

« The French Connection »

Lessons learned from the management of invasive alien plants in French Overseas tropical island Territories

Jean-Yves Hiro MEYER^{1*}, Yohann SOUBEYRAN^{2*},
Christophe LAVERGNE^{3*} & César DELNATTE^{4*}

¹Délégation à la Recherche, Gouvernement de la Polynésie française, Papeete, Tahiti, French Polynesia

²Comité français de l’IUCN, UMR AMAP, Montpellier, France

³Conservatoire Botanique National de Mascarin, Saint-Leu, La Réunion, France

⁴Office National des Forêts, Martinique, France

* « Initiative sur les Espèces Exotiques Envahissantes en Outre-Mer »



Global biotic homogenization / species mixing

Invasive alien species in an era of globalization

Laura A Meyerson^{1*} and Harold A Mooney²

Front Ecol Environ 2007; 5(4): 199–208

Critical issues and new challenges for research and management of invasive plants in the Pacific Islands

JEAN-YVES MEYER¹

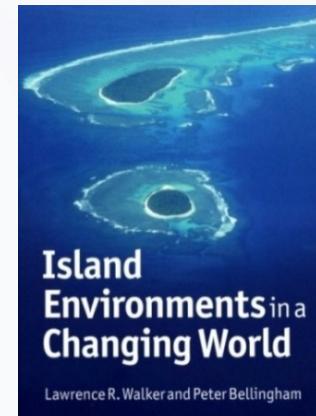
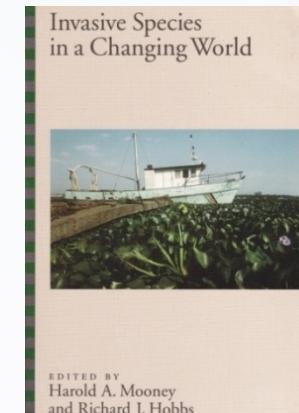
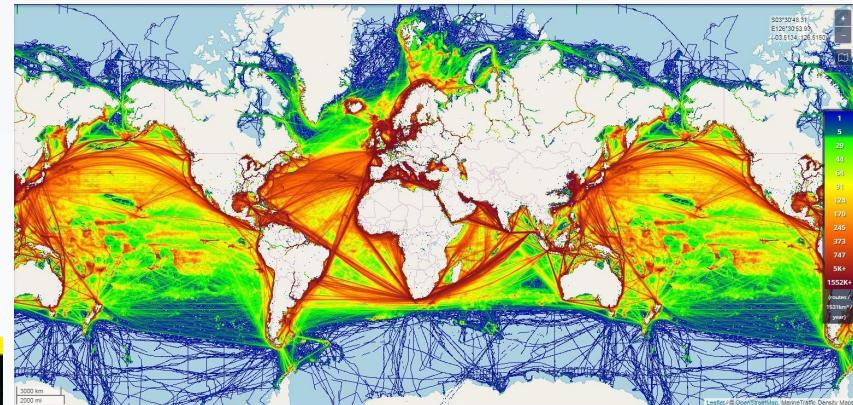
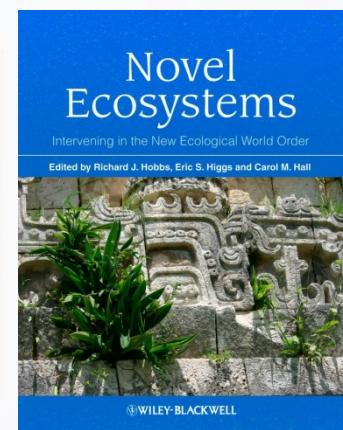
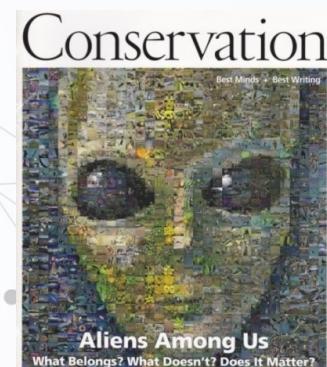
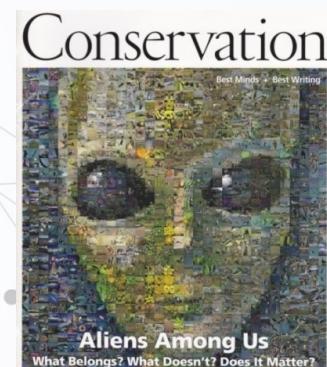


Table 1. Comparison between native and alien flora (flowering plants and ferns) in selected Pacific tropical islands (by size of terrestrial area) and number of naturalized and invasive alien plants (including dominant or major IAP).

Island or island group	Area (km ²)	Native flora (number of indigenous species)	Alien flora (number of introduced species)	Naturalized alien plant species	Invasive alien plant species	Dominant IAP
New Caledonia	19 060	3 261 ^a	2 008 ^b	597 ^b	97 ^c	67 ^b
Fiji	18 270	1 622 ^d	977 ^d	461 ^d	107 ^e	30 ^f
Hawai'i	16 880	1 138 ^g	8 134 ^h	1 104 ⁱ	469 ⁱ	86 ^j
Galápagos	7 900	550 ^k	870 ^l	220 ^l	109 ^l	22 ^l
French Polynesia	3 519	885 ^m	> 1 700 ⁿ	593 ⁿ	-	57 ⁿ
Cook Is.	238	296 ^o	997 ^o	333 ^o	76 ^p	12 ^q
Rapa Nui (Easter Island)	166	48 ^r	370 ^s	180 ^s	-	36 ^s
Wallis et Futuna	142	351 ^t	338 ^u	151 ^u	-	18 ^u

^aJaffré *et al.* 2004, ^bMeyer *et al.* 2010, ^cHequet *et al.* 2009, ^dBrownlie 1977 and Smith 1985, ^eGHD, ^fMeyer 2000, ^gWagner *et al.* 1999, ^hStaples and Herbst 2005, ⁱStaples and Cowie 2001, ^jSmith 1985, ^kMauchamp 1997, ^lTrueman *et al.* 2010, ^mFlorence *et al.* 2007, ⁿFourdrignier and Meyer 2008, ^oMcCormack 2007, ^pSpace and Flynn 2002, ^qMeyer 2004, ^rDubois *et al.* 2013, ^sMeyer 2008, ^tMorat *et al.*, ^uMeyer *et al.* 2010



Invasive species do not respect borders!

