

SAPIA NEWS

SOUTHERN AFRICAN PLANT INVADERS ATLAS

July 2008 ARC-Plant Protection Research Institute **No. 8**

ARC • LNR

WORKING FOR WATER

Patron in Chief: Nelson Mandela

Inside this issue:

You are invited to participate in the SAPIA phase II project.

Submit records online at : Weeds and Invasive Plants website www.agis.agric.za/wip

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

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

New reports available at WIP

Mini reports for all species in the SAPIA database are now available at the Weeds and Invasive Plants website (www.agis.agric.za/wip). Fields listed are: Date of observation, quarter degree square (in ascending order), latitude and longitude co-ordinates, accuracy, locality description, abundance, habitats invaded and notes.

Mini reports for all quarter degree squares in the SAPIA database are also available. All invasive species are listed alphabetically with the corresponding information listed as for 'mini report per species'.

Other reports available in excel and pdf format:

- Species lists per southern African country (only SA is comprehensive)
- Species lists per SA Province
- Species lists per quarter degree square
- Lists of quarter degree squares per species.

All the SAPIA Newsletters are posted at WIP and can be downloaded free of charge

Extension of WIP to rest of Africa

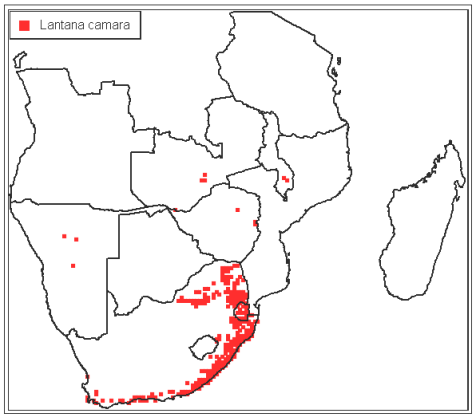
The Weeds and Invasive Plants website currently houses the most comprehensive online database of invasive alien plants in South Africa. It is an important tool to assist with the identification and management of invasive plants. It is available to anyone who has access to the internet and also allows for submission of data online. WIP already contains some data for other countries within SADC—Botswana, Namibia, Zambia, Zimbabwe, Malawi. Mozambique, Swaziland and Lesotho. However, there is currently no facility to observe the spatial data.

The technology to expand WIP to the rest of Africa is available. A proposal for additional funding is being considered for the following:

Spatial expansion of WIP to cover the whole of Africa (possibly at three levels—SA, SADC and the whole of Africa)

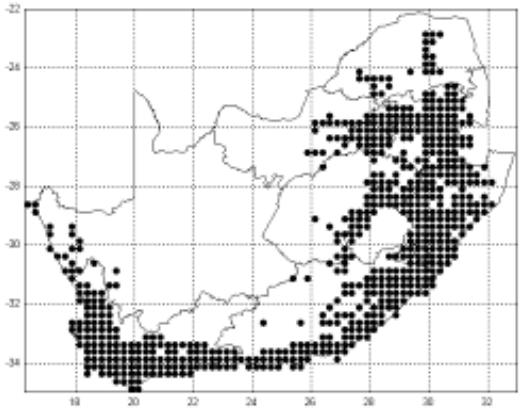
Data capture that would enable a person to click on a map to record the QDS or approximate latitude/ longitude

Extension of reports already available for SA to the rest of Africa.



Focus on Acacias

The genus *Acacia* with 18 listed species is the largest genus of naturalized and casual alien species within the SAPIA Database. **Naturalized** species are defined as alien species capable of consistent reproduction and persistence outside of cultivation. **Casual alien** species do not form self-replacing populations; they are not known to have persisted outside of cultivation for more than ten years. Many of the naturalized species are **invasive** and are capable of spreading far from parent plants, often in large numbers. The invasive acacias are important invaders of all the major vegetation types except for those in the arid interior, where other leguminous invaders take over, namely species of Mesquite or *Prosopis* species.



