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Investigation of Pathogens for Biological Control of Parthenium Weed (*Parthenium hysterophorus*) in Ethiopia

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Abstract

Parthenium is an exotic invasive annual weed believed to be introduced to Ethiopia in 1970s and has currently spread to the most part of the country. An exploratory field survey and laboratory studies on pathogens associated with parthenium was studied from 1998 to 2002 in order to provide information on future implementations of biological control in an integrated parthenium management.

A number of fungal isolates were obtained from seed and other plant parts of parthenium weed of which putative pathogenic fungal isolates were species of the genus *Helminthosporium*, *Phoma*, *Curvularia*, *Chaetomium* and *Alternaria*. The two most important diseases associated with parthenium were the rust caused by *Puccinia abrupta* DIET. & HOLW. var. *partheniicola* (JACKSON) Parmelee and the phyllody caused by Faba Bean Phytoplasma Group (FBP). The rust was commonly found in mid altitude (1500–2500 m) with incidence from 5 to 100 % while phyllody was observed in low to mid altitude regions (900–2300 m) of Ethiopia with incidence of 5–75 %.

The individual effects of the rust and phyllody diseases on parthenium weed morphological parameters and seed production capacity showed that the rust disease reduced mean plant height, number of leaves per plant, leaf area, number of branches, dry matter yield at maturity and number of seed produced by 11 %, 22 %, 28 %, 13 %, 25 %, and 43 %, respectively. On the other hand, phyllody disease significantly reduced mean plant height, leaf area and seed production by 29 %, 81 %, and 85 %, respectively.

Phyllody phytoplasma and *Puccinia abrupta* were successfully infecting parthenium weed in many infested areas of Ethiopia with significant reduction on morphological parameters and seed production in the field. Hence, they are potentially useful as components of integrated parthenium management after further confirmation of insect vectors that transmit phyllody, and of host range of phyllody disease to related economic plants in Ethiopia.

Keywords: Biological control, parthenium, phyllody, rust