

Abstract

An understanding of the contribution of manure applications to global atmospheric N₂O loading is needed to evaluate agriculture's contribution to the global warming process. Two field experiments were carried out at Dufuya wetland (19°17'S; 29°21'E, 1260 m above sea level) to determine the effects of single and split manure applications on emissions of N₂O from soil during the growing seasons of two rape and two tomato crops. Two field experiments were established. In the first experiment the manure was applied in three levels of 0, 15, and 30 Mg ha⁻¹ as a single application just before planting of the first tomato crop. In the second experiment the 15 and 30 Mg ha⁻¹ manure application rates were divided into four split applications of 3.75 and 7.5 Mg ha⁻¹ respectively, for each of the four cropping events. Single applications of 15 and 30 Mg ha⁻¹ manure once in four cropping events had higher emissions of N₂O than those recorded on plots that received split applications of 3.75 and 7.5 Mg ha⁻¹ manure at least up to the second test crop. Thereafter N₂O emissions on plots subjected to split applications of manure were higher or equal to those recorded in plots that received single basal applications of 30 Mg ha⁻¹ applied a week before planting the first crop. Seasonal split applications of manure to wetland vegetable crops can reduce emissions of N₂O at least up to the second seasonal split application.