Distribution of alien acacias growing outside of cultivation

The most widespread and abundant invasive acacias are black wattle (*A. mearnsii*), rooikrans (*A. cyclops*) and Port Jackson (*A. saligna*). Black wattle has invaded the widest range of vegetation types in South Africa and is the most widespread riverine invader, occurring almost continuously from Louis Trichardt in the Limpopo Province down the eastern seaboard to Cape Town, a distance of ± 2 500 km. Rooikrans stretches along almost the entire Cape coastline from Port Nolloth in the northwest to beyond East London in the east, a distance exceeding 2 000 km. Port Jackson stretches along the Cape coastline from Saldanha bay in the west to the Kei River in the east, a distance of ± 1 500 km.

Port Jackson, *Acacia saligna* in full flower

Port Jackson and rooikrans are important invaders of Fynbos vegetation. Successful biological control of Port Jackson, using an introduced gall-forming rust fungus, has greatly reduced the densities of populations and in the long term should provide complete control of this invader.

Rooikrans and black wattle are also the subjects of biocontrol programmes that aim to reduce seed recruitment. Information on these and other biocontrol programmes can be found at the ARC website: www.arc.agric.za, see page 6.

Descriptions, images and distribution maps of most of the invasive and naturalized acacias are available at WIP.

Taxonomy

All the naturalized, invasive and casual alien *Acacia* species keyed out on page 3 are from Australia and with one exception, kangaroo wattle (*A. paradoxa*), differ from African species in having no spines or thorns.

They can be divided into two distinct groups, one with bipinnate (twice-divided) leaves (see photo 1) and the other with phyllodes (see photo 2). A phyllode appears to be a simple, undivided leaf but is actually a leaf-like petiole with no blade. All the listed alien acacias are evergreen whereas most of the indigenous species are deciduous.

1. Green wattle, *A. decurrens*

2. Port Jackson, *A. saligna*

Will the only Acacias in Africa be Australians?

Taxonomic research indicates that the genus *Acacia* is very broad and could be split into at least 5 separate entities. At the International Botanical Congress in 2006, Australia managed, through devious means, to change the type species of *Acacia* from the African/Asian *A. nilotica* to the Australian *A. penninervis*, a phyllodinous species. This means that if *Acacia* is split into several entities in the future, *Acacia* would apply only to the phyllodinous species—most of which are Australian. The African species, according to a proposed subdivision of *Acacia*, would become various species of *Vachellia* and *Senegalia*. Read about the controversy surrounding this issue in Moore, G. (2007). The handling of the proposal to conserve the name *Acacia* at the 17th International Botanical Congress–an attempt at minority rule. *Bothalia* 37, 1, pp. 109–118. For an Australian perspective: http://www.anbg.gov.au/cpbr/taxonomy/acacia-conserved-2004.html

Acacia means 'spiked'or 'thorny' and aptly describes the African acacias; the new type species, *Acacia penninervis*, has no thorns!

The thorny African *Acacia erioloba*

Key to identification of invasive(i), naturalized(n) & casual alien(c) Acacias

Leaves twice-divided (bipinnate):

leaflets large (20–50 mm long), large evergreen tree with heavy, low side branches.....peppertree wattle (*A. elata*)(**n**)

leaflets small (1.5–15 mm long)

leaves silver/grey

many side branches (pinnae) .....silver wattle (*A dealbata*)(**i**)

2–4 side branches (pinnae).....Bailey's wattle (*A. baileyana*)(**n**)

leaves green

raised glands at junctions of pinnae

leaves feathery (leaflets long and slender).....green wattle (*A. decurrens*)(**i**)

leaves compact (leaflets short and crowded).....silver wattle (*A. dealbata*)(**i**)

glands at and between pinnae junctions; leaves compact.....black wattle (*A. mearnsii*)(**i**)

