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Parthenium hysterophorus is Recommended for Regulation in European and Mediterranean Countries

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Parthenium hysterophorus has been identified as an emerging threat by the European and Mediterranean Plant Protection Organization (see www.eppo.int).

Within the European and Mediterranean area, the species is currently only officially known to be established in Israel. A Pest Risk Analysis (PRA) has been performed for this species, convening an Expert Working Group, to identify the pathways of entry, where the species could establish in the Euro-Mediterranean area, how and how fast the species could spread, as well as what its agricultural, environmental and social impacts could be. From this assessment, it appears that *Parthenium hysterophorus* could enter the EPPO region through numerous pathways: as a contaminant of used machinery, of grain, of seed, of growing media attached to plants for planting and of travelers. Climatic projection was undertaken using the software CLIMEX, and it appears that the whole Mediterranean basin, as well as the most thermophilous temperate areas, are at risk. Climate change would increase that risk.

Parthenium hysterophorus may have major economic impacts due to its negative effects on pastures and crops, as well as in protected areas and on human health (allergies and dermatitis). The species therefore qualifies as a quarantine pest, it is recommended for regulation to the 50 EPPO member countries, and adequate preventive measures were assessed through the Pest Risk Management part of the PRA. The EPPO Pest Risk Analysis records and reports are freely available on the EPPO website. Furthermore, an EPPO Datasheet on the species as well as an article summarizing the outcomes of the PRA will be published in the December issue of EPPO bulletin.

An EPPO Standard to set surveillance, eradication and containment programmes is currently under preparation and shall be presented for final approval and hopefully published in 2015.

References

EPPO Webpage on Lists of Invasive Alien Plants
http://www.eppo.int/INVASIVE_PLANTS/ias_lists.htm

EPPO Bulletin
http://www.eppo.int/PUBLICATIONS/bulletin/bulletin.htm

What's in a Name? The Conscious Decision to Choose "Famine Weed" As the English Common Name for the Invasive Alien Plant *Parthenium hysterophorus* in South Africa

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In South Africa, where *Parthenium hysterophorus* has only in recent decades become a problematic invasive alien plant species, it has been decided to call the species in English "Famine Weed" rather than to follow the Australian practice of calling it "Parthenium Weed" or the Indian practice of calling it "Congress grass". South Africa has 11 official languages and already it has been decided to call the species in IsiZulu, "Umbulalazwe" (which roughly translated means "The one that breaks everything") as this is the main language spoken in northern KwaZulu-Natal Province where the species is already becoming a serious problem. If, as appears likely, the species increases its distribution in Southern Africa into areas in which other local languages are mainly spoken, then it will probably be necessary to create appropriate "common names" for *P. hysterophorus* in the other languages as well. Fortunately, in the Eastern Cape Province, which lies directly south of KwaZulu-Natal and where the CLIMEX model predictions show the species is very likely to be able to invade considerable areas, the dominant local language is IsiXhosa and the author has tested the Zulu name with Xhosa-speakers and they all agree it is an excellent name for it in IsiXhosa as well, so this will simplify matters considerably. In this note I attempt to explain the rationale behind the conscious strategic decision not to simply call it "Parthenium Weed" or "Feverfew" in English, but instead to use the new common name "Famine Weed".

Do recently arrived alien plant species have "common names" in their invaded range?

It is axiomatic that a newly-arrived alien species cannot have an entrenched common name in the newly-invaded country as "common names" are by definition the names lay people commonly refer to the species which they recognise in their local environments. An exception might be an alien species which is common in cultivation globally and which has an internationally recognised "common name" in agriculture, horticulture or sylviculture. But for the vast majority of accidentally-introduced invasive alien species they will have no existing common names in the countries they invade. This contention is made even stronger by the reality that the languages spoken in the countries they invade are almost certainly different from the countries in which they are native and where they might well have legitimate "common names".

