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FUNGI ASSOCIATED WITH STORED SEEDS OF *PARTHENIUM HYSTEROPHORUS* COLLECTED FROM LAHORE

Arshad Javaid, Shazia Shafique and Sobiya Shafique

Department of Mycology and Plant Pathology, University of the Punjab, Quaid-e-Azam Campus Lahore, Pakistan.
E-mail: arshadjpk@yahoo.com

ABSTRACT

The present study reports the fungi associated with stored seeds of an alien weed *Parthenium hysterophorus* L. collected from Lahore from February to June 2006. Experiment was conducted on July, 2006. A total of three fungal species namely *Aspergillus niger* van Tieghem, *A. flavus* Link ex Gray and *Alternaria alternata* (E.M. Fries) Keissler were isolated from *Parthenium* seeds. The percentage of occurrence of *A. nigeer*, *A. flavus* and *A. alternata* was 10, 20 and 30%, respectively in February. In the succeeding months of March and April both the number of species and their frequency of occurrence were reduced. Seeds collected in May and June did not harbour any fungal flora. This is the first report on seed-born mycoflora of *Parthenium.*

Key words: *Parthenium hysterophorus*, seed-borne fungi, Lahore.

INTRODUCTION

Parthenium hysterophorus L., an aggressive weed originating in tropical America (Adkins *et al.*, 1996), was accidentally introduced in subcontinent in 1955 through imported food grains. The weed has been spreading rapidly in Pakistan for the last twenty years and now it occurs widely along the roadsides, on wastelands and sometimes in crop fields. It has become a common wasteland weeds in district Lahore, Gujranwala, Gujrat, Jehlem and Rawalpindi and is also spreading in Kashmir. It is now found about 20 km uphill from Islamabad towards Murree.

Parthenium hysterophorus is considered as a noxious weed because of its fast spreading ability, allelopathic effect on other plants (Adkins and Sowerby, 1996), strong competitiveness with crops and health hazard to human beings as well as animals (Khosla and Sobti, 1979; Chippendale and Panetta, 1994). The chemical analysis has indicated that all the plant parts including trichomes and pollens contain toxins called sesquiterpene lactones. The major components of toxin being 'Parthenin' and other phenolic acids such as caffeic acid, vanillic acid, anisic acid, chlorogenic acid and parahydroxy benzoic acid are lethal to human beings and animals (Oudhia, 1998). There are reports of total habitat change in native Australian grasslands, open woodlands, river banks and floodplains due to *Parthenium* invasion (McFayden, 1992; Chippendale and Panetta, 1994). Similar invasions of national wildlife parks have also been reported in southern India (Evans, 1997).

Parthenium weed is an extremely prolific seed producer, with up to 25,000 seeds per plant (Navie *et al*., 1996), and with an enormous seed bank, estimated at 200,000 seeds m^{-1} in abandoned fields (Joshi, 1991). The seeds of *Parthenium* remain viable for a long time and can thrive under very harsh environmental conditions (Williams and Groves, 1980). Extreme light weight of its seeds armed with pappus are the characteristics which help extensive spread and establishment of *Parthenium* (Ramaswami, 1997). The present study was carried out to identify the fungal flora associated with stored seeds of *Parthenium.*

MATERIALS AND METHODS

Seeds of *Parthenium* collected from University of the Punjab, Quaid-e-Azam Campus, Lahore on February, March, April, May and June and stored in paper bags under room temperature. Seeds were analyzed for isolation of associated fungal flora following standard blotter method of ISTA (Anonymous, 1985). Ten seeds of each sample were placed in sterilized petri dish containing well-moistened blotting paper. Each treatment was replicated thrice. The petri dishes were incubated at 25±2 °C for 10 days. Fungi appearing on seeds were isolated and identified. Germination percentage of each test species was also recorded at the end of the experiment.
Percentage frequency of occurrence of different isolated fungi was calculated by applying the following formula:

$$\text{Frequency of occurrence (\%)} = \frac{\text{No. of seeds on which a fungal species occurs}}{\text{Total number of seeds}} \times 100$$

RESULTS AND DISCUSSION

A total of three fungal species viz. *A. niger*, *A. flavus* and *A. alternata* were isolated from the stored *Parthenium* seeds. From the seed samples collected in February, all the three fungal species were isolated. *A. alternata* exhibited the highest percentage of occurrence i.e. 30% followed by *A. flavus* (20%) and *A. niger* (10%). Both the number and species and their percentage of occurrence was reduced in the succeeding months. From seed samples collected in March only *A. alternata* was isolated with a very low frequency of 10%. Similarly from April samples two species namely *A. niger* and *A. alternata* were isolated with 5% frequency of occurrence each. Samples collected in May and June did not harbour any fungal flora (Fig. 1). These results showed that both the number of fungi as well as their frequency of occurrence is directly proportional to the length of storage period. There are chances that more fungal species will appear as these seeds will be continued to keep under storage.

At present it is not possible to calculate any correlation between seed germination percentage and storage fungal population as germination was very poor in the studied seed sample because of dormancy. Only samples collected in April showed 20% germination while in all other samples germination was 0%. Earlier non conclusive results have been reported on the initial dormancy status of *P. hysterophorus* seeds. Butler (1984) and McFadyen (1992) reported absence of a primary dormancy mechanism in the seeds, but the study by Navie *et al*. (1998) showed initial inhibition of germination in freshly shed seeds. In an ongoing long-term study regarding seed dormancy of *Parthenium*, we have found that dormancy in this weed species is season specific. In general seeds collected during winter months of November-January did not exhibit any dormancy and 100% germination was obtained within 4-7 days. Conversely, seeds collected from February onwards showed dormancy. Further study in this regard is in progress.