Leaves (phyllodes) undivided:

stems with spines, spines in pairs, leaves with wavy margins, pods white-woolly.....kangaroo wattle (*A. paradoxa*)(**n**)

stems without spines

leaves very narrow, 1–5 mm wide, 20–130 mm long:

leaves with prominent midvein

leaf margins & branchlets usually fringed with hairs, flowerheads globular, 8–25 in leaf axils.....fringed wattle (*A. fimbriata*)(**n**)

leaves and branchlets not hairy, flowerheads globular, 4–11 in leaf axils.....Wallangarra wattle (*A. adunca*)(**c**)

leaves with 3–7 longitudinal veins, leaves and branchlets resinous and sticky, flowerheads globular, 1 or 2 in leaf axils.....sticky wattle (*A. viscidula*)(**n**)

leaves > 5 mm wide, silver/grey, < 40 mm long

leaves oval/elliptic.....pearl acacia (*A, podalyriifolia*)(**n**)

leaves ± triangular .....knife-leaved wattle (*A. cultriformis*)(**c**)

leaves > 5 mm wide, green, > 50 mm long

leaves markedly curved

leaves pendulous, leaf tips rounded, galls on stem.....golden wattle (*A. pycnantha*)(**i**)

leaves pendulous, leaf tips pointed, pods twisted.....screw-pod wattle (*A. implexa*)(**i**)

leaves not markedly curved

dark green

leaves with longitudinal veins and net veins between, leaves divided on young plants and coppice shoots, pyramidal tree.....Australian blackwood (*A. melanoxylon*)(**i**)

light, bright or blue-green

leaves ± erect, rounded shrubs/small trees

leaves with prominent midvein and net veins.....hop wattle (*A. stricta*)(**c**)?

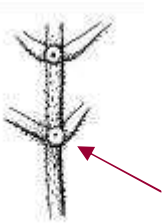
leaves with 3–5 prominent longitudinal veins.....rooikrans (*A. cyclops*)(**i**)

leaves ± erect, spreading shrub/tree, flowerheads cylindrical, galls on stems.....long-leaved wattle (*A. longifolia*)(**i**)

leaves slightly erect to pendulous, flowerheads globular, young leaves broad and wavy, willow-like, fungal growths on stems.....Port Jackson (*A. saligna*)(**l**)