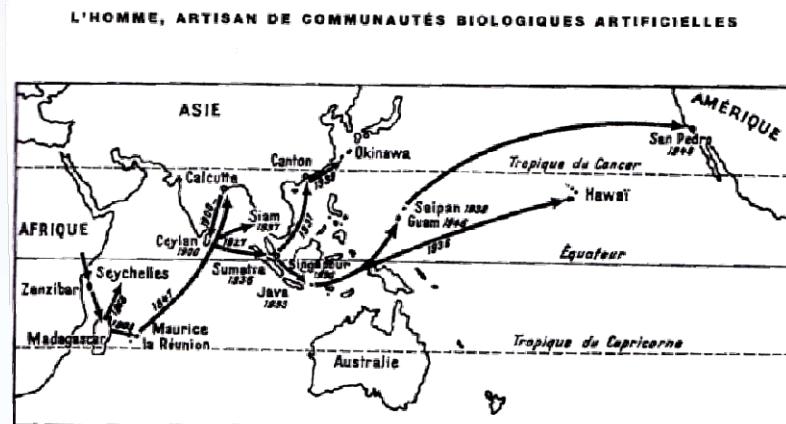
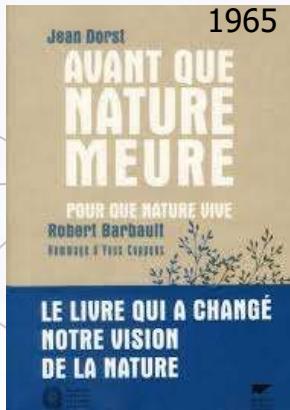


Fig. 43. Transport et acclimatation volontaire ou non de l'Achatine *Achatina fulica*.
D'après R. Tucker Abbott, 1949.

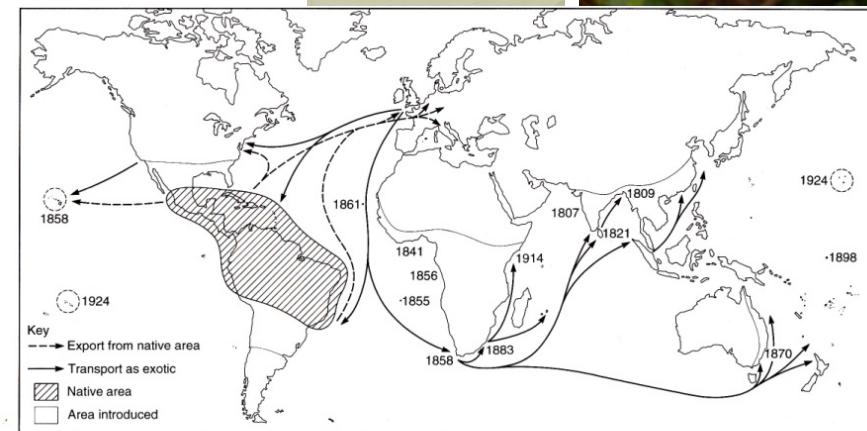
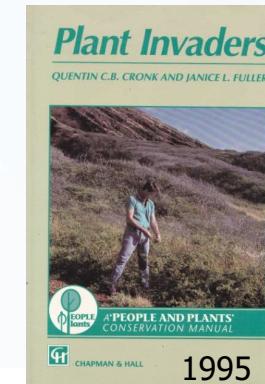
PeerJ

The invasive land planarian *Platydemus manokwari* (Platyhelminthes, Geoplanidae): records from six new localities, including the first in the USA

Jean-Lou Justine¹, Leigh Winsor², Patrick Barrière³, Crispus Fanaï⁴, Delphine Gey⁵, Andrew Wee Kien Han⁶, Giomara La Quay-Velazquez⁷, Benjamin Paul Yi-Hann Lee^{8,9}, Jean-Marc Lefèvre¹⁰, Jean-Yves Meyer¹¹, David Philipart¹², David G. Robinson¹³, Jessica Thévenot¹⁴ and Francis Tsatsia¹⁵

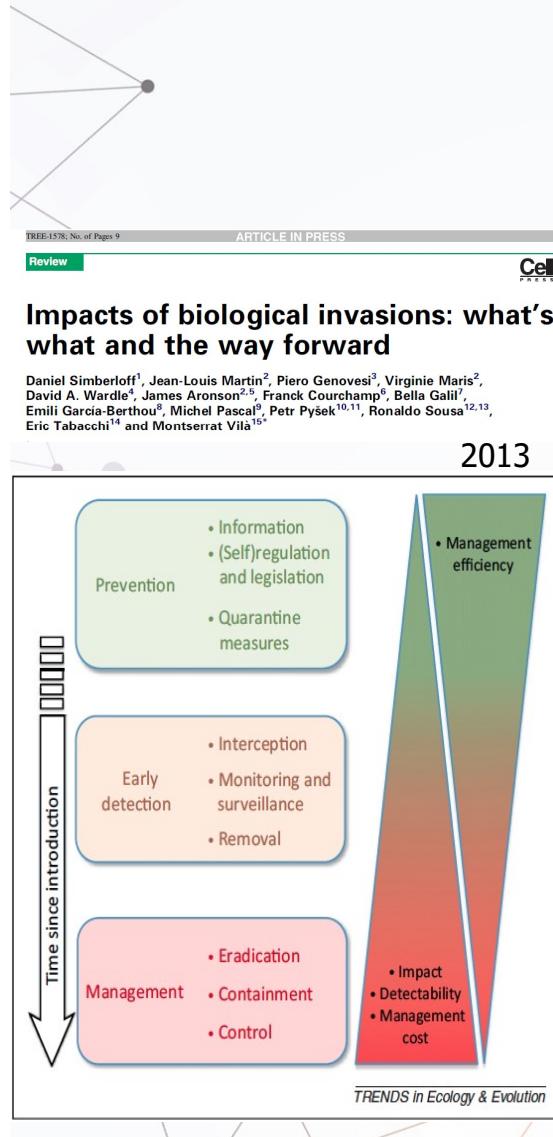


Figure 7 *Platydemus manokwari*, map of distribution records. Blue: previous records (Justine et al., 2014); Red: new records reported in this paper.



