

Effects of Perennial Fodder Crops on Disintegration of Gravels in Partially Weathered Basaltic Gravelly Land

Rajagopal V*, Y. Singh, G.C. Wakchaure, S.K. Bal, P.B. Taware, K.K. Krishnani and J. Rane

ICAR- National Institute of Abiotic Stress Management, Baramati, Pune-413115 Maharashtra

E-mail rgpsac@gmail.com

Abstract—Livestock is very much essential for the sustainability of farm income in the rainfed agro-ecosystems. This depends on availability of sufficient fodder. Generally, marginal lands are spared for the fodder crops as the most favourable land are used for the important crops. The large tract of partially weathered shallow land under rain shadow areas left uncultivated as they are rich in gravels. The gravels limit the spread of roots and affect the biomass production. However, the temporal dynamics of land attributes such as rate of gravels break down and change in soil properties and effect on biomass productivity over this region have not yet been studied. Hence, we tested a hypothesis that perennial grass can improve soil properties of gravelly land. In this regard, a detailed study was planned by raising locally adapted fodder crops such as napier, stylo, marvel-stylo intercrop and marvel at research farm of ICAR-National Institute of Abiotic Stress Management in Pune, Maharashtra, India. In order to study the disintegration of gravels, representative soil samples in large quantities were annually collected from the surface as well as subsurface for four consecutive years i.e. 2012-13, 2013-14, 2014-15 and 2015-16. Initially, on weight basis, the gravelly land had 21-22% of small particles of less than 2 mm and the remaining particles of different sizes were considered as large gravel particles. The fodder crops cultivation disintegrated gravels both in surface and sub-surface depth and the disintegration rate was high in the surface land. Rate of disintegration gradually decreased in the subsequent years. Napier grass could disintegrate more rapidly (79.6% to 62.9%) than stylo (79.5 to 68%) or marvel grass (79.5 to 74%) in three years while gravel disintegration remained almost unchanged (77%) in native fallow land. The gravel disintegration rate was high from fine gravels than that of medium and coarse gravels. The fodder crops cultivation enhanced the gravel designation by about four fold relative to the same in native fallow land during the three years. This was further supported by rate of increase in above as well as below ground biomass over the years. Over all, the napier grass found more effective for gravel disintegration as well as good amount of biomass on the gravelly land.

Keywords: Fodder crops, gravel dynamics, soil production, biomass production