Working group II: ARC and Invasive Species

Conservation of the Aeolian wall lizard through translocation, reintroduction and habitat restoration

Leonardo Vignoli

LIFE Platform Meeting: Amphibian and Reptile Conservation (ARC)

Challenges and Opportunities in Europe

Santander, Spain - 22-24 May 2024

Life EOLIZARD

LIFE EOLIZARD

UNIVERSITÀ DEGLI STUDI DELL'AQUILA

CNR IRET
Istituto di Ricerca sugli Ecosistemi Terrestri

ROMA TRE
UNIVERSITÀ DEGLI STUDI

TRITON

cnrs

UNIVERSITÀ DEGLI STUDI DI MILANO
LA STATALE

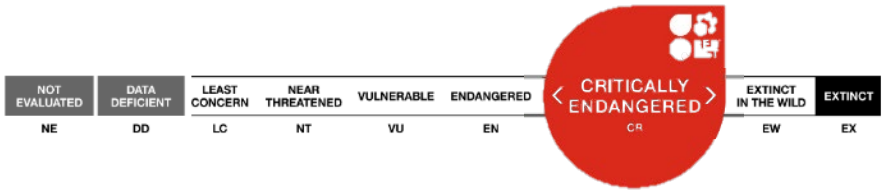
FONDAZIONE BIOPARCO di ROMA

cibio

ISPRA
Istituto Superiore per la Protezione e la Ricerca Ambientale

Sistema Nazionale per la Protezione dell'Ambiente

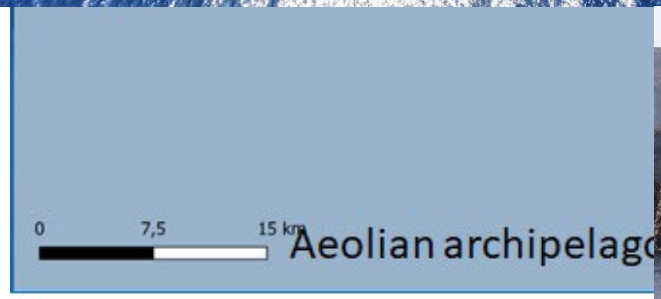
Podarcis raffonei (Mertens, 1952)



- **Limited Distribution**
- **Fragmentation**
- **Population Decline**
- **Low genetic diversity**
- **Hybridization + competition with the invasive *P. siculus***


Strombolicchio islet

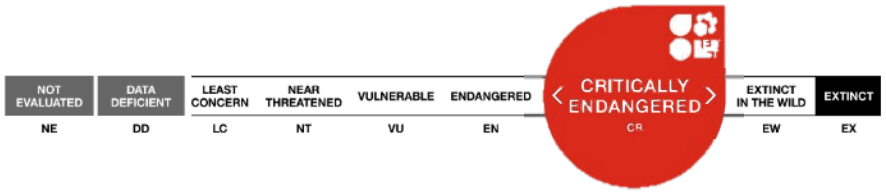

Scoglio Faraglione islet


0
7,5
15 km
Aeolian archipelago


Capo Grosso promontory

tion status?

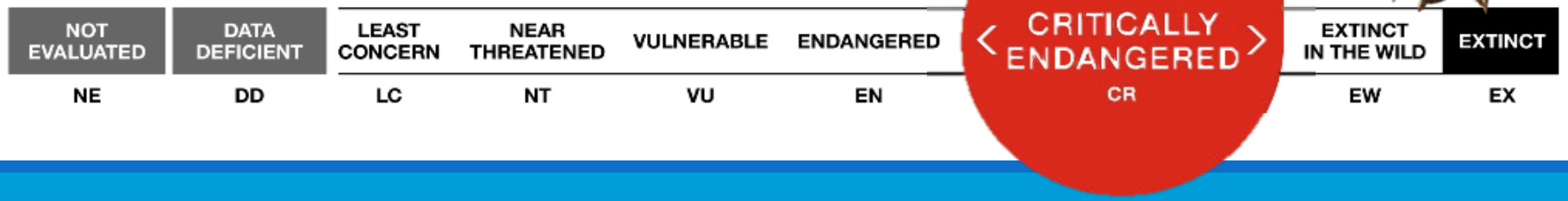
Podarcis raffonei (Mertens, 1952)