Map 2. Transport of *Lantana camara* around the world. This species has become a major pest in many areas. (After Stirton (1978))

The importance of networks and sharing data and experiences for invasive species management



Trends in Ecology & Evolution

Opinion

Invasion Biology: Specific Problems and Possible Solutions

Franck Courchamp,^{1,*} Alice Fournier,¹ Céline Bellard,² Cleo Bertelsmeier,³ Elsa Bonnaud,¹ Jonathan M. Jeschke,^{4,5,6} and James C. Russell^{1,7}

Trends in Ecology & Evolution, January 2017, Vol. 32, No. 1



- Difficult measure and demonstration of impacts
- Difficult anticipation of system evolution
- Lack of general rules
- Local scale interests
- Lack of knowledge on many systems
- Multifaceted threat

Alerting



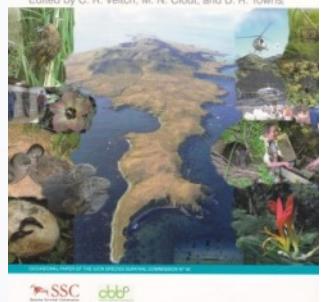
Improved communication



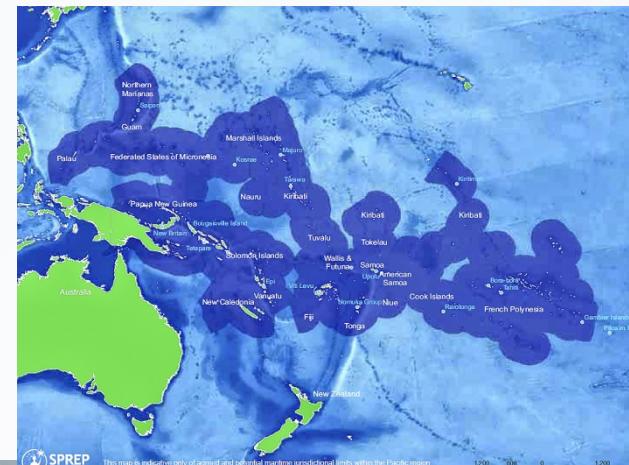
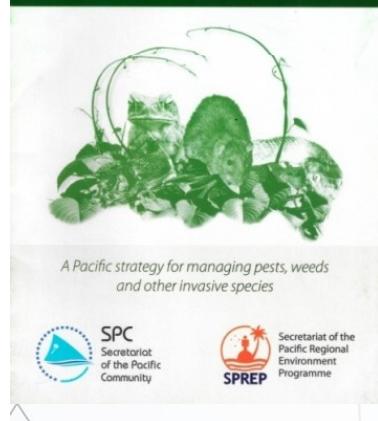
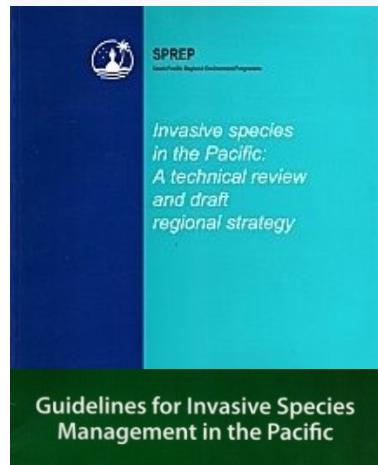
Improved collaboration



Island Invasives:
Eradication and Management
Proceedings of the
International Conference on Island Invasives
Edited by C. R. Veitch, M. N. Clout, and D. R. Towns.



Existing networks in the Pacific Islands



PILN meeting, Moorea, French Polynesia 2007



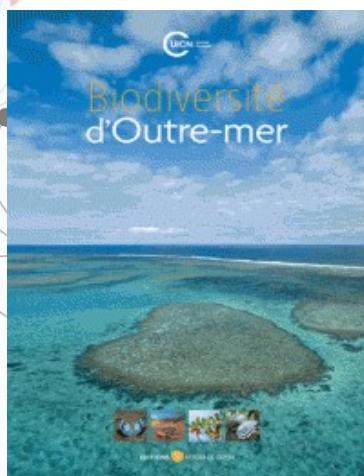
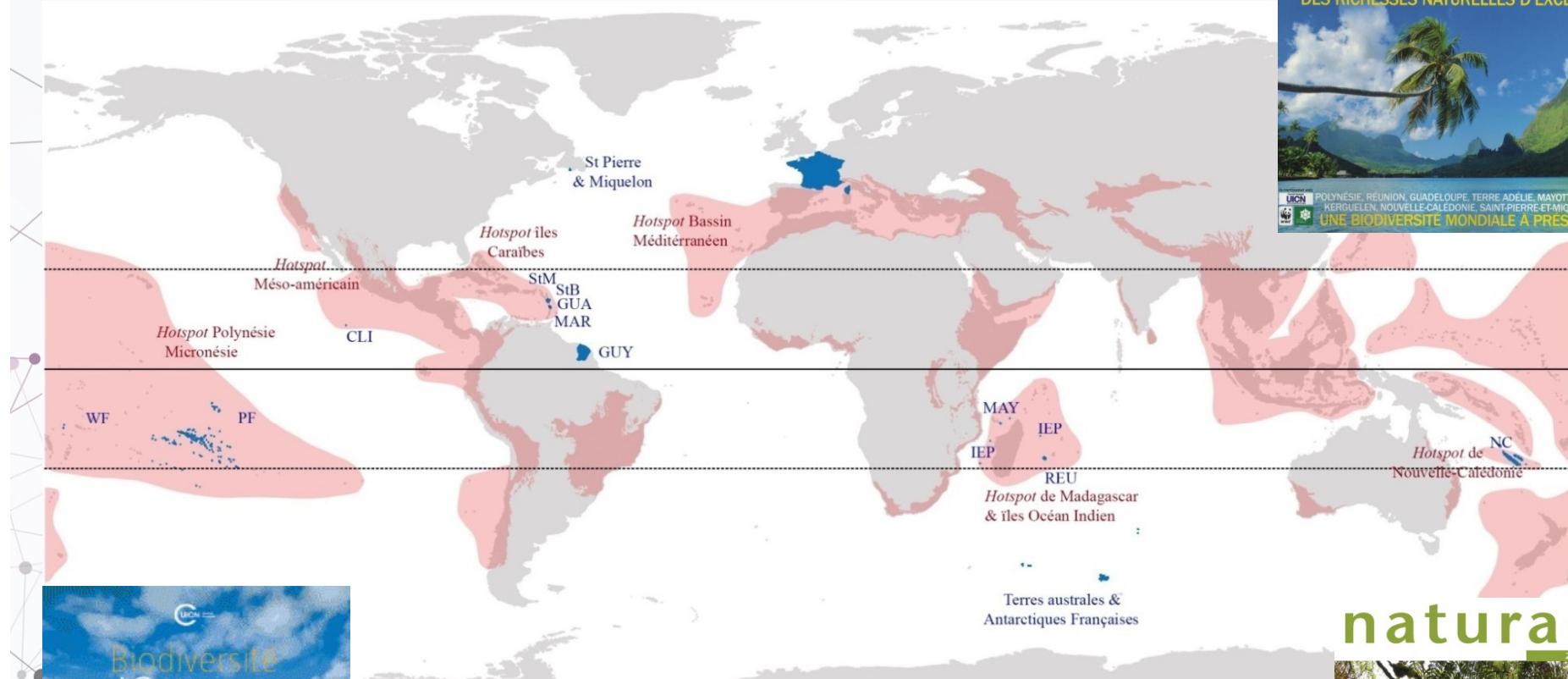
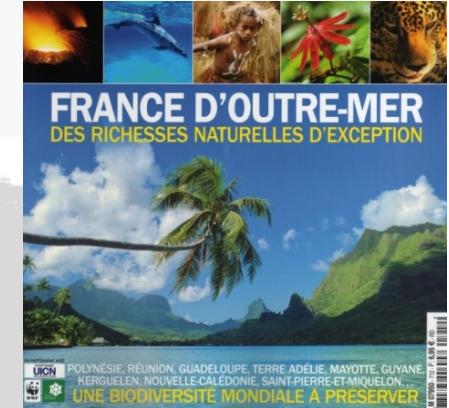
PILN meeting, Kiritimati, Kiribati 2012



