

# Cover Crop Management Effects on Soil C and N pool and Fresh-Market Tomato Yield

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### Abstract

Depending on management, cover crops may improve soil and environmental quality and tomato yield. We evaluated the effects of hairy vetch residue management and the biculture of hairy vetch (*Vicia villosa* R.) and rye (*Secale cereale* L.) on soil organic carbon (SOC), microbial biomass nitrogen (MBN), soil inorganic nitrogen, and tomato yield for two years in a plastic high tunnel in Sapporo, Japan. SOC in the surface 10 cm depth was 2.87% to 17.5% significantly greater in hairy vetch incorporation, hairy vetch mulch, and the biculture of hairy vetch and rye treatments, than in a no cover crop treatment (bare fallow). Residual soil nitrate-N, subject to leaching losses after winter, was increased by cover crops, more so by hairy vetch incorporation and mulch than the biculture. MBN and inorganic N ( $\text{NO}_3^- + \text{NH}_4^+$ ) were greater in hairy vetch incorporation than either hairy vetch mulch or biculture. Tomato total yield was 11.1% to 43.8% significantly greater in hairy vetch incorporation and mulch than in the bare fallow. However, the effects of the biculture on MBN, inorganic N, and tomato yield varied with C/N ratio of residues and best results were obtained with a C/N ratio of 17.6 than with 23.7. Therefore, if adequate seeding hairy vetch to rye ratio (2:1) is used, the biculture is a better management practice to increase SOC at surface soil layer and tomato yield with least residual N.

### Biography

Rafael Muchanga is a faculty of Agronomic Engineering and Forestry at University of Zambeze, Mozambique. He has published various articles in international journals with citation over 25.

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