

Feral cats threaten the biodiversity of French Polynesia: some island-dependent patterns

Palmas P.^{1,2,*}, Meyer J.-Y.³, De Méringo H.⁴, Teatiu G.^{*}, Bambridge R.^{*}, Teatiu S.^{*}, Timau T.^{*}, Maihota N.⁵, Gaertner J.-C.^{1,5} & Vidal E.²

¹ University of French Polynesia, UMR-241 EIO, Labex Corail, Faa'a, Tahiti, French Polynesia

² Institut Méditerranéen de Biodiversité et d'Ecologie marine et continentale (IMBE), Aix Marseille Université, CNRS, IRD, Avignon Université, Centre IRD de Nouméa, BP A5, 98848 Nouméa cedex, Nouvelle-Calédonie

³ Délégation à la Recherche, Gouvernement de la Polynésie française – B.P. 20981, 98713 Papeete, Tahiti, French Polynesia

⁴ Institut Méditerranéen de Biodiversité et d'Ecologie marine et continentale (IMBE), Aix Marseille Université, CNRS, IRD, Avignon Université, Europôle de l'Arbois, BP 80, 13545, Aix-en-Provence, France

⁵ IRD, UMR-241 EIO, Labex Corail, Faa'a, Tahiti, French Polynesia

* Volunteers from the islands of Tahiti, Tahuata, Ua Huka, French Polynesia

Correspondence author : pauline.palmas@ird.fr

BACKGROUND

Invasive populations of feral cats *Felis catus* strongly threaten the native fauna on islands worldwide (Doherty *et al.* 2016, Palmas *et al.* 2017). French Polynesia, located in the South Pacific and formed by 120 tropical and subtropical islands divided in five archipelagos, harbors several threatened endemic bird species. Feral cats which were introduced by Europeans less than 200 years ago, are currently present in most habitats of many atolls and high volcanic islands, but their abundance and impacts remain largely understudied compared to other invasive mammalian predators such as rats.

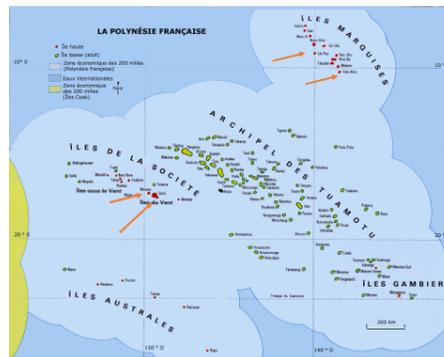
The French Polynesian islands can be considered as multi-invaded systems with different assemblages of introduced rodents. The impact of feral cat populations is assumed to be higher in presence of introduced rodents and may also vary according to the rodent species. In particular, black rats *Rattus rattus*, which constitute a constant and abundant resource, can help sustain feral cat abundance at a high level, thereby exacerbating predation pressure on native wildlife via the "hyperpredation" process (Courchamp *et al.* 1999, Ringler *et al.* 2015).

AIMS

We investigated the impacts of feral cats on biodiversity in four contrasted inhabited high volcanic islands in French Polynesia, particularly in terms of alien rat species, by studying:

- feral cat trophic ecology and predated endemic bird species;
- abundance of feral cat populations.

STUDY SITES



Marquesas Islands:

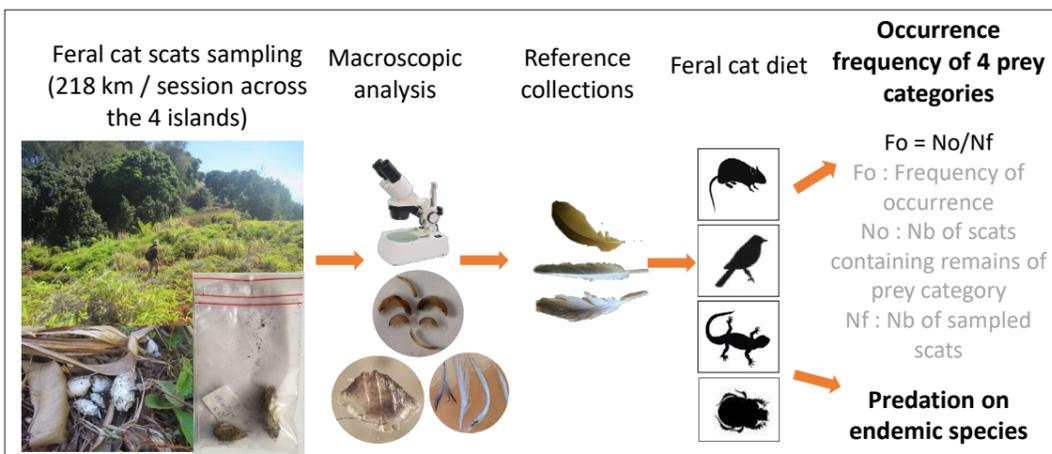
Ua Huka, 83 km² (with *R. exulans*)
Tahuata, 69 km² (with *R. rattus*, *R. exulans*)

Society Islands:

