



PISCES LECTURE RESOURCES

The Ecology of Freshwaters

LECTURE 7 – Food webs in freshwaters.

Introductory remarks: An important tool for the ecologist in understanding the ecology of a freshwater system is the food web. By understanding the energy flows through a system and the role of the different organisms in mediating those flows, we can form a more comprehensive picture of the way in which it works. Of course, the food web portrays only one aspect of the system and if we want to be more rigorous we need to know something of the population dynamics of the component species and the way in which the entire community is structured. Food webs are, however, a good place to start. Due to the complexity of ideas introduced here, the lecturer is encouraged to use these slides as a base from which to develop discussion and further work on food webs.

The forest stream food web is based on the paper Henderson, P. A. & Walker, I. 1986. On the leaf litter community of the Amazonian blackwater stream Tarumazinho. *Journal of Tropical Ecology*, 2: 1-17. **A pdf copy of this paper is included on this CD.**

Slide One: Title slide.

Slide Two: By contrasting food webs from these two different systems we can form a better appreciation of how food webs are constructed.

Slide Three: Because the trees shade the water greatly, *in situ* primary production is very limited. The inputs into the system are therefore derived almost entirely from the trees and other forest plants (and occasional dead animals). The important habitats are as shown, typically, animals are found in these inaccessible areas...

Slide Five: ...because they are much more vulnerable when out in the open.

Slide Six: For nearly all taxa, tropical systems are of a higher diversity than temperate systems, and the tropical aquatic leaf litter community is no exception, there are probably many species waiting to be discovered.

Slide Seven: The food web commences with vegetable matter falling into the river.

Slide Eight: Note that the food webs shown here are entirely qualitative, and no attempt has been made to apply figures to these flows, although thicker lines indicate greater energy flow. Also remember that food webs are dynamic entities and energy flows will change according to season and as different species undergo their various life stages. This slide shows the basic form of the web.

Slide Nine: The primary consumers of the forest stream food web.

Slide Ten: The primary consumers are consumed by these species, the secondary consumers.



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Slide Eleven: ...and they, in turn are consumed by these species, the top predators.

Slide Twelve: Contrast this web with that of the forest stream. Note the role of algae, and herbivorous zooplankton. The lower route on this slide, including bacteria and rotifers, has only been recognized in recent years and has enable previously unbalanced energy flows to be finally understood.

Slide Thirteen: The primary producers of open water systems...

Slide Fourteen: ...consumed by these, the primary consumers.

Slide Fifteen: The top end of the web looks like this, with the primary consumers being consumed by larger invertebrates and larval fish, that are, in turn consumed by top predators.

Slide Sixteen: The closing slide illustrates not only that different food web structures may co-exist in the same waters, but also reminds us that, in natural systems, connectivity is all, and that these food webs are connected via certain species to terrestrial food webs.