Perspective Article

iMedPub Journals
www.imedpub.com

Annals of Biological Sciences
ISSN 2348-1927

2023
Vol.11 No.1:73

Contribution of Biodiversity to Various Ecosystem Benefits

Hoyama Darsong*

Department of Biological Sciences, University of Hong Kong, Hong Kong

Corresponding author: Hoyama Darsong, Department of Biological Sciences, University of Hong Kong, Hong Kong, E-mail: hoyamadar2@gmail.com

Received date: January 10, 2023, Manuscript No. ABS-23-16025; **Editor assigned date:** January 12, 2023, PreQC No. ABS-23-16025 (PQ); **Reviewed date:** January 26, 2023, QC No. ABS-23-16025; **Revised date:** February 09, 2023, Manuscript No. ABS-23-16025 (R); **Published date:** February 16, 2023, DOI: 10.36648/2348-1927.11.1.73

Citation: Darsong H (2023) Contribution of Biodiversity to Various Ecosystem Benefits. Ann Bio Sci Vol.11 No.1:73

Description

Biodiversity is one of the most valuable aspects of the earth. The greater the number of different species, varieties, breeds, and genetic variability, the richer is our living environment. The number of plant species per square meter indicates more micro sites, provides stability to the ecosystem, and guarantees several ecosystem benefits. Therefore, it is obvious that plant communities with higher biodiversity have higher spatial stability. There are numerous studies describing how cessation of traditional land management practices has reduced species richness of grassland communities. Many authors have also shown how grazing and mowing can have different effect on species richness in general or to specific communities and species. Grassland plant species vary by their environmental preferences and therefore useful tools like Ellenberg indicator values are established to interpret patterns of commonness and rarity on local flora. Today, it is becoming increasingly clear that traditional nature conservation, which focuses on protected areas where human activity is kept to a minimum, will be unable to achieve its goal of ensuring the conservation of species, habitats and thus, the benefits of nature that have evolved together with humans on semi natural grasslands, so it is imperative to deepen the knowledge required to promote diversity and stability on over as large an agricultural area as possible.

Semi-Natural Grasslands

The pros and contras of land-sparing and land sharing approaches have been discussed in details over the past 20 years and it is important to keep in mind that these two approaches may have severe disparities between in-situ and ex-situ ecosystem services benefits. Extensively managed semi-natural grasslands are some of the most species-rich biotopes in the boreal region with exceptionally high small-scale species densities. These habitats provide us with many ES of all three types: providing, regulating, and cultural. Primary production, pollination, biodiversity, and soil formation are the most important among these. Provisioning services include food, fresh water, fibre, and bioenergy, as well as medicinal and ornamental plants, a genetic library, and a habitat for animals and plants. Grasslands provide numerous regulating services, including climate regulation, carbon sequestration, erosion control, water regulation, air quality regulation, soil formation, pest control, waste treatment, and pollination services. Cultural services of grasslands include horse riding, bird watching, aesthetic appreciation, cultural heritage, pastoral farming, eco-tourism, etc. Grassland ecosystems also have important an educational and scientific value thanks to their unique biodiversity and many rare plants, animal, and insect species. Grassland-based production in the boreal region, with ruminant livestock, is the backbone of agricultural land use. Until today semi-natural grasslands have held a largely marginal role in fodder production and farm economics in boreal Europe, despite being immensely important for the biodiversity. In Estonia, the main reason for not using much of the potential of semi-natural habitats is attributed to conservational restrictions - it is allowed to make hay on these grasslands only after mid-July when the forage quality has fallen. The importance of quality meat production on traditional rural biotope that includes also semi-natural grasslands is growing. Across Europe, TRBs also provide a multitude of non-agricultural ES such as cultural heritage and scenic beauty. From an ecological perspective, understanding ES provision requires a focus on the interactions between biodiversity and ecosystem function, as plant species number is the simplest and the longest exploited quantitative parameter in grassland evaluation. Biodiversity change is often accompanied by shifts in the functional composition of the vegetation and further alters numerous ecosystem functions and services. The contribution of biodiversity to various ecosystem benefits, however, remains theoretically unclear and empirically challenging to quantify. For example, it has been demonstrated that blossom density was more important than plant species richness in explaining the number of flower visitors and pollination. Some researchers have found that the abundance of common species, as opposed to species richness, drove the delivery of pollination services. Species diversity in grasslands enhanced the production of fodder but had mixed effects or even contrary expectations on many other services. A recent meta-analysis concluded that the relationship between biodiversity and ES in grasslands needs further studies.To predict the impact of high plant biodiversity on local biomass productivity, one could commence with well-studied richness-productivity models that are provided to cover different plant community types around the world. According to meta-analysis, the majority of them report the highest biodiversity to be recorded at intermediate levels of productivity indicating unimodal relation. High plant biodiversity in these models is usually associated with a diversity of plant functional traits and

