

[Home](#) » [Volume 3 / 1999](#) »

Remote Sensing, Line-intercept Sampling for Tarnished Plant Bugs (Heteroptera: Miridae) in Mid-south Cotton

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An accurate estimate of tarnished plant bug (*Lygus lineolaris* [P. de B.]) densities is necessary to achieve optimal pest control in cotton (*Gossypium hirsutum* L.) production. This research was conducted to create a sampling protocol for use in commercial cotton fields that would provide estimates of population abundance even at sparse densities. The protocol uses a modified line-intercept sample design, multispectral remote sensing imagery, and a drop cloth. Samples were collected from a belt transect line positioned at right angles to the row direction. Information was collected from drop cloth samples arranged as a series of at least eight adjacent units along the transect line. High-resolution multispectral remote sensing imagery assisted in the delineation of different sampling strata in a large cotton field. Various sample sites within these strata were selected and the plant bug density was estimated for each site. The novel sampling methodology detected a spatial distribution in tarnished plant bug abundance that corresponded to different phenological states (strata) of the crop as measured by remote sensing. Examples based on information collected from a large Mississippi Delta cotton field during 1997 illustrate major concepts and overall application of the integrated sampling scheme. The integrated sampling methodology can detect extremely sparse densities of tarnished plant bug nymphs and teneral adults. Remote sensing is an efficient technique that delineates sampling strata in large fields of cotton without excessive labor costs. The technique is best employed between the time of square initiation and canopy closure.