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**In collaboration with IOBC working
group on biological control and
management of parthenium weed.**

Malaysia Invaded: Weed it Out Before it is Too Late

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Parthenium weed (*Parthenium hysterophorus* L.) is an invasive and obnoxious weed, which is native to Mexico and South America. It has invaded many countries including India, Australia, Pakistan, South Africa, Ethiopia, Tanzania, Kenya, Papua New Guinea, Bangladesh, Nepal Bhutan and Sri Lanka. It has caused remarkable ecological and economical losses in those places. In India, the weed has been rated as the "Worst Weed" of the century. Until now no records have been made of its presence in Malaysia. However, very recently (03 September 2013) Prof. Dr. S. M. Rezaul Karim, from the Faculty of Agro-Based Industry, University of Malaysia, Kelantan in his preliminary survey found the weed to be present and infesting roadsides in Batang Kali, Selangor (Figs.1&2). The exact site was near the Masjid Hulu Yam Bharu, on the edge of Jalan B57 and also near the bank of Sungai Liam (Fig. 1). More recently this weed has been observed in another location, Sungai Petani, Kedah, also in Malaysia (Fig 3&4). The weed has been reported to have severe allergenic effect on human and animal health. In India, at least 11 people have died

due to the diseases caused by this weed. Among the probable human diseases are skin dermatitis and eczema, hay fever, itching and reddening of the skin, respiratory problems such as asthma, and bronchitis etc. In case of livestock, it may cause allergic inflammation of the mouth and udder, rashes on the skin, and ulceration of the mouth and digestive tract. In severe cases the animals may perish. When cattle and goats consume the weed, the quality of their milk becomes impaired having an unacceptable odour and the meat becomes tainted. Direct contact with the weed by the hands, feet or the ingestion of parthenium pollen through the nose are all dangerous to human and animal health (cited from Adkins, 2010) An allergy-induced mouth ulcer was observed on a goat by Prof. Karim during his survey and he noticed that the infestation site was close to a number of vegetable and water melon farms managed by a number of private companies (Fig 2).



Figure 1: Map showing the site (green arrow) where parthenium weed was observed in Batang Kali.



Figure 2: The site on which Parthenium weed was observed to be present in Batang Kali.



Figure 3: The site on which Parthenium weed was observed to be present in Sungai Petani, Kedah.

It is suspected that during importation of agricultural materials (seed, compost, implements etc.) from parthenium-infested countries the seed of the weed may have been introduced into the area. Since, nobody in that area was aware about this weed being an environmental pollutant, it has therefore remained undisturbed for some time and consequently has established. However, the population size of the weed at present is not so extensive and is controllable.



Figure 4: Closer view of the parthenium weed growing along a roadside in Malaysia.

It is recommended that an appropriate eradication programme be undertaken as soon as possible. Integrated weed management involving chemical control and physical removal should be undertaken. For protection during the control program workers should be well protected by covering their hands with gloves and face with a mask. After uprooting the weeds, they should be burned in a deep pit and then buried to a depth of at least 1 m. Community awareness should be adopted through different media channels to inform Malaysians on how they can

partake in the early detection, the eradication of this weed to avoid further populations establishing and becoming a potential ecological disaster.

Parthenium Weed Invasion in the Pacific: An Update from Vanuatu and PNG

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Sylverio Bule of Biosecurity Vanuatu spent a week in Brisbane working with Michael Day and other staff at the Queensland Department of Agriculture, Fisheries and Forestry, Invasive Plants and Animal unit at the Ecosciences Precinct, Brisbane (Fig. 1). While there, he collected *Zygogramma bicolorata* Pallister to import into the quarantine facility at Port Vila. Parthenium weed is found on only three islands in Vanuatu but it is becoming an increasing problem on Efate and Tanna islands and there is a real risk it will spread to other islands (Fig. 2). Introducing biocontrol agents should decrease the size of parthenium infestations and the risk of spread. Biosecurity Vanuatu is also considering importing the moth *Epiblema strenuana* Walker to aid control.

In PNG, staff at the National Agricultural Research Institute and the National Agricultural Quarantine Inspection Authority have inspected several sites where parthenium was present and report that the weed has still not appeared following its removal. Monitoring of these sites is on-going.

