GROWTH AND PHOTOSYNTHESIS OF TOMATO, *LYCOPERSICON ESCULENUM*, IN RESPONSE TO BIOLOGICAL CHITIN AMENDMENT

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**Abstract:** Methyl bromide is the major soil fumigant in use worldwide. However, due to its role in depletion of the ozone layer, international agreement has been reached calling for its reduced consumption and complete phasing out. Nonchemical methods and strategies for nematode management include cultural methods and engineered measures. This present research evaluates *Ecologic*, a biological, marine shell meal chitin material, effects on growth, photosynthesis and plant pigments, chl a, chl b, carotenoids, and total chlorophyll in ‘Floradel’ tomato plant, *Lycopersicon esculentum*. Greenhouse studies were conducted at Mississippi State University, Entomology Department, Starkville, Mississippi and at the Mississippi State Research Extension and Experimental Station, Poplarville, Mississippi. Pots were set up in the greenhouse environment using autoclaved soil inoculated with 5,000 root-knot eggs per 1500 g soil. There were 4 treatments and 5 replications. Treatments were: No chitin; 50 g chitin; 100 g chitin; and 200 g chitin. A two-week wait period following *Ecologic* amendment preceded ‘Floradel’ tomato planting to allow breakdown of the chitin material into the soil. Fresh and dry weights were taken of the above soil level shoot materials, stems and leaves, and below soil root materials. Photosynthetic parameters were obtained using the LiCor 6400 instrumentation. A statistically significant difference (P ≤ 0.05) was obtained with regard to the growth rate of *L. esculentum* at 100 g chitin treatment compared to the control with no chitin. Mean fresh weights of ‘Floradel’ tomatoes were 78.0 ± 22.3g, 81.0 ± 20.3g, 109.0 ± 25.4g and 102.0 ± 33.3g at 0, 50, 100 and 200g chitin, respectively. Measurements of physiologic parameters indicated significant differences (P ≤ 0.05) in transpiration rates at 100g and 200g chitin levels, compared to the control. Final values of transpiration rate were 3.52 ± 1.0 mol/m²/sec (100g chitin) and 3.50 ± 1.0 mol/m²/sec (200g chitin) compared to 1.6 ± 1.0 mol/m²/sec for the control. Stomatal conductance measurements also indicated significant differences (P ≤ 0.05), especially with the 50g and 200g chitin treatment levels. Final values of stomatal conductance were 0.16 ± 0.2 mol/H₂O/m²/sec (50g chitin) and 0.080 ± 0.002 mol/H₂O/m²/sec (200g chitin), compared to 0.250 ± 0.002 mol/H₂O/m²/sec for the control with no chitin.

**Keyword:** Root knot nematode, J2’s (Juveniles), chl a, chl b, chl c, carotenoid, total chlorophyll

**Acknowledgments:** Supported by the Title III Graduate Education Program at Jackson State University for financial support of this project.