

SAPIA NEWS

SOUTHERN AFRICAN PLANT INVADERS ATLAS

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Inside this issue:

Editor and SAPIA co-ordinator:
Lesley Henderson
ARC-PPRI, Weeds Division
c/o SANBI
Private Bag X101
Pretoria
0001
South Africa

e-mail: L.Henderson@sanbi.org.za
Tel: 012 843 5035
Fax: 012 804 3211
website:
www.agis.agric.za/wip

Flavours of the month: Spain and South Africa

Spain won the Soccer World Cup in South Africa on 11 July–Well done, Spain! We hope that this will further good relations between the two countries. Did you know that Spain and South Africa have been invaded by plants from each other's country? Similar climatic conditions in parts of the countries, especially those areas with a Mediterranean climate, with their hot and dry summers and cold, wet winters, have favoured the exchange of plants between these two countries.

Spanish broom (*Spartium junceum*) (Family Fabaceae), a common ornamental plant in South Africa, is becoming increasingly invasive in the Western Cape; and the South African Cape figs, vygies or ice plants (*Carpobrotus acinaciformis* and *C. edulis*) (Family Mesembryanthemaceae), are invasive in the coastal region of Spain.



Spanish broom

Cape fig /vygie /ice plant

More ties between SA and Iberian Peninsula

Spain and Portugal share many invasive alien plant species with South Africa. Some of the most important species include the Australian wattles or acacias (*Acacia cyclops, A. dealbata, A. longifolia* and *A. saligna*).

In recent years South Africa has assisted Portugal with the implementation of a biological control programme for the invasive long-leaved wattle (*Acacia longifolia*) using the flowerbud-galling wasp (*Trichilogaster acaciaelongifoliae*). The same programme has been very successful in South Africa in preventing flowering and hence seed set.

Photo: J.H. Hoffmann

Photo: S. Neser

Lantana control recommendations

A.J. Urban, ARC-Plant Protection Research Institute

BACKGROUND

Lantana (*Lantana camara* hort.) (**photo 1**) is widespread in South Africa (**photo 2**) and *must* be controlled because it is a CARA Category 1 weed that transforms indigenous vegetation into an impenetrable thicket which diminishes natural pasturage (**photo 3**), reduces productivity of stock farming, poisons cattle (**photo 4**), obstructs access to water sources and plantations, suppresses biodiversity, devalues land, and control is required by law.

It is *extremely* difficult to kill lantana, because it comprises a variety of vigorous, prolific, bird-dispersed, polyploid hybrids (with extra sets of genes) that are resistant to drought, frost, fire, insects, pathogens, browsing and herbicides – it dies back, but the parent plant coppices, seeds germinate (better in the sun) and the infestation becomes denser.

The *aim* is to get rid of lantana and restore the indigenous vegetation. For getting rid of lantana, two options are *not recommended*: reliance on biological control *alone* (because it results in the lantana infestation becoming steadily worse), and the use of fire (too unspecific, ineffective and ecologically damaging).

Quick and easy treatments are a waste of time and money. Getting rid of lantana requires a very thorough and persistent approach.

The following recommendations using **mechanical-plus-chemical control**, are based on experience gained with lantana in South Africa and Australia. For cost-effectiveness, *all* invasive alien plants that occur in the same area as the lantana should be treated at the same time.

CONTROL

Initial Clearing: Cut the weed down to the ground, using loppers or a pruning saw, to remove nutrient reserves. Paint immediately, five times, with a herbicide, using a squeeze-bottle (**photo 5**). Registered herbicides: imazapyr (*Chopper* or *Hatchet*), picloram (*Access* or *Browser*) or fluroxypyr/picloram (*Plenum*). Dilute the herbicide according to instructions on label. Preferably cut and paint when plants are growing actively, but it may also be done during winter using imazapyr, which has longer persistence.

Follow-up Treatment: This is always absolutely essential. Hand-pull or Spot-spray all weed regrowth when it is 0,5-1,0 m tall, using *Access*, *Browser* or *Plenum*. These herbicides are selective: they harm broadleaved plants, but not grasses. Avoid spraying non-target broadleaved plants such as indigenous plants and crops.

