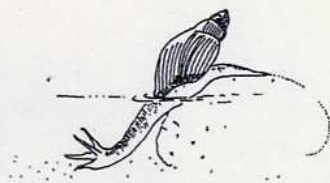


French Polynesia: a natural paradise ...for invasive species

French Polynesia - comprising a total of 118 tropical oceanic islands located in the Southeast Pacific, and divided into 5 archipelagoes, namely Austral, Gambier, Marquesas, Society and Tuamotu - is best known to scientists as the location of some of the most infamous cases of biological invasion of island ecosystems, with resulting dramatic effects on the native biota. The black (or ship) rat Rattus rattus, accidentally introduced by the first European travellers during the 18th century, is suspected to have caused the extinction of several endemic birds, especially lorikeets (Vini spp.) and flycatchers (Pomarea spp.) in the Society and the Marquesas Islands. The carnivorous snail Euglandina rosea has completely eradicated the 7 endemic tree snails (Partula spp.) of the island of Moorea (Society Islands) in the less than 10 years since its intentional introduction in 1977 to control the giant African snail Achatina fulica.

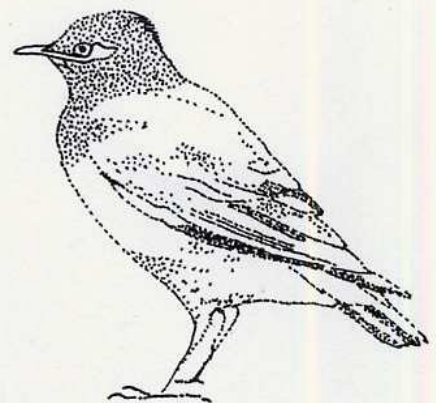


Euglandina rosea

The alien tree Miconia calvescens, is native to Tropical America and was introduced as an ornamental to a botanical garden in Tahiti in 1937. It forms dense monospecific stands from sea level up to 1300 m. elevation, causing the extirpation of many endemic plants located in the understorey (40 to 50 Tahitian endemics are directly endangered, especially lobeliads of the Southeastern Pacific endemic genus Sclerotheca), and alters the structure, composition and ecosystem processes of the native forests. Those three striking examples are unfortunately *les arbres qui cachent la forêt* of many other alien species thriving in French Polynesia.

Since the arrival of the first Polynesian migrants, who voluntarily or accidentally introduced circa 80 plant species (mostly food resources such as taro and breadfruit) and a few animal species (such as dogs, pigs, chickens and the Polynesian rat Rattus exulans) about 2,500 years ago, the islands of French Polynesia have faced an increasing number of species introductions over time, mainly for economical and ornamental or game uses. Retired American professor Harrison W. Smith introduced approximately 250 plant species to Tahiti, between 1921 and 1944, via his private botanical garden (including Miconia calvescens and the African tulip tree Spathodea campanulata). Eastham Guild, a member of the American Ornithologists' Union, released about 10,000 birds of 50 to 55 different species in Tahiti between 1930 and 1940. As a result, there are now more

alien species than native species in French Polynesia (circa 1700 alien plants versus 960 native plants). Some of those species are naturalized, i.e. established in the wild (around 550 plant species and 15 land birds) but only a few of them have become invasive in native habitats and had significant ecological effects. Grazing and browsing mammals, such as goats, sheep, horses and cattle, have turned the dry forests of the islets of Eiao and Mohotani in the Marquesas and the island of Mangareva in the Australs into a *terre déserte* without any vegetation cover; the thimbleberry Rubus rosifolius and the strawberry guava Psidium cattleianum, whose fruits are eaten and actively dispersed by animals, have aggressively colonized the native wet forests; introduced birds such as the common myna Acridotheres tristis (introduced around 1910 to control alien wasps) or the aggressive red-vented bulbul Pycnonotus cafer (introduced in 1979



Acridotheres tristis

as a cage bird) are strong competitors with and/or egg predators of native birds; other alien birds such as the swamp-harrier *Circus approximans* introduced in 1885 to Tahiti, and the owl *Bubo virginianus*, brought back to Hiva Oa in 1927, (both species were introduced to control rats) are considered to have a major impact on the endemic avifauna. Among the approximately 40 alien ant species present in French Polynesia, the big-headed ant *Pheidole megacephala*, known to have eliminated endemic spiders and insects in the Hawaiian islands, is abundant in the Marquesas up to 1000 m. elevation, but its impact on the native entomofauna is not precisely known. Nor is the effect of other introduced insects, spiders (circa 80 species), freshwater mollusks (4 species) and fishes (especially the tilapia *Oreochromis mossambicus* introduced in the 50s). A matter of strong concern is the existence of alien species which are known to be highly invasive in other tropical countries, and have not yet expanded to French Polynesia but could be potentially invasive (species in a lag phase?). Those species include the rose-myrtle *Rhodomyrtus tomentosa* and the ginger *Hedychium gardnerianum* (both invasive in the Hawaiian Islands), the quinine-tree *Cinchona succirubra* (invasive in the Galapagos), the christmas-berry *Schinus terebinthifolius* (invasive in Florida) or the vine *Thunbergia grandiflora* (invasive in Singapore). Also the red-billed leiothrix (*Leiothrix lutea*), a passeriform widely naturalized in Hawaii, where it is an active seed-disperser of invasive plants and a carrier of the pathogen causing avian malaria, which is currently sold as a caged bird in Papeete; the red-eared slider (*Trachemys scripta*), an omnivorous aquatic turtle which is very popular in aquariophily, and is known to escape sometimes into the wild, or to

be released into rivers. Finally, some of the newly established species are not known to be invasive elsewhere but show signs here of beginning stages of invasion (the fire-spike *Odontonema strictum* and the fan-palm *Licuala grandis*, both introduced as garden ornamentals).

Faced with the exponential increase of species introductions via human movements by plane and boat and via the green industry, and aquarium and caged bird trade, and with the immediate and direct threats these plant and animal invaders cause to native biodiversity, the French Polynesian Government passed a law on nature protection in December 1995. The main aims of this new legislation are to protect endangered native species and their habitats, to forbid the introduction of new alien species that could be a threat to biodiversity, and to control harmful alien invasive species. A non-exhaustive list of 75 alien plants which are currently or potentially invasive in French Polynesia has been compiled, as well as a list of unwanted plant invaders still absent from French Polynesia.

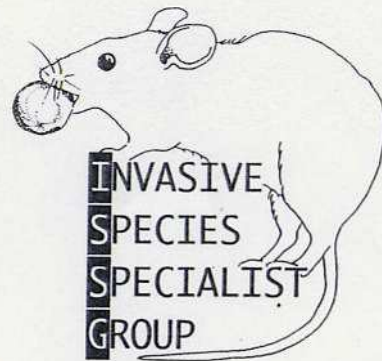
However, with the lack of a strong conservation agency, trained field-technicians and local biologists, and because of the scarcity of funds, the management of invasive species in French Polynesia cannot be effective. More than 700,000 individual *Miconia calvescens* plants have been destroyed in 5 years of intensive manual and chemical control in the islands of Raiatea and Tahaa (Society), with the help of hundreds of volunteers and even the intervention of the French Army, in order to halt the spread of this plant pest. Meanwhile, in September 1997, an isolated plant was discovered on the remote island of Fatu Iva in the Marquesas by a young pig hunter. Information, education and training to prevent new establishment of invasive species appear to be our highest priority.

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Hedychium gardnerianum

ALIENS



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