Pumpkin Yield and Disease Response to Amending Soil with Silicon. (S04-heckman143045-Poster)

Authors:

- J.R.Heckman* *Rutgers University*
- S.A.Johnston Rutgers University
- W.P.Cowgill Rutgers University

Abstract:

Field experiments were conducted with Cucurbita pepo L. 'Howden' pumpkin in 2000 to 2001 to study the effect of silicon (Si) amendment of soil on yield and powdery mildew suppression. A Quakertown silt loam soil (fine-loamy, mixed, mesic Typic Hapludult) with an initial soil pH of 5.7 was amended with either calcium carbonate or calcium silicate at the rate of 7840 kg/ha of calcium carbonate equivalent. Fungicides were applied on a 7-10 day schedule to half of the plots as a 2x2 factorial, beginning when the first powdery mildew lesions were detected in the field. Silicon amendment increased pumpkin yield by 60% in 2000 but Si did not influence yield in 2001. Infection with bacterial leaf spot reduced yield on all plots in 2001. Fungicide applications increased yield only in 2001. In 2000, Si amendment had the effect of delaying foliage senescence but it was not clear if this was the result of an effect of Si on disease activity or crop physiology. In August 2001, Si amendment generally reduced powdery mildew severity, but only at the 10% level of significance. In September 2001, the combination of Si amendment plus fungicide application was more effective in reducing powdery mildew severity than either Si or fungicide alone. Silicon amendment resulted in a 5fold increase in plant Si concentration. Soil pH measured after harvest in 2001 indicated no significant difference in pH between plots amended with calcium carbonate (pH=6.8) and calcium silicate (pH=6.9). In New Jersey, the cost of these liming materials is similar. Thus, the selection of calcium silicate as a liming material as needed for soil pH correction has the potential benefits of suppressing powdery mildew and increasing pumpkin yield without increasing the cost of production.

Corresponding Author Information:

Joseph Heckman Rutgers University 59 Dudley Rd. phone: 732-932-9711 fax: 732-932-9441 e-mail: heckman@aesop.rutgers.edu New Brunswick, NJ 08901 USA

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