



Invasive species in the winter rainfall region of the W Cape

The Western Cape, with its winter rainfall and Mediterranean-type climate, is home to the unique Cape Floristic Region (CFR). The CFR is one of the world's richest regions in terms of botanical diversity with about 9000 known plant species, of which 69% occur only here, i.e. are endemic. Habitat destruction and alien plant invasion are the biggest threats to the conservation of this flora. More than 300 alien plant species are known to be naturalised in this region and more than 70 of these invade large areas of natural vegetation. Despite considerable progress over the past two decades, largely through the Working for Water Programme, the problem of invasion in the CFR is still immense and growing. **To prevent new species becoming a problem we need an effective early detection and rapid response to deal with them before they spread over large areas and cause major damage. This issue of SAPIA News introduces the work being done by SANBI's Invasive Species Programme: Early Detection and Rapid Response, in this region.**



Showy banksia (*Banksia speciosa*), native to south-western Australia on coastal sand dunes and sand plains, is an emerging invasive species in similar habitats on the Agulhas plain. SANBI's ISP team is investigating the extent of the invasion and methods of control. This is just one of about 50 species being investigated by the team.

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SAPIA newsletters are posted at the ARC website: www.arc.agric.za under 'Newsletters'

AGIS/WIP website no longer functional

Please note that the AGIS/WIP (Weeds and Invasive Plants) website is no longer functional. This website has had operational problems since about 2008 and distribution data was last updated in October 2007. Please contact Lesley Henderson for up-to-date distribution data from the Southern African Plant Invaders Atlas (SAPIA) database.

Invasive species programme: winter rainfall region Western Cape

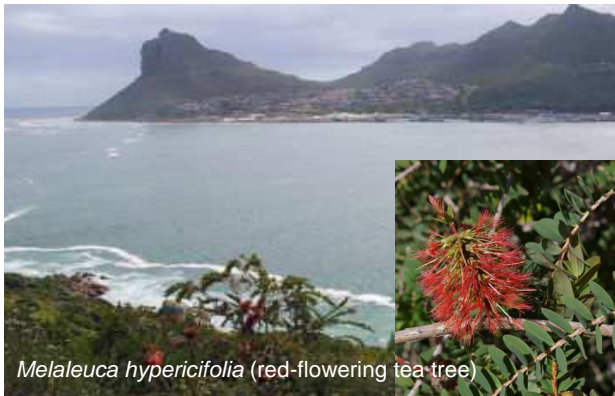
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Introduction and overview of the species

The winter rainfall team is responsible for just less than 50 invasive alien plant species targeted for assessment and eradication, where feasible. The species range from woody species of *Acacia*, *Melaleuca*, *Eucalyptus*, *Banksia* and *Genista* to perennial herbs such as *Anigozanthos* species (kangaroo paws) introduced for the cut flower trade, ornamental aquatics such as *Sagittaria latifolia* (common arrowhead), ornamental climbers such as *Billardiera heterophylla* (bluebell creeper), *Asphodelus fistulosus* (onion weed) adapted to thrive in the deep sandy soils of the West Coast, and wetland and salt marsh specialists such as *Lythrum salicaria* (purple loosestrife) and *Spartina alterniflora* (smooth cord grass).



Acacia paradoxa (kangaroo wattle)



Melaleuca hypericifolia (red-flowering tea tree)



Banksia integrifolia
(coast banksia)



yet to be identified *Melaleuca* or *Callistemon* species



Genista monspessulana (French broom)



Anigozanthos flavidus (tall kangaroo paw)

Photo Tessa Oliver



Sagittaria latifolia (common arrowhead)



Lythrum salicaria (purple loosestrife)



Asphodelus fistulosus (onion weed)



Spartina alterniflora (smooth cord grass)

The diverse growth forms, the array of species life-histories and different situations in which the populations are found, require a knowledgeable and adaptable response team.