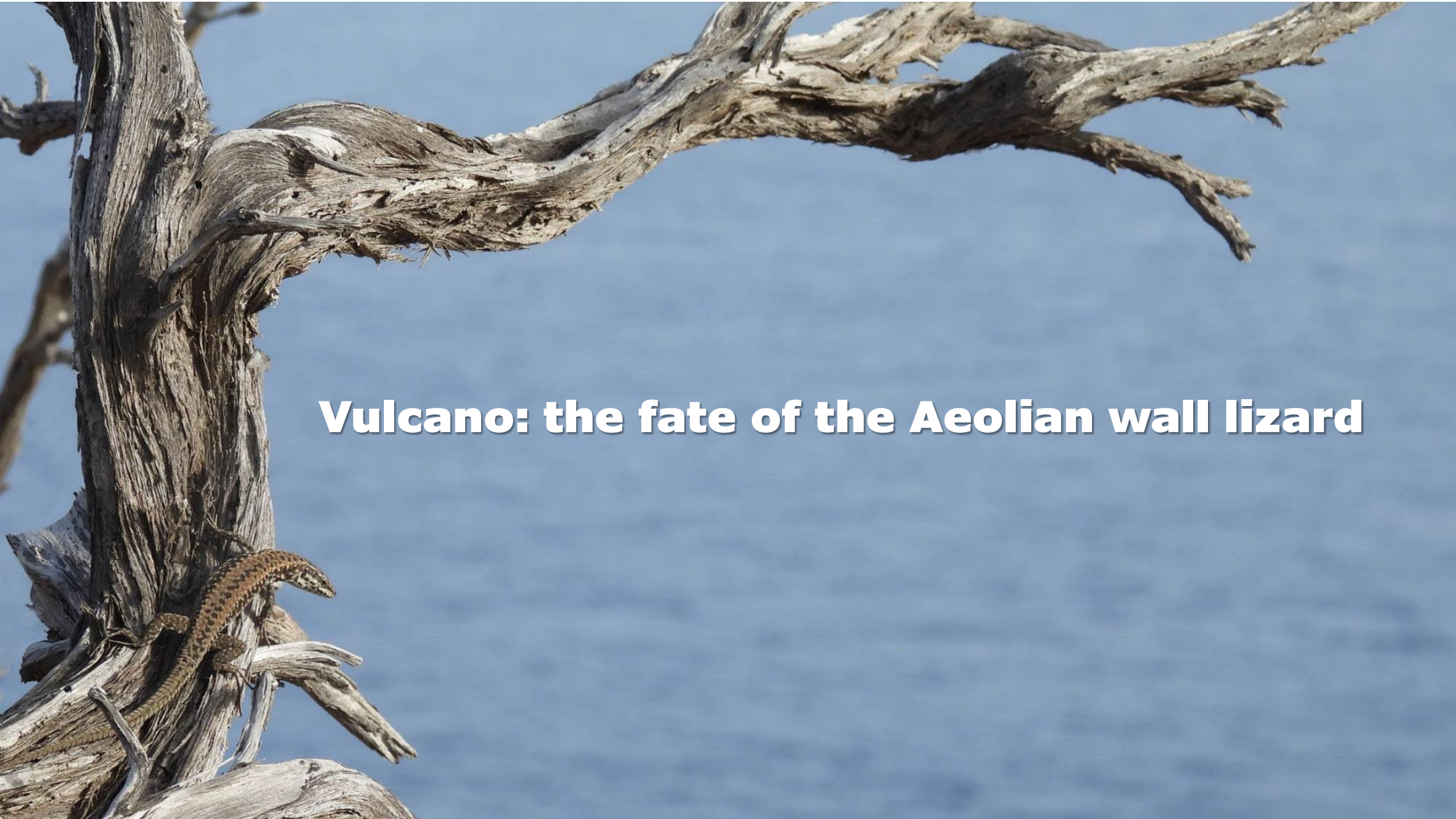


- **Limited Distribution**
- **Fragmentation**
- **Population Decline**
- **Low genetic diversity**
- **Hybridization + competition with the invasive *P. siculus***

***Podarcis raffonei* (Mertens, 1952)**

Significantly extend the range by create new large population in areas where *P. siculus* is absent





