

Management Strategies and Practices for Preventing Nutrient Deficiencies in Organic Crop Production

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Field experiments are underway in Canada to determine the influence of management practices (input level, crop diversity, green manure, fallow, legume) and amendments (*Penicillium bilaiae*, rock phosphate, elemental S, gypsum, manure, wood ash) on crop yield. In the cropping systems study established in 1995, crop yields for organic system without any chemical input were 30-40% lower than the conventional system with high inputs. But, lower input costs plus price premiums for organic produce normally more than offset lower yields, resulting in favourable economic performance and energy efficiency. Legume, green manure, fallow and manure helped to replace nutrients lacking in the soil and improved crop yields. In the organic system, amount of P removed in crop exceeded that of P replaced and this can be a major yield limiting factor. In amendments experiments, there was small effect of granular rock phosphate fertilizer and/or *Penicillium bilaiae* in increasing soil P level and crop yield in the application year. Other findings suggested the use of elemental S fertilizer, gypsum, manure or wood ash to improve nutrient availability, and yield and quality of produce. In conclusion, the findings suggest that integrated use of management practices and amendments has the potential to increase sustainability of crop production and net returns to producers as well as improve soil quality and prevent soil erosion by returning more crop residues to the soil plus minimize environmental damage of nitrate-N (leaching to ground water and nitrous oxide emissions) by leaving less residual nitrate-N in the soil. In the short as well as long term, economic outlook for organic systems remains very promising, provided there is a sufficiently large organic price premium, and nutrients and weeds are managed effectively.