

INVASION DYNAMICS AND MANAGEMENT OF THE INVASIVE TREE *CASUARINA EQUISETIFOLIA* IN THE ATOLL OF MORUROA (FRENCH POLYNESIA), A FORMER NUCLEAR TEST SITE IN THE SOUTH PACIFIC

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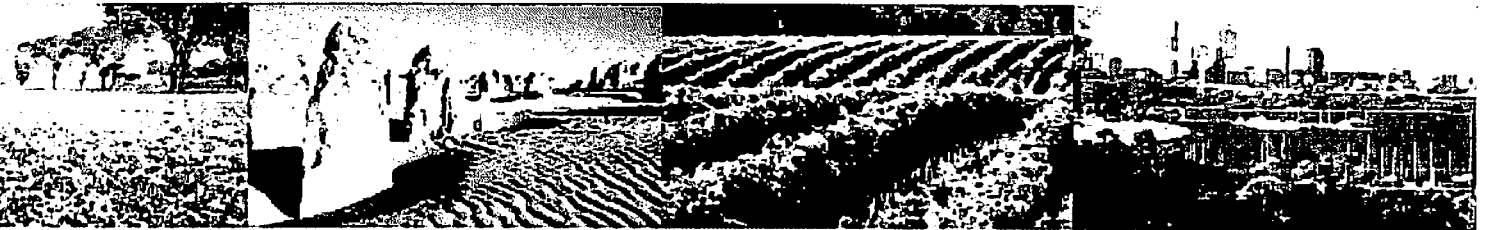
Human disturbances are recognized as a major triggering factor for invasion of native habitats by pioneer or early successional species. The coral atoll of Moruroa (21°50'S lat., 138°55'W long.) located in the Tuamotu archipelago (French Polynesia, South Pacific), a site of extensive nuclear testing by France and of massive settlement (more than 2,500 people on a 3 sq. km land surface) between 1966 and 1996, provides a striking example of extreme disturbance in an island ecosystem.

Ironwood tree *Casuarina equisetifolia* (Casuarinaceae), a salt-resistant, drought-tolerant and nitrogen fixing tree, first introduced to the atoll in 1966 as an ornamental and a shade tree, appeared invasive in 1994 and is now a major concern for the French Army, especially for the maintenance of the road, the airstrip and the radiological monitoring installations. Recent field-surveys conducted in 2005 and 2007 reveal that more than half of the atoll is now covered by dense monospecific stands of *C. equisetifolia* (ca. 150 ha). Ironwood density in six 100 sq.m quadrats ranges between 90 (trees up to 12 cm in dbh) and 290 stems/sq.m (75% of the trees less than 4 cm in dbh). Larger trees (up to 20 m tall and more than 30 cm in dbh) found along the main road might be those originally planted in the 1960's and 70's. The main cause of massive ironwood invasion is probably a combination of the complete destruction of the native vegetation and soil sterilization during the atmospheric tests between 1966 and 1975 followed by severe anthropogenic disturbances caused by the demolition and cleanup of all the infrastructures and equipments in 1996. Ironwood is known as an aggressive invader in open or disturbed areas and poor soils, e.g. in human-modified coastal habitats in the Everglades in Florida, in phosphate-mined areas on the raised atoll of Nauru, or on young lava flows in La Réunion Island. Different control methods (chemical treatments with glyphosate applied on cut stumps and frilled trunks, fire, sea-water inundation) are being tested in collaboration with the French Army. A rehabilitation project of the atoll by planting native plants in the treated areas was recommended.



9th International Conference
on the Ecology and Management
of Alien Plant Invasions

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17-21 September 2007
Hyatt Regency Perth, Western Australia

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