Vulcano: the fate of the Aeolian wall lizard

A little bit of history: Vulcano Island

A little bit of history: Vulcano Island

1923

2008

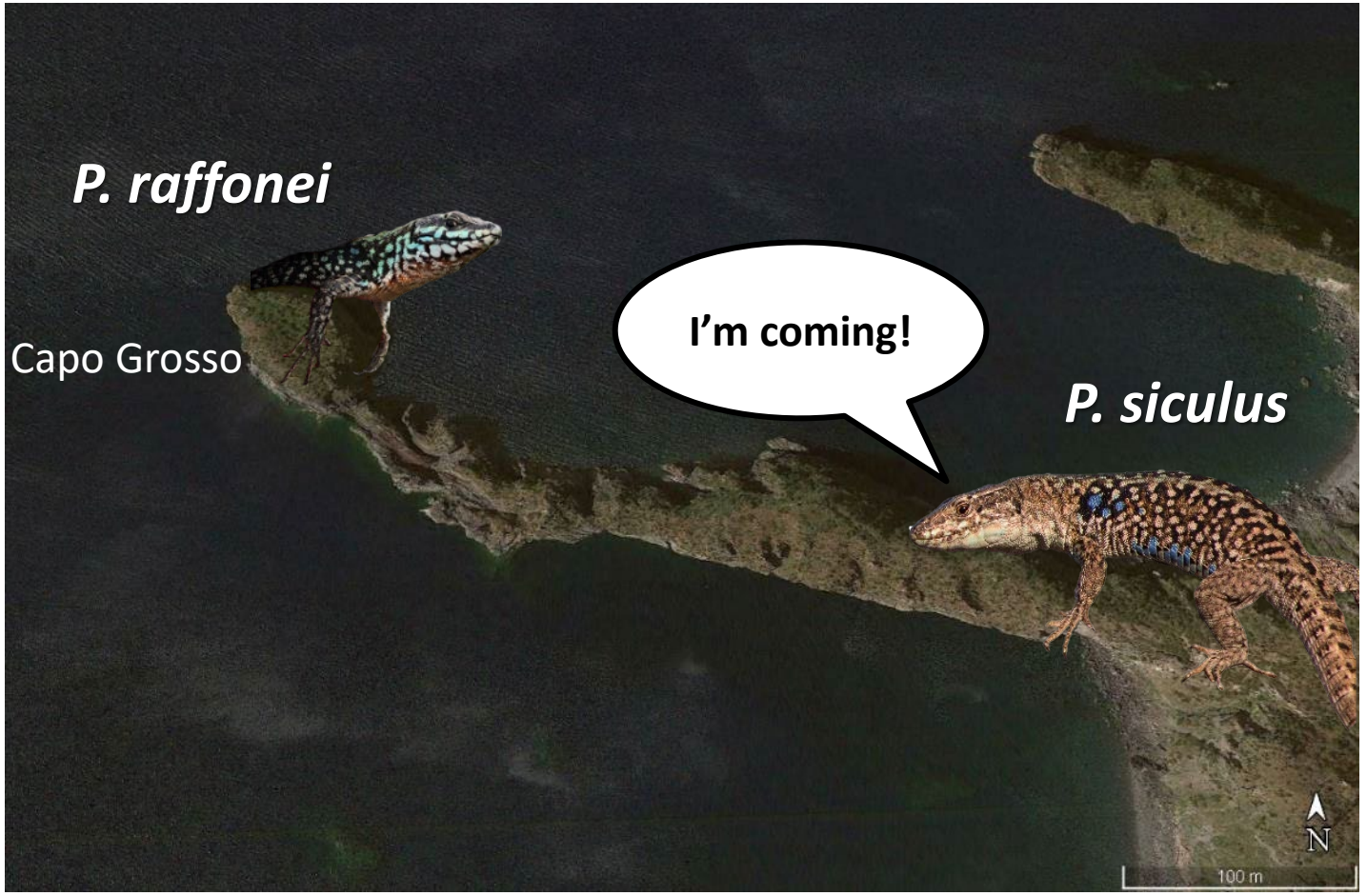
Vulcano:
very fast decline

1950

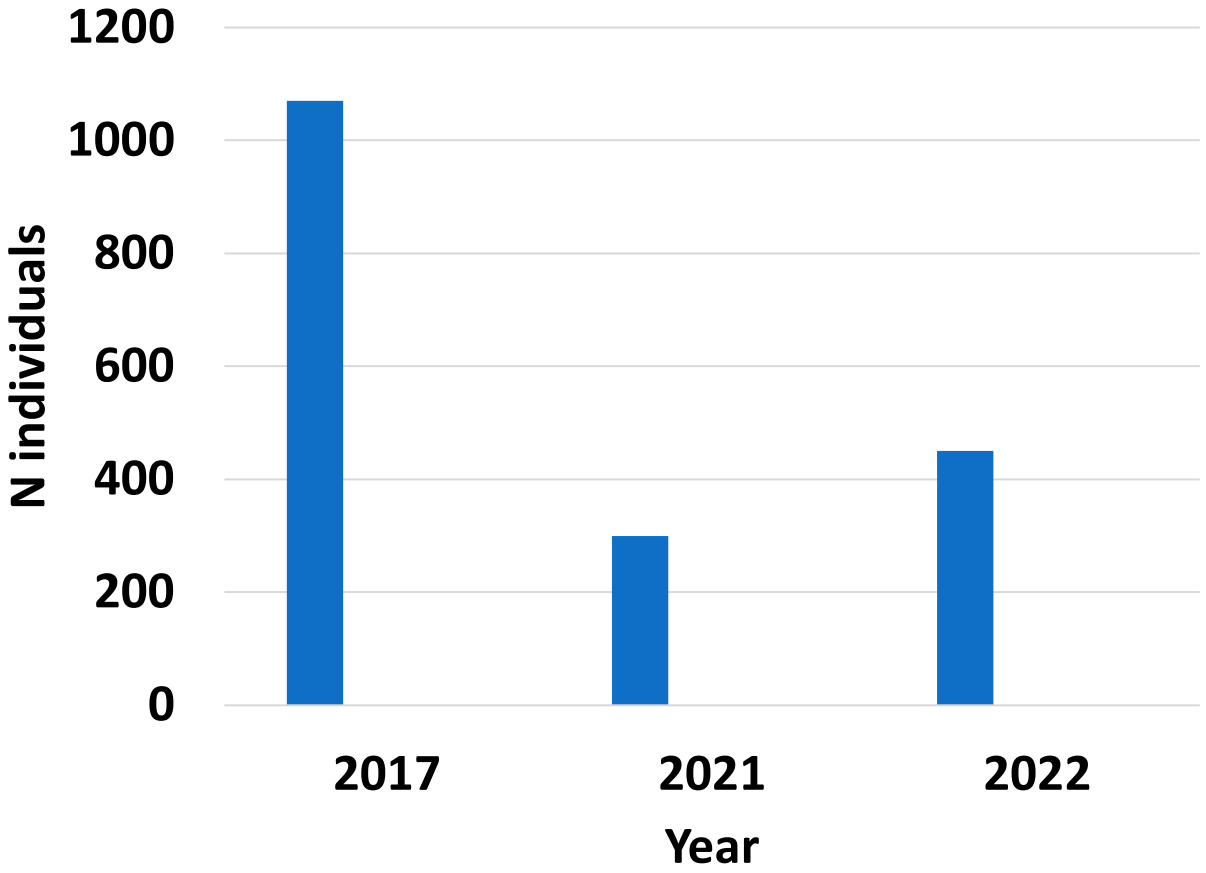
1980-2000

Today: less than 1 ha!