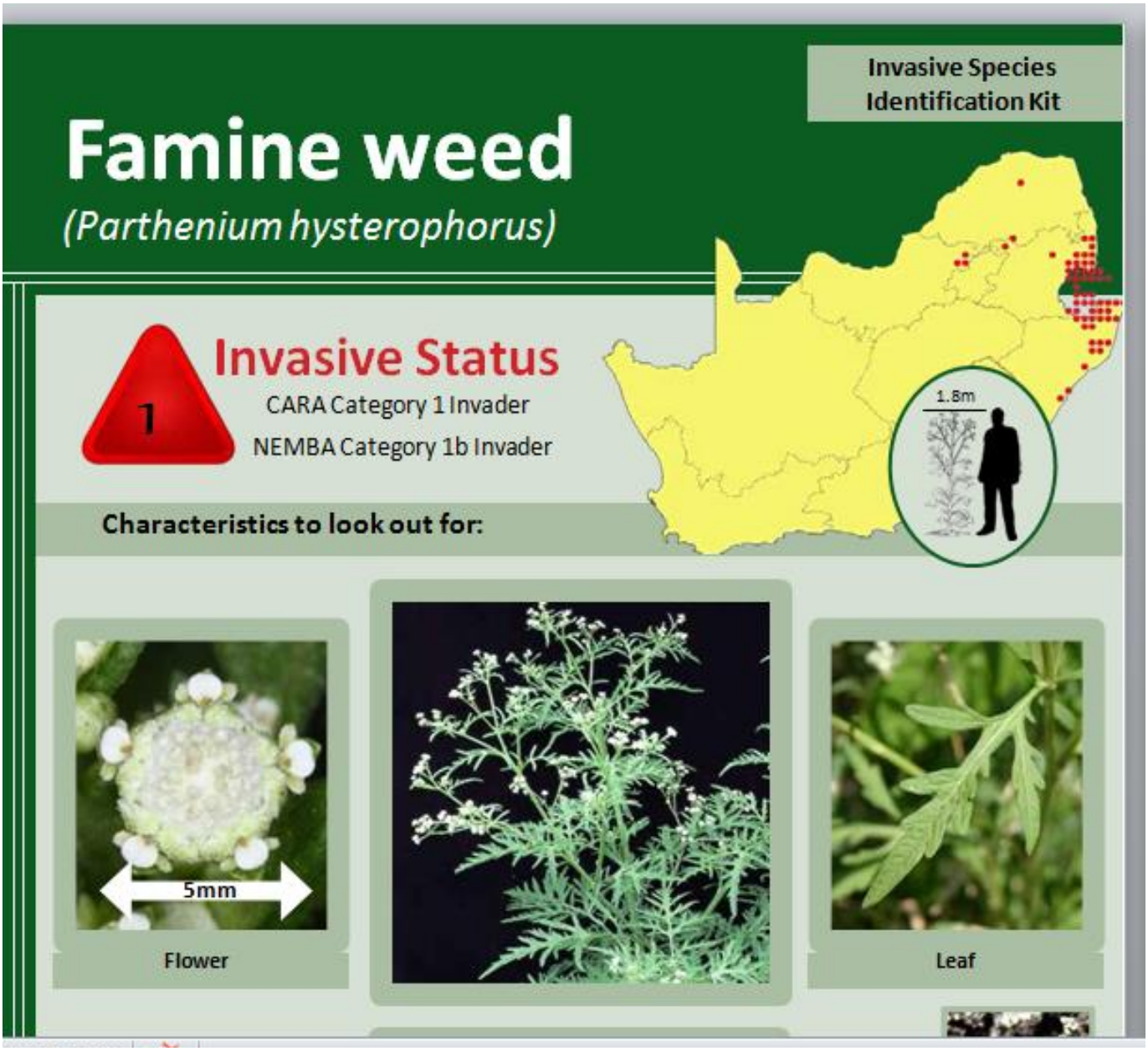
Is it a good idea to create Pseudo-common names by using versions of their scientific names?

As weed scientists around the world know invasive alien species by their scientific binomials it is often tempting for them to simply use an abbreviated version of this scientific name as their "common name" for the species. Examples are the globally invasive man-made invasive alien plant *Lantana camara* which is now very often just referred to as "Lantana" and, in South Africa at least, the highly invasive *Chromolaena odorata* which is now increasingly being spoken about simply as "Chromolaena" in weed management circles. It is my contention that this is a very unsound practice as (1) these scientific names are subject to change when taxonomies are revised (e.g. when I first started working on invasive alien species in South Africa in the late 1970s *C. odorata* was called *Eupatorium odoratum* and some of my colleagues were keen to call it "Eupatorium"! Fortunately, I insisted on calling it "Triffid Weed" then - as I still do today).

