Description of the ecosystem inside each microcosm

Each patch was composed of six compartments: a detritus compartment (ground straw contained in the medium and organic material released by the wheat seeds), inorganic nutrients (included in the medium and released by the bacteria when decomposing the detritus), decomposers (the bacteria *Serratia fonticola*, *Bacillus subtilis*, and *Brevibacillus brevis*), primary producers (the alga *Euglena gracilis* and the water ciliate *Euplotes aediculatus*), primary consumers feeding on the decomposers, and a secondary consumer (the predatory ciliate *Blepharisma sp.*) feeding on the primary consumers and primary producers. Throughout the paper, we refer to this community of an alga, a rotifer, and nine protists simply as protists.

Diagram

Description automatically generated

Figure M1. (A) S = small patch (7.5 ml), M = medium patch (22.5 ml), L = large patch (37.5 ml), arrows = resource flows, x5 = five replicates. (B) Initial composition of the ecosystem within each of the patches.

* This assumes that when we look at ecosystem function, this is driven only by the dispersal of species. In reality, what we have in an ecosystem is not only dispersal but also many different other things, such as animal movements like foraging (e.g., bear feeding on salmons), seasonal migrations (e.g., snow geese bringing nutrients from productive marshes in southern California to the Canadian arctic), life-cycle migrations (e.g., salmons migrating from the ocean to rivers to spawn and die). This what we call “animal subsidies”. Here cite some papers that show animal subsidies increase ecosystem function. However, not much has been done to understand how ecosystem function changes because of meta-ecosystem dynamics.
* We cannot understand the effects of meta-ecosystems on function without considering patch size. Imagine if we were to consider the effects of a small pond on a large forest and vice versa. We know that bigger patches have more species and tend to be more productive. Furthermore, bigger patches are more resistant to perturbations that kill a fixed number of individuals or affect a fixed area. For example, if we were to disturb one square metre of a really small marsh or of a humongous one, they wouldn’t have the same effect. Therefore, we expect that if an ecosystem is connected to a larger instead of a smaller ecosystem, it will receive more subsidies and have a larger biomass production. This is just because the larger ecosystem is denser in biomass.