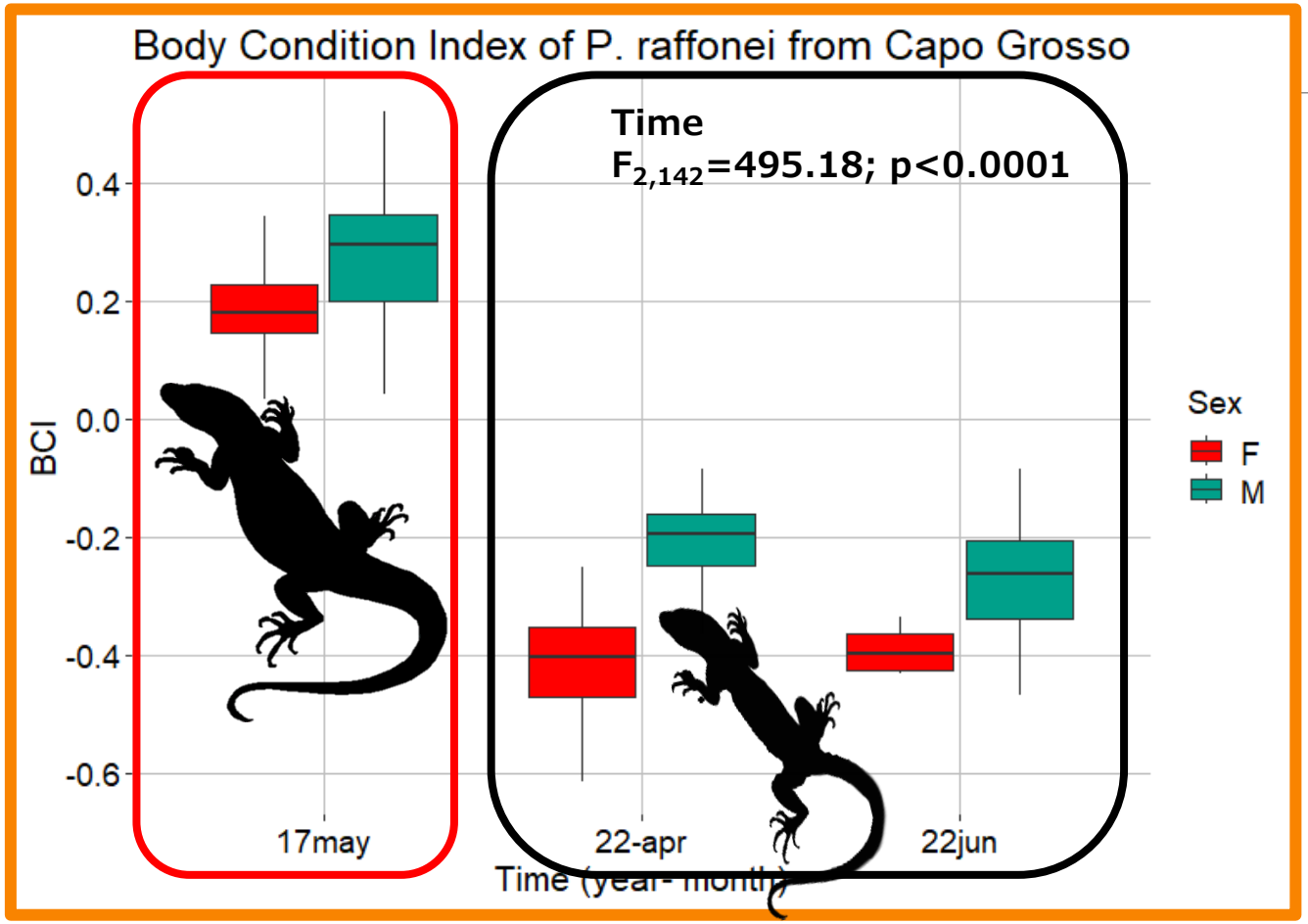
Capo Grosso promontory



Decline on Capo Grosso: population size



Decline on Capo Grosso: body condition



Body condition (BCI) declined in the last 5 years

2017 **2022**

Decline on Capo Grosso

What threats do we face to conserve native lizards?