The lay public hates the way scientists keep changing scientific binomials just when they, at great effort, have managed to learn a few of them! You can imagine how they would hate it if the scientists demanded they relearn their common names as well! More importantly, (2) these scientific binomials are meaningless to the lay person. It is hard enough for lay people to learn the names of the bewildering array of plant and animal

species they come into contact with in their daily lives – let us not make it harder by using names which are totally devoid of meaning to the "common man"! This has become all the more so now that the vast majority of people no longer study Latin at school, as these scientific names are mainly based on this now archaic language in which even most modern taxonomists have no formal training. I personally think that this habit amongst some scientists dealing with invasive alien species of calling them by "pseudo-common names" based on their scientific binomials is mainly driven by laziness, but to a certain extent is also indicative of an "insider arrogance" which typifies many professions.

The top of the front page of South African Identification pamphlet for *Parthenium hysterophorus* (produced by numerous South African agencies working cooperatively led by the Natural Resource Management Programmes of the Department of Environmental Affairs with funding from the Expanded Public Works Programme – obtainable for free download at http://www.invasives.org.za/resources/downloadable-resources/viewcategory/70-famine-weed-parthenium-hysterophorus.html)



Examples of such "insider arrogance" from other professions are the use of Latin phrases in legal practice such as "*de jure*", "*de facto*" and "*sub judice*" and terms such as "*hypoglycaemic*" by medical practitioners. This "specialist jargon" is used by professionals to elevate their professions (and themselves) above the common realm. It is a highly undesirable practice in the arena of invasive alien species management where the success of control programmes almost invariable rests on all segments of society fully understanding what is happening and "buying in" to the management programme. Any practice which creates an "us and them" situation can only be bad for invasive alien species management.

Why we chose "Famine Weed" as the English common name for *Parthenium hysterophorus*

In 2001 when Lesley Henderson produced her excellent handbook "*Alien weeds and invasive plants: a complete guide to declared weeds and invaders in South Africa*" the English common names she listed for *P. hysterophorus* were "parthenium, feverfew, congress grass". However, in 2010 Clive Bromilow, in the third revised edition of his "*Problem Plants and Alien Weeds of South Africa*", listed only "parthenium" as the English common name but in the species' account he mentioned that in the Mpumalanga Province it was being called "Demoina Weed". This locally generated common name was based on the observation that *P. hysterophorus* only became common in the north-eastern areas of South Africa abutting the countries of Mozambique and Swaziland following severe flooding that affected these areas during Cyclone Demoina in 1984. The utility of this alleged "common name" is very dubious as already we have a whole generation in South Africa who know nothing about this cyclone with its Spanish woman's name!

However in the period 2006 to the present when I lived and worked in Northern KwaZulu-Natal, I found that virtually no members of the public knew about *P. hysterophorus* and certainly were not using any of these "common names" for it, even though it was becoming very common there. I also found that when I told people it was called "Parthenium Weed" they simply could not remember this name. At the same time Dr Arne Witt, working for CABI in East Africa, told us that the Ethiopians, whose country had been severely invaded by *P. hysterophorus* a few decades before South Africa, had developed a common name in their own language which roughly translated meant "if this plant comes into your area you will have to stop farming and move away". As Ethiopia is the country in Africa where famine has become a frequent recurrent phenomenon, we decided to shorten this Ethiopian name and translate it into a new English common name "Famine Weed" (Macdonald, in Carnie 2013). We tested this name on local people in northern KZN and found that they immediately took note of *P. hysterophorus* when we used this common name and, furthermore, they could remember this common name easily.

Adoption of the English common name "Famine Weed" in South Africa

The new common name was readily taken on board by the communication experts working on the national *P. hysterophorus* awareness campaign (see ID brochure above). At the first stakeholder workshop to develop a National Strategic Plan and Implementation Plan for *P. hysterophorus* in South Africa (held in KwaZulu-Natal in June 2014), the meeting discussed the issue of the species' English common name in South Africa and it was formally decided to promote the use of "Famine Weed" as the name of choice. One of the arguments made in support of the adoption of this common name, rather than the name "Parthenium Weed", was that the use of this new common name instantly gave one much more "traction" with decision-makers.