life-history strategies and the lower values in extremely high or low biomass productivity sites are restricted due to local species pool size or environmental conditions. Soil edaphic conditions and competition for light are found to be crucial among the latter. In arid conditions, the species richness/productivity relation is also explained with “more individuals’ hypotheses” that associate the high productivity with more individuals. There are studies available demonstrating that in dry and winter-cool climates grassland species richness decline started with lower productivity than in more productive temperate grasslands. There are also reports available about the hump-shaped species richness-productivity relation among sites of specific wetland communities, but fewer studies have analysed the relations of these two parameters inside any mainland (semi)natural plant community.

Grassland Biomass Quality

In several experimental trials, plots with various plant assemblies are observed for a long period and positive correlations between plant biodiversity and biomass productivity are detected. In these cases, it is assumed that it is not just the productivity of a plant community that could derive benefits from higher biodiversity; in fact, functional biodiversity and resistance to plant community pathogens or potential invasive species can also be benefitted. However, these studies do not consider natural species pool size, and life-history strategies, or reflect the total potential variability of growing conditions inside a habitat. For instance, both the limitation and extra supply of N may diminish plant species number. Therefore, selecting a reasonable set of study sites is a complicated process. In European Union, fortunately, the application of such a study is supported by NATURA2000, which has created a rational dataset for grasslands' short-term history and limits the management options - in any NATURA2000 grassland ploughing, sowing or fertilising is forbidden: at the same time, extensive grassland management *via* grazing or mowing is subsidised. It is well known that the consumption of biomass from semi-natural grasslands in terms of forage is limited by its quality rather than yield in many cases or by some plant species with specific characteristics that could have a severe impact on total grassland biomass quality. In extensive semi-natural systems, where grazing livestock is totally dependent on the local herbage without supplementation, there is a risk of shortage in minerals leading to animal nutritional disorders and health problems. However, some reports suggest that the quality of forage from semi-natural grasslands may benefit the ruminant nutrition system. Furthermore, it has been theoretically demonstrated that plant diversity may substantially increase fodder quality-adjusted yield and revenues and that semi-natural grasslands with high biodiversity may contribute significantly to food security or other bio-based products for sustainable bioeconomy. The chemical composition of semi-natural grassland biomass varies by its species and functional group composition. In general, monocotyledons contain more hemicellulose and less lignin than legumes and other forbs. The content of proteins and nitrogen, by contrast, is higher in dicotyledonous. The concentration of Ca, Mg is found to be lower in monocotyledons than dicotyledonous. Typically, ash content is associated with the concentration of minerals in plant organs and therefore;dicotyledonous plants tend to contain more ash than monocotyledonous plants. The current study aimed to analyse the plant biodiversity variability in Estonian semi-natural grasslands. In order to get more than one data sets to our study we selected two grassland types that differ from each other mainly by bedrock and summer water availability, but not much in average species number per area. We wanted to know 1) how the number of plant species correlates with local biomass productivity and 2) whether or not high biodiversity has any impact on biomass quality in terms of fodder or other bioeconomy products. We also searched for 3) indicator species for high plant diversity and examined, if the plant species that are more recorded on sites with high plant species numbers, are more endangered or have any other specific growing condition requirements.