Invasive lizards

Rats

Habitat alteration

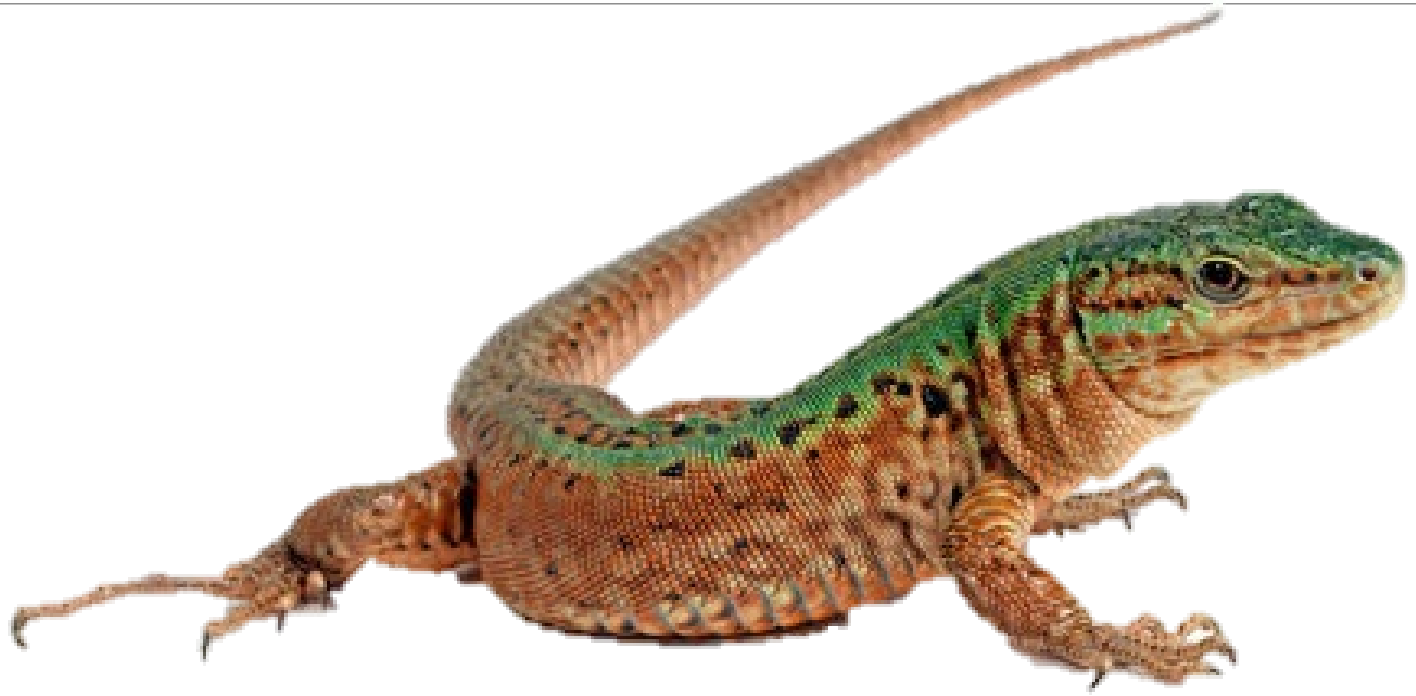
What threats do we face to conserve native lizards?

Different spatial scale

whole range ⟷ **local**

Invasive lizards

Rats

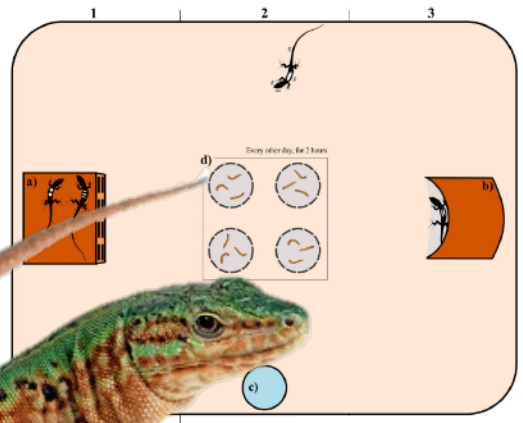


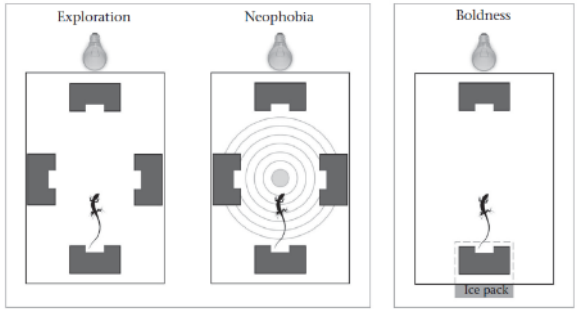
Invasive lizards
Podarcis siculus

Behavioral Ecology and Sociobiology (2020) 74: 117
https://doi.org/10.1007/s00265-020-02893-2

