

GUAYULE GROWTH AND YIELD OVER TIME AT TWO LOCATIONS AT HIGH AND LOW IRRIGATION TREATMENTS

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Information regarding growth and yield components is critical when determining where guayule (*Parthenium argentatum* A. Gray) will be best suited for commercial production. Two guayule irrigation experiments were planted in April 2018 at Eloy, AZ on a clay soil and at Maricopa, AZ on a sandy loam soil. Guayule was direct seeded in both locations. The harvested treatments were the I100 % and I50 % (replacement of 100% and 50% of estimated soil water depletion) for subsurface drip and flood at Eloy. Same treatments were harvested from the Maricopa field except the I50% flood, which was not available there. Harvests were at 4, 6, 8, 10, 12, 14, and 16 months after planting from the three replicates of each treatment. At each harvest, plots were measured with a 1 m template to assure equal sample size. Plants were cut at ground level and roots were dug to obtain as much of the main taproot as possible. Roots were counted to obtain an estimate of plants per acre and length measured. Fresh and dry weights were obtained. All plants were processed by separating each by leaves, stems, roots, and flowers on the same day they were harvested. Plants were further dried and then ground and analyzed for rubber and resin content. Differences between treatments became evident 14 months after planting. Shrub dry biomass was higher at Eloy compared to Maricopa until the first winter. During that winter and in the early spring, soil temperatures at Maricopa, sandy loam soil, were warmer compared to Eloy, clay soils. Biomass weights at Maricopa were nearly equal until June 2019 when Eloy shrubs were again at higher weights than Maricopa. In the June 2019 harvest, the I100% treatments had higher biomass compared to the I50% treatments at both locations. Differences in root weight are seen in Maricopa between the I50% and I100% drip treatments compared to small differences between Eloy treatments. The proportion of flowers, leaves, and stems changed over time significantly. Since February 2019, the proportion of leaves and stems on the shrub has been stable. Flower proportion increased from April to August 2018. In June 2019, the rubber percent was higher at Maricopa compared to Eloy. That has been the trend since February 2019. It is interesting that peak rubber content for the I50% treatments remains at about the same from February to June 2019. In the 100% treatments, rubber began to decrease in June 2019. Resin content has increased slightly over time but most of the resin content was present in the plant 4 months after planting. The overall rubber yield was very similar for the two locations despite the higher biomass at Eloy. The higher rubber content in the sandy loam soil, at Maricopa, compensated for the lower biomass. There is not much difference between treatments so far, indicating the lower water treatments have not had the proportional effect on yield. Samplings will continue until spring of 2020 when final harvest will be conducted.

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