Latitudinal diversity gradient: swallowtail butterflies

Species area curves for tropical lowland evergreen forests

5. How tropical & temperate forests differ (a few important distinctions)

Tropical forests

- Most nutrients are in the biomass; soils are poor. Rootmats of tropical trees (in conjunction with mycorrhizae) pull nutrients out of fallen leaves before they enter soil.
- Plants tend to have specialist pollinators / dispersers: thus plants are reliant on individual animal spp.
- Most are not deciduous. Seasonality not as obvious to the untrained eye, but phenologies still exist.
- High diversity and large biomass.

Temperate forests

- Most nutrients are in the soil: soils are rich.
- Plants tend to be wind pollinated and dispersed, or have generalist pollinators/dispersers.
- Most forests are deciduous (less so the farther North you go). Seasonality is obvious, and plants and animals have distinct reproductive seasons.
- Lower diversity and biomass.