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Evaluation of Allelopathy in Crotalaria by Using a Seed Pack Growth Pouch

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Abstract:
Allelopathic effect of aqueous extracts of six Crotalaria species on wheat root growth at early growing stage was examined by using a seed pack growth pouch. There was a significant difference in total root length of wheat with application of the extract of each species compared with control at 21 days after planting. C. juncea and C. pallida suppressed the length by approximately 40% based on the control. Remarkable suppression of root growth could be clarified by image-processing of the root system which appeared on the surface of the pouch. A significant reduction in the length of the longest root was also observed, and C. juncea and C. spectabilis showed severe reduction. Definite inhibition was observed with the leaf extract compared with the stem extract in C. spectabilis, and the inhibition was remarkable as the concentration of the extracts increased. Dry weights of both top and root of wheat were not influenced by application of C. brevidens, C. juncea, C. lanceolata and C. pallida. With application of C. spectabilis, however, top dry weight was restricted to a low value compared with the control. Fractal dimension of the profile of root system ranged in value from 1.27 to 1.35, and it was not necessarily influenced by the application of extract of each species. These results indicated that wheat root growth was inhibited by application of the aqueous extract of Crotalatia, and the seed pack growth pouch techique might be applied to the evaluation of allelopathy.

Keywords:
Allelopathy, Crotalaria, Fractal analysis, Root system, Seed pack growth pouch, Triticum aestivum L., Wheat

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