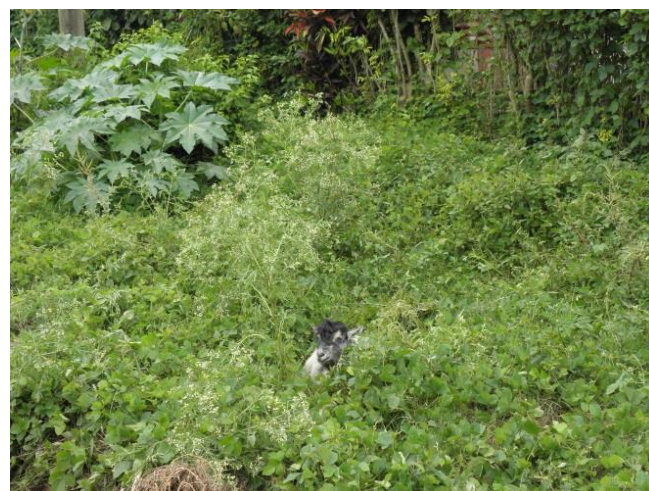


Figure 1: Parthenium weed invasion in Tanna Island, Vanuatu.



Figure 2: Mr. Sylvério Bule from Biosecurity Vanuatu, inspecting lantana in Brisbane.

Nationwide Survey for Parthenium Weed and its Biocontrol Agent *Zygogramma bicolorata* Completed in Nepal

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Rapid spread of parthenium weed (*Parthenium hysterophorus* L.) is an emerging environmental problem for Nepal with negative impact upon biodiversity and productivity of forests, productivity of grasslands and agro-ecosystems as well as having an impact upon human health. As an effort to understand the spatial pattern of distribution of parthenium weed and its biological control agent *Zygogramma bicolorata*, a team of researchers led by Bharat Babu Shrestha of the Central Department of Botany, Tribhuvan University, Kathmandu, Nepal conducted a nationwide survey along the main road network of Nepal in 2013. The survey scanned 4,100 km of road side vegetation and lasted for 7 weeks. The survey was supported financially by the International Foundation for Science (IFS), Sweden. With nearly a five decade-long invasion history of parthenium weed in Nepal, the weed was found widespread in the southern half of the country which includes the Tarai, Siwalik and the Mid Hills. The weed has already entered into all protected areas in the Tarai and Siwalik regions. *Zygogramma bicolorata* was also frequent but the damage inflicted upon the weed was relatively low. Photographs presented below highlight some of the activities during the survey and

their status of the parthenium weed and its biological control agent in Nepal.



Figure 1: Recording the occurrence of parthenium weed in western Nepal.



Figure 2: Fallow land colonized by parthenium weed in Birgunj, central Nepal

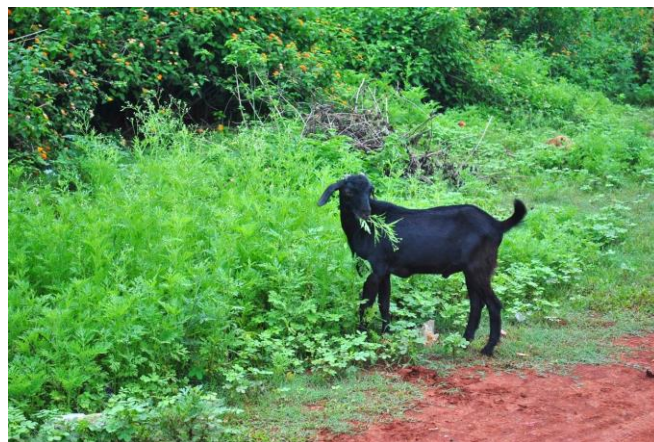


Figure 3: Parthenium weed eaten by goat in Hetaunda, central Nepal.



Figure 4: Response of local people when they know that the weed is harmful (Rautahat, central Nepal)



Figure 6: Leaf defoliation caused by *Zygodonta bicolorata* on parthenium weed plants.



Figure 5: A number of *Zygodonta bicolorata* beetles feeding on leaves of parthenium weed.



Figure 7: Grazing land invaded by parthenium weed in Surkhet, western Nepal.