CRITICAL ECOSYSTEM
PARTNERSHIP FUND



The French Overseas Island Territories



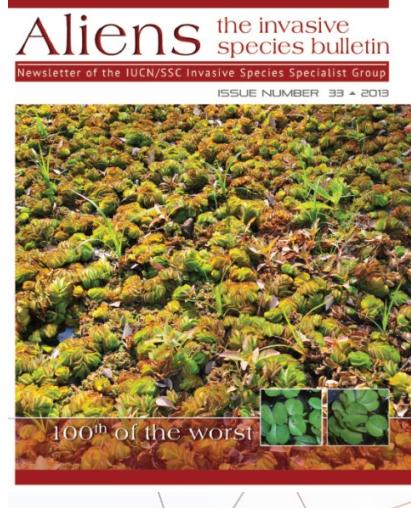
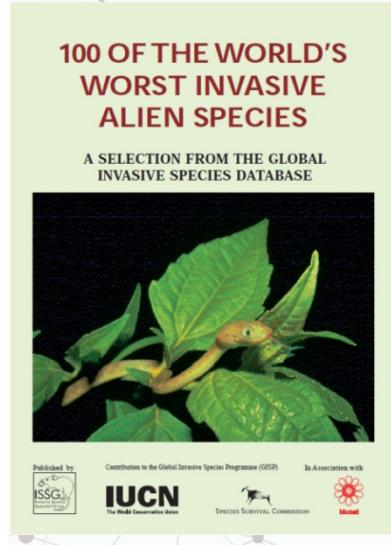
(Bocquet & Gargominy, coord. 2013)

- **11 tropical island territories (140+ main islands) in three oceans**
- **5 of the 36 “global biodiversity hotspots”**
- **70% of the ca. 18,000 terrestrial endemic plants and animals of France!**



(Meyer *et al.*, 2018)

- Half of the “100 World’s Worst IAS”!
- More than 300 invasive alien plants (excluding weeds)

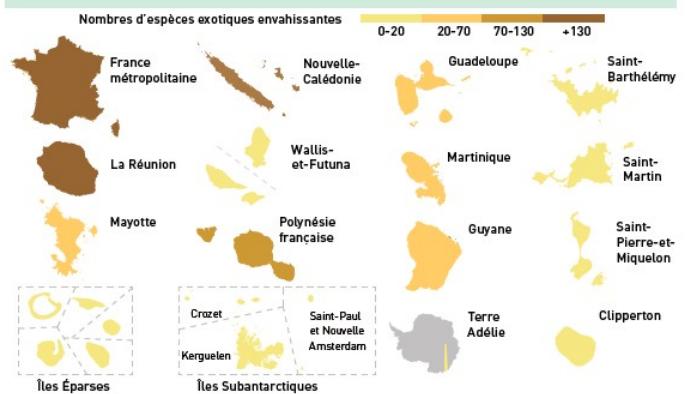


INPN
ONB

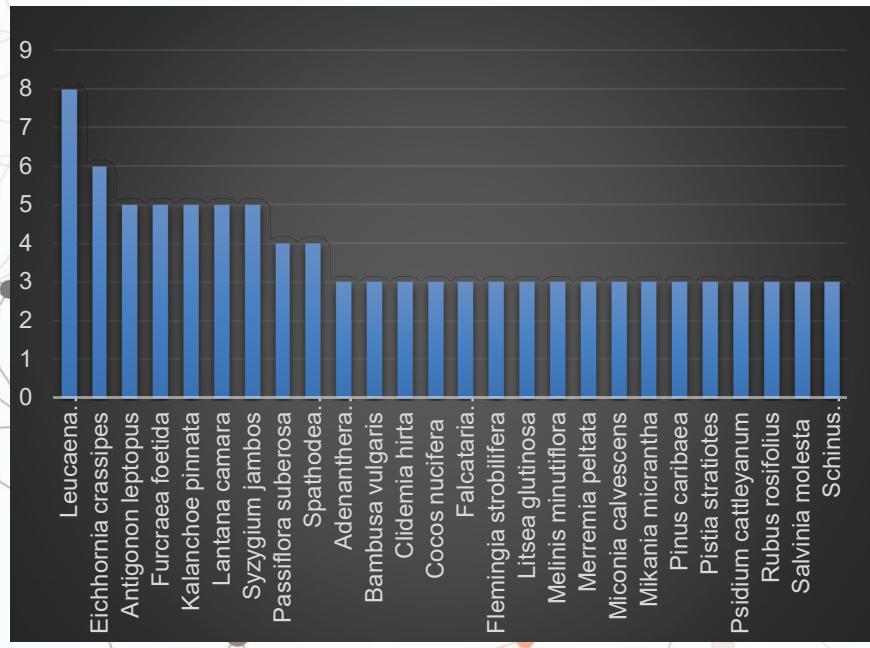
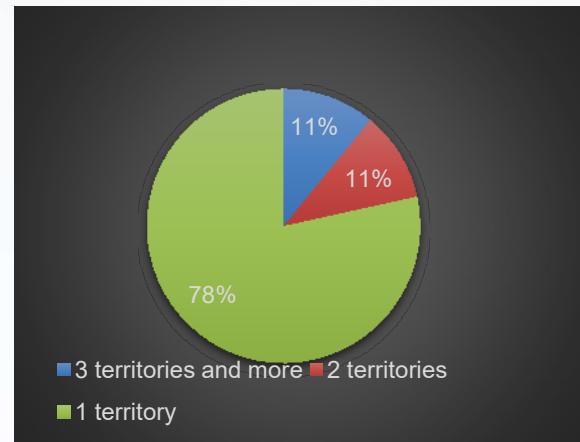
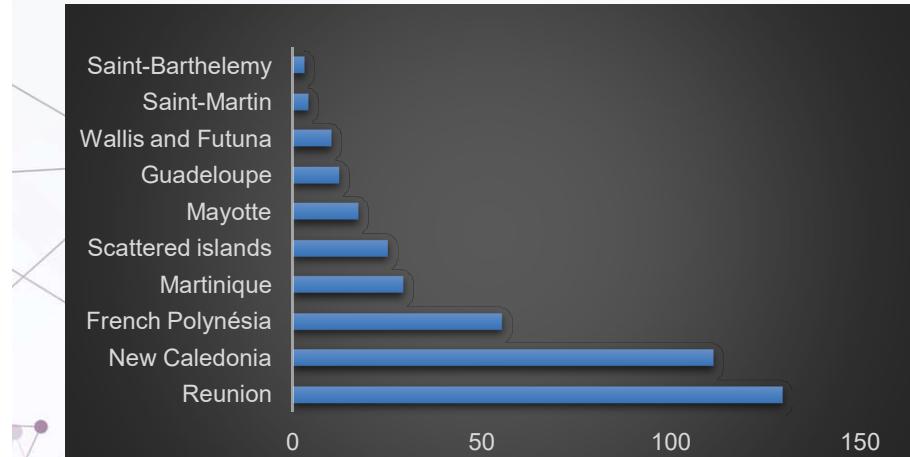
LES ESPÈCES EXOTIQUES ENVAHISSENTES (EEE)

