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ROLE OF ALLEY CROPPING SYSTEM WITH CULTIVATED TITHONIA (TITHONIA DIVERSIFOLIA) ON SOIL EROSION AND SOYBEAN (GLYCINE MAX MERR L) PRODUCTION AT ULTISOL UNDER WET TROPICAL AREA

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Abstract

Alley cropping is an alternative way to reduce erosion in cultivated sloping area. Tithonia, as a kind of green manure, can be used as alley fence due to its good growth and high nutrient content. The objective of this research was to study the role of cultivated tithonia as an alley fence in reducing erosion and providing nutrients especially N, P, K for soybean production at sloping area in poor Ultisol under wet tropical region. Tithonia used for this research was derived from cultivated tithonia which were introduced with some types of microorganisms. There were 6 treatments, those were: A= without alley fence, B= Tithonia without microbe reinoculation, C= Tithonia was reinoculated with Mycorrhizae + Azospirillum + Azotobacter, D=Tithonia was reinoculated with Mycorrhizae + phosphate dissolving fungi (PDF), E= Tithonia was reinoculated with micorhyza + phosphate dissolving bacteria (PDB), F=Tithonia was reinoculated with Mycorrhizae+PDF+PDB. Parameters analyzed were soil physical and chemical properties, soil runoff, erosion, as well as plant nutrients within eroded soil. And then, the dry matter and the nutrient (N, P, and K) content of the tithonia were also measured. The data resulted showed that soybean plots having tithonia as the alley fence could significantly reduce soil erosion by 46-72% and runoff by 8-27% as found at treatment E (tithonia reinoculate with mycorrhizae+PDF) compared to that without alley fence. Reinoculated tithonia decreased runoff and soil erosion by 11-21% and 15-48%, respectively compared to tithonia without bioagents. The highest amount of nutrients (N, P, and K) contributed by tithonia were generally found under D (Tithonia reinoculated with mycorrhizae and PDF), which was 22,750; 993; 168; and 1,052 kg/ha for dry matter, total-N, -P, and -K, respectively. Soybean yields from the plots supplied with reinoculated tithonia tended to be higher than that without reinoculation. However, production of soybean was still higher under control plot (100% synthetic fertilizer application) for the 1st planting time.

Author Keywords

Alley cropping, Erosion, Soybean, Tithonia diversifolia, Ultisol, Wet tropical area

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