It remains to be seen if the use of this new common name "Famine Weed" will help South Africa to meet the enormous challenge that the rampant invasion of this extremely dangerous invasive alien plant poses for this nation.

References

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Carnie, T. 2013. KZN rhinos have bright pink lips – alien invader plant to blame. The Mercury 20 May 2013 p. 3., Durban, South Africa (www.themercury.co.za)

Henderson, L. 2001. Alien Weeds and Invasive Plants – A complete guide to declared weeds and invaders in South Africa. Plant Protection Research Handbook 12, Agricultural Research Council, Pretoria. 300pp. ISBN 1-86849-192-7

International Workshop on Biological Control and Management of *Parthenium hysterophorus* Addis Ababa and Adama, Ethiopia, 13-17 July 2014

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An International Workshop on parthenium weed was conducted in Addis Ababa and Adama, Ethiopia, on July 13-17, 2014. The workshop was sponsored by the IPM Innovation Lab, International Organization for Biological Control Working Group on Parthenium weed, and the Ethiopian Institute for Agricultural Research. Participants traveled from South Africa, CABI, Australia, Tanzania, Kenya, Uganda, USA, and Ethiopia.

Fig. 1 (From left to right): A farmer of Wollenchiti, Ethiopia, Sintu Alemayhu Chala of the Ethiopian Institute of Agricultural Research IPM IL parthenium project, Alana Den Breeyen, and Lorraine Strathie of the ARC-Plant Protection Research Institute, South Africa, examine larvae and stem-boring feeding damage on parthenium by the stem-boring weevil Listronotus setosipennis at the IPM IL mass-rearing centre near Wollenchiti.

Presentations ran the gamut of current parthenium weed research topics, including mass rearing of bioagents *Zygogramma bicolorata* and *Listronotus setosipennis;* integrated cultural and biological control measures; distribution of parthenium in Ethiopia, Uganda, and Kenya; and reviews of successful strategies implemented in Australia and South Africa. On July 16th, participants visited *Zygogramma bicolorata* field rearing facilities in Adama and field-released the beetles at two sites in Villenchiti. The Workshop continued with presentations on July 17th, which focused on monitoring and evaluating biological control of parthenium weed, baseline conditions of parthenium weed at *Zygogramma* release sites, and aspects of field implementation for biological control.

During the final session of the Workshop, participants discussed how to proceed as a continent. They came up with a list of recommendations to most effectively deal with the increasingly serious problem of parthenium in Africa.

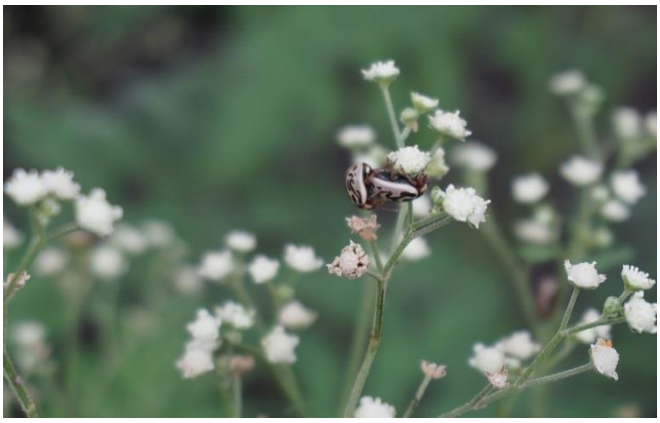

Figure 2: Adults of the leaf-feeding beetle Zygogramma bicolorata, being mass-reared at Wollenchiti, Ethiopia for release.

Fig. 3: Official release of the leaf-feeding beetle Zygogramma bicolorata, near Wollenchiti, Ethiopia with Dr Wondi Mersie, the IPM Innovation Lab Parthenium project coordinator, and project partners and international workshop participants, 16 July 2014.

Recommendations

1. The International Workshop on Biological Control and Management of Parthenium, and the Second Parthenium Workshop of the Working Group of International Organizations for Biological Control commend the various International and local funders, project partners

and agencies in the U.S.A., Ethiopia, South Africa, Australia and Kenya for their support of biological control of parthenium weed in Ethiopia.

