

More sample final exam questions

1. We began the semester by considering why changes in the size of organisms have important effects on how organismal needs (e.g., locomotion) may be solved. But is scaling an issue when one considers communities? Given assumptions about what general factors influence species diversity, would you expect species diversity to be higher in communities of SMALL organisms or LARGE organisms? Explain your reasoning.

2. The data below show the results of decomposition studies using “litter bags” of leaves from the Hawaiian endemic *Metrosideros polymorpha* and the invasive exotic shrub *Myrica faya* placed in the litter under their own and each others’ canopies. Describe any patterns you can observe in these data and discuss their relevance for evaluating the community level effects of the invasive species.

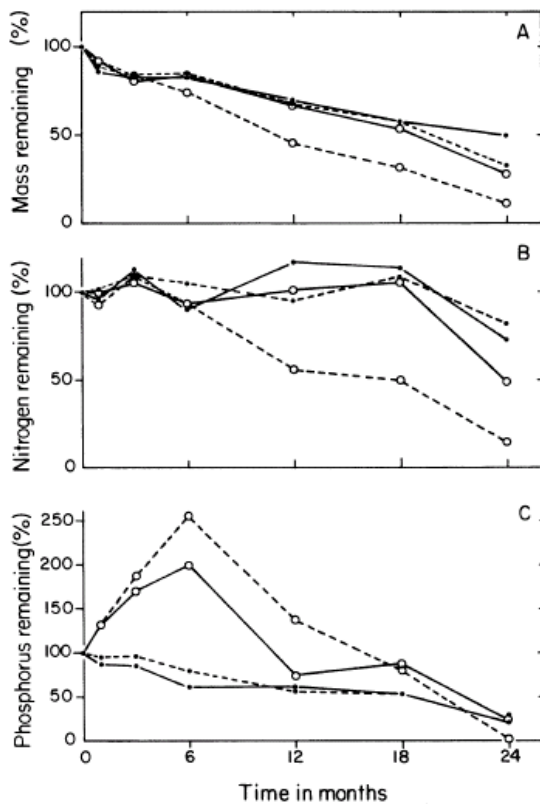


FIG. 5. Decomposition and nutrient release of senescent leaves of *Metrosideros polymorpha* and *Myrica faya* under their own and each others' canopies in the UB site, Hawaii Volcanoes National Park. The initial chemical quality of the leaves is summarized in Table 8 and in Results: Decomposition and nutrient release. ●: *Metrosideros* leaves; ○: *Myrica* leaves. —: leaves of either species under *Metrosideros* canopies; ---: those under *Myrica* canopies. (A) Percent of original mass remaining. (B) Percent of original nitrogen content remaining. (C) Percent of the original phosphorus content remaining.

3. Nitrogen and phosphorus have been shown to be limiting nutrients in many ecosystems. Using your knowledge of molecular and cell biology and the biogeochemical cycles of these elements, explain why this is not surprising.

4. We have examined the results of several experiments that demonstrated that annual spring fire has variable effects on plant and animal species and on ecosystem processes. Since the latter depend on microbial activity, it is interesting to ask whether fire frequency affects community structure of these important organisms. Describe and justify your hypothesis of how annual fire should influence *species diversity* of bacteria. Describe the sampling, data gathering and analysis protocols you would use to test your hypothesis using CERA's experimental burn plots. Assume that you have developed Magic Microbe Media™, which allows each species of bacteria to be visually discriminated from other species by growing colonies on the media in a Petri dish.

5. Describe one of the reasons given by Mary Power to explain why steelhead fish have strong top-down effects on the boulder but NOT on the gravel communities in the streams she studied.