



Harnessing nature's green magic: Exploring the best plants for carbon sequestration

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Introduction. In the battle against climate change, carbon sequestration has emerged as a crucial strategy for mitigating the impacts of greenhouse gas emissions (Petrescu-Mag 2023). While technological innovations play a significant role, nature has provided us with a powerful ally in the form of plants. Through photosynthesis, plants absorb carbon dioxide from the atmosphere, converting it into organic matter and releasing oxygen. Some plants excel in this process, making them invaluable allies in our quest to combat climate change (Petrescu-Mag & Gavriloaie 2022). This essay explores some of the best plants for carbon sequestration and their potential applications in addressing the global carbon crisis.

Trees. Trees are the superheroes of carbon sequestration. Their large size and longevity make them highly effective at storing carbon over the long term (Domke et al 2020; Havu et al 2022). Species such as oak, pine, and spruce are particularly efficient at sequestering carbon due to their dense wood and extensive root systems. Additionally, tropical rainforests, such as the Amazon, store vast amounts of carbon, making their preservation crucial in global climate efforts.

Grasses and Bamboo. Grasslands and bamboo forests also play a significant role in carbon sequestration (Devi & Singh 2021). Grasses have deep root systems that can store carbon in the soil for extended periods (Bai & Cotrufo 2022). Bamboo, known for its rapid growth rate, absorbs carbon dioxide at a much faster pace than many tree species. Furthermore, bamboo's versatility in various industries, such as construction and textiles, presents opportunities for carbon-neutral products.

Seagrasses and Mangroves. Underwater ecosystems, including seagrasses and mangroves, are vital carbon sinks. Seagrasses capture and store carbon in their roots and sediments (Wesselmann et al 2021), while mangroves sequester carbon both above and below the waterline (Kusumaningtyas et al 2022). Protecting and restoring these coastal habitats is essential not only for biodiversity but also for their role in mitigating climate change.

Algae and Phytoplankton. Often overlooked, marine algae and phytoplankton are incredibly efficient at sequestering carbon through photosynthesis. These microscopic organisms are the foundation of marine food webs and play a crucial role in regulating the Earth's climate. Research into enhancing algae growth and utilizing it for biofuel production shows promise in carbon capture and storage technologies (Sarwer et al 2022).

Agroforestry and Perennial Crops. Agroforestry practices integrate trees and shrubs into agricultural landscapes, providing multiple benefits, including carbon sequestration (Petrescu-Mag et al 2023). Additionally, perennial crops such as switchgrass and perennial grains offer opportunities for sustainable agriculture while sequestering carbon in their root systems and soil.

Conclusions. In the face of climate change, harnessing the power of plants for carbon sequestration is a critical strategy. From towering trees to microscopic algae, diverse plant species offer unique solutions for capturing and storing carbon dioxide. By prioritizing conservation, reforestation, and sustainable land management practices, we can maximize the potential of these green allies in combating climate change. Embracing nature's green magic is not only essential but also offers hope for a more sustainable and resilient future.

Conflict of Interest. The author declares that there is no conflict of interest.

References

- Bai Y., Cotrufo M. F., 2022 Grassland soil carbon sequestration: Current understanding, challenges, and solutions. *Science* 377(6606):603-608.
- Devi A. S., Singh K. S., 2021 Carbon storage and sequestration potential in aboveground biomass of bamboos in North East India. *Scientific Reports* 11(1):837.
- Domke G. M., Oswalt S. N., Walters B. F., Morin R. S., 2020 Tree planting has the potential to increase carbon sequestration capacity of forests in the United States. *Proceedings of the National Academy of Sciences* 117(40):24649-24651.
- Havu M., Kulmala L., Kolari P., Vesala T., Riikonen A., Järvi L., 2022 Carbon sequestration potential of street tree plantings in Helsinki. *Biogeosciences* 19(8):2121-2143.
- Kusumaningtyas M. A., Kepel T. L., Solihuddin T., Lubis A. A., Putra A. D. P., Sugiharto U., et al, 2022 Carbon sequestration potential in the rehabilitated mangroves in Indonesia. *Ecological Research* 37(1):80-91.
- Petrescu-Mag I. V., 2023 Current trends and concerns in environmental science. *AES Bioflux* 15(1):20-21.
- Petrescu-Mag I. V., Gavriloiu C., 2022 Carbon sequestration: the non-utopian version of achieving climate neutrality. *AES Bioflux* 14(2):62-63.
- Petrescu-Mag R. M., Petrescu D. C., Muntean O. L., Petrescu-Mag I. V., Radu Tenter A., Azadi H., 2022 The nexus of traditional knowledge and climate change adaptation: Romanian farmers' behavior towards landraces. *Local Environment* 27(2):229-250.
- Sarwer A., Hamed S. M., Osman A. I., Jamil F., Al-Muhtaseb A. A. H., Alhajeri N. S., Rooney D. W., 2022 Algal biomass valorization for biofuel production and carbon sequestration: a review. *Environmental Chemistry Letters* 20(5):2797-2851.
- Wesselmann M., Geraldi N. R., Duarte C. M., Garcia-Orellana J., Díaz-Rúa R., Arias-Ortiz A., Hendriks I. E., Apostolaki E. T., Marba N., 2021 Seagrass (*Halophila stipulacea*) invasion enhances carbon sequestration in the Mediterranean Sea. *Global Change Biology* 27(11):2592-2607.

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