2019

RÉPARTITION DES 523 EEE CONTINENTALES ET MARINES



➤ “Common pool” of invasive plants



➤ **Impacts on ecosystem structure, composition and dynamics** (“the transformers” *sensu* Richardson *et al.* 2000)



Fire regime



Melinis minutiflora

Light availability & soil erosion



Miconia calvescens

Light & water regime



Psidium cattleianum

Nutrient cycling



Falcataria moluccana

Plant succession



Pinus caribaea

Water flow & quality



Eichhornia crassipes

« Initiative sur les Espèces Exotiques Envahissantes en Outre-Mer »



- **2005-on going**
- **12 local coordinators/focal points**
- **100+ French overseas and « continental » experts**



Paris (France) 2008



Guadeloupe (Caribbean Is.) 2009



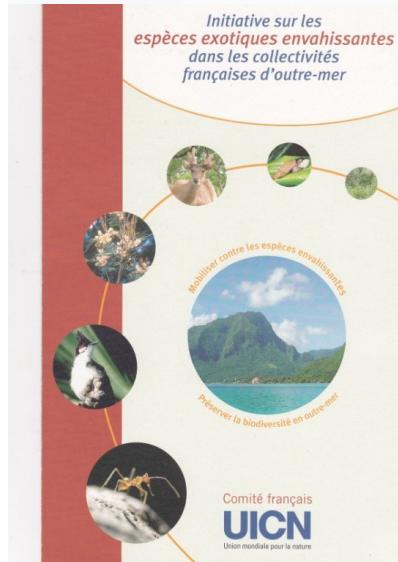
Mayotte (Indian Ocean) 2012



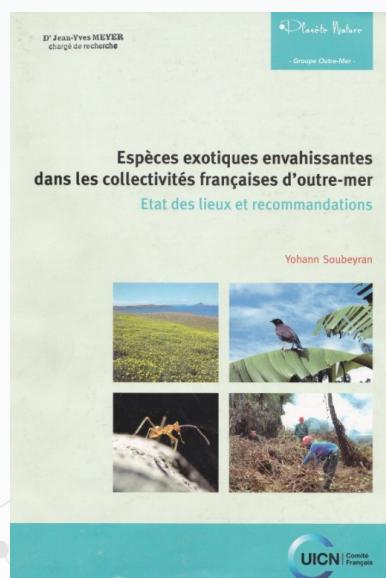
Nouvelle-Calédonie (Pacific Ocean) 2010

➤ Publishing

2007



2008



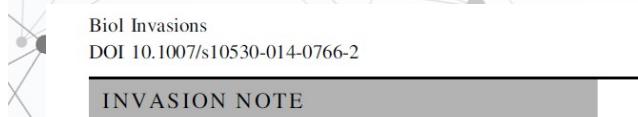
2011



2015



2014



2018



Dealing with invasive alien species in the French overseas territories: results and benefits of a 7-year Initiative

Yohann Soubeyran · Jean-Yves Meyer · Marc Lebouvier ·
Benoit De Thoisy · Christophe Lavergne · Frank Urtizberea ·
Florian Kirchner

Symposium “Invasive Species on Islands”, “Island Biology 2019”, La Réunion, 09 July 2019

➤ Promoting

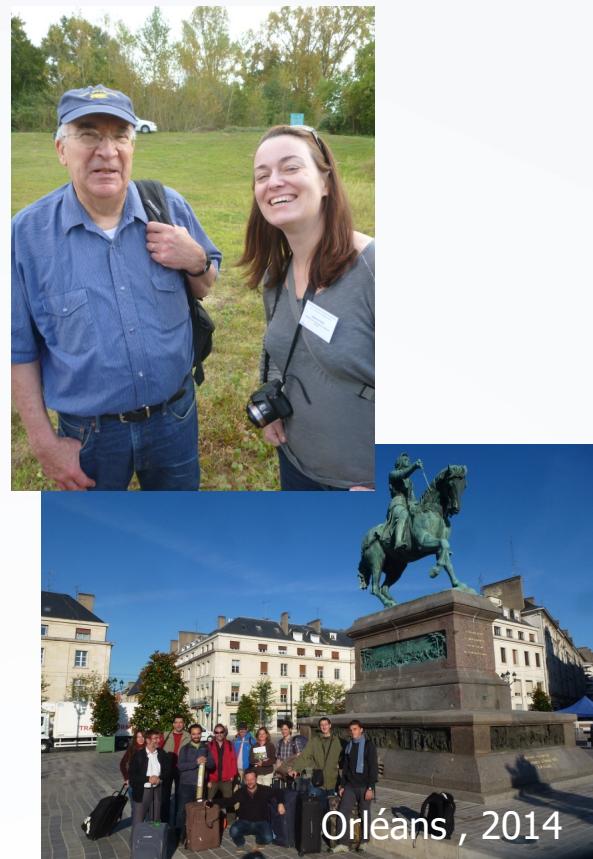
UICN Comité Français
Assises nationales
Espèces exotiques envahissantes :
Vers un renforcement des stratégies d'action