Challenges for the ISP: winter rainfall region, W Cape

Long-lived seed banks

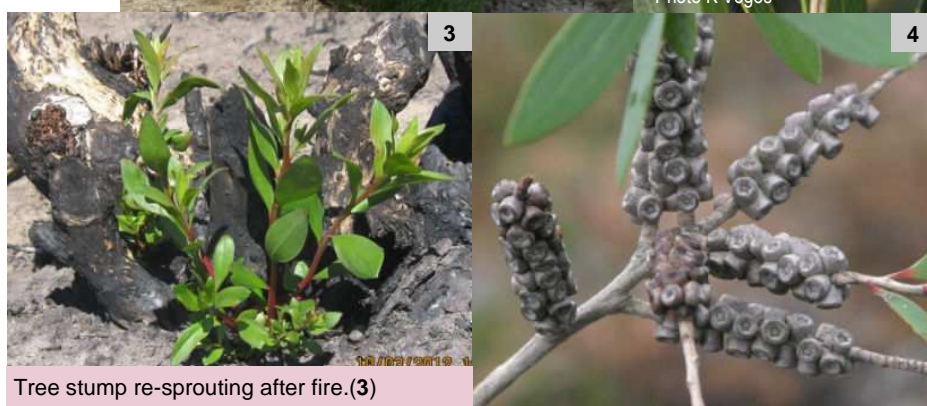
Some species have long-lived seed banks and long term perseverance is needed to control these populations. Good examples are: *Acacia paradoxa* (kangaroo wattle), *Acacia stricta* (hop wattle) (photos 1 & 2), *Acacia implexa* (screw-pod wattle), *Genista monspessulana* (French broom) and *Lythrum salicaria* (purple loosestrife).



Fire-adapted species

A number of species are fire-adapted and are able to either survive fires as adult plants and/or germinate after a fire event, making them quite difficult to control in the fire-prone Fynbos.

Good examples are *Melaleuca quinquenervia* (broadleaf paperbark) (photos 3 & 4), which can re-sprout after fire and store seed in its canopy which are released after fire; *Melaleuca parvistaminea* (rough-barked honey myrtle); *Cistus ladanifer* (common gum cistus) (photo 5); *Melaleuca hypericifolia* (red-flowering tea tree); *Banksia ericifolia* (heath banksia) (photos 6 & 7), and *Banksia speciosa* (showy banksia).



Tree stump re-sprouting after fire.(3)



The seeds of *Banksia ericifolia* are stored in woody follicles and released after a fire. (7)

Difficulty of identification

Some species are difficult to identify in the field. For example, the Australian tree ferns, *Cyathea australis* and *Cyathea cooperi* (photo 8), to the untrained eye, can be easily confused with morphologically similar alien as well as native ferns, such as *C. capensis* (photo 9)



Lack of registered herbicides

Since the ISP team works with new species there are often no registered herbicides available in South Africa for a new target species. In order to proceed with the work and provide feedback, the Department of Agriculture has granted a 'limited use' licence to the ISP team. However, there are concerns about the residual activity and non-target effects of herbicides particularly when applied in or near wetlands. To overcome this, ISP staff members are trained to understand the physiological action of the different chemical compounds and to carefully select appropriate herbicides and doses when planning herbicide applications.

Projects of the ISP showing good progress in the winter rainfall region of the W Cape

Spartina alterniflora (smooth cord grass)

Very good progress is being made with the control of the only known population of smooth cord grass in South Africa, which occurs in the Groot Brak estuary near George. This aquatic grass is also known as an aggressive invader in Washington State, USA, and China. The seed viability of the Groot Brak population is very low and the plant responds extremely well to foliar herbicide (glyphosate) application. A monitoring plan has been constructed on a baseline study by colleagues at the Nelson Mandela Metropolitan University. The total size of the population currently is 0.7 hectares, making it an attractive eradication target.

Since ISP herbicide treatments were started in January 2013, the density of live plants has decreased from 161 plants per m² to 5 plants per m² in April 2014.