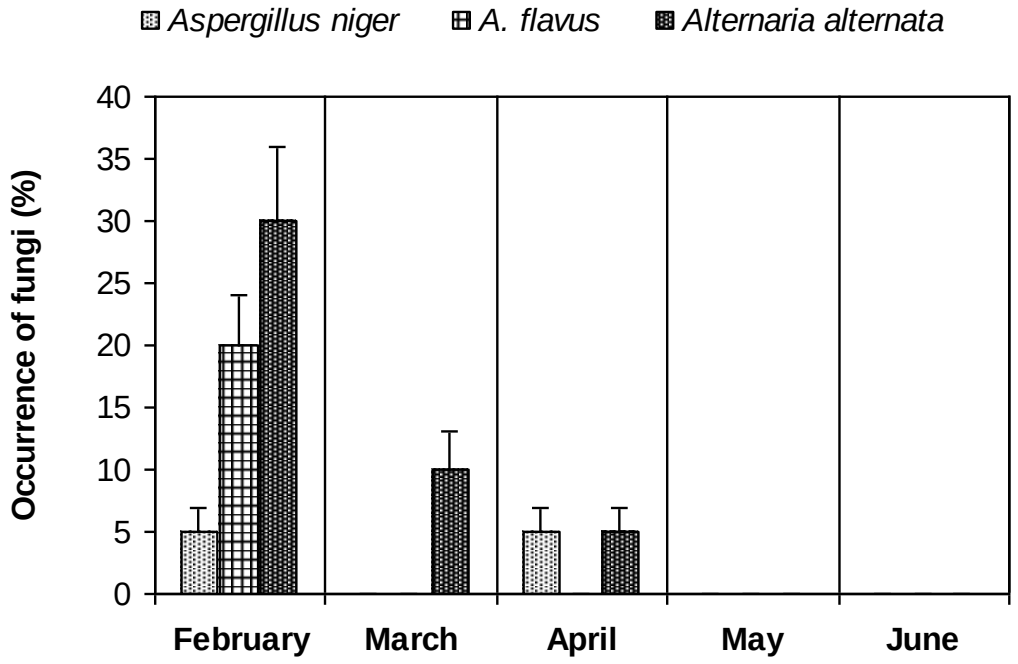

Fig. 1. Fungi isolated from seeds of Parthenium hysterophorus collected in different months from February to June.

REFERENCES

Adkins, S.W., S.C. Navie and R.E. McFadyen (1996). Control of *Parthenium* weed (*Parthenium hysterophorus* L.): A centre for tropical pest management team effort pp. 573-578 in *Proc. 11th Aust. Weeds conf.*, (R.C.H. Shepherd ed.) Weed Sci. Soc. Victoria, Frankston.

Adkins, S.W. and M.S. Sowerby (1996). Allelopathic potential of the weed, *Parthenium hysterophorus* L., in Australia. *Plant Protec. Quarterly* 11:20-23.

Anonymous (1985). International rules for seed testing. *Proc. 1st Seed Test Ass*. pp.520.

Butler JE, 1984. Longevity of *Parthenium hysterophorus* L. seed in the soil. *Aust. Weeds*, 3: 6.

Chippendale, J.F. and F.D. Panetta (1994). The cost of *Parthenium* weed to the Queensland cattle industry. *Plant Prot. Quarterly*, 9: 73-76.

Evans, H.C. (1997). *Parthenium hysterophorus:* a review of its weed status and the possibilities for biological control. *Biocontrol/News and Information*, 18: 89-98.

Joshi, S. (1991). Interference effect of *Cassia uniflora* Mill. on *Parthenium hysterophorus* L. *Plant Soil*, 132: 213-218.

Khosla, S.N. and S.N. Sobti (1979). Parthenium – a national health hazard, its control and utility – A review. *Pesticides* 13:121- 127.

McFadyen, R,E, (1992). Biological control against *Parthenium* weed in Australia. *Crop Prot.*, 11: 400-407.

Navie, S.C., R.E. McFayden, F.D. Panetta and S.W. Adkins (1996). The biology of Australian weeds. 27. *Parthenium hysterophorus* L. *Plant Prot. Quarterly*, 11: 76-88.

Navie, S.C., F.D. Panetta, R.E. McFadyen and S.W. Adkins (1998). Behaviour of buried and surface-sown seeds of *Parthenium hysterophorus*. *Weed Res.*, **38:** 335-341.

Oudhia, P. (1998). *Parthenium:* A curse for the biodiversity of Chhattisgarh plain. In: *Abstract National Research Seminar on Biochemical changes. An impact on Environment*. R.D. Govt. P.G. College, Mandla (M.P.) 30-31 July p.26.

Ramaswami, P.P. (1997). Potential uses of *Parthenium*. In: *Proc. First Int. Conf. on Parthenium Management, India*, pp. 77-80.

Williams, J.D. and R.H. Groves (1980). The influence of temperature and photoperiod on growth and development of *Parthenium hysterophorus. Weed Res.,* 20: 47-52.

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