Illustrations to accompany key on page 3

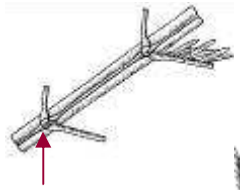
Peppertree wattle, *Acacia elata*



gland at pinnae junction

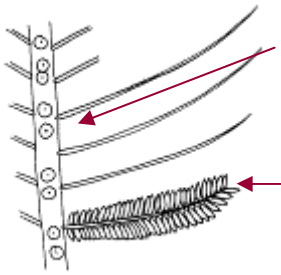
Silver wattle, *A. dealbata*

Bailey's wattle, *A. baileyana*



gland at pinnae junction

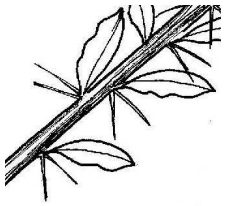
Green wattle, *A. decurrens*



glands at and between pinnae junctions

pinna with leaflets

Black wattle, *A. mearnsii*

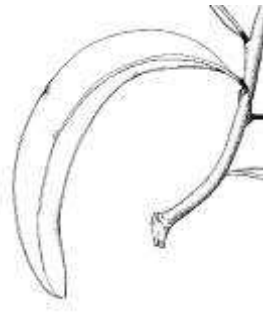


Kangaroo wattle, *A. paradoxa*

Knife-leaved wattle, *A. cultriformis*

Pearl acacia, *A. podalyriifolia*

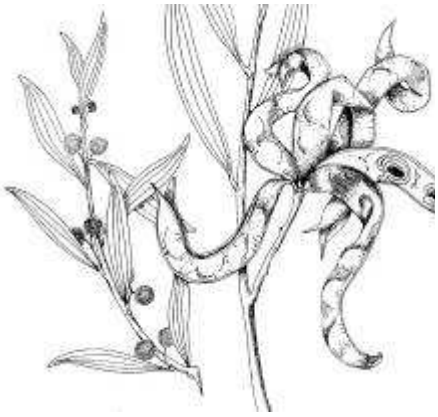
Fringed wattle, *A. fimbriata*



Golden wattle, *A. pycnantha*

Screw-pod wattle, *A. implexa*

Australian blackwood , *A. melanoxylon*



Rooikrans, *A. cyclops*

Long-leaved wattle, *A. longifolia*

Port Jackson, *A. saligna*

Emerging weeds

Kangaroo wattle

Kangaroo wattle (*Acacia paradoxa*) is a spiny shrub up to 3.5 m high native to temperate Western, Eastern & Southern Australia. Slender straight spines 4–12 mm long occur in pairs. The leaves (phyllodes) are dark green, held erect, up to 15 mm long and 6 mm wide, and usually have a wavy margin.

The flowerheads are golden-yellow, globular in shape, up to 12 mm across, arising singly in the axils of the leaves. Pods are small, brown, covered in white woolly hairs and measure up to 60 mm long and 5 mm wide.

Kangaroo wattle has been cultivated for ornament and hedging. It is naturalized in Mountain Fynbos on the slopes of Devil's Peak, Table Mountain. It is listed under the Australian Noxious Weeds Act which is an indication of its weed potential in South Africa.


Photo: J.R. Wilson

Legislation: It is a category 1 declared plant under CARA 2001.

It is a proposed category 1a plant under the revised CARA—high priority species that must be eradicated or strictly controlled.

Screw-pod wattle

Screw-pod wattle (*Acacia implexa*) is a small tree 3–15 m high, native to Eastern Australia. It often suckers and resembles Australian blackwood, *A. melanoxylon*. Leaves (phyllodes) are greyish-green, pendulous, sickle-shaped with pointed tips (more drooping, narrowed at the base and thinner than in blackwood).

Flowerheads are pale yellow, globular, produced in short clusters. Pods are long and narrow when young, becoming strongly curved and twisted after dehiscence. The seed has a white fleshy seed stalk folded at one end, but not encircling the seed (blackwood has pinkish-red seed stalks that almost encircle the seeds).

Screw-pod wattle has been cultivated for timber, shelter and ornament. It invades watercourses and Fynbos in the Western Cape.

Legislation: It is a category 1 declared plant under CARA 2001.

See WIP for fuller descriptions of the species on this page


Photo: S. Neser

Hop wattle

Hop wattle (*Acacia stricta*) is a shrub or small tree 1–6 m high, native to E & SE Australia. Branchlets are angled or flattened; the ridges distinct and resinous.

Leaves (phyllodes) are held erect, up to 140 mm long x 15 mm wide, with prominent midvein and net-veining. Flowerheads are globular, pale yellow or whitish, occurring in groups of 2–4 in the axils of the leaves. Pods are ± straight, up to 100 mm long x 5 mm wide. The seed stalk is expanded at one end but does not encircle the seed.

Hop wattle might be mistaken for rooikrans (*A.* cyclops) or long-leaved wattle (*A.* longifolia)—see key to identification on page 3 and features underlined here. It invades roadsides, watercourses and gaps in plantations in the Stellenbosch, George, Knysna and Plettenberg Bay areas of the W Cape.

Legislation: It has been proposed as a category 1a plant under the revised CARA.


Photos: K. Voges

ARC-PPRI, WEEDS 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

The Weeds Research Division of the 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 PPRI Newsletter

for current news from the Weeds Research Division

Read PPRI Newsletter No. 76 for the following news from the Weeds Research Division:

- From the rockery to the veld—invasive ornamental succulents
- Survey for natural enemies of *Cestrum* and *Cardiospermum* species in Argentina; *Pseudonapomyza* sp., a potential biological control agent of yellow bells (*Tecoma stans*)
- Temperature as a catalyst for boom/bust events
- The 36th Annual Weeds Biological Control Workshop

Biological control of invasive plants

Port Jackson (*Acacia saligna*) being controlled biologically by the gall-forming rust fungus (*Uromycladium tepperianum*)

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 27 invasive alien plant species under biological control. In the process, 99 species or biotypes of natural enemies were released, 74 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 and Forestry.