2. It recognizes parthenium weed to be one of the most invasive weeds in Eastern and Southern Africa, affecting crop and animal production, the environment and health.

3. It recommends that national, regional, and International organizations get involved (provide resources), increase awareness and take necessary steps to mitigate adverse impacts caused by this weed, and to prevent its further spread in Africa.

4. Countries wherein this weed has already invaded should take up biological control without further delay. Governments are encouraged to establish policies for the introduction, evaluation and release of biological control agents, and to utilize existing data from other countries.

5. In countries with parthenium weed and other established invasive species infestations, coordination of activities at a national and regional level are encouraged, through the establishment of a working group. Working groups should identify gaps and required resources for management.

6. Sharing of information in central databases and the utilization of links is encouraged.

Recommendations carried through from the 1st IOBC International Workshop on Biological Control and Management of parthenium weed held in Nairobi, Kenya in November 2010:

7. While *Zygogramma bicolorata* is recognized as an effective biological control agent of *Parthenium hysterophorus*, there are several other agents available in Australia which should be considered for introduction in countries where *P. hysterophorus* is a problem.

8. Where feasible, combined workshops of the IOBC Working Group on Parthenium Weed with the IOBC Working Group on Chromolaena and other Eupatorieae, and/or the International Conference on Parthenium Weed should be considered for future meetings.

9. The IOBC Parthenium Working Group, IPM Innovation Lab Parthenium Project and International Parthenium Weed Network to consider development of a Parthenium Weed website.

10. Countries in West Africa, Indochina and Pacific should monitor possible introduction of Parthenium from countries where it is present and take up immediate eradication measures when found.

11. Governments of countries where Parthenium has established in recent years are encouraged to declare it as a noxious weed.

A Successful First Season of Insect Agent Releases on Parthenium Weed in South Africa, and Other Biological Control Activities

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After receiving approval to release the stem-boring weevil *Listronotus setosipennis* (Coleoptera: Curculionidae) and the leaf-feeding beetle *Zygogramma bicolorata* (Coleoptera: Chrysomelidae) on *Parthenium hysterophorus* (parthenium weed) in South Africa in June and August 2013, respectively, mass-rearing of these agents was undertaken at ARC-PPRI Cedara in KwaZulu-Natal (KZN) Province. During the 2013/2014 summer, rearing and releases on parthenium ensued in earnest, and initial releases focused on the KZN and Mpumalanga Provinces, which are extensively invaded in parts. Parthenium weed is present to a lesser degree in the North-West and Limpopo provinces in South Africa, and neighbouring countries of Swaziland in particular, as well as Mozambique and Zimbabwe.

Between July 2013 and January 2014, 4044 *L. setosipennis* adults were released at 19 sites in KZN and at 11 sites in Mpumalanga Province. Between August 2013 and April 2014, 9600 adults and larvae of *Z. bicolorata* were released at 36 sites in KZN and 19 sites in Mpumalanga provinces. In collaboration with CABI Africa, ARC-PPRI also provided 2000 *Z. bicolorata* beetles (1000 adults and 1000 larvae) for the first release of this agent in Tanzania, at several sites near Arusha on 1 October 2013, and a further 1200

adult beetles were supplied in January 2014. In February 2014, 79 of these release sites were monitored in South Africa. *Zygogramma bicolorata* eggs, larvae and adults were quantified and defoliation levels were rated, while at sites where *L. setosipennis* had been released, oviposition and larval feeding damage in stems were quantified. *Zygogramma bicolorata* was present at about 50-60% of the release sites in KZN and Mpumalanga Provinces, while *L. setosipennis* was present at about 45% of the release sites in KZN and at all of the Mpumalanga Province release sites.

Fig. 1: Extensive defoliation by *Zygogramma bicolorata* near Malelane, Mpumalanga Province.

It is possible that the agents may in fact be present at sites where they were recorded as absent during the brief monitoring survey, but at levels that were too low to detect at that time. As anticipated, abundance at release sites varied, with none or only very low numbers of individuals at some sites, while at a limited number of sites more than 100 *Z. bicolorata* beetles or more than 1000 *L. setosipennis* eggs were observed on plants during the 30-minute search period.