Annual Maintenance: Scout for weed regrowth every spring/early summer, and treat as immediately above.

General: Do not rely on biocontrol alone for lantana (see below). Do not disturb the soil, because that creates a seedbed for weeds to germinate in and facilitates soil erosion. Do not destroy indigenous plants, because they compete with weeds, and provide various, valuable ecosystem services. If there are big bare areas, rehabilitate them using local indigenous grasses, to impede weeds, restore grazing and prevent erosion.

Biological Control: Unfortunately, the dozen or so biocontrol agents that are established on lantana do not kill the weed (**see photos on page 5**), nor do they stop the infestation densifying and spreading. Reliance on biocontrol *alone*, results in the lantana infestation becoming steadily denser and more widespread. The **biocontrol agents are nevertheless of value, because they do reduce the rate of growth and reproduction of lantana, its rate of densification and spread, and the frequency and cost of mechanical-plus-chemical control.**

For more detailed guidelines contact Dr Alan Urban at Weeds Research, ARC-Plant Protection Research Institute, Private Bag X134, Queenswood 0121, Pretoria, South Africa. Tel: 012 356 9843. E-mail: UrbanA@arc.agric.za


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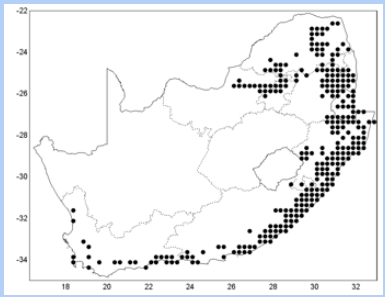
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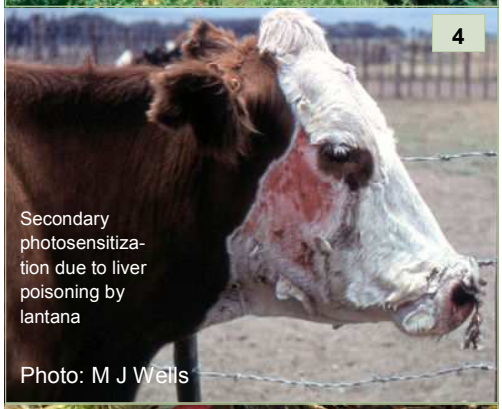
Photo: S. Neser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Secondary photosensitization due to liver poisoning by lantana

Photo: M J Wells

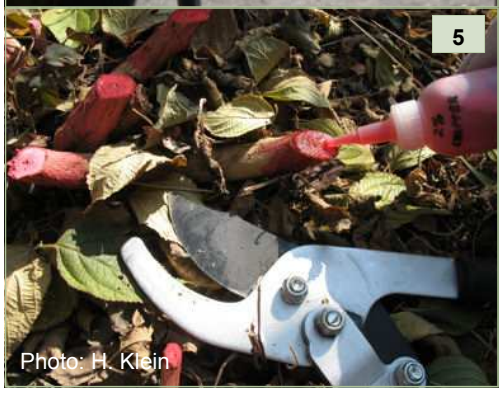
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Photo: H. Klein

Tribute to Michael John Wells (1935–2010)

Michael John Wells, or Mike to most of his staff and work colleagues, was a remarkable man who made a huge contribution to weed science in South Africa and in particular did much to create awareness of weeds and invasive plants. He lay the foundations for much that has been achieved today in the field of weed science. It was his mentorship and inspiration that led to the development of roadside survey techniques for recording invasive alien plants which ultimately culminated in the Southern African Plant Invaders Atlas (SAPIA) project.

Mike started his employment at the Botanical Research Institute in 1956 and was based at the University of Natal. He later transferred to the Albany Museum in Grahamstown where he was Officer in Charge. In 1969 he was transferred to Pretoria where he took charge of the Economic Botany section. Apart from economically important plants, much attention was focused on problem plants, especially introduced weeds. He led the campaign against the South American invasive grass, nassella tussock (*Nassella trichotoma*) and compiled the National Weed List which eventually was incorporated within 'A catalogue of problem plants in southern Africa'. Mike retired from the institute, then the National Botanical Institute, in 1993.

