

**TWO YEARS OF GROWTH, CANOPY
PHOTOSYNTHESIS AND YIELD IN RESPONSE
TO DIFFERENT FORMULATIONS OF MEPPLUS**

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Abstract

Four combinations of mepiquat chloride and a biological growth promotor (*Bacillus cereus*) were compared to mepiquat chloride alone and an untreated control. The treatments consisted of the following: 2.1% mepiquat chloride + 4g *B. cereus* /gal (MP24); 4.2% mepiquat chloride + 2g *B. cereus* / gal (MP42); 3.15% mepiquat chloride + 2g *B. cereus*/ gal (MP32); 3.15% mepiquat chloride + 3g *B. cereus* (MP33) ; 4.2% mepiquat chloride alone (MC); and an untreated control. All treatments were applied at 4oz./acre at matchhead square, and at three ten day intervals thereafter. Two locations, Rocky Mount and Clayton, NC, were planted on 13 May. All plots consisted of six rows, 25 foot long and 38 in wide. Growth was assessed at 71 and 113 DAP (days after planting) by harvesting plants from 0.5 m of row. At Clayton, 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 were determined on five dates from 87 to 129 DAP. Reductions in carbon dioxide concentrations 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 the end of the season at both locations. Weight per boll and the lint percentage was determined from fifty boll samples taken from the row prior to harvesting the remaining fiber. Major growth differences existed between the control and the other treatments. The untreated control had approximately 12 and 4 % greater vegetative dry weight and LAI than the next highest treatment at 113 DAP. Boll dry weights ranged from 376 to 560 g/m² for MP32 and MC at this time, respectively. The control had a total boll dry weight per m² that was 25 % lower than MP32. Fiber yields were not significantly different among the treatments, however, all treatments had at least 56 pounds/A more fiber than the control when averaged over location. The MC treatment had an average fiber yield below that of the control. Canopy photosynthesis was not significantly different among the treatments. There appeared to be a shift in dry matter allocation from vegetative to reproductive tissues attributable to some treatments. Reproductive-to-vegetative dry weight ratios of the control and MC treatments were

significantly lower than MP42, MP32, and MP33 at 113 DAP. Altered allocation patterns appear to be related to the presence of *B. cereus* and its relative concentration to mepiquat chloride in the formulations. Further research is required to discover the mode of action of the bacterium and to match formulations to specific environmental conditions.