ORIGINAL ARTICLE

Getting ahead: exploitative competition by an invasive lizard





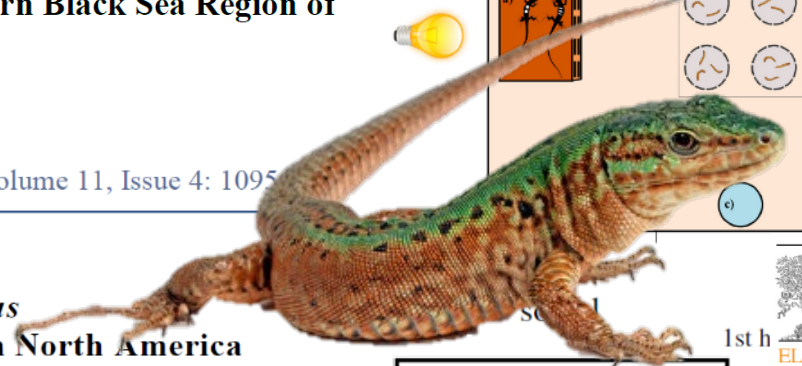
The Black Sea Journal of Sciences, 14(1), 262-271, 2024. DOI: 10.31466/kfbd.1398485

KFBD

Karadeniz Fen Bilimleri Dergisi
The Black Sea Journal of Sciences
ISSN (Online): 2564-7377 https://dergipark.org.tr/tr/pub/kfbd

Araştırma Makalesi / Research Article

New Locality Record of the Italian Wall Lizard, *Podarcis siculus* (Rafinesque-Schmaltz, 1810) (Squamata: Lacertidae) from the Western Black Sea Region of Türkiye



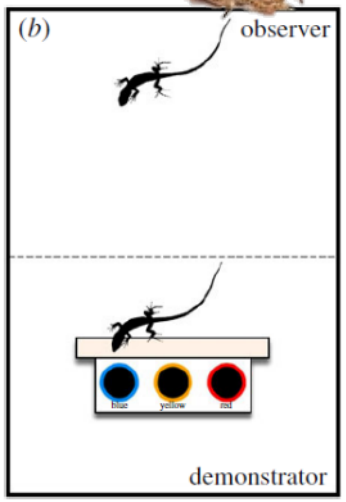
BioInvasions Records (2022) Volume 11, Issue 4: 1095

Research Article

Origin of introduced Italian wall lizards, *Podarcis siculus* (Rafinesque-Schmaltz, 1810) (Squamata: Lacertidae), in North America

1st h

Contents lists available at ScienceDirect
Animal Behaviour
journal homepage: www.elsevier.com/locate/anbehav



Can behaviour explain invasion success? A comparison between sympatric invasive and native lizards

Proceedings of the Zoological Institute RAS
Vol. 324, No. 3, 2020, pp. 364–370
10.31610/trudyzin/2020.324.3.364

УДК 598.11:591.9

Podarcis siculus (Reptilia: Sauria: Lacertidae), a new alien species for Russian fauna

Acta Herpetologica 9(2): 253-258, 20
DOI: 10.13128/Acta_Herpetol-149

Molecular assessment of *Podarcis sicula* populations in Britain, Greece and Turkey reinforces a multiple-origin invasion pattern in this species

