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ALLELOPATHIC EFFECT OF AQUEOUS EXTRACT OF INVASIVE ALIEN PLANT, WEDELIA (*Sphagneticola trilobata*) ON BEANS (*Phaseolus vulgaris*)

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Sphagneticola trilobata is an invasive plant that demonstrates allelopathy as an attribute for their ecological success. The allelopathic effect of aqueous extract of *S. trilobata* on *P. vulgaris* was studied in the current study, using fresh and dry plant parts, separately. Fresh *S. trilobata* plants (75 g) were collected, immediately cut into pieces and ground using an electric grinder. The extract was dissolved in 0.1 L of distilled water to prepare a stock solution with concentration of 7.5×10^2 g L^{-1} at room temperature of 30 °C. Stock solution of dry plant parts was also prepared using the same procedure. From the stock solutions, another two test solutions with 2.5×10^2 g L^{-1} and 5.0×10^2 g L^{-1} concentrations were prepared. To determine the effect of these test solutions on the germination of *P. vulgaris* seeds, four sets of petri dishes were used. One hundred *P. vulgaris* seeds were introduced into petri dishes. Aliquots of 30 mL of 2.5×10^2 g L^{-1} (T_1), 5.0×10^2 g L^{-1} (T_2) and 7.5×10^2 g L^{-1} (T_3) of aqueous extracts of fresh plant parts were added daily into each petri dish separately, while a similar volume of distilled water was added to the control. The entire study was replicated thrice and the number of germinated seeds was counted after five days. The same procedure was repeated using dry plant part extracts. To determine the effect of aqueous extracts of fresh plant parts of *S. trilobata* on the growth of *P. vulgaris,* four sets of pots filled with compost mixture were prepared with three replicates as described above. Five *P. vulgaris* seedlings (age of 5 days) were planted in each pot. Plants in three treatments were treated with 100 mL of 2.5×10^2 g L^{-1}, 5.0×10^2 g L^{-1} and 7.5×10^2 g L^{-1} concentrations of aqueous extract while distilled water was added to control pots. Plant height and leaf area of *P. vulgaris* seedlings were measured weekly. Fresh shoot mass, dry shoot mass, root length, fresh root mass, dry root mass, length of the pod and average yield were measured at the 7th week. Analysis of variance (oneway ANOVA) and Pearson correlation test were used for statistical analysis. The number of germinated seeds in T_1, T_2 and T_3 petri dishes was significantly low compared to control ($p < 0.05$, oneway ANOVA). For fresh plant parts, number of germinated seeds corresponding to control, T_1, T_2 and T_3 were 84, 55, 31 and 9, respectively, while dry plant extracts resulted in 80, 53, 33 and 8, respectively. There was a strong negative correlation between the concentration and the number of germinated seeds. Plant shoot height, leaf area, fresh shoot mass, dry shoot mass, root length, fresh root mass, dry root mass, length of the pod and average yield of *P. vulgaris* plants were significantly low in T_1, T_2 and T_3 pots, compared to the control pots ($p < 0.05$, oneway ANOVA). Further, a strong negative correlation was shown between the concentration and the above growth parameters of *P. vulgaris* plants. In conclusion, aqueous extracts of fresh and dry plant parts of *S. trilobata* denoted allelopathic effects on *P. vulgaris*.

Keywords: Alien invasive plant, allelopathic effect, aqueous extract