Biodiversity Holds the Key to Sustainable Biofuel Production

According to a recent study by American scientists, ecosystems containing a greater number of plant species, produce more biomass. This result suggests that biodiversity holds the key to producing a sustainable supply of biomass for biofuel. Furthermore, ecosystems with a higher biodiversity are more stable and are therefore able to recover more easily from climate extremes, pests and disease over long periods of time.

It has been reported that global biodiversity has decreased during the last centuries due to human activity. As the global population has increased, so forests and prairies have been cleared to meet the increasing demand for land for farmland planted with monocultures, buildings and roads. For more than 50 years, scientists have hypothesized that greater ecological diversity (diversity of plant and animal species) leads to a greater stability of the ecosystem that sustains it. To date, the only study to test such a theory lasted only 8 weeks and obtained mixed results.

A recent, well-designed study by American researchers, the longest of its type to date, has confirmed the diversity-stability theory. This study, resulting from 12 years of experiments, consisted in a long-term grassland biodiversity experiment that established 168 plots of land, each of which was randomly planted with 1 to 16 perennial prairie plant species.

The authors found that the year-to-year stability of the ecosystem was significantly greater at higher plant diversity levels and tended to increase as systems matured. Ecosystem stability was also positively dependant on root mass. The time period of the study allowed researchers to evaluate the average net effects of diversity on resistance to and recovery from year-to-year climate change, pests, disease and other disturbances. The more stable the ecosystem, the greater its capacity to maintain its productivity despite climatic variation and other disturbances.

Furthermore, the results of the study showed that ecosystems containing many different plant species are more productive than those containing only one of those species. In particular, diverse prairie grasslands were found to be more than 200 percent more productive than grasslands with a single prairie species. Thus, it could be more productive to grow many species together because such plantations will yield more total vegetation and do it more reliably than monocultures. These results suggest that the best source of biomass for the production of biofuels could be fields with a high diversity of plant species.

The current study suggests that biodiversity can be used to produce a sustainable supply of biomass for biofuels. Fields with high diversity may allow us to produce biofuels with low inputs, and this means that it may be possible to get more energy from a hectare of land. Consequently, biomass from diverse prairies can be used to make biofuels without the need for annual tilling, fertilizers and pesticides, which require energy and pollute the environment. Therefore, promoting field biodiversity may be a key to both meeting increasing energy demand and to restoring global ecosystems.

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