

Development and Validation of a Fixed-Precision Sampling Plan for Estimating Striped Cucumber Beetle (Coleoptera: Chrysomelidae) Density in Cucurbits

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ABSTRACT. Striped cucumber beetle, *Acalymma vittatum* (F.), has been identified as one of the most damaging insect pests of vegetables in Minnesota. In an effort to develop practical methods for estimating adult beetle density, beetles were sampled in cucurbit fields throughout central and southern Minnesota during 1994-1995. *A. vittatum* samples were collected in several cucurbit crops including: cucumber, pumpkin, and squash. A sample unit consisted of seven consecutive plants within a row. Beetle counts were recorded for each of the seven plants in a sample unit and the sample size consisted of a total of 48 sample units in each field. Counts from individual plants in a sample unit were combined to evaluate progressively larger sample units of one, two,...seven consecutive plants. An enumerative fixed-precision sampling plan was developed based on Green's method and Taylor's Power Law. Performance of the plan was validated using bootstrap (resampling) simulations and nine independent data sets. Final analysis indicated that a sample unit of two consecutive plants provided the highest relative net precision (RNP) for estimating *A. vittatum* adult density. On average, over a range of densities, 30, 2-plant sample units per field were necessary to maintain the desired precision (SEM/\bar{x}) level of 0.25. This plan should aid further research on *A. vittatum* population dynamics, the yield-density relationship, or the correlation between density and incidence of bacterial wilt. This plan can also be used in tandem with recently developed economic thresholds for pest management decision making.

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