



Ragweed emerging a major host for the cotton mealy bug in Pakistan

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Parthenium hysterophorus is an invasive weed of global significance that has become a major weed in sub-continent and many other parts of the world. *Parthenium* has been reported to be a significant weed of rangelands, crops, a disrupter of biodiversity in natural ecosystems and a health hazard to people and livestock (Adkins *et al.* 2010). The indirect impacts of *Parthenium* weed on agricultural production are also significant. *Parthenium* can also cause indirect losses to crop production by acting as a secondary

host to a number of important crop pests and diseases, for example, common hairy caterpillar (*Diacrisia obliqua* Walk.) *Xanthomonas campestris* pv. *phaseoli* and tobacco streak virus. A list of economically important pests and diseases reported on *Parthenium* weed is presented (Table 1).

In agricultural ecosystems of Pakistan, *Parthenium* is commonly found growing along the water courses, filed verges and wastelands and abandoned agricultural fields. The weed is now slowly but

Table 1. Pests and diseases that are known to use *Parthenium* weed as an alternate host

Agent	Main host(s)	Reference(s)
Insects		
<i>Pseudoheteronyx</i> sp.	Sunflower	Robertson and Kettle (1994)
<i>Liriomyza trifolii</i> Burgess	Bell pepper	Chandler and Chandler (1988)
<i>Diacrisia obliqua</i> Walker.	Multiple crops	Remadevi and Sevaramakirishnan (1996)
<i>Phenacoccus solenopsis</i> Tinsley	Multiple crops	Arif <i>et al.</i> (2009)
<i>Aphis fabae</i> Scopoli	Black bean	Rajulu <i>et al.</i> (1976)
Fungi		
<i>Myrothecium roridum</i> Tode ex Fr.	Crops and trees	Pandey <i>et al.</i> (1990)
<i>Colletotrichum gloeosporoides</i> (Penz.) Sacc.		
<i>Fusarium oxysporum</i> Schlecht. <i>Fusarium moniliforme</i> Sheld.	Crops and trees	Pandey <i>et al.</i> (1991)
<i>Sclerotium rolfsii</i> Sacc.	Multiple crops	Siddaramaiah <i>et al.</i> (1984)
<i>Alternaria zimmiae</i> M. B. Ellis	Zinnia	Sharma and Gupta (1998)
<i>Rhizoctonia solani</i> Kuhn	Many crops	Kumar <i>et al.</i> (1979)
Bacteria		
<i>Xanthomonas campestris</i> pv. <i>Phaseoli</i>	Bean	Ovies and Larrinaga (1988)
<i>Pseudomonas solanacearum</i> E. F. Smith	Multiple crops	Kishun and Chand (1987)
Viruses		
Tomato leaf curl virus	Tomato	Govindappa <i>et al.</i> (2005) Sastry (1984)
Potato virus X and Y	Potato	Cordero (1983)
Tobacco streak virus (TSV)	Cotton	Ahmed <i>et al.</i> (2003)
	Sunflower	Basappa (2005)
	Mungbean	Sharman <i>et al.</i> (2009)
	Groundnut	Sharman <i>et al.</i> (2009)
Tobacco leaf curl virus	Tobacco	Swanson <i>et al.</i> (1998), Reddy <i>et al.</i> (2002)
Phytoplasma		
Phyllody disease	Black bean	Taye <i>et al.</i> (2002)
Brinjal little leaf	Brinjal	Singh and Singh (1998)

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progressively moving inside the major crops such as, wheat, rice (direct seeded) sugarcane and maize (Shabbir *et al.* 2012). Its year-round occurrence provides an excellent opportunity for many agricultural pests and diseases to survive in the unfavorable conditions. In survey to document the distribution of *Parthenium* weed in the Punjab, province of Pakistan in 2009-10, an exotic mealy bug, *Phenacoccus solenopsis* Tinsley (Hemiptera: Pseudococcidae) was consistently found attacking *Parthenium* plants growing in wastelands of the districts Lahore, Kasur, Pakpattan, Khanewal, Okara and Sahiwal.

Phenacoccus solenopsis is a serious pest in many parts of the world where it causes serious damage to number of major crops fruits and vegetables. Cotton (*Gossypium hirsutum* L.) is major cash crop mostly grown southern Punjab and the Sind provinces and it provides fiber, food and fuel and earns foreign exchange for the country. It is estimated that *P. solenopsis* had infested 45,000 sq. km area across Pakistan, especially in the Punjab and Sindh provinces (Hodgson *et al.* 2008). In a survey to document the alternate hosts, Arif *et al.* (2009) listed *Parthenium* weed as one of the 154 host plants for *P. solenopsis* in cotton agroecosystem of the Punjab. Already in India, *Parthenium* weed has been reported as important alternate host for *P. solenopsis* and this weed has been listed among very few hosts with extreme severity of *P. solenopsis* during crop and off seasons in all zones of cotton (Vennila *et al.* 2011). *Phenacoccus solenopsis* multiplies on weedy host plants and moves onto crop plants during the season.

Parthenium is spreading very fast in Pakistan (Shabbir *et al.* 2012), and its presence in cotton growing areas, poses a serious threat to the cotton crop. In Pakistan, *P. solenopsis* attack is increasing, and it could result in an epidemic in the cotton-growing areas if unchecked. It is recommended that alternate hosts of this pest especially the preferred *Parthenium* weed should be managed to stop its further spread of both the invasive *Parthenium* weed and *P. solenopsis* to minimize the losses.

SUMMARY

Parthenium is an alien invasive species spreading very fast in natural and agricultural ecosystems of Pakistan. Besides having direct negative effects on many field crops and other economically important plants, this weed has also been reported to be an alternate host of a number of agricultural pests and diseases. This paper reports *Parthenium* weed being as an emerging host for cotton mealy bug in Pakistan. Efforts were needed to remove *Parthenium* weed from

cotton growing belt to minimize the damages caused by this pest to cotton crop in the season.

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