

## **Control of *Parthenium hysterophorus* (L) and its Impact on Yield Performance of Tomato (*Solanum lycopersicum* L) in the Northern Province of Sri Lanka**

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**Abstract:** Impact of weed control methods on the persistence of *Parthenium hysterophorus* (L), and quantity and quality of tomato (*Solanum lycopersicum* L) yield was studied in two farmer fields i.e. a site heavily infested with *P. hysterophorus* (Parthenium-site) and Parthenium-free site, in the Jaffna peninsula of the Northern Province of Sri Lanka. The split-plot design consisted of two main plots i.e. manual weeding and ploughing (both followed by harrowing), and three sub-plots i.e. use of a pre-emergent herbicide (Oxyfluorfen; 240 g/L EC at 2 days before planting), mulching [*Gliricidia sepium* (Jacq) Kunth ex Walp. leaves at 12 kg per plot on fresh weight basis], and un-weeded plot after crop establishment (control), in three replicates. The soil seed bank of the Parthenium-site was dominated by *P. hysterophorus* as expected, and the Parthenium-free site was dominated by the perennial sedge *Cyperus rotundus* (L). At tomato harvest, the un-weeded sub-plots recorded the highest weed densities ( $p<0.05$ ) when compared to the rest, The Parthenium-site showed a higher weed dry weight ( $p<0.05$ ) when compared to that of the Parthenium-free site, due to higher emergence of the Parthenium weed in the former. Mulching was the best sub-plot treatment for Parthenium control in combination with the main plot treatments. The average fruit weight of tomato at the Parthenium-free site was 7.8% higher than that of the Parthenium-site (47.8 g per fruit). In the Parthenium-site, mulching resulted in a 6.4% higher fruit weight and 58% higher total yield ( $p<0.05$ ) when compared to rest of the sub-plot treatments. The weed competition negatively affected the tomato yield ( $Y=-0.7551X+7.88$ ;  $R^2=0.58$ ;  $p<0.05$ ), with Parthenium weed playing a dominant role. Mulching with *G. sepium* coupled with manual weeding during land preparation or ploughing would suppress growth and development of weeds including *P. hysterophorus* and enhance yield of tomato.