Mike was a founder member and a major driving force in the Southern African Weed Science Society (SAWSS) and served as its president for at least two terms: from 1988–1989 and 1993–1994.

Mike Wells and Carina Cilliers leading an excursion after 6th National Weeds Conference, July 1984

Some of Mike Wells' publications on weeds and invasive plants:

HENDERSON, L. & WELLS, M.J. 1986. Alien plant invasions in the grassland and savanna biomes. In: I.A.W. Macdonald, F.J. Kruger & A.A. Ferrar (eds), *The ecology and management of biological invasions in southern Africa,* pp.109–117. Oxford University Press, Cape Town.

WELLS, M.J. 1976. Nassella tussock threatens you. *Department of Agriculture Brochure.*

WELLS, M.J. 1977. Progress with research on Nassella tussock. *Proceedings of the Second National Weeds Conference of South Africa* 47–55.

WELLS, M.J. 1978. What is a weed? *Environment RSA* 5 (11): 6.

WELLS, M.J. 1978. Nassella tussock. In: C.H. Stirton (editor), *Plant invaders: beautiful but dangerous*, pp. 140–143. The Department of Nature and Environmental Conservation of the Cape Provincial Administration, Cape Town.

WELLS, M.J., BALSINHAS, A.A., JOFFE, H., ENGELBRECHT, V.M., HARDING, G. & STIRTON, C.H. 1986. A catalogue of problem plants in southern Africa. *Memoirs of the Botanical Survey of South Africa* No. 53.

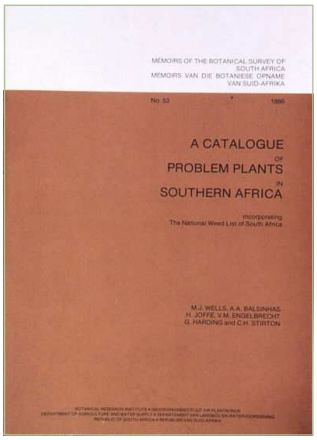
WELLS, M.J., DUGGAN, K.J. & HENDERSON, L. 1980. Woody plant invaders of the central Transvaal. *Proceedings of the Third National Weeds Conference of South Africa, 1979,* pp. 11–23. Balkema, Cape Town.

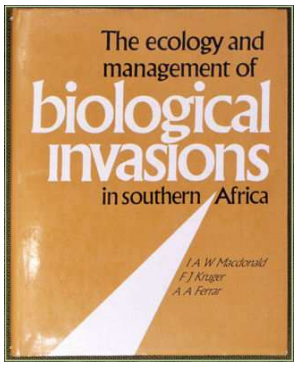
WELLS, M.J., ENGELBRECHT, V.M., BALSINHAS, A.A. & STIRTON, C.H. 1983. Weed flora of South Africa 1: major groupings. *Bothalia* 14: 945–948.

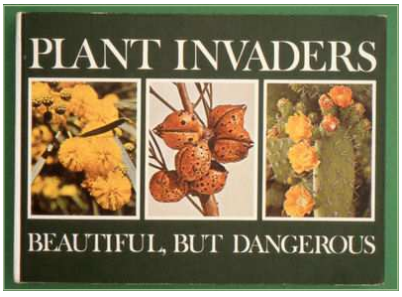
WELLS, M.J., ENGELBRECHT, V.M., BALSINHAS, A.A. & STIRTON, C.H. 1983. Weed flora of South Africa 2 & 3: power shifts in the veld. *Bothalia* 14: 961–965, & 967–970.

WELLS, M.J., POYNTON, R.J., BALSINHAS, A.A., MUSIL, K.J., JOFFE, H., VAN HOEPEN, E. & ABBOTT, S.K. 1986. The history of introduction of invasive alien plants to southern Africa. In: I.A.W. Macdonald, F.J. Kruger & A.A. Ferrar (eds), *The ecology and management of biological invasions in southern Africa,* pp. 21–35. Oxford University Press, Cape Town.

