CANOPY PHOTOSYNTHESIS AND GROWTH IN RESPONSE TO A MIXTURE OF MEPIQUAT CHLORIDE AND A BIOLOGICALLY DERIVED GROWTH PROMOTING COMPOUND

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Abstract

Four combinations of mepiquat chloride and a biological growth promotor (Solo) were compared to mepiquat chloride alone and an untreated control. The treatments consisted of the following: 2.1% mepiquat chloride + 2g Solo/gal (MFX2294); 2.1% mepiquat chloride + 4g Solo/ gal (MFX2494); 4.2% mepiquat chloride + 2g Solo/ gal (MFX4294); MFX2294 x 2 (MFX4494); 4.1% mepiquat chloride alone (MC); and an untreated control. All treatments were applied at 4oz./acre at 34(matchhead square), 44, 56, and 68 days after panting (DAP) . All plots consisted of six rows, 25 foot long and 38 in wide. Growth was assessed at 55, 71, and 95 DAP by harvesting plants from 0.5 m of row. Plants were separated into leaves, stems, and bolls after recording the height and nodes of all plants. Leaf area was determined by calculating the specific leaf weight (weight leaf/unit area) from a leaf sub-sample and dividing the value into the total dry weight of leaves. Canopy photosynthesis rates of the MFX2494, MFX4294, MC, and control treatments were determined on six different dates from 64 to 105 DAP. Carbon dioxide concentration decreases within a MYLAR covered chamber (1.0 m W x 1.25 m L x 1.4 m H) were determined using a Li Cor, Inc. Model 6200 infrared gas analyzer. Fiber yield was determined at three stratified harvests starting at 131 DAP and every three weeks thereafter. Weight per boll and the lint percentage was determined from fifty boll samples taken from the row prior to harvesting the remaining fiber. Position of bolls at the end of the season was determined by removing bolls at each main stem node of fifty plants. No attempt was made to separate the bolls by branch position. Major growth differences existed between the control and the other treatments. The untreated control had approximately 61, 35, and 51 % greater vegetative dry weight, total dry weight, and LAI than the next highest treatment at 95 DAP. Boll dry weights were similar among all treatments at this time, and therefore, the reproductive-to-vegetative ratios of the MFX and MC treatments were at least 70% larger than the control. Fiber yields were not significantly different among the treatments, however, the MFX treatments were all at least 84 lb./A greater than the next highest treatment (MC). Boll location on the MC treated plants were lower on the plant than found on the control plants. All MFX treatments displayed boll profiles similar to those of the MC treatment Canopy photosynthesis was numerically greater in the MFX 2494 treatment at all dates but significance was only evident at the last measurement (105 DAP). Integrated seasonal canopy photosynthesis or the total area under the canopy photosynthesis rate over time, was 12% larger for the MFX 2494 treatment than the next greatest treatment. The data indicate that some enhancement in plant performance is caused by applications of the MFX formulations. Further research is necessary to fully understand this response.

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