

Mission Report

Presentation of the PI@ntInvasive-Kruger project

Contribution to the study of exotic invasive plants by RP-PCP



Zimbabwe
3 – 8 of June 2012

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Cover photo: Observation of exotic plants in Gonarezhou National Park (©Thomas Le Bourgeois – Cirad)

Calendar

3 June		Arrival at Harare (Zimbabwe)
4 June	pm	Presentation of Pl@ntInvasive-Kruger at the University of Zimbabwe
5 June		Travel to Malipati area
6 June		Survey of exotic invasive plant at Malipati communal zone
7 June		Survey of exotic invasive plant at Malipati communal zone Survey of exotic invasive plants at Gonarezhou national park
8 June		Survey of exotic invasive plants at Gonarezhou national park Departure to South Africa

Main participants

Dr Thomas Le Bourgeois: Weed scientist, Cirad UMR AMAP

Dr Michel de Garine-Wichatitsky: Coordinator of the RP-PCP Zimbabwe, Cirad UR AGIRs

Dr A. Murwira: University of Zimbabwe, Dept Geography and Environmental Sciences

Dr M. Masocha: University of Zimbabwe, University of Zimbabwe, Dept Geography and Environmental Sciences

Ms Charon Chikuruwo: Mphil student, University of Zimbabwe

Mr Billy Butete: Research assistant, RP-PCP Zimbabwe

Introduction

The general objective of the RP-PCP “Production and Conservation in Partnership” in Zimbabwe is to contribute to sustainable development, conservation and improved rural livelihoods in Zimbabwe through strengthening national research capacities, multidisciplinary approaches and institutional partnerships with a focus on protected and neighboring production areas.

Invasive alien plants represent a major threat to biodiversity in national parks but also a major constraint in agricultural areas for crop production.

One of the student project studies of the RP-PCP, carried out by Ms Charon Chikuruwo, aims at contributing to the understanding of the patterns and mechanisms of invasion operating in savannas environment according to disturbance and anthropogenic activities in communal zones and conserved areas.

The objectives of this mission were:

- i. To present the PI@ntInvasive-Kruger project to Zimbabwean partners;
- ii. To bring scientific help to the Mphil student in the analysis of the situation of invasion and in the definition of her study.

Presentation of the PI@ntInvasive-Kruger project

PI@ntInvasive-Kruger is a case study of the global PI@ntNet project (<http://www.plantnet-project.org/papyrus.php?langue=en>) focused on alien invasive plants of the Kruger National Park in South Africa. It is developed in collaboration with SANparks (South African National Parks) and SAEON (South African Environmental Observatory Network).

Efficient control of the invasive threat requires prevention, early detection of introduced species, accurate methods of eradication, and dissemination of updated data to increase people's awareness. At present, KNP rangers are conducting a survey of such

invasions by recording invasive plants on a daily basis in PDA using GPS localization. But they are not employing useful identification tools to recognize the species.

The PI@ntInvasive-Kruger case study aims to assist with biodiversity conservation in the Kruger National Park and improve the management of invasive plant species. The project seeks to create a science and technology module for KNP managers and researchers, help with plant identification, and also exchange information and foster appropriate and improved invasive plant management practices.

This project is articulated in the use of several computer tools such as:

- An online and multi-users database for the management of field observations, bibliographic information syntheses on weeds, pictures and herbarium specimens.
- A collaborative Web platform dedicated to the project available at <http://community.plantnet-project.org/pg/groups/561/plntinvasive-kruger/> that allows project members in sharing information, documentation and contributing to fora.

The main modules selected for this platform, and used by members of the project are:

- Discussions: for members to exchange questions, information or discuss any topic, or inform about any event
 - Pages: managed as Wiki, for example to write meeting report...
 - Files: to make documents (reports, scientific papers, protocols...) available to the community
 - Bookmarks: links to Web sites of interest
 - Albums: photos of invasive plants or invaded areas, non identified species, control programs...
- A web portal to access species web data sheets at <http://publish.plantnet-project.org/kruger/>

Preliminary analysis of the invasion by alien plants in Malipati communal zone and Gonarezhou National Park

Field surveys were conducted in the different types of vegetations of Malipati communal land such as:

- *Acacia tortilis* bush land
- Riverine forest
- Mopane woodland
- Mopane and *Combretum* sp. wood land
- Agricultural area
- Pond riverine forest

and in few places inside Gonarezhou national park such as:

- Mabalauta camp, Mopane and *Acacia tortilis* bush land
- River banks along the Mwenezi river and secondary affluent

Finally, very few alien species have been recorded.

- *Xanthium strumarium* L., Asteraceae
- *Ipomoea fistulosa* Mart. ex Choisy, Convolvulaceae
- *Cylindropuntia imbricata* (Haw.) F.M.Knuth, Cactaceae
- *Opuntia monacantha* Haw., Cactaceae
- *Datura stramonium* L., Solanaceae

The very common and famous *Lantana camara* L., Verbenaceae has never been recorded in the area. It has already been seen near old buildings or camps as ornamental, but it seems not to have spread in the countryside and could not be considered as a threat in this area.

Xanthium strumarium (Large cocklebur) is surely the main and the most troublesome species. It was recorded in the Malipati communal land on heavy and clay soils and punctually along track sides. In the Gonarezhou Park it is present all along the river banks and sometimes along small streams.



