
Sorghum halepense allelopathy: impact on soil and plant seedling growth

Sudipto Majumdar^{*1}, Urvashi Sanwal¹, and Inderjit Singh^{†1}

¹Department of Environmental Studies, Centre for Environmental Management of Degraded Ecosystems, University of Delhi, Delhi (CEMDE) – India

Abstract

Sorghum halepense is an aggressive invasive species in the arid and semi-arid regions throughout the world including India. We quantified the species richness in the *Sorghum halepense*-invaded communities and communities not yet invaded by the weed. Sorghum soil and no-sorghum soil were analysed for total phenolics, microbial activity, available nitrogen and organic carbon. Manipulative experiments were designed to understand the allelopathic potential of *S. halepense*. Soil was amended with root or shoot leachate of *S. halepense*, and its impact on plant growth and soil properties was studied. *Sorghum halepense* did not impact species richness in natural settings. *S. halepense*-invaded soil had higher levels of total phenolics and lower levels of available nitrogen. Root leachate had greater inhibitory effects on the root growth of two common species, *Brassica juncea* or *Bidens pilosa*, than did shoot leachate of the weed. Shoot leachate-amended soil had higher levels of total phenolics and available nitrogen than root leachate-amended soils. *Sorghum halepense* allelopathic potential is argued due to lower levels of available nitrogen. Higher inhibition in the root dry weight of assay species in root leachate-amended soil compared to shoot leachate-amended soil can be due to lower levels of nitrogen in root-amended soil. Relative allelopathic potential of root versus shoot leachates in bioassays for allelopathy should be examined to distinguish the role of chemicals versus nutrient availability.

Keywords: Sorghum halepense, Soil, Microbial activity, Nitrogen

*Speaker

†Corresponding author: inderjitdu@gmail.com