ORLÉANS
23, 24 et 25 septembre 2014
Centre régional de documentation pédagogique (CRDP)
55, rue N-D de Recouvrance
45012 Orléans

With the support of:

ORLÉANS, 2014

Rennes, 2018



ISLAND INVASIVES 2017

IUCN

Island invasives:
scaling up to meet the challenge

Proceedings of the
international conference on island invasives 2017

Edited by C.R. Veitch, M.N. Clout, A.R. Martin, J.C. Russell and C.J. West

Océanopolis Paper of the IUCN Species Survival Commission N° 62

SSC Species Survival Commission **University of Dundee**



Groupement de Recherche
'Invasions Biologiques'
GdR CNRS InvaBio 3647



➤ Collecting and sharing data

The screenshot shows the homepage of the UICN Comité Français Initiative sur les Espèces Exotiques Envahissantes en Outre-mer. It features a banner with a green and blue gradient background, a title "Enquête : quels besoins d'accompagnement et de formation sur les EEE ?" (Survey: what needs for support and training on EEE?), and several small images related to invasive species. At the bottom, there's a "LIRE PLUS" button and the logo for ipbes Science and Policy.

ESPÈCES EXOTIQUES ENVAHISSENTES DANS
LES COLLECTIVITÉS FRANÇAISES D'OUTRE-MER

A network diagram with grey nodes connected by white lines. Two dashed arrows point from the UICN website towards a central node, which then points to the PestNet interface. The PestNet interface is shown in a Microsoft Internet Explorer window, displaying a large green caterpillar image and navigation links like "What is PestNet?", "How to Join PestNet", and "Guide for Contributors".

INPN
Institut National du Patrimoine Naturel

ONB
Observatoire National des Biodiversités

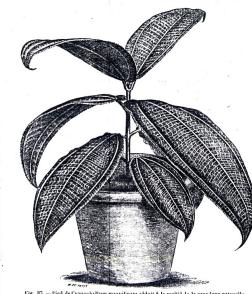
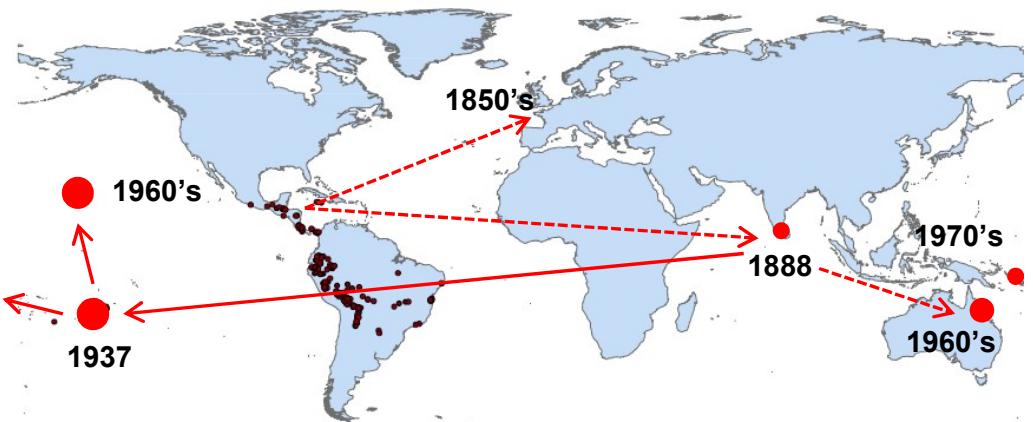
Three solid blue arrows originate from the central node in the network diagram and point to three separate database interfaces. The top arrow points to the Global Invasive Species Database (GISD) interface, featuring a snake image and the text "GLOBAL INVASIVE SPECIES DATABASE". The middle arrow points to the Invasive Species Compendium (ISC) interface, showing a detailed dataset for "Candidatus Phytoplasma fraxini" (ash yellows). The bottom arrow points to the Global Register of Introduced and Invasive Species (GRIIS) interface, featuring a rat image and the text "GRIIS GLOBAL REGISTER OF INTRODUCED AND INVASIVE SPECIES".

GRIIS
GLOBAL REGISTER OF
INTRODUCED AND INVASIVE SPECIES

www.issg.org/database

Case study. The « purple plague » *Miconia calvescens*

- Tahiti > 80,000 ha invaded
- Moorea > 3,500 ha
- Hawai'i (Big island) > 61,000 ha
- Maui > 12,000 ha
- North Queensland > 300 ha
- New Caledonia > 140 ha



(Biosecurity Queensland©)



Tahiti (E. Killgore©)



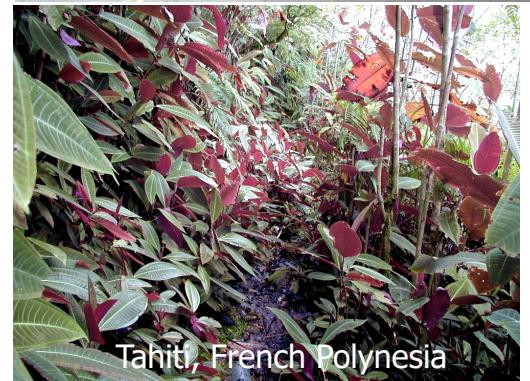
Maui, Hawai'i (P. Leary©)



New Caledonia



Big Island, Hawai'i



Tahiti, French Polynesia

- **Public awareness**
- **Biosecurity protocols**



Declared Class 1

Big, Bad Weeds

Stopping the spread of O'ahu's most dangerous invasive species, like the miconia tree, before they take root

by Lara Reyno

Forestry Queensland

Miconia could be in your area.

- It invades rainforest areas and competes with native plant species.
 - It's an aggressive tree up to 15 m.
 - Fruit is spread by birds.
 - The large leaves have prominent veins with a purple underside.
 - Early detection helps protect Queensland's tourism industries and natural environment.



Miconia, attention danger !

Deux clés jouent pour l'expansion du miconia : la Coléodactyle et Polytra. Un franc-pas, mi-moustique, mi-abeille, qui dépose ses œufs dans les fleurs de miconia. Puis, après à huit jours pour ingurgiter la végétation de la plante, il libère des larves qui dévorent la racine et l'ensemble du miconia. Cette plante envahissante a été introduite au Japon par les armées Américaines au cours des années 50. Objectif de ce programme : éliminer les plantes indigènes dans une mesure telle qu'il puisse prédiriger leur croissance dans les zones dévastées par les bombes atomiques. "Ici la campagne de guerre n'a pas fini", déclare le botaniste.



