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Herbicidal properties of invasive alien plants *Dillenia suffruticosa* and *Prosopis juliflora* against *Brassica juncea* and *Pennisetum polystachion*

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Synthetic pesticides can cause deleterious effects on human health and the environment. The rapid spread of invasive alien plants (IAPs) threatens biodiversity and the natural and semi-natural ecosystems. A strategy to address these problems is to develop eco-friendly plant-based pesticides from IAPs. In this study, the two IAPs, *Dillenia suffruticosa* (Griff.) Martelli. and *Prosopis juliflora* (Sw.) DC., were evaluated for their herbicidal properties against *Brassica juncea* (L.) Czern. (**Bj**) and *Pennisetum polystachion* (L.) Schult. (**Pp**). The dry leaf powders of IAPs, were separately extracted into dichloromethane-methanol (1:1) using a bottle extractor. The leaf powders and the concentrated leaf extracts were assayed for their inhibitory effects on seed germination and early seedling growth (shoot length, root length and biomass) of **Bj** and **Pp** using a Petri dish assay; 2-methyl-4-chlorophenoxyacetic acid (MCPA) and glufosinate were used as positive controls and distilled water and aqueous dimethyl sulfoxide as negative controls. Each treatment was done on 25 seeds in four replicates, in three trials. The IC₅₀ values of the leaf powders and extracts expressed in equivalent amount of leaf powder for the inhibition of seed germination of **Bj** and **Pp** were as follows: 3.70 ± 0.38 and 3.10 ± 0.52 mg cm⁻² (*D. suffruticosa* leaf powder against **Bj** and **Pp**, respectively); 1.55 ± 0.05 and 0.23 ± 0.06 mg cm⁻² (*P. juliflora* leaf powder against **Bj** and **Pp**, respectively); 1.47 ± 0.07 mg cm⁻² (*D. suffruticosa* leaf extract against **Bj**); 1.19 ± 0.53 mg cm⁻² (*P. juliflora* leaf extract against **Bj**). Both IAPs were more effective on **Pp** than **Bj** (ANOVA, $F = 70$, $p < 0.001$). According to the results of the Kruskal-Wallis test, the leaf powders of *P. juliflora* (at 3.52 mg cm⁻², $\chi^2 = 25.7$, $p < 0.001$) and *D. suffruticosa* (at 17.62 mg cm⁻², $\chi^2 = 24.3$, $p < 0.001$) and the leaf extracts of *P. juliflora* (at 5.56 mg cm⁻², $\chi^2 = 26.2$, $p < 0.001$) and *D. suffruticosa* (at 8.27 mg cm⁻², $\chi^2 = 25.6$, $p < 0.001$) displayed more potent inhibitory effects on seed germination than glufosinate (at 4.4 µg cm⁻²) and MCPA (at 10.6 µg cm⁻²). Growth parameters of **Bj** and **Pp** decreased with increasing concentrations of leaf powders and extracts of IAPs (one-way ANOVA, $p < 0.05$). The leaves of *P. juliflora* and *D. suffruticosa* can be exploited to develop eco-friendly herbicides.

Keywords: *Dillenia suffruticosa*, Herbicidal activity, *Prosopis juliflora*