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Determining Nutrient Availabilty in Gallatin Valley Organic Systems Through Comprehensive Soil Testing

Our projects investigated the effects of different forms of organic matter and the effects of production intensity on plant available nitrogen in two separate agricultural operations in the Gallatin Valley; a research experiment located in Townes Harvest Garden and a commercially operative organic vegetable farm, Field Day Farm. In order to determine plant available nitrogen levels among different soil treatment plots and cropping areas on these farms, we cultivated annual ryegrass in greenhouse pots using soil composites collected from different treatments. The ryegrass pots were maintained for 8 weeks, at which time cuttings of biomass from each composite were taken and analyzed to determine nitrogen content within plant tissues. We compared our bioassay results to traditional laboratory analyses for KCl-extracted nitrate. The methods being performed were modeled after Liu, et al. (2011). The results from soil analysis show that the hay mulch provided the most plant available nitrogen, followed by the nitrogen mineral fertilizer treatment, the control, and the barley straw mulch. We will compare tissue nitrogen levels from the greenhouse assay to our soil results. Overall, understanding nitrogen uptake could provide information useful to farmers who are trying to maximize crop yield while lowering soil inputs.