

Allelopathic potential of *Parthenium hysterophorus* L. on pollen germination and pollen tube growth of *Phaseolus mungo* cv.T-9 and *Zea mays* L.cv. GANGA SAFED-2

AJAY KUMAR SINGH AND ARVIND KUMAR SINGH

Asian Journal of Environmental Science (June to November, 2009) Vol. 4 No. 1 : 62-65

See end of the article for authors' affiliations

Correspondence to :
AJAY KUMAR SINGH
Department of Botany,
T.D. (P.G.) College,
JAUNPUR (U.P.)
INDIA

SUMMARY

Parthenium hysterophorus L. was evaluated for its pollen allelopathy. Leachate obtained from the pollen grains of *Parthenium* caused significant inhibition in pollen germination i.e. 32.53% in *Phaseolus mungo* and 30.19% in *Zea mays*. Inhibition in pollen tube growth was 54.72% in *Phaseolus mungo* and 40.29% in *Zea mays*. Treatment with higher concentration exerted more inhibition in these parameters. Moreover, inhibition in pollen germination and pollen tube growth was found more in *Phaseolus mungo* than in *Zea mays*. Some pollen tubes of *Phaseolus* were found to be thin and some were distorted.

Key words :

Parthenium,
allelopathy,
Phaseolus mungo, *Zea mays*, Pollen grains and leachate

Allelopathy refers to the beneficial or harmful effect of one plant to another plant by the release of chemicals from different plant parts by leaching, root exudation, volatilization, residue decomposition and other processes. Common effects of allelopathy include reduced seed germination and seedling growth. However, known sites of action for some allelochemicals include cell division, pollen germination, nutrient uptake, photosynthesis and specific enzyme function. Allelopathic effect of one pollen grain to pollen germination, pollen tube growth (Murphy and Aarssen, 1995,a,b,c) and seed set of another plant is called pollen allelopathy. *Parthenium hysterophorus* L. also known as 'carrot weed', 'congress grass', 'white head', 'gajarghass', is a herbaceous, erect and annual plant belonging to the family Asteraceae. *P. hysterophorus* L. has been reported to contain several allelochemicals, like parthenin, kempferol, p-cumaric acid, caffeic acid etc. (Pickman and Towers, 1982). Organic compounds like phenolic acids and flavonoids have been found to retard the growth of several plants (Mall and Dagar, 1979). *Parthenium* is not only harmful to crops but also causes several diseases to man e.g. asthma, contact dermatitis and loss of weight, eye irritation in dogs and horses (Towers *et al.*, 1977).

Phaseolus mungo cv.T-9 (black gram or urd or mash) a leguminous crop, is highly priced pulse. It is early maturing (80 days), erect, medium, black seeded recommended as a early crop in *kharif*.

Maize (*Zea mays* L. var. Ganga safed-2), a cereal crop belonging to the family Graminae, is high yield hybrid variety. There are no report on all epathic effect of pollen grain of *Parthenium hysterophorus* L. on pollen germination and pollened tube growth of these two plants.

MATERIALS AND METHODS

Pollen grains of *P.hysterophorus* were collected at random from the field. One gram of pollen grains were mixed in 10ml of double distilled water in Erlenmeyer flask under aseptic condition and kept for three days at 8°C in referigerater. Aqueous leachate was filtered through Whatman no.1 filter paper. Aqueous leachate so obtained was taken as 100% concentration leachate. To prepare 50% concentration leachate sterilized distilled water was added in the ratio of 1:1. Leachates were used to prepare nutrient medium for pollen germination. For control, pollen grains were germinated on nutrient medium without leachates.

Brewbaker and Kwack (1963) and Roberts *et al.* (1983) media were used for pollen germination and pollen tube growth for black gram and maize, respectively. Percentage of pollen germination and pollen tube growth were studied by the method given by Iwanami (1959). Semisolid media were prepared by adding 1% agar to the liquid media and were heated to dissolve the latter and poured on the slides. On cooling, thin agar-

Accepted :
March, 2009