[View all posts by admin](#) | [View all posts in category](#)

[View all posts by admin](#) | [View all posts in category](#)

Cette plante envahissante, d'origine sud-américaine, a envahi la côte sud du Québec.

et de Moorea où toutes les forêts

humides sont complètement envahies. D'autant que nous

avons que les Marquises ont
un hibiscus qui ressemble

Le jardinier amateur ou le professionnaliste avec énormément de plantes et

desse à renouvellement. Dès lors, si on ne lutte pas

contre ces fléaux sans parler d'éradication mais au moins de lutte

*active-on risque de perdre ce
qui nous a rendus heureux?*

insi, la cartographie en cours

La réalisation par les jeunes de ces critères devrait être renforcée.

aux autorités marquises

Mélanie face à une plantule de miconia en bord de route sur les

oient mises en place dans les hautes de Taichae.

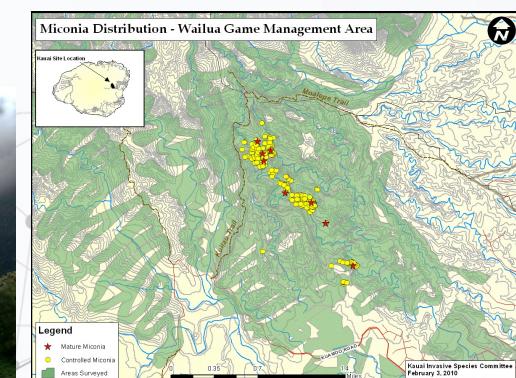
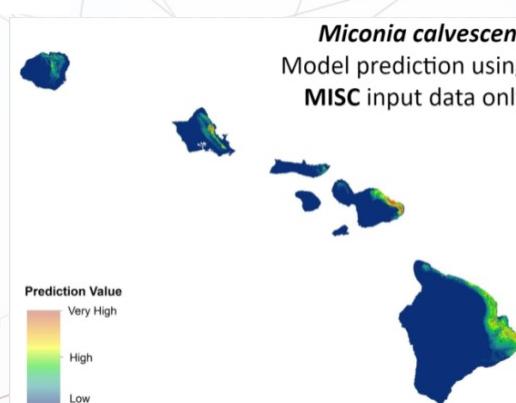
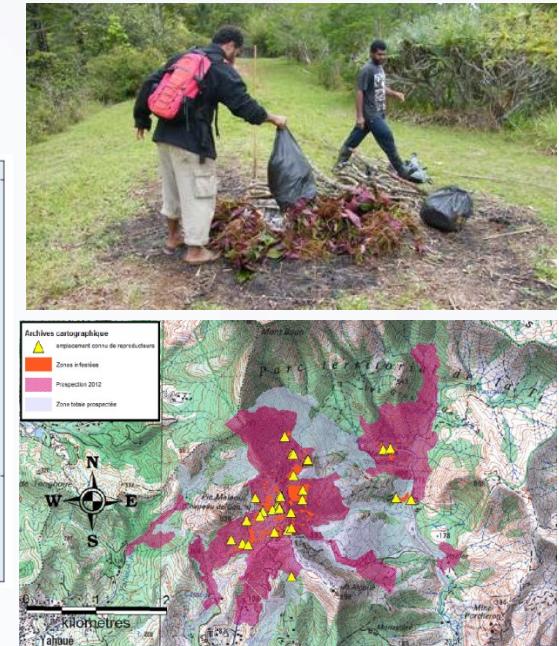
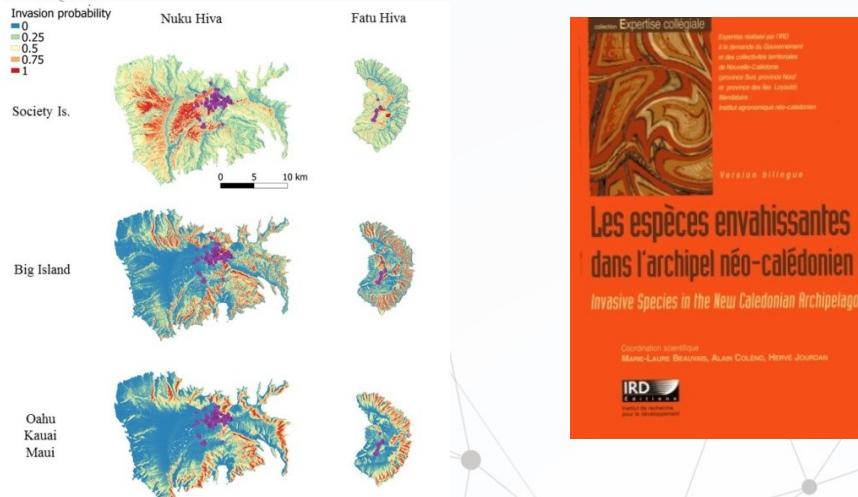
➤ Predicting the risks

- Distribution models and maps as warning tools for decision-makers
- Monitoring and field surveys (ground and aerial) for managers

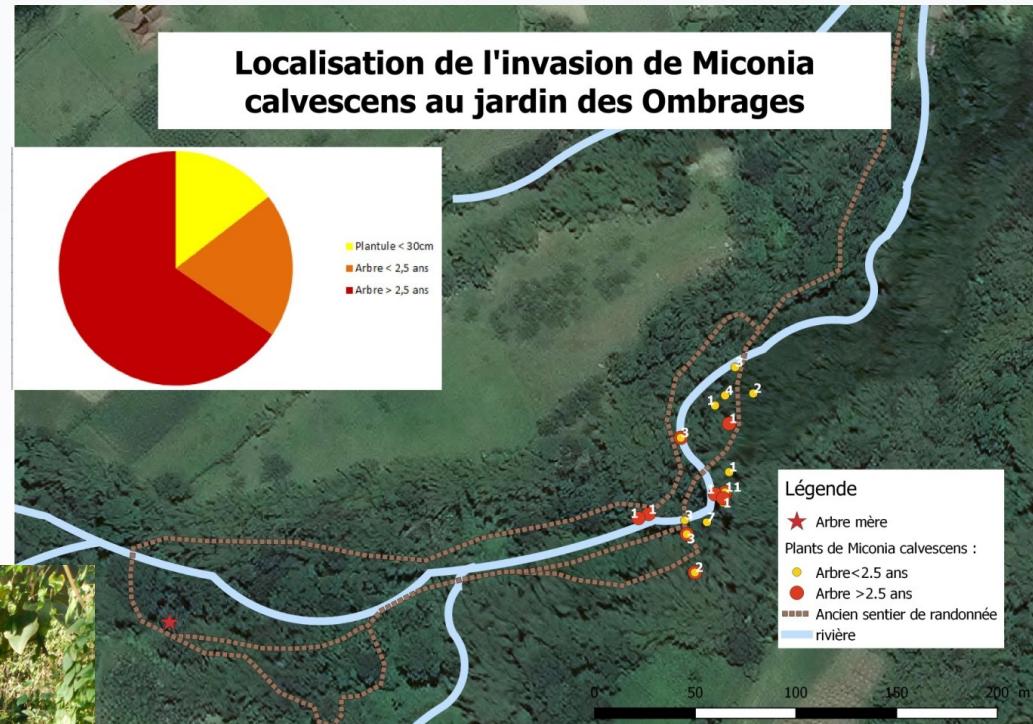
Predicting the Invasion Risk of *Miconia calvescens* in the Marquesas Islands (South Pacific): A Modeling Approach¹