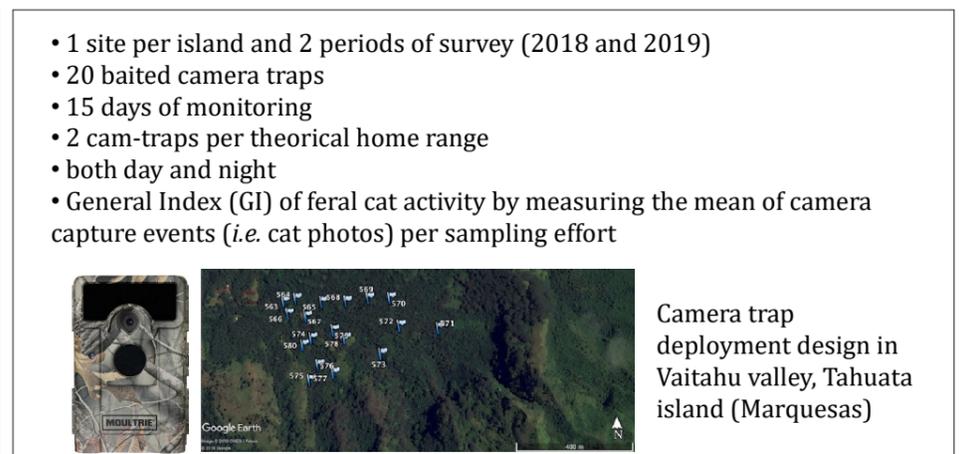
Moorea, 135 km² (*R. rattus*, *R. exulans*, *R. norvegicus*)
Tahiti, 1045 km² (*R. rattus*, *R. exulans*, *R. norvegicus*)

METHODS

Cat diet

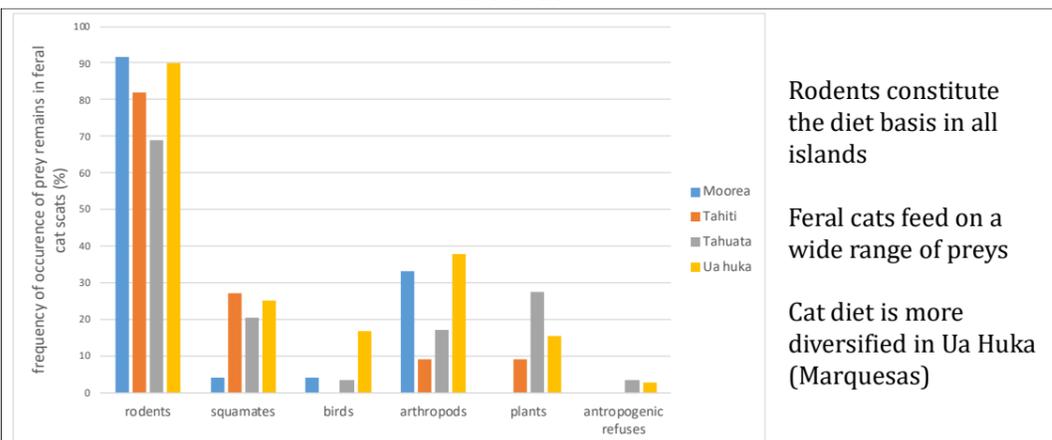


Cat abundance



RESULTS

Cat diet



Impacts on endemic bird species (IUCN Red List status according to MNHN *et al.* 2015)

PREDATED	LC	Kuku <i>Ptilinopus dupetithouarsii</i> White-caped fruit-dove Marquesas endemic	PREDATED	LC	'U'upa <i>Ptilinopus purpuratus</i> Grey-green fruit-dove Society endemic
?	CR	Pihiti <i>Vini ultramarina</i> Ultramarine lorikeet Ua Huka endemic	?	CR	Pahi <i>Todiramphus godeffroyi</i> Marquesan kingfisher Tahuata endemic
?	EN	Pati'oti'o <i>Pomarea iphis</i> Iphis monarch Ua Huka endemic	?	EN	Upe <i>Ducula galeata</i> Marquesas Imperial pigeon Marquesas endemic

Cat abundance

Our study reveals feral cat presence and both day and night activity

Unreported patterns of cat abundance; were found: higher in the Marquesas compared to the Society, and the highest in the island of Ua Huka

Archipelago	Island	Abundance (GI index) Cat detection / 100 camera trap days
Marquesas	Ua Huka	2.1
Marquesas	Tahuata	0.5
Society	Moorea	0.03
Society	Tahiti	0.00

DISCUSSION

- We showed unreported patterns of feral cats predation in islands.
- At least 2 endemic bird species (fruit doves, Columbidae) were predated.
- Surprising relative abundances with more feral cats on islands harboring 1 or 2 species of rodent (Ua Huka with only *Rattus exulans*; Tahuata with *R. exulans* and *R. rattus*).

CONSERVATION IMPLICATIONS

- Although free of black rats *Rattus rattus*, the island of Ua Huka urgently needs a more in-depth study in order to elaborate an efficient management plan against feral cats.
- Bird conservation in the different islands of French Polynesia requires specific studies on invasive predators before implementation of management actions.

- The GI index could provide an alternative management tool for monitoring feral cats relative abundance between sites or changes in populations with time.

Nota-Bene: this work is still ongoing and the analysis of data from the 2019 sampling period will confirm and clarify these patterns and conclusions (particularly concerning the bird species affected by feral cat predation)