Aliens: The Invasive Species Bulletin

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Front Cover Photo
The California Kingsnake (*Lampropeltis californiane*): striped albino pattern
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Pl@ntInvasion: collaborative identification and information platform on invasive plants in French Overseas Territories

Thomas Le Bourgeois, Yohann Soubeyran

Invasive alien plants are a major threat to the biodiversity of French Overseas Territories, but information on these species is often incomplete or not easily accessible to many stakeholders. Better management of these species therefore hinges on sharing experiences with, and knowledge of, these pests. The Pl@ntInvasion project aims to build a specialised technical network by providing a set of tools (collaborative platform, database and plant identification applications) to help people in plant identification, obtain pertinent information and share experiences and problems.

Invasive alien plants are a major threat to the biodiversity of French Overseas Territories. These are mainly islands and constitute 4 of the 34 world biodiversity "hotspots".

Information on these invasive alien plant species is often incomplete or may be unavailable or difficult to access for many stakeholders. Better management of these species hinges on sharing experience and knowledge of these invasive alien plants and requires global collaboration between researchers, agronomists, ecologists, rangers, land managers, citizens, etc.

To this end, the Pl@ntInvasion[1] project - one of the case studies of the Pl@ntNet[2] project (Barthélémy et al. 2009; Barthélémy et al. 2011) - proposes to set up a specialised network that can be used by all those concerned with invasive alien plants in French Overseas Territories. The project was supported by the IUCN French Committee through the second phase of its initiative[3] (2009-2012) which was devoted to promoting the means and coordination necessary to prevent, survey and control invasive species in French Overseas Territories.

The Pl@ntInvasion platform can be used by members to share knowledge, data and discussions, but it also makes its species information and identification tools available to the wider public. It currently contains information on approximately 300 alien plant species that have already been documented and are considered as invasive in at least one of the territories.

IT tools

The project operates through a combination of four main IT tools interacting with each other:

- The Pl@ntInvasion collaborative platform (Fig.1) is part of the Pl@ntNet-community main platform developed with Elgg[7] V.1.7.15, a leading open source social networking engine. It is the hub of communications between project members, allowing them to work in a common space and share documents, wikis, bookmarks, discussions, photo albums, questions and all information on invasive plants and their management. Members may comment on all documents, texts and photos available on the platform, and discuss a whole range of issues. Discussions on, or additional information about, a document are structured and can be used to update the document regularly. This means the community can be challenged or called upon for any purpose, for example, the identification of an unknown species from an uploaded photo, or improvements in the content of a recommendation sheet for species control. Each document, album or discussion can be restricted to members only, or can be opened up to public access. Direct links are provided to species information sheets and identification systems.

Fig. 1: First page of the Pl@ntInvasion platform providing an introduction to the project, direct access to resources, tools and recently uploaded documents (discussions, photo albums, documents, bookmarks, etc.)

- The plant identification system offers two different approaches. “Identify” is an image recognition process (Boujemaa et al. 2001; Yahiaoui et al. 2006). The user can submit one or several photos corresponding to different parts of the plant (e.g. seedling, stem, leaf, flower, fruit, etc.). The system will compare these photos to those in a referenced image base and sort the species by probability (Fig.2). Process efficiency partly depends on the quality and diversity of the reference base which is currently being finalized. “IDAO”[5] is an identikit system (Grard et al. 2009; Grard et al. 2008; Le Bourgeois et al. 2004) that guides users through a series of step-wise choices and simple schematics to identify a plant based on its morphological and habitat characteristics. Final identification is expressed as the similarity (ranked percentage probability) between the unknown specimen and information on the type of specimen in the database. This IDAO tool for invasive plants is not yet available on the platform but several applications for weeds, trees and pollens have already been published and are available.