Mélanie Libeau,^{2,3} Jean-Yves Meyer,² Ravahere Taputuarai,⁴ and Robin Pouteau^{5,6,7}

Pacific Science (2019), vol. 73, no. 1:17–34



➤ Early detection and control



➤ Finding the next invaders!

Twelfth Australian Weeds Conference

SLEEPER WEEDS

Richard Groves
CSIRO Plant Industry and CRC Weed Management Systems,
GPO Box 1600, Canberra, ACT 2601

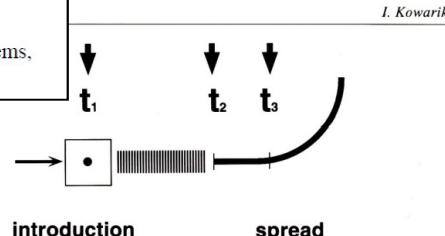


Fig. 1. The process of biological invasions including two kinds of lag phases: (a) the period between the first introduction to an area and the first spread (t₂-t₁), (b) the period preceding the switch to a significantly higher rate of population growth (t₃-t₂).
I. Kowarik

Diversity and Distributions, (Diversity Distrib.) (2004) 10, 333–347



Beautés fatales: Acanthaceae species as invasive alien plants on tropical Indo-Pacific Islands

Jean-Yves Meyer* and Christophe Lavergne†



PALMS

Meyer et al.: Invasive Palms

Vol. 52(2) 2008

Time Bombs in Gardens: Invasive Ornamental Palms in Tropical Islands, with Emphasis on French Polynesia (Pacific Ocean) and the Mascarenes (Indian Ocean)

JEAN-YVES MEYER
Délégation à la Recherche
B.P. 20981
Papeete, Tahiti
French Polynesia
jean-yves.meyer@recherche.gov.pf

CHRISTOPHE LAVERNE
Association Palmerale-Union
Domaine de Palmahoutoff
97432 Ravine des Cabris
La Réunion
France

AND

DONALD R. HODEL
University of California
P.O. Box 22255
Los Angeles, California
90022
USA

Tahiti (French Polynesia)

The snake-like climber *Anodendron paniculatum* (Apocynaceae), a “new” invasive liana in the rainforests of Tahiti (Pacific Ocean)
Anodendron paniculatum A. DC. (syn. *A. manubriatum* Merr., *Echites paniculata* Roxb. Apocynaceae) is a large climbing and twining liana, native to India, Bangladesh, Burma, Sri Lanka, Southeast Asia (Thailand, Cambodia, Vietnam, Laos, Philippines) and Malesia (Indonesia, Malaysia). The species is characterized by terminal or axillary panicles up to 15cm long, each bearing small white or yellowish tubular flowers; and by large fruits (paired follicles or “pods” up to 16cm long, 3cm wide, black when ripe) containing small flattened seeds (1-2cm long, 0.6-0.8mm wide), each attached to a long white silky coma (or “ruff”) 5-8cm long. In its native range, this huge twiner is often more than 20m tall and is found in evergreen or secondary forests up to 1700m elevation.

Known as a medicinal plant in India and used for making fishing nets in Sri Lanka, *Anodendron paniculatum* was introduced to Tahiti in the 1970s and has since become a major invader of the island’s rainforests.



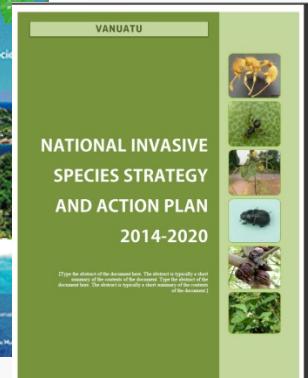
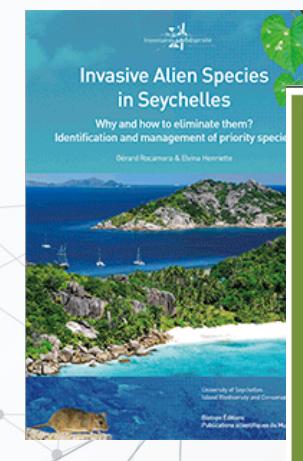
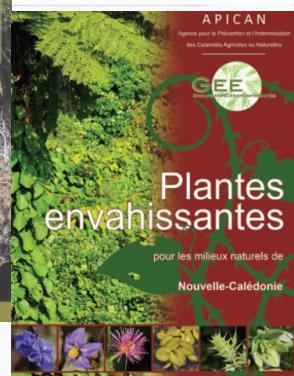
A. paniculatum seed Photo: Jean-Yves Meyer



Invasive Species Specialist Group of the IUCN Species Survival Commission
ALIENS
Double issue Numbers 24/25 2007
ISSG
Invasive Species Specialist Group

Conclusions

- **Building a network of national and local experts = better capacity building**
- **Updating IAS assessments in each territory = better knowledge**
- **Publishing toolkits/guidelines of best practices = better management**
- **Setting up IAS local committees with local strategies in each territory = better governance**
- **More regional cooperation (with non-French countries and territories!)**
- **May inspire other initiatives, networks and collaborative projects on IAS at a regional scale... or on other critical conservation issues (biodiversity, ecosystem services, restoration, climate change...)!**





**Thank you
for your attention
Mauruuru roa!**



Comité
Français

**INITIATIVE SUR LES
ESPÈCES EXOTIQUES
ENVAHISSENTES
EN OUTRE-MER**

<https://especes-envahissantes-outremer.fr/>

