

Allelopathic effect of siam weed on germination and growth of field crops

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Siam weed (*Chromolaena odorata*) is widespread in humid tropical regions specially southeast Asia and has become invasive in Bangladesh (Karim 2010). In India, siam weed causes yield losses up to 45% in several crops and 80% in forage production (Hills and Ostermeyer, 2000). It suppresses the growth of plants through allelopathic exudation like phenolics, alkaloid and amino acids (Rajangam 1997). With these views in mind, the present study was undertaken to evaluate the allelopathic effects of Siam weed on seed germination, development and growth of four field crops.

METHODOLOGY

Seeds of four crop species namely *Oryza sativa*, *Brassica napus*, *Cicer arietinum*, *Arachis hypogaea* were germinated with aqueous extracts of siam weed at different concentrations (4, 3.5, 2.5 and 0%) at the Seed Laboratory of Bangladesh Agricultural University, Mymen singh to see the impacts on seed germination and seedling growth. The germination percentage, root length and shoot length were recorded after 10 days of seed placement. Seedling dry weights were also recorded after being dried in an electrical oven for three days at 80°C.

The overall effects on the growth of the crops was determined on the basis of average percent inhibition as below-

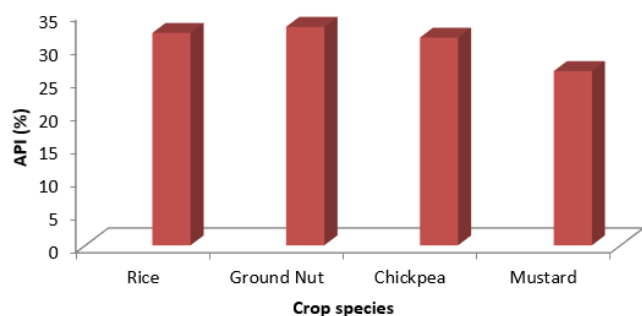
Average Percent Inhibition (API) = $[G (\%) + RL (\%) + SL (\%) + DM(\%)]/4$

Where, G = percent reduction in seed germination, RL = percent reduction in root length, SL = percent reduction in shoot length, DM = percent reduction in seedling dry weight.

RESULTS

Average Percent Inhibition (API)

When API was calculated taking the average of all reductions caused in different plant characters of the crops it was observed that rice was mostly affected (API= 33.02)



Among the plant parts, leaf of the weed was most inhibitory to the crop seed germination and seedling growth (API= 45.12) followed by root (API= 29.36) and stem (API= 22.92) (Fig. 2).

Fig. 1. Mean API (%) in four crop species due to allelopathic effects of Siam weed

followed by groundnut (API= 32.95), chickpea (API= 31.32), and the lowest inhibition was marked in mustard (API = 26.27) due to allelopathic effect of Siam weed (Fig. 1). Onwugbuta (2001) observed that aqueous extract of Siam weed leaf at the concentration of 1 g/40 ml of water caused significant growth reduction of tomato. Gill *et al.* (2013) also found growth inhibitory effect of the weed on cowpea.

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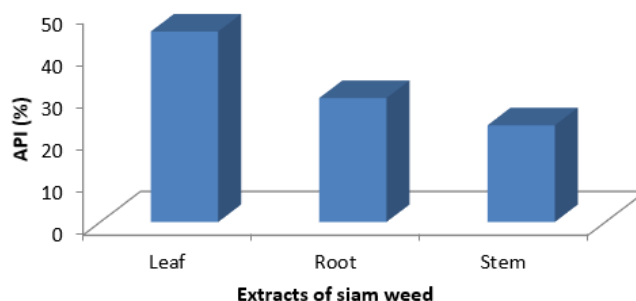


Fig. 2. Mean API (%) due to leaf, root and stem extracts of Siam weed in four crop species

CONCLUSION

Allelopathic effect of siam weed reduced the growth of crops namely rice, groundnut, chickpea and mustard significantly, API ranging from 26.3-47.3% and ground nut being the mostly affected crop. Leaf caused maximum inhibition (API = 45.12%), while the stem showed the least inhibition effect (API = 22.92%). Siam weed leaf extract (4%) was enough to reduce the growth of the crops by about 50%. Invariably presence of siam weed in crop field or incorporation of leaves of siam weed in the fields must be avoided.

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