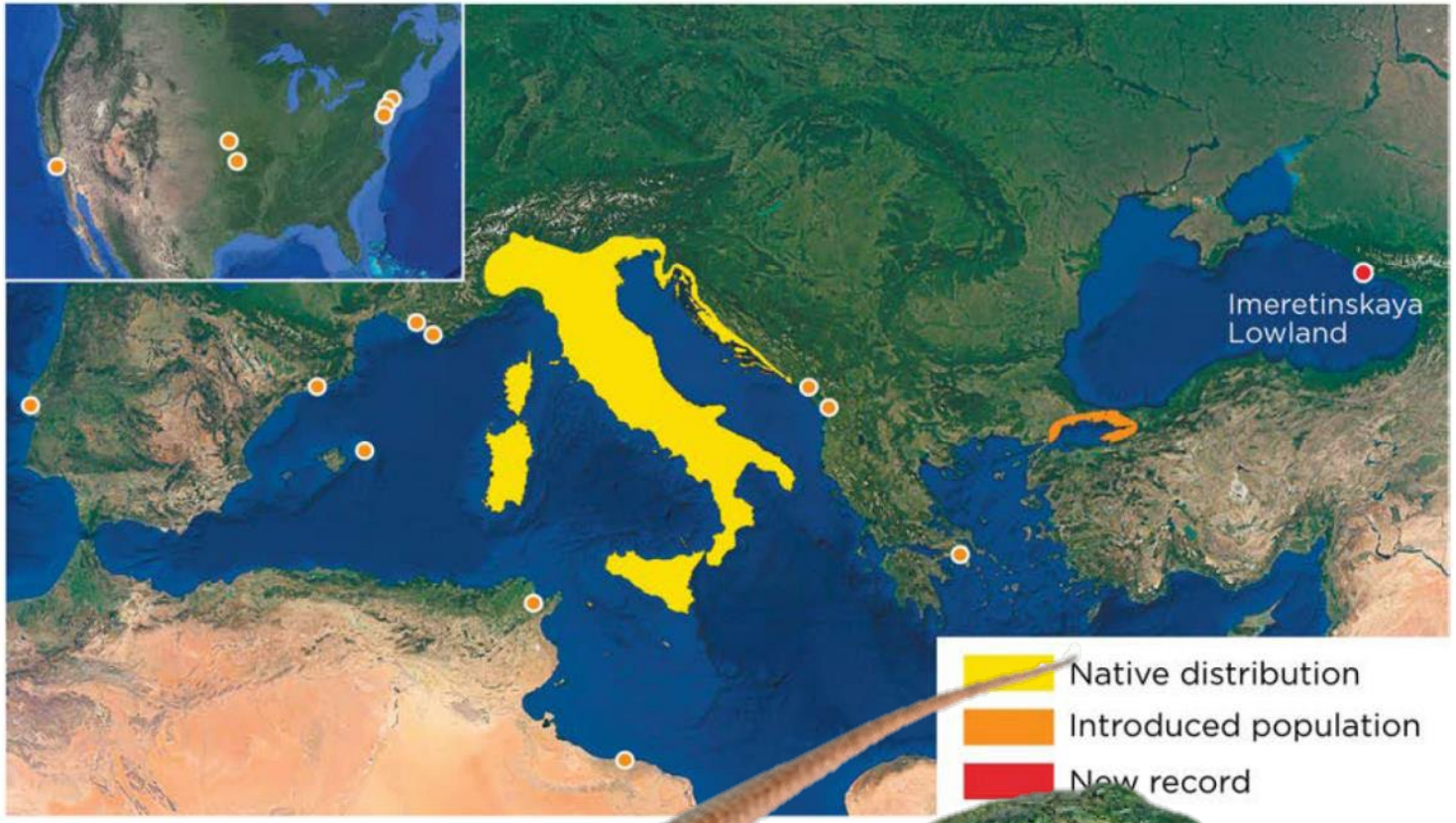
Animal behaviour

Learning from others: an invasive lizard uses social information from both conspecifics and heterospecifics

The Italian wall lizard's natural habitats are Mediterranean-type shrubby vegetation, rocky areas, rocky shores, sandy shores, rural gardens, pastureland, plantations and urban areas.
© Aleksander Niweliński

Invasive Alien Species native to parts of the EU:

The Italian wall lizard (*Podarcis siculus*)



Scientific name(s)	*Podarcis siculus* Rafinesque Schmaltz, 1810
Common names (in English)	Italian wall lizard
Authors	Riccardo Scalera (IUCN, SSC, Invasive Species Specialist Group, Italy)
Reviewers	Roberto Sindaco (Istituto per le Piante da Legno e l'Ambiente, Italy)
Date of completion	28/10/2019
Citation	Scalera, R. 2019. Invasive alien species native to parts of the EU: The Italian wall lizard (*Podarcis siculus*). Technical note prepared by IUCN for the European Commission.

Points for discussion

- novel invasive species (i.e. lizards): is eradication/translocation feasible?
- methods to extirpate invasive lizards

Is it alien?

Invasive Alien Species native to parts of the EU:

The Italian wall lizard (*Podarcis siculus*)

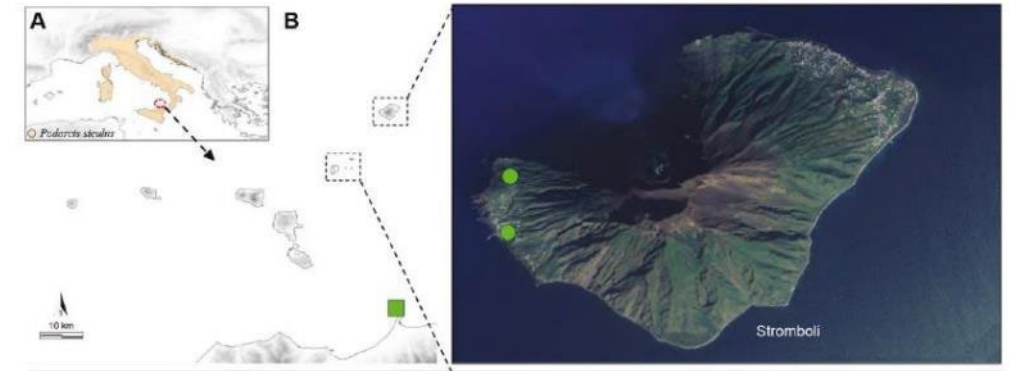
Biological Journal of the Linnean Society, 2024, XX, 1–17
https://doi.org/10.1093/biolinnean/blae001
Advance access publication 13 February 2024
Original Article