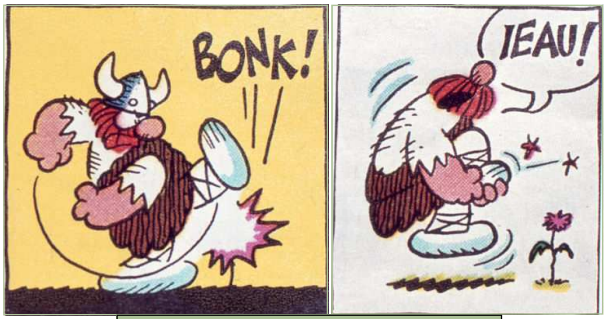
WELLS, M.J. & STIRTON, C.H. 1988. *Lantana camara* a poisonous declared weed. Weeds/Onkruid A.27/1988. *Farming in South Africa.*







Mike Wells was a man of many talents and interests. He was a botanist, artist, writer, poet, photographer, organizer, historian, humanitarian, gardener, cook and whisky connoisseur. His oral presentations at congresses were always well received because they were informative, well illustrated and usually included a touch of humour.



Weeds are tough plants to deal with!

Nassella tussock (*Nassella trichotoma*) threatens you!

Compiled by L. Henderson largely from publications by M.J. Wells
Photos by M.J. Wells

Nassella tussock (*Nassella trichotoma*) (= *Stipa trichotoma*) (**photo 1**), also known as serrated tussock or just nassella, is a South American grass that probably entered South Africa as a contaminant of hay during the Anglo-Boer War (1899–1902). It has invaded South Africa, as well as mainland Australia, Tasmania, New Zealand, some states in the USA and parts of southern Europe.

Nassella completely replaces nutritive grazing with useless, valueless tussock. The sharp awns on the seeds severely irritate the skin of young lambs and death of animals is caused when nassella fibres cannot be digested and completely block the gut.

Nassella can spread rapidly if the natural plant cover is disturbed. It also invades cultivated pastures such as lucerne, making them unproductive and uneconomic to maintain. Nassella's vigorous growth, its high seed production and the long viability of its seed, make it an enduring menace in any area it has invaded. Efficient dispersal of nassella by wind, water, stock and other agencies increase the danger of the plant. Mature seedheads break off and can be blown 30 km or more by wind to invade remote mountains.

Nassella can force farmers off the land, and jeopardize the economy of the country, if it is not contained. Currently 21 herbicides are registered for control of nassella. Of equal importance to spraying is the re-establishment and recovery of natural grazing to provide competition with the invasive grass. Farmers should be on the lookout for any new infestations and eradicate single tussocks before they can produce seed.

Nassella prefers high rainfall areas of more than 500 mm per annum. It often invades the wetter ridges first, and then spreads to adjacent, lower and drier slopes. In the 1970s and 1980s there was a rapid invasion of land in the eastern (**photo 2**) and southern Cape. Wells estimated that 36% of the land area of South Africa is endangered. **What is the status of nassella today?**

How to recognize nassella tussock:

- Densely tufted, perennial grass up to 60 cm high; mature tussocks droop and appear as though they have been lain on (**photo 1**).
- Leaves tightly rolled, bristly, and harsh to touch downwards. Ligule (junction of blade and sheath): papery 0.5–1 mm long, without a ring or tuft of hairs.
- The inflorescence is open, loosely branching, at maturity standing well clear of the leaves, Nov–Dec; breaking off and leaving tussocks clean of old flowering stalks for most of the year.
- The seed (**photo 1 inset**) has a single, unbranched awn 2–3 cm long. The awn is straight or slightly bent but never with a definite 'elbow' bend
- Very strong root system; tussocks difficult to pull out. Tussock bases are whitish and break up easily into separate, compact tufts.

White tussock (*Nassella tenuissima*) (= *Stipa tenuissima*) invasion at Wodehouse, E Cape, 1973

Nassella tussock invasion at Hogsback, E Cape, 1980

How to distinguish white tussock (photo 3) from nassella tussock: Tussocks do not collapse untidily and are distinctly white in winter. Leaves ~ rough to the touch (less rough than nassella tussock). Inflorescence is compact, ~ included within tuft. Seed awns bent and twisted, becoming entangled and forming 'rat's nests'.