Parthenium hystrophorus in Somaliland

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Crop farming in Somaliland is currently the second most important economic activity in the country, after livestock production, with up to 20-25% of the population depending on it for their livelihoods. Cropping is currently underdeveloped both for cereal and horticultural production. Parthenium weed (*Parthenium hystrophorus* L.) is an invasive weed widely distributed in Gabiley, Awdal, and Marodi jeh regions in Somaliland¹. Parthenium weed invaded Somaliland in about 1977 (about the time for the war

¹ **Somaliland** is an unrecognised self-declared that is not internationally recognized as an autonomous region of Somalia.
<http://en.wikipedia.org/wiki/Somaliland>

between Ethiopia and the Somali Democratic Republic) and was first seen in the Wajale region (a border region of Somaliland with Ethiopia). During the war soldiers used parthenium weed leaves as a medicine to stop bleeding. Since then the weed has spread rapidly to other parts of the country, negatively affecting plant diversity in many native communities.



Figure 1: Parthenium weed invasion in a rangeland of Somaliland.

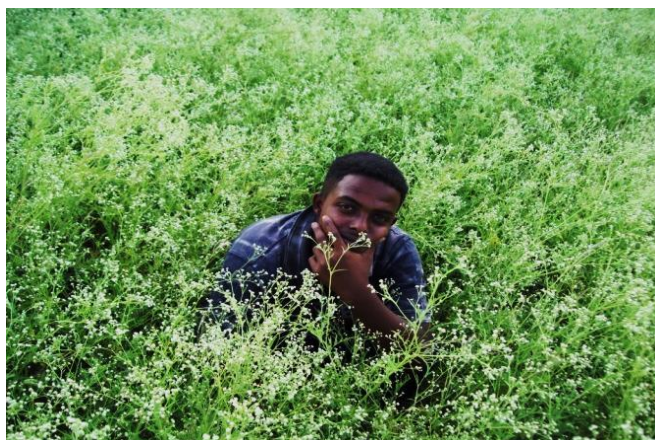


Figure 2: A local boy, unaware of the health hazards, sitting in a pure stand of parthenium weed.

Parthenium weed has become an extremely serious cropping and rangeland weed in the rural areas of Somaliland, and this problem has been the problem of Parthenium weed has been noticeable since 1977 and is continuing to affect farm production, human and animal health and the environment. Parthenium weed grows without intervention from farm workers due to a lack of knowledge of its noxious weed status. The Somali people have given it the name “Kelidii Noole” which means it does not allow other vegetation grow along with it in peace. Problems caused by parthenium weed have now become the biggest for farmers, the

Ministry of Agriculture, local NGO's and International organizations working on land management. Nobody is aware of the harmful effects of this weed.



Figure 3: Parthenium weed growing in a highly eroded and disturbed landscape.

Due to the lack of vegetation in some areas, people working for soil and water conservation see parthenium weed as a way to improve the landscape as the weed provides vegetation cover and holds the soil together, reducing erosion, but there is no awareness about the associated problems of the weed and the difficulties in controlling it once it is established.

Parthenium weed problems in milk

Livestock eat parthenium weed in the winter, when there is little or no alternative fodder available, and this causes the milk to become tainted and unfit to drink.



Figure 4: A cow grazing parthenium weed.

