



Parthenium Weed: Biological Control in Bangladesh

Introduction

Parthenium (*Parthenium hysterophorus* L. (Family: Asteraceae) is an invasive weed originating in Mexico. It has spread to Australia and to many countries in Africa and Asia, and it was first reported at Rajshahi in Bangladesh in 1988 (Pallewatta et al., 2003), presumably spread by way of India. It is one of the most destructive weeds in Bangladesh, especially among upland crops. In Bangladesh, it has invaded over 32 crop lands in addition to invading roadsides, vacant lots, parks, and recreation areas (Fig. 1). The invasive weed causes human and animal health issues, such as dermatitis.

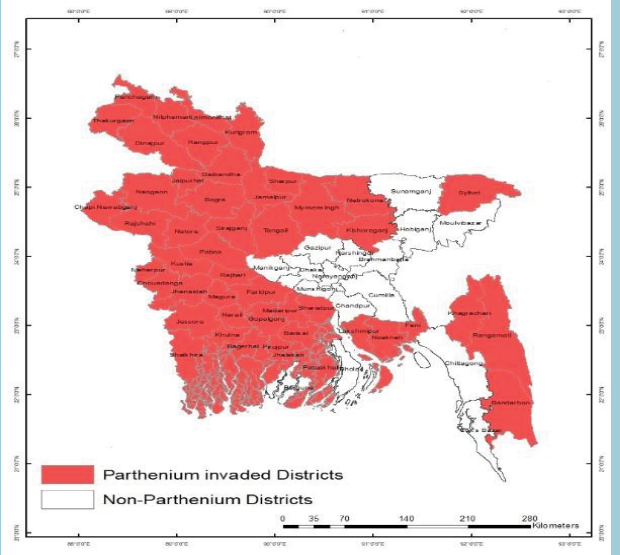


Fig. 1. Current distribution of *P. hysterophorus* in Bangladesh (Karim and Ilias, 2022)

Management

Quarantine regulations: Parthenium has already established in Bangladesh, especially in the western and central parts of the country and spreading eastwards. Little could be done to prevent its further spread within the country except attempting to suppress it in the established areas.

Chemical control: It is expensive and not feasible under current environmental and economic conditions where parthenium grows.

Biological control: It is one of the effective, economical, sustainable, and environmentally safe methods. Australia, Ethiopia, India, Pakistan, South Africa, Tanzania, and Uganda have implemented this method for management of parthenium.

Parthenium beetle or Mexican beetle, *Zygogramma bicolorata* (Coleoptera: Chrysomelidae), is one of the natural enemies of parthenium collected in Mexico, and host specificity tested and released in Australia in 1980 (Dhileepan et al., 2019). It was introduced to India in 1983 (Jayanth, 1987). First it was released in the fields in

Bengaluru and eventually it spread throughout India. The population of the beetle that established in India moved to Pakistan in 2003 (Javaid and Shabbir, 2007), Nepal in 2009 (Shrestha et al., 2010), Sri Lanka in 2019 (Pakeerathan, 2019), and Bhutan in 2020 (Dorji and Adkins, 2020), without human aid (Fig. 2). Authorities in Nepal and Pakistan are multiplying and releasing this beetle throughout their countries for control of parthenium.



Fig. 2. Reported establishment of *Z. bicolorata* into South Asian countries

The Integrated Pest Management Activity (IPMA) team began surveying Jessore and Chaudanga areas of Bangladesh in early 2022 for the possible fortuitous introduction of this beetle from India without success. However, recognizing the occurrence of this beetle at Malda in the West Bengal state of India, surveys were then conducted closer to this area in Bangladesh.

On October 24, 2022, the IPMA team traveled to Rajshahi and surveyed Bholarhat subdistrict area and found the beetle feeding on parthenium at Choto Jambairia village (Fig. 3). This is the first report of occurrence of *Zygogramma bicolorata* in Bangladesh.

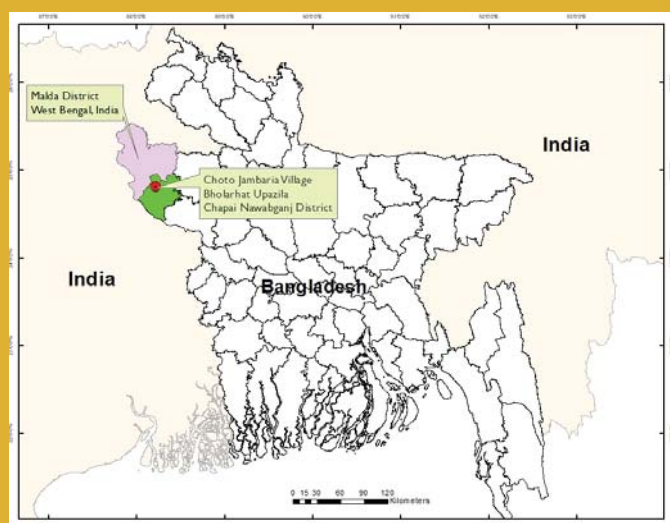


Fig. 3. Location of first finding of *Z. bicolorata* in Bangladesh

Biology of *Zygogramma bicolorata*: The female beetle lays eggs on the leaves, flowers, and stems of parthenium. Eggs are yellow to orange, elongate or oblong. Eggs hatch in 4-5 days. Grubs that emerge from the eggs are pale yellow in color and turn white as they grow. Grubs feed on the leaves for 10 to 15 days and enter soil for pupation. Adults also feed on the leaves and undergo diapause in the soil during the hot summer months and emerge upon the onset of rains.

Awareness-building: Attention should be brought to policy makers, scientists, and extensionists in Bangladesh on benefits of multiplying and releasing this beetle in different regions of the country to suppress this weed. Suppressing this weed will also aid in curtailing the spread of the weed.

Conclusion: Parthenium is a serious weed in Bangladesh. The natural enemy, *Zygogramma bicolorata*, has already established in the western part of the country and it needs to be multiplied and released in different parts of the country for control of this weed.

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