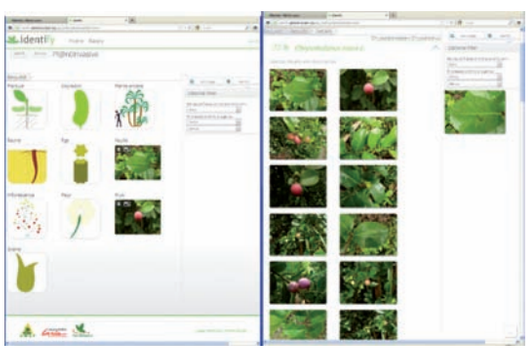

Fig. 2: “Identify” screen for submitting photos of different parts of a species, and the result obtained (example of the identification of *Chrysobalanus icaco* L. from photos of a leaf and fruit)

Both identification systems provide access to supporting text and images of candidate species, helping the user confirm identification.
These applications are compatible with a range of mobile electronic devices (Smartphones, PDAs and Tablets), allowing on-site identification and immediate action.

- All field observations and species-related information is managed in the database. Species datasheets (Fig.3) are automatically generated from this database and are available to all on the collaborative platform, as well as identification systems. The database was initially operated as an offline single-user tool but now uses a new system (“DataManager”[6]) that supports multi-user access, online or offline use from a local or network base and syncing with other bases. This facilitates the installation and use of local databases in each territory, all temporarily or permanently linked to a central database.

Species datasheets are linked with local, national or international databases such as EPPO (European Plant Protection Organisation) or GISD (Global Invasive Species Database) to provide invasive plant descriptions, invasive risk assessments, and information on control measures.

Uses

There are two main ways of using the Pl@ntInvasion collaborative platform:
- As a member of the public you can consult the main page and access species datasheets, identification tools and all documents and discussions open to the public.
- If you wish to become a project member, you need to log in and provide a password on the Pl@ntNet-Community platform then apply for membership of the Pl@ntInvasion project. Once you are a member you can access all discussions restricted to project members.

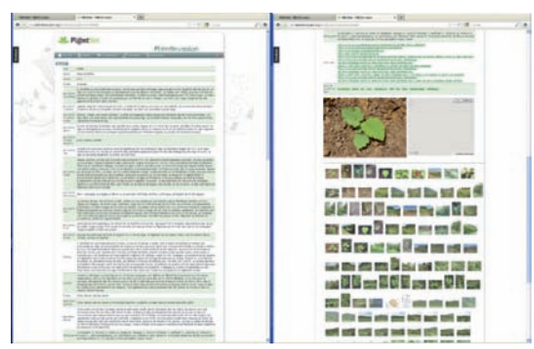

Fig.3: Datasheet for *Rubus alceifolius* Poir.

The platform currently uses only the French language as it is used by mainly French-speaking stakeholders. It has 28 members in France, New Caledonia, French Polynesia, La Reunion Island, French Guiana, Saint Pierre and Miquelon, Guadeloupe, Mauritius, Comoros Islands and Seychelles where French is spoken.

Conclusion

This collaborative platform and the tools it provides, primarily address the needs of those involved in the border control of plant imports, in plant import regulations, plant protection services, decision makers, land managers, scientists and citizens who are not familiar with botany and need information to prevent the introduction of invasive plants or the management of invasive plants. It should facilitate relations between players who can interact, discuss

and exchange information through the platform and gradually build up a network on alien invasive plants. It is particularly suited to researchers, developers, suppliers, producers and policy makers and will provide a better understanding and better management of invasive plants in French Overseas Territories.

The Pl@ntInvasion sub-project is funded by Agropolis Foundation as part of the Pl@ntNet project.

(1) *http://community.plantnet-project.org/pg/groups/516/plntinvasion/*
(2) *http://www.plantnet-project.org/papyrus.php?langue=en*
(3) *http://www.especes-envahissantes-outremer.fr/*
(4) *http://community.plantnet-project.org/*
(5) *http://idao.cirad.fr/*
6) *http://community.plantnet-project.org/pg/groups/5320/plntnetdatamanager/*
(7) *http://www.elgg.org/index.php*

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