Beware: All alien *Stipa* spp. (there are two indigenous species) and *Nassella* spp. are potentially invasive in South Africa, and their importation and cultivation should be discouraged.

Have you seen either of these invasive grasses?

Please submit sightings of invasive alien species directly to Lesley Henderson at L.Henderson@sanbi.org.za or to the Weeds and Invasive Plants website (www.agis.agric.za/wip)

ARC-PPRI, WEEDS RESEARCH DIVISION

ARC-Plant Protection Research Institute

Weeds Research Division
Private Bag X134
Queenswood
0121

Phone: +27 (0)12 356 9840
Fax: +27 (0)12 356 9852

Contact: Acting Division Manager:
Dr Roger Price
e-mail: PriceR@arc.agric.za

General enquiries: Mrs Hildegard Klein
e-mail: KleinH@arc.agric.za

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Excellence in Research and Development

The Weeds Research Division of the ARC-Plant Protection Research Institute is responsible for research on the ecology and control of invasive alien plants in South Africa. These plants were introduced either intentionally (e.g. for ornamental use or agroforestry purposes), or accidentally (e.g. in livestock feed) and now threaten biodiversity and agriculture. In addition, they reduce run-off from water catchments, thus diminishing flow in streams, and adversely affect the quality of life of communities.

- Biological control
- Chemical control
- Bioherbicides
- Integrated control
- Monitoring the emergence and spread of invasive alien plants

We are on the Web:

www.arc.agric.za

see Plant Protection News

for current news from the Weeds Research Division

Read *Plant Protection News* No. 84 for the following news from the Weeds Research Division:

Lantana herringbone leafminer now in Ethiopia.

The biological control of the invasive plant *Parthenium hysterophorus* in South Africa.

Biological control of invasive plants

Lantana (*Lantana camara* hort.) defoliation by the leaf-sucking lace-bug (*Teleonemia scrupulosa*) is striking but only temporary. Photos: H.G. Zimmermann & C.J. Cilliers

Biological weed control is the use of natural enemies to reduce the vigour or reproductive potential of an invasive alien plant. The principle is that plants often become invasive when they are introduced to a new region without any of their natural enemies. The alien plants therefore gain a competitive advantage over the indigenous vegetation, because all indigenous plants have their own natural enemies that feed on them or cause them to develop diseases. Biological control is an attempt to introduce the alien plant's natural enemies to its new habitat, with the assumption that these natural enemies will remove the plant's competitive advantage until its vigour is reduced to a level comparable to that of the natural vegetation. Natural enemies that are used for biological control are called biocontrol agents.

The potential risk posed by a candidate biocontrol agent is determined by biocontrol researchers through extensive host range studies (specificity tests) that are carried out in a quarantine facility. These trials determine the range of plants that a potential biocontrol agent is able to use as host plants throughout its life cycle, as well as its host plant preferences. Permission to release a biocontrol agent will be sought only if the host-specificity tests prove without doubt that the potential agent is sufficiently host-specific for release in this country. To be regarded as sufficiently host-specific, the candidate agent must be either monophagous (i.e. the insect feeds on only one plant species, the target weed in this case) or it could have a slightly wider host range, provided that none of the additional host plants occur in South Africa or surrounding countries, either as indigenous or introduced crop plants.

South Africa is regarded as one of the world leaders in the field of biological control of invasive alien plants. Since the 1930s we have brought 29 invasive alien plant species under complete or substantial biological control. In the process, 111 species or biotypes of natural enemies were released, 85 of which became established. Remarkable successes have been achieved with either controlling or reducing the invasive potential of many invasive plants including cacti, aquatic weeds, Australian wattles, chromolaena and lantana. Seed feeders feature strongly in many of our projects. Tested and safe biocontrol agents are distributed in co-operation with the *Working for Water* Programme of the Department of Water Affairs.