

## ***Virulent and Avirulent Ralstonia solanacearum Population Density in a Potato Grown Field, Applied with Five Types of Soil Amendments for Three Consecutive Growth Seasons***

U.L.W.Y.S. Lindakumbura<sup>1</sup>, C. Ranasinghe<sup>2</sup> and D.M. De Costa<sup>3\*</sup>

<sup>1</sup>Post Graduate Institute of Agriculture, University of Peradeniya, Sri Lanka

<sup>2</sup>Agriculture Research Station, Sita Eliya, Sri Lanka

<sup>3</sup>Department of Agricultural Biology, Faculty of Agriculture, University of Peradeniya, Sri Lanka

\*devikadecosta@gmail.com

Bacterial wilt caused by *Ralstonia solanacearum*, poses a significant threat to potato cultivation; hence reducing pathogenic soil bacterial density is a strategic management approach. This study evaluated the effect of five locally-available soil amendments on reducing the density of *R. solanacearum* in a potato-growing field subjected to the application of the amendments for three consecutive seasons. Half-burn paddy husk, rice husk biochar, and radish and mustard plant residues were used as soil amendments and each was applied at a rate of 2 kg/m<sup>2</sup> on fresh weight basis. A previously identified effective soil amendment comprised of fresh wild sunflower leaves (*Tithonia diversifolia*) at 2 kg/m<sup>2</sup>, urea (20 g/m<sup>2</sup>) and CaO (200 g/m<sup>2</sup>) and soil without any amendment (untreated control) were used for comparison. Potato (var. Granola) was planted two weeks after the incorporation of soil amendments. The treatments were laid out as a randomized block design with three replicates. Soil samples were collected five times over the cultivation season (i.e., before incorporation of the amendments, at the time of planting, and one, two- and three-months post-planting). Samples were cultured on TZC medium by the dilution plate technique and the density (cfu/g of soil) of the virulent and avirulent *R. Solanacearum* was quantified based on colony morphology. Over the growth period, virulent *R. solanacearum* population density was significantly reduced ( $P < 0.0001$ ) by rice husk biochar, *Thithonia* + Urea + CaO and radish and mustard plant residue treatments compared to the soil not treated with any amendment, exhibiting no significant difference among the four treatments. Percentage avirulent *R. Solanacearum* count was significantly ( $P < 0.0001$ ) higher in soil treated with radish and mustard residues (i.e. 86.5% and 81.2%, respectively) and *Thithonia* + Urea + CaO (i.e. 73.3%) treatments. Results revealed the potential of reducing pathogenic soil *R. solanacearum* density by repeated application of above three treatments.

**Keywords:** Bacterial Wilt, Half-Burn Paddy Husk, Mustard Residues, Radish Residues, Rice Husk Bio Char