Abstract

Multiple biotic and abiotic events can result in early season defoliation of corn (Zea mays L.) plants. The recovery from, and resulting impact of this defoliation depends on the timing, severity, and frequency. Our objective was to evaluate the effect of clipping plants at approximately 2.5 cm above the soil beginning at V3 and continuing for three weeks. Studies were conducted in 2011, 2012, and 2013 at Kentland Farm near Blacksburg, VA. Treatments were imposed with a string trimmer at one, two, or three times weekly in a full factorial arrangement with timing of V3, one and two weeks later, with four replications in a randomized complete block design. Plot size was 4, two weeks later, with four replications in a randomized complete block design. Plot size was 4, 2, and 5 m long. At maturity, all ears were counted and harvested from 3 m of row from the center two rows in each plot and weighed. A representative six-ear subsample was then shelled and grain test weight and moisture determined. Ears ha⁻¹, kernels ear⁻¹, kernel weight and cob weight were likewise determined on shelled samples. Defoliation during the first week (V3) even on multiple days had little effect on grain yield. By the second week, multiple defoliation timings decreased yield more than a single event. Defoliation during week three (V6) resulted in the greatest yield loss.

Materials and Methods

- In early May of each year corn was planted directly into recently killed cereal winter cover crop using a Wintersteiger Plot King no-till plot planter at a population of 69,000 seeds ha⁻¹.
- The area was divided into plots that were 4, 76 cm rows by 5 m long. At maturity, all ears were counted and harvested from 3 m of row from the center two rows in each plot and weighed. A representative six-ear subsample was then shelled and grain test weight and moisture determined. Ears ha⁻¹, kernels ear⁻¹, kernel weight and cob weight were likewise determined on shelled samples. Defoliation during the first week (V3) even on multiple days had little effect on grain yield. By the second week, multiple defoliation timings decreased yield more than a single event. Defoliation during week three (V6) resulted in the greatest yield loss.
- Treatments were imposed in a randomized complete block design with four replications.
- Beginning at the V3 stage and for the two following weeks a string trimmer was used to trim corn plants to a height of approximately 2 cm either once, twice or three times per week creating a factorial arrangement of treatments. The string trimmer created a non-uniform or “ragged” defoliation that would be more similar to most natural damage than incising the plants with a razor.
- Production practices, other than the treatments outlined above followed Virginia Cooperative Extension recommendations.
- At maturity, corn was hand-harvested from 3 m of the center two rows of each plot. The number of plants and harvested ears was also recorded from this harvested area. All harvested ears were weighed and a representative six-ear subsample selected. Subsamples were oven-dried at 40°C until the grain reached approximately 150 g kg⁻¹ moisture. The six-ear subsamples were then shelled, grain weighed, and grain moisture and test weight determined via a DICKEY-john GAC 2500 (DICKEY-john, Auburn, IL). Yields are reported on a consistent 155 g kg⁻¹ moisture basis.
- Analysis of variance was conducted using Proc GLIMMIX in SAS with replication considered a random effect and defoliation timing and frequency as fixed effects. Treatment mean separations were performed using Tukey’s test with significant fixed at p<0.05.