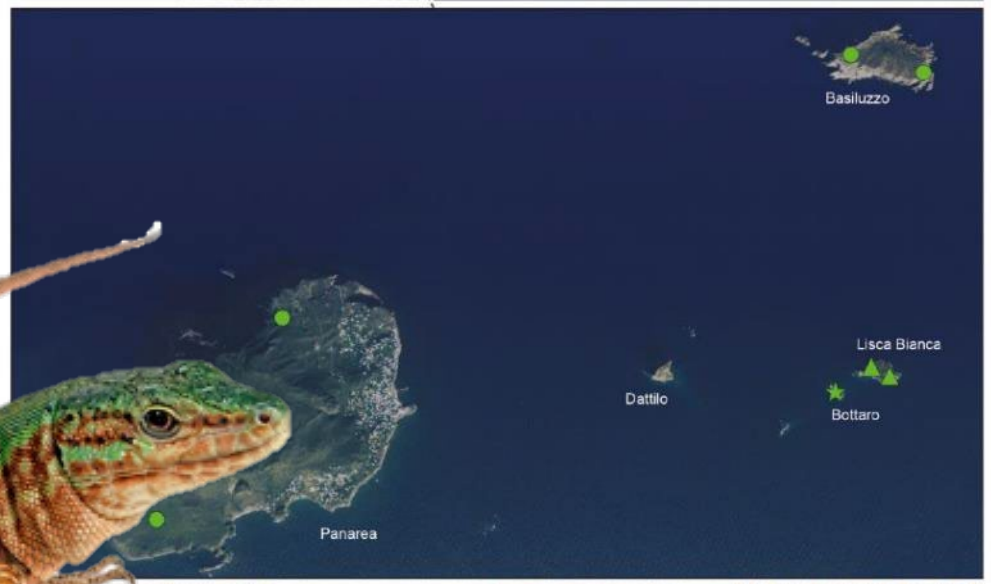
OXFORD

Original Article

Subspecies inflation hampers conservation efforts: a case study on wall lizards

Emanuele Berrilli[1], Benedetta Gambioli[2], Pierluigi Bombi[3], Matteo Garzia[1], Martina Muraro[4], Claudio Pardo[5], Marco Reale[2], Stéphanie Sherpa[4], Gentile Francesco Ficetola[4], Leonardo Vignoli[2] and Daniele Salvi[1,*]





1. ***P. siculus*** **of Lisca Bianca and Bottaro: same gene pool as Panarea**
2. **Genomic data confirm a very recent origin (ALIEN)**
3. **Suitable for TRANSLOCATION (3-4 km)**

Is it eradicable?

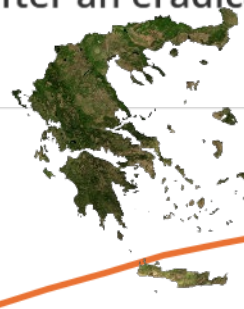
Conservation Evidence (2012) 9, 63-66 www.conservationevidence.com

Successful rapid response to an accidental introduction of non-native lizards *Podarcis siculus* in Buckinghamshire, UK

4 Total lizards removed

Short Communication Herpetozoa 32: 165-169
https://doi.org/10.3897/herpetozoa.32.e36609 (30 Jul 2019)

Eaten or beaten? Severe population decline of the invasive lizard *Podarcis siculus* (Rafinesque-Schmaltz, 1810) after an eradication project in Athens, Greece



204 Total lizards removed

Points for discussion

- eradication/translocation: timing and methods to extirpate invasive lizards

Great Barrier island

Chevron skink (***Oligosoma homalonotum***)

Plague skinks (***Lamprophilis delicata***)

Stuff

NZ NEWS / QUIZZES / SPORT / WORLD / LISTEN

st, motorsport enthusiast and founder of the Giltrap Group – has died at age 84 ... read more

Chickens unleashed against Australian skink plague in world first eradication trial

April 04, 2018, - 11:17pm

0 Comments Share

Chickens have been enlisted by DOC to eradicate a skink plague.

Newshub.

Shows

NEW ZEALAND WORLD POLITICS SPORT ENTERTAINME

Heroic Great Barrier Island chickens fight foreign skinks and provide Auckland City Mission with eggs

05/07/2018

ON

Skink-hunting hens supply for Auckland City Mission parcels

9:14 pm on 24 December 2018

Share this