***Xanthium strumarium* at Malipati, Gonarezhou, fruit, seedling, leaf, fruits and mature fruit on the ground.**

It has been noticed in the Malipati area around 1987. This species is native to South America. It is an annual plant, multiplying only by seeds. Burs are spread by running water along streams and rivers and by animal wool or hair, human clothes. It is poisonous and not consumed by cattle or any other animal. Its development in large spots can prevent cattle for grazing. It is known to be a serious arable weed in South Africa. It is competitive and difficult to control. The Pre-emergence herbicides do not work well because it has extended germination and seeds with large food reserves. It can be controlled by shallow cultivation during the seedling stage or with post-emergence herbicides (Bromilow, 2010).

Ipomoea fistulosa (Bush morning-glory) was recorded along track sides around Malipati where it is used as fences around fields and to prevent soil erosion. It was also observed punctually on river banks in the Gonarezhou Park.



***Ipomoea fistulosa* at Malipati: fences along fields, flower, leaf, fruit and hairy seed.**

This is a perennial plant which can be multiplied by cuttings and shoots, but it produces also a lot of big seeds which can be spread by running water. Along river banks, this species can grow in wide bush bands that make water access difficult to wild animals or livestock. It is poisonous for mammals. It is native to tropical America and naturalized elsewhere in tropics and subtropics.

Cylindropuntia imbricata (Imbricate cactus, Imbricate prickly pear) was recorded in few places at Malipati, forming more or less isolated spiny bushes. It was observed on old settlement sites and it is used as an ornamental in Mabalauta camp in the Gonarezhou Park.



***Cylindropuntia imbricata* growing on old settlement places and in camp garden**

Introduced in the area for a long time, it is considered as a medicinal plant and as a protection against lightning. This species is native to America. No fruit was observed. Multiplication is mainly by stem pieces that break off the main plant and are capable of rooting, producing a new plant a little bit further. In case of fruit production, rodents and birds are good seed dispersers. It does not seem to be invasive in such ecological conditions but it is widely spread and considered invasive in South Africa (Bromilow, 2010).

Opuntia monacantha (Drooping prickly pear) was only observed in the Gonarezhou Park as a spot in an Acacia bush land close to Mabalauta camp. It was used as ornamental plant in camps but can easily spread and naturalize into the native vegetation.



***Opuntia monacantha* forming patches in the Acacia bush land.**

It comes from South America. No fruit was observed. This kind of cactus propagates easily from the leaf-pads or cladodes. Even a small piece lying on the ground can root and flourish. It is declared weed in South Africa (Bromilow, 2010).

Datura stramonium (Common thorn-apple) is a common ruderal and nitrophilous species. It was observed more or less everywhere in the village of Malipati along tracks and close to houses. It was also observed in large spots on river banks where wild animals are staying. Seeds and seedling are poisonous. Old leaves are consumed by both livestock and wild animals living only stems and fruits.



***Datura stramonium* at this season most of the leaves are consumed by animals.**

It is declared weed in South Africa for both poisonous properties and because of its tall and aggressive habit. It is difficult to control in maize fields (Bromilow, 2010).

Conclusion

A first set of operational tools (collaborative platform, online database, identification and information systems) of the PI@ntInvasive-Kruger project should be available during the year 2013. At this time the project could be open to a larger number of partners such as scientists and land managers from University and National Parks of Zimbabwe. It would be an opportunity to share more information on invasive plants of conservation areas at a regional level.

The first overview of the situation of invasion by exotic species in the Malipati communal zone and the Gonarezhou National Park shows that only very few species were observed. This situation needs to be confirmed during the rainy season, but at that time we should record essentially more annual plants. Compared to the north-east part of South Africa (area of the Kruger National Park, inside and outside the park) in a quite similar ecological and climatic environment, it is interesting to realize that this part of Zimbabwe is still really preserved to plant invasions.

In this situation, and considering that *Xanthium strumarium* naturalized recently in the area and represent the major threat for both the communal zone of Malipati and the Gonarezhou Park, we encourage Charon Chikuruwo to focus her Mphil study on the following aspects:

- 1) Survey and mapping of the 5 exotic plant species with a higher precision for *Xanthium strumarium*, in order to have a first evaluation of geographical and ecological distribution of the species
- 2) Ecological analysis of the biotopes and vegetation types susceptible to invasion by these species, using the vegetation map which should be produced in July 2012 by RP-PCP, and evaluation of areas threatened.
- 3) Study of the biology and ecology of *Xanthium strumarium* and its capability to germinate and grow in the different types of vegetations using experiments on germination and growth in several controlled conditions in the area of Malipati and Gonarezhou, including the effect of grazing. The control of the weed after experiments should be done precisely, mainly for trials inside the Park. The use of herbicide should follow the revised policy on the use of herbicides by Working for Water in South Africa (Working-for-Water, 2004).
- 4) Evaluation of bur spreading by livestock when passing through a contaminated area and moving from the communal land to the Park.
- 5) If possible, evaluation of spreading of *Xanthium strumarium* and *Opuntia monacantha* by wild animals from inside the park to the communal land.
- 6) Survey of seedlings of *Ipomoea fistulosa* during the rainy season to evaluate the contribution of seeds in the propagation of this species.

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References

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