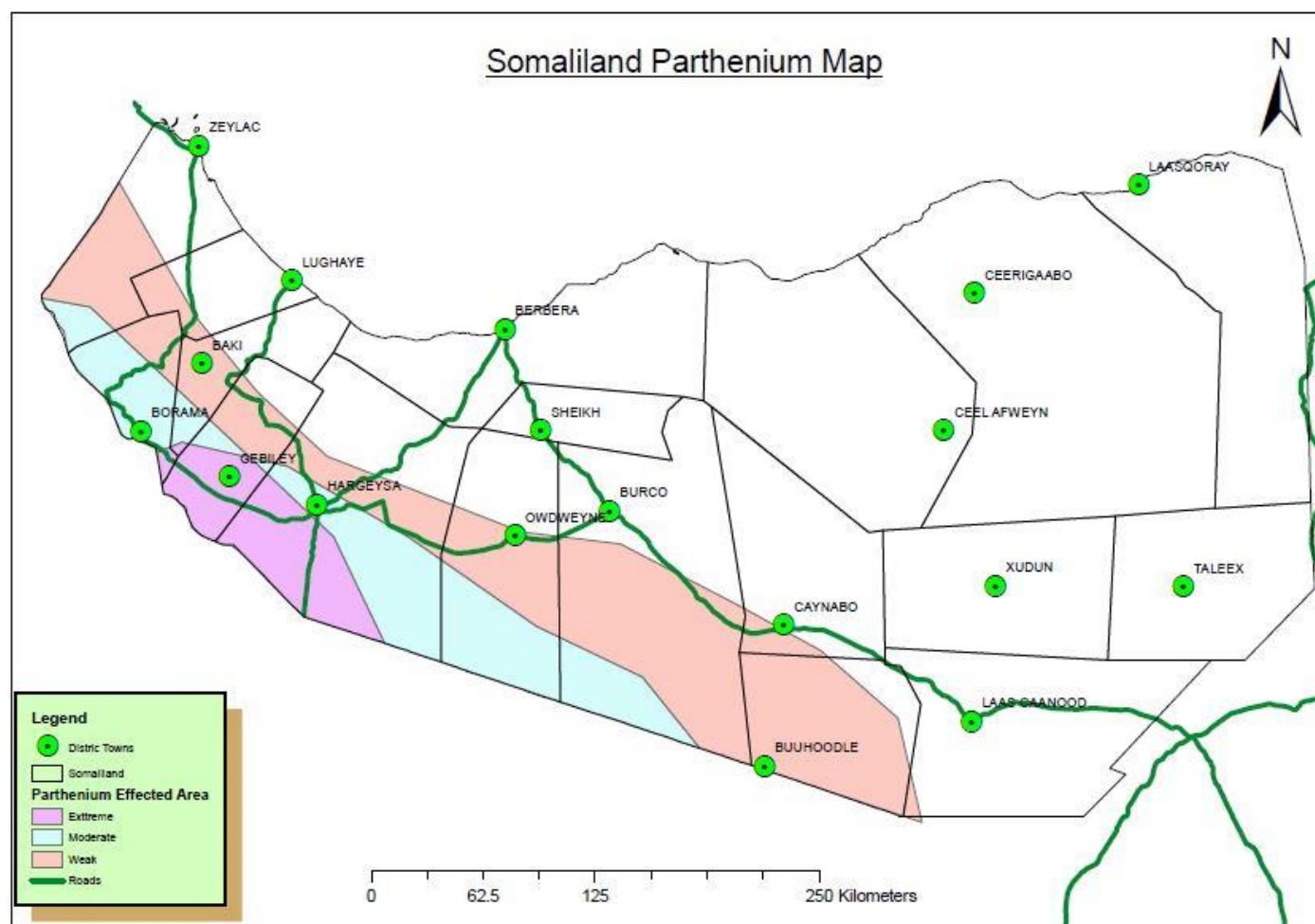


Figure 4: Map of the parthenium weed invaded areas of Somaliland.

A Report on the International Parthenium Weed Network Meeting, October 23, 2013, Bandung Indonesia.

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An International Parthenium Weed Network meeting was held at the Padjadjaran University Convention Hall Bandung Indonesia on the evening of the 23rd October 2013 during the 24rd Asian Pacific Weed Science

Society (APWSS) Conference held from 22-25th October 2013. The workshop was part of the activities of the International Parthenium Weed Network (IPaWN) and included brief country reports from a

none countries in the Asian-Pacific region that have parthenium weed and discussed a number of emerging parthenium weed issues. The workshop also aimed to develop opportunities for international research collaboration. More than 30 delegates from 15 countries participated in the workshop.

Dr Steve Adkins, Chair, IPaWN, started off proceedings with a brief presentation summarizing what we know about the present distribution of parthenium weed around the globe highlighting the modes and speed of its spread, the kinds of habitats that are becoming infested, the impacts it is having upon crop and pasture production, and upon human and animal health. The presentation concluded with a summary of the research collaborations that are presently underway around the globe and concluded with an open invitation to others to join into the future activities.

Dr Asad Shabbir, IPaWN Network Coordinator gave a presentation on the objectives, past activities and future plans of IPaWN. He reported that since its initiation in 2009, IPaWN has been a rapidly expanding network facilitating the exchange of information about parthenium weed and its management. Dr Shabbir encouraged the participants to visit the webpage of the IPaWN network. This webpage is linked to the official website of APWSS (<http://apwss.org/apwss-ipawn.htm>). All past issues of the international Parthenium Weed Newsletter and identification kit are uploaded to this website. He further described the recent (early) detection of parthenium weed in Malaysia as a success of the IPaWN network. The network was also working towards linking all regional working groups, institutions and other stakeholders with an interest in parthenium weed and its management into a common discussion group. To date there are more than 300 members from 30 countries. He also reported that IPaWN produces a 6-monthly International Parthenium Weed Newsletter and other useful publications which are posted online to all network members.