Fig. 2: *Listronotus setosipennis* larval feeding damage in parthenium stem in KZN Province

At a few sites, mainly in Mpumalanga Province, *Z. bicolorata* had entirely defoliated areas of about 30 x 20 m, spreading outwards from release points. Such encouraging damage levels by *Z. bicolorata* were not observed for a number of years after releases in Australia. There was promising persistence of both agents after the first season of releases in South Africa. It remains to be seen how successfully these agents will have overwintered; release sites will continue to be monitored and establishment will be confirmed during summer 2014. Releases of 3800 *Z. bicolorata* adult beetles and 300 *L. setosipennis* adult weevils in Mpumalanga and KZN Provinces have continued to a lesser degree between July and September 2014 during a particularly prolonged dry winter season when parthenium weed is scarce. The South African Sugarcane Research Institute's Weed Biological Control Unit near Durban, as well as other facilities to be developed, will also be involved in the near future to increase mass-rearing capacity for continued releases.

As a suite of natural enemies are required for the management of parthenium weed, other biological control activities have continued in South Africa. Following the conclusion of host-specificity testing on

the seed-feeding weevil *Smicronyx lutulentus* (Coleoptera: Curculionidae) at ARC-PPRI Cedara, an application for permission to release this agent is to be assessed by the appointed National biological control review committee in November 2014. This agent has been shown to be host specific to *P. hysterophorus*, following no-choice tests on 38 species, as well as 11 commercial cultivars of *Helianthus annuus* (sunflower) and several species of other indigenous and economically important Asteraceae in South Africa. This weevil will complement the existing suite of natural enemies in the field, including the two rust fungi *Puccinia abrupta* var. *partheniicola* and *P. xanthii* var. *parthenii-hysterophorae*, and *Z. bicolorata* and *L. setosipennis*.

Fig. 3: Field visit with visiting scientists in Malelane, South Africa. From left to right: Dr Alec McClay (Canada), Dr Rachel McFadyen (Australia), Dr Andrew McConnachie (ARC-PPRI), Dr Bill Palmer (Australia), Mrs Kathleen Saunders (DEA NRMP, Mpumalanga), Dr K. Dhileepan (Queensland DAFF, Australia), Ms Daleen Strydom (DEA NRMP, Mpumalanga), Dr Alana den Breeyen (ARC-PPRI)

In April 2014, ARC-PPRI researchers undertook surveys in Central Queensland, Australia, with Mr Mariano Trevino and Dr K. Dhileepan and Dr Olusegun Osunkoya of Biosecurity Queensland DAFF, to collect a starter culture of the root crown-boring moth *Carmenta* sp. nr. *ithacae* (Lepidoptera: Sesiidae), which had been prioritized for importation into South Africa. About 700 parthenium root stocks with developing larvae and pupae of this day-flying moth were collected and a culture has been established at ARC-PPRI Cedara, to initiate host-specificity testing to assess its suitability for release. Although initial establishment of *C.* sp. nr. *ithacae* following releases during 1998 to 2002, was slow and fairly restricted in Queensland, in the interim the moth's extent and effect appears to have increased considerably. Parthenium weed root stocks with evidence of *Carmenta* larval tunnelling were collected from 10 sites in Central Queensland during April 2014. *Carmenta* sp. nr. *ithacae* was fairly widespread, occurring from around the Nebo area (22° S) through to Moolayember Creek (25° S) and from Wycarbah (150° E) through to Clermont area (147° E), in varying abundance. The moth was present in high numbers at some sites, in particular at a site near Capella, where nearly every second plant displayed signs of larval tunneling, and multiple individuals per plant. Tolerance of a variety of conditions throughout the range was evident: larvae were present in narrow and broad-stemmed plants; in young and in mature plants; in isolated plants and in dense stands; in hot, dry conditions; and in plants growing in sandy soils and in black, cracking-clay soils.