Asphodelus fistulosus (onion weed)

This rhizomatous herb, with hollow, cylindrical, onion-like leaves and attractive flowers, is native to southern Europe. It is invasive in other parts of the world including Western Australia. In South Africa it is an easy-to-spot roadside invader with the total known population of less than 1 hectare. Although the seeds may persist for a while, the plant is easily detectable and easy to hand-pull to prevent seed set. Herbicide may also be applied.

Apart from plant removal, population recovery and seed banks of this species are being carefully monitored by the ISP on the west coast.



Melaleuca quinquenervia (broadleaf paperbark tree)

This tenacious tree, native to Australia, can resprout after fire from buds in the tree trunk and roots. At a research site near Wolseley the population has been reduced from 300 mature individuals (over 0.28 hectares) in 2010, to only 9 live stems, measuring 70 cm high, in 2014. This control has been achieved by applying an effective herbicide and by routinely removing all reproductive structures (flowers and fruits) from the population.



More ISP projects in the winter rainfall region, W Cape

Acacia paradoxa (kangaroo wattle)

The only known population of this thorny Australian shrub occurs on Devil's Peak of Table Mountain. In 2009 a wildfire swept through half of the population which was distributed over an area of about 400 hectares. This event stimulated seed germination in abundance and offered an opportunity for the ISP team to hand pull seedlings and to remove adult plants. The total affected area, and a zone around that, are surveyed annually, during which all plants are mapped, measured and removed. In the most recent survey, which is the fifth since dedicated efforts began in 2010, 2 674 plants were found and removed, compared to the 11 350 plants estimated in the 2009 assessment. A large and persistent seed bank, and ability to reproduce within one year of germination, make the control of this species very challenging.



Melaleuca parvistaminea (rough-barked honey myrtle)

Naturalised populations of this tree occur in seasonally inundated wetlands in the Wolseley and Tulbagh areas. A survey revealed 26 000 plants in an area of 1 800 hectares. The potential extent of invasion is large and could exceed 9 000 hectares. This species can form monospecific stands that displace the native shrubland and is thus considered a potential transformer. Fortunately no evidence has been found of a soil-stored seed bank, and plants do not re-sprout after cutting at ground level or after herbicide application. Seeds only survive for about one year and seedlings reach maturity after four years. It is estimated that the known populations of this species could be eradicated by 2021.



Banksia species (banksias or Australian pincushion trees)

The ISP team has started devising control plans for several small, naturalised populations of *Banksia speciosa* (showy banksia, on the Agulhas plains), *B. serrata* (saw banksia, at Kleinmond) and *B. integrifolia* (coast banksia, at Pringle Bay). The biggest challenge is that there is almost no information about the response of these species to herbicide treatments. Investigations showed that *B. serrata* and *B. integrifolia* coppice after cutting and that it would be worthwhile testing a few different types of herbicides on all three species.

Currently herbicide trials are being conducted on populations at Pringle Bay and in the Agulhas National Park to determine which active ingredient and dosage is the most effective. As part of the trial each treated plant must be marked so that the response of individual plants can be traced.



Banksia serrata sprouting after cutting (photo 1) and measuring *B. speciosa* in the Agulhas National Park (photo 2).

SANBI's Invasive Species Programme

SANBI's Invasive Species Programme (ISP) aims to protect South Africa's valuable and unique biodiversity by preventing the next wave of plant invasions. By doing so, we safeguard not only our indigenous fauna and flora, but human livelihoods and well-being too.

What can you do to help?

The ISP aims to reduce the threat of new alien invasions by detecting them before they become widespread. This can be achieved through having eyes and ears throughout the country. Kindly assist us in achieving this objective. Please report sightings of any of the species mentioned in this newsletter or any new emerging weed that you may be aware of, to the ISP. Please do not remove any parts of the plant, as this might promote its further spread. If possible, provide us with a locality description, a photo and a GPS co-ordinate.

Contact Details

The Programme has 8 regional teams working in all 9 provinces

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The Weeds Research Programme 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

Weeds Research URL:

<http://www.arc.agric.za/arc-ppri/Pages/Weeds%20Research/Weeds-Research.aspx>

see Plant Protection News

for current news from the
Weeds Research
Programme