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Effect of tillage system and nutrients on growth, yield on snake gourd and residual soil fertility under rice fallow condition

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ABSTRACT

An investigation was carried out in the Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalainagar, Tamil Nadu during the year 2005-06 to asses the performance of snake gourd for different tillage practices and nutrients under rice fallow condition. The treatments followed were zero tillage, minimum (conservative) tillage and normal tillage with organic manures of FYM (25 t ha^{-1}), inorganic fertilizers of NPK (60:50:40) in combination with Vermiwash (1:5) dilution, Panchakavya (3%) and humicacid (0.2%). Normal cultural practices were also adopted for check. The biometric observations *viz.*, vine length, number of laterals per plant, number of leaves per plant, leaf area, leaf area index, chlorophyll content, relative growth rate, photosynthetic rate, dry matter production, number of male and female flowers per plant, fruit yield (t ha^{-1}) and post harvest soil available nutrients NPK (kg ha^{-1}) were recorded for each treatment along with economics of cultivation. The results revealed that the treatment combination of normal tillage + 25t ha^{1} of FYM with recommended dose of inorganic fertilizers (60:50:40 kg NPK ha^{-1}) + foliar application of vermiwash (1:5 dilution) T_{10} was found to be the best with a total yield of 19.21 t ha^{1} and a benefit cost ratio of 3.76 which was *at par* with the treatment combination receiving conservative (minimum) tillage + 25 t ha^{-1} of FYM with recommended dose of inorganic fertilizers (60:50:40 kg NPK ha^{-1}) + foliar application of Vermiwash (1:5dilution) recorded a total yield of 19.06 t ha^{-1} and more benefit cost ratio of 4.14.

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The assumption of farmers and researchers that ploughing is essential for successful cropping has been revised in recent decades. Minimum (conservative) tillage has gained importance due to the need in reduction of production costs. Benefits of crop rotation and usage of organic manures in conservation tillage are widely recognized (Halvorson *et al.*, 2002a., Katsvairo *et al.*, 2002). No-till cultivation or zero tillage or their modified version conservation agriculture have been proving beneficial for farmers net income and for the environment. More than 30 per cent of the cropped area is now under some form of reduced till or no till in the heart land of large scale mechanized tillage of the USA and globally more than 70 million hectares are cultivated according to conservation agriculture (Norman Uphoff, 2006). Minimum (conservation) tillage practices considerably improve soil physical and chemical properties under rice fallow cultivation except from its advantage in reducing the cost of cultivation (Harnanz *et al.*, (2002) Shaver *et al.* (2002) and Karuppaiah and Kathiravan, (2006). Zero tillage was found to reduce labour time by 3-5 hours per 10 ha and reduce the damage from weeds and pests. Crop rotation and organic manures utility are the integral component of successful conservation tillage. Vermiwash a liquid fertilizer collected after the passage of water through a column of warm activation and is applied to crop as organic foliar nutrition to boost crop growth (Pramoth, 1995). Humic acid which is the constituent from various organic sources like matured compost, lignite etc., (Schnitzer, 1991). Panchakavya, an organic solution was found to be the best in enhancing efficiency of crop plant (Natarajan, 2002). Rice based crop rotations have assumed paramount importance to meet the dietary habits of 42 per cent population of India and showed 3.5 per cent increase in area in the past two decades. In an area of 4,500 ha, the rice – vegetable system was popular because of nearness to the market and good price for vegetables (Nanda *et al.*, 1999), But, the major constraints faced by the farmers following the rice fallow cultivation of vegetables are the requirement of more nutrients and costs for field preparation. (Karuppaiah and Kathiravan, 2006). Reduced tillage and application of appropriate organic manures can play a significant role in reducing the above said problem. Taking into consideration of all these aspects, a study was formulated to minimize the