A COMPARISON OF EMERGENCE OF OVERWINTERED BOLL WEEVIL POPULATIONS IN NE ARKANSAS USING GIS

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Abstract

Overwintering mortality and spring emergence of the cotton boll weevil (*Anthonomus grandis*) are known to be variable and difficult to predict. A trapping system in four northeastern Arkansas county sites was established to determine areas and times of peak boll weevil emergence during the spring of 1994 and 1995. The trapping sites covered an area of 32,794 acres in 4 counties and contained a total of 921 boll weevil traps. The traps were sampled approximately every 14 days beginning in mid to late April and ending in late June. The average number of boll weevils trapped in both years was variable and ranged from 2.3 weevils trapped in a two week period ending on April 18, 1994 in Lonoke County to 85.9 boll weevils trapped during a two week period ending on May 23, 1995 in Craighead County. The skewness value for each sampling date ranged from 0.95 to 9.57. The high skewness values serve as an indicator of the large variability of the trapped boll weevil population due to different trapping environments. The greatest number of boll weevils trapped occurred in traps located adjacent to areas recognized as forests from satellite data and areas with high leaf litter accumulation. Overall, the average trapped boll weevil population was up to 12 times higher in the spring of 1995 as compared to the spring of 1994. The increase in trapped boll weevils in the 1995 trapping season is thought to be due to less severe winter weather conditions in the cold weather months of 1994 and 1995 as compared to the same time period in 1993 and 1994. Air temperatures were obtained from a National Oceanographic and Atmospheric Association weather station located at Keiser, AR in Mississippi County. The average temperatures for each day were calculated from November 1993 through September 1995. Degree days with a critical temperature at 43° Fahrenheit (DD43) were calculated from the daily average temperatures by subtracting 43 degrees from each average daily temperature. The daily DD43 temperatures were accumulated beginning on the first day of November, December and January for both the 1993/94 and 1994/95 cold weather seasons. It was determined from the DD43 cumulative temperatures that the 1994/95 winter was much warmer than the 1993/94 winter. The warmer weather in the 1994/95 winter are thought to be the cause of the higher trapped boll weevil population in the spring of 1995. Also, separation of cumulative DD43 temperatures was twice as great for the DD43 temperatures accumulated in November as compared to those DD43 temperatures accumulated in December and January. This suggests that models using degree days as a method of predicting boll weevil survival in northeast Arkansas may be more suited to degree days accumulated in November rather than in January.

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