Fig. 4: Parthenium stem with characteristic damage (exit hole at base of stem where stem pith shavings are pushed out by larval tunneling, onto soil surface) by *Carmenta* sp. nr. *ithacae* larva in Queensland, Australia

Interest in the management of parthenium weed in South Africa has increased in recent years as the weed continues to invade parts of the country, affecting agriculture, biodiversity conservation and human health. During March 2014, an informative one-day Workshop on parthenium weed was held at Krantzkloof Reserve, KZN with visiting scientists, Dr Rachel McFadyen from Australia and Dr Alec McClay from Canada, and about 50 stakeholders from South Africa

and Swaziland. The workshop included presentations on native range findings on parthenium weed and its natural enemies in Mexico, the successful biological control and management of parthenium weed in Australia, current research and management activities underway on parthenium in South Africa and Swaziland, and discussions around these topics.

A process to develop a National Strategy and an Implementation Plan for the management of parthenium weed (referred to as 'famine weed') in South Africa has been underway intensively since April 2014. This framework is being compiled for the National Department of Environmental Affairs Natural Resource Management Programmes by an independent consultant, Ms Colette Terblanche, via the South African National Biodiversity Institute (SANBI) and ARC-PPRI. The main objectives of this process are to prevent the spread of parthenium into uninvaded regions, and to reduce infestations in priority areas, using various management methods. Other elements include improving public awareness, developing best management practices, and ensuring coordination of efforts to manage the weed. The process has included two stakeholder workshops, in KZN and Mpumalanga Provinces, to obtain inputs into key components of the National strategy and implementation plan. Biological control is addressed as a component of the national strategy and presented in greater detail in the implementation plan, and is proposed to be particularly useful in the zone where parthenium infestations are dense and extensive, namely in northern KZN and from Malelane eastwards in Mpumalanga Province. In this zone, chemical control operations are likely to be restricted to the protection of key assets mainly (e.g. areas protected for biodiversity conservation, schools, clinics and road networks), as it is impractical to chemically treat the entire area invaded in this zone due to the extent and density of the infestations. Stakeholders have recently provided comments on a draft version of the documents, and after further local and international reviews, the national strategy and implementation plan will be concluded by the end of October 2014. Biological control continues to be recognized as a critical control option for the sustainable management of parthenium in South Africa, as concern grows for the need for management interventions on this plant.

Ms M. Gareeb, Mr S. Sambo, Ms L. Khumalo, Mr D. Nkala and Mr S. Mqolombeni, of ARC-PPRI Cedara, are thanked for technical support. Ms D. Strydom, Ms K. Hope, Ms Z. Shoba, of the Department of Environmental Affairs Natural Resource Management Programmes and Ms K. Trumpelmann of Lowveld Pest, Disease and Variety Control are thanked for assistance with field releases. Dr R. McFadyen, Dr K. Dhileepan of Biosecurity Queensland DAFF, Mr M. Trevino and Dr A. McClay are thanked for their advice and assistance. Financial support by the Agricultural Research Council, the Department of Environmental Affairs Natural Resource Management Programmes, and in-kind contribution by the KwaZulu-Natal Department of Agriculture are gratefully acknowledged.

Parthenium Weed Status and Control in Malaysia

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Early this year (February 2014) people from the Plant Bio-Security Division of Ministry of Agriculture, Kuala Lumpur, Malaysia undertook an initiative to control parthenium weed in Batang Kali, Selangor, Malaysia. In collaboration with the Agricultural Chemicals Malaysia Ltd. (ACM) they sprayed glyphosate on the known infested spots. Although all the herbicide-treated weeds in the identified spots died, some of the isolated weed populations, not known to exist at that time, escaped untreated. The weed is now growing fast in these untreated areas.

Fig. 1: More parthenium weed growing at Batang Kali

Moreover, from the seed bank study of the infested areas of Batang Kali Prof. R. Karim (Universiti Malaysia Kelantan) with his team has recently (July 2014) found that in the heavily-infested areas (3 or more weeds m^{-2}) the weed seeds in the soil at depths of 0 to 5 cm are in range of 846 to 1807 seeds ha^{-1}, in the medium infested areas (1to 2 weeds m^{-2}) the weed seeds at the same depth were in the range of 230 to 279 seeds m^{-2} and in the less infested areas (<1 weed/m^2) at that shallow depth of soil the weed seeds are 90 to 183 seeds m^{-2}. Some seeds (19 to 80 m^{-2}) were also noticed at the depth of 10 to 15 cm.

