# Latitudinal Diversity Gradients in Freshwater

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# Introduction/Methods

I did a literature search using Web of Science, trying to find as many studies of latitudinal diversity gradients (LDG) in freshwater as possible. The search term was latitud\* diversity freshwater. That search found 228 articles of which I saved 50 after reading the abstracts. Laura added several articles as well. I compiled the results in a table, for those studies that had valid tests of the LDG, and classified them by taxon, type of waterbody, type of gradient, response variable, and continent. I also found a few elevational gradient studies, which I've ignored for the moment. Almost all the studies looked at richness, but there were 2 or 3 studies that looked at some other diversity metric (which incorporated richness), 1 study that looked at functional diversity, and 2 or 3 studies that looked at intraspecific genetic diversity. I have lumped those together for the moment. A study could have multiple rows in the table if it reported gradients for different taxa. I just classified the LDG results by whether it declined with latitude, increased, had a peaked/unimodal pattern, had a trough/U-shaped pattern, or no pattern, rather than reporting the slope.

## Results

Overall, the majority (58%) of the studies found a "standard" LDG, which I define as richness declining with latitude as you go away from the equator. This is probably pretty close to what meta-analyses that encompass terrestrial and aquatic systems have found, but might be a little less than expected.

#### Table by number of gradients

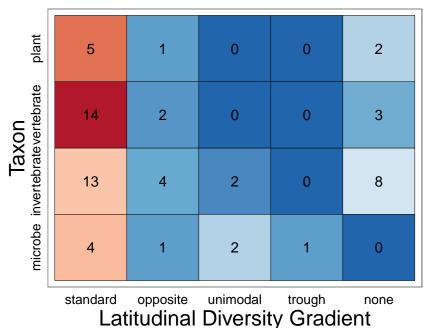
```
##
## standard opposite unimodal trough none
## 36 8 4 1 13
```

#### Table by proportion

```
## ## standard opposite unimodal trough none ## 0.581 0.129 0.065 0.016 0.210
```

In addition, I classified the results by taxon and by type of waterbody. The first figure below shows that the breakdown is pretty consistent across taxa, thoughinvertebrates seem disproportionately likely to show a non-standard pattern. The second figure shows that streams (including all running waterbodies) may be more likely to show a non-standard pattern than lakes (including ponds, etc.) though there are few studies done only on streams. I had to lump a lot of studies together as "freshwater" because it either included both streams and lakes or it was not adequately clear if it focused on one or the other.

## Contingency table by taxon



Contingency table by waterbody class