Dr A R Sharma, Director, Directorate Weed Science Research Jabalpur, India gave a brief overview of the parthenium weed problem in India. He outlined the ongoing research work on the awareness and management of parthenium weed in different States of India. He pointed out that further spread of the weed in the India may be reduced, through a national awareness, education and eradication campaign. He also discussed the increasing human and animal health problems that are occurring in India and a need for a coordinated effort to tackle this problem.

Dr Buddhi Marambi, Professor of Weed Science within the Faculty of Agriculture, at the University of Peradeniya, Sri Lanka gave a detailed report on the location of the parthenium weed infestations in his country and their effects upon the agriculture, forestry and horticulture of his country, as well as its effects upon human and animal health. Dr Buddhi supported the view that international collaborative efforts are needed to successfully manage this weed.

General Discussion and recommendations: After the conclusion of the country reports, a discussion took place involving all the participants with the following items generating the greatest discussion and in some cases, led to recommendations being made. The need for International Collaboration was seen as being critical for a better understanding and management of the weed.

1. Evaluation of the economic losses incurred due to the weed is seen as being important to help convince donor agencies at local and

international scale of the weeds importance. It was suggested to include economists in future projects on impact assessment studies on parthenium weed.

2. Parthenium weed has been detected in Malaysia through the networking efforts of the IPaWN, it is now high time for Malaysian authorities to start a survey and surveillance to detect the further spread of this weed and eradication programs within their country.
3. The need to educate the public about the health problems caused by the weed particularly those living in remote and rural areas.
4. Encourage more people to join the IPaWN, contribute to the Newsletter and to visit the website (<http://apwss.org/apwss-ipawn.htm>).

Upcoming Conferences on Weed Science and Invasive Species

International Conference on Invasive Alien Species Management

Dates: March 25-27, 2014

Venue: Sauraha, Chitwan, Nepal

Website: <http://ntnc.org.np/iciasm>

4th International Symposium on Weeds and Invasive Plants

Dates: 18-23 May 2014

Venue: Montpellier, France

Website:

<http://invasive.weeds.montpellier.ewrs.org/default.asp>

International workshop on biological control and management of *Parthenium hysterophorus*

Dates: July 13-17, 2014

Venues: Addis Ababa – Ethiopia first 2 days

July 13 – July 15, 8:30 am to 12:00 noon

Nexus Hotel <http://www.nexusaddis.com/>

Adama – Ethiopia second 2 days

July 15 – July 17, 8:30 am to 12:00 noon

Kereyu Hill Resort Hotel

<http://kereyuhillresorthotel.com/>

19th Australasian Weeds Conference 2014

Venue: Hotel Grand Chancellor, Hobart, Tasmania, Australia.

Dates: 1 Sept - 4 Sept, 2014

Website: <http://australasianweeds2014.com.au/>

8th Neobiota Conference

Dates: 3-8 November 2014

Venue: Antalya, Turkey

<http://www.oekosys.tu-berlin.de/menue/neobiota>

Recent Publications

Adkins, S and Shabbir, A (2014) Biology, ecology and management of the invasive parthenium weed (*Parthenium hysterophorus* L.). Pest Management Science, doi: 10.1002/ps.3708

Khan, N., Shabbir, A., George, D., Hassan, G. and Adkins, S.W. (2014) Suppressive fodder plants as part of an integrated management program for *Parthenium hysterophorus* L. Field Crops Research 156, 172-179.

Shabbir, A., Dhileepan, K., O'Donnell, C. and Adkins, S.W. (2013) Complementing biological control with

plant suppression: Implications for improved management of parthenium weed (*Parthenium hysterophorus* L.). Biological Control 64 (3), 270-275.

Nishanthan, K. S. Sivachandiran ?? and Marambe, B. (2013) Control of *Parthenium hysterophorus* L. and its Impact on Yield Performance of Tomato (*Solanum lycopersicum* L.) in the Northern Province of Sri Lanka Tropical Agricultural Research 25 (1): 56 - 68

Khan, N., O'Donnell, C., George, D. and Adkins, S.W. (2013) Suppressive ability of selected fodder plants on the growth of *Parthenium hysterophorus*. Weed Research (Oxford) 53 (1), 61-68.



Parthenium weed growing inside a field of a mixed fodder crop (maize-brassica) near the district Lahore of the Punjab, Pakistan (Photo by Asad Shabbir).