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Agroforestry and Biodiversity

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Abstract

Declining biodiversity (BD) is aecting food security, agricultural sustainability,and environmental quality. Agroforestry (AF) is recognized as a possible partial solution forBD conservation and improvement. This manuscript uses published peer-reviewed manuscripts,reviews, meta-analysis, and federal and state agency documents to evaluate relationships betweenAF and BD and how AF can be used to conserve BD. The review revealed that floral, faunal, and soilmicrobial diversity were significantly greater in AF as compared to monocropping, adjacent croplands, and within crop alleys and some forests. Among the soil organisms, arbuscular mycorrhizaefungi (AMF), bacteria, and enzyme activities were significantly greater in AF than crop and livestockpractices. Agroforestry also creates spatially concentrated high-density BD near trees due to favorablesoil-plant-water-microclimate conditions. The greater BD was attributed to heterogeneous vegetation,organic carbon, microclimate, soil conditions, and spatial distribution of trees. Dierences in BDbetween AF and other management types diminished with time. Evenly distributed leaves, litter,roots, dead/live biological material, and microclimate improve soil and microclimate in adjacentcrop and pasture areas as the system matures. Results of the study prove that integration of AFcan improve BD in agricultural lands. Selection of site suitable tree/shrub/grass-crop combinationscan be used to help address soil nutrient deficiencies or environmental conditions. Future studieswith standardized management protocols may be needed for all regions to further strengthen thesefindings and to develop AF establishment criteria for BD conservation and agricultural sustainability.

Keywords: agroforestry, biodiversity conservation, floral diversity, animal biodiversity, soil microbial diver

Full text

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