Control of Parthenium weed in an Urban Town of Faisalabad, Pakistan

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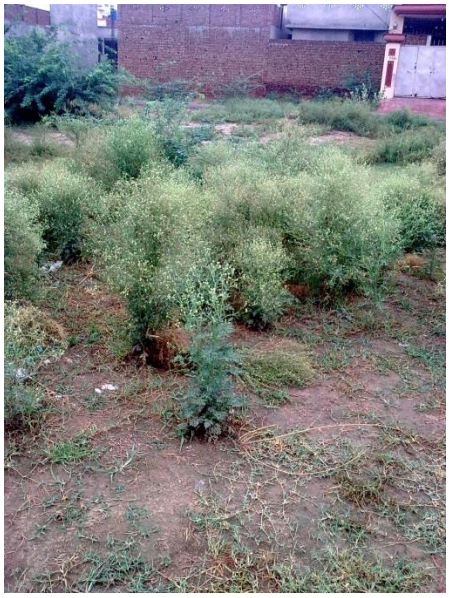
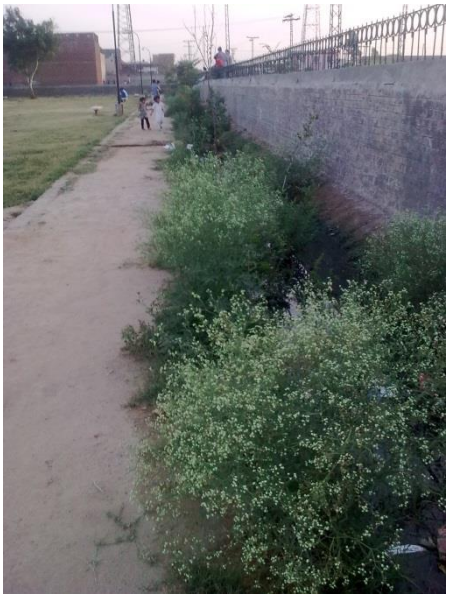
Parthenium weed was introduced in Pakistan about two decades ago. The possible mode of introduction may be through seed attached to the vehicles coming from infested areas along the Indian border. In the last 10 years, it has spread drastically from eastern areas to the north western and central regions of Pakistani Punjab. It has infested rail, road and canal sides. It is also found in field crops and abandoned fields. Interestingly, It is also commonly noticed growing in metropolitan cities like Lahore, Islamabad and Faisalabad. Here, I would like to share a story that how we managed this weed in our town (University town) comprising of 20 hectares.

In March 2012, I started constructing my house in University town and I observed just few plants of Parthenium weed in the town. While a heavy infestation of this weed was present in an adjacent town (Millat town). I decided to start a manual and mechanical weed control approach in our town and directed our staff to uproot all the parthenium weed plants and keep vigilance that no more parthenium weed plant emerge. It is now more than 2.5 years and our town is still free of parthenium weed. Some pictures of the parthenium weed-invaded Millat Town and that of the weed-free adjacent University Town are shown below. We can manage this weed in our town and cities by self-help and starting an awareness campaign.


Upcoming Conferences on Weed Science and Invasive Species

8th Neobiota Conference
Dates: 3-8 November 2014
Venue: Antalya, Turkey
http://www.oekosys.tu-berlin.de/menue/neobiota

17th European Weed Research Society Symposium
Dates: 23-26 June 2015
Venue: Montpellier SupAgro, France
http://ewrs2015.org

18th International Plant Protection Congress
Dates: 24-27 August 2015
Venue: Berlin, Germany
http://www.ippc2015.de

13th Queensland Weed Symposium
Dates: 14-17 September 2015
Venue: The Civic and Cultural Centre Longreach Qld AUSTRALIA
http://event.icebergevents.com.au/qws-2015

EMAPi 2015: 13th International Conference Ecology and Management of Alien Plant Invasions
Dates: 20-24 September 2015
Venue: Waikoloa Beach Marriott Resort & Spa Hawai'i Island, USA
http://www.emapi2015.hawaii-conference.com/

25th Asian Pacific Weed Science Society Conference
Dates: 13-16 October, 2015
Venue: Hyderabad, India
http://isws.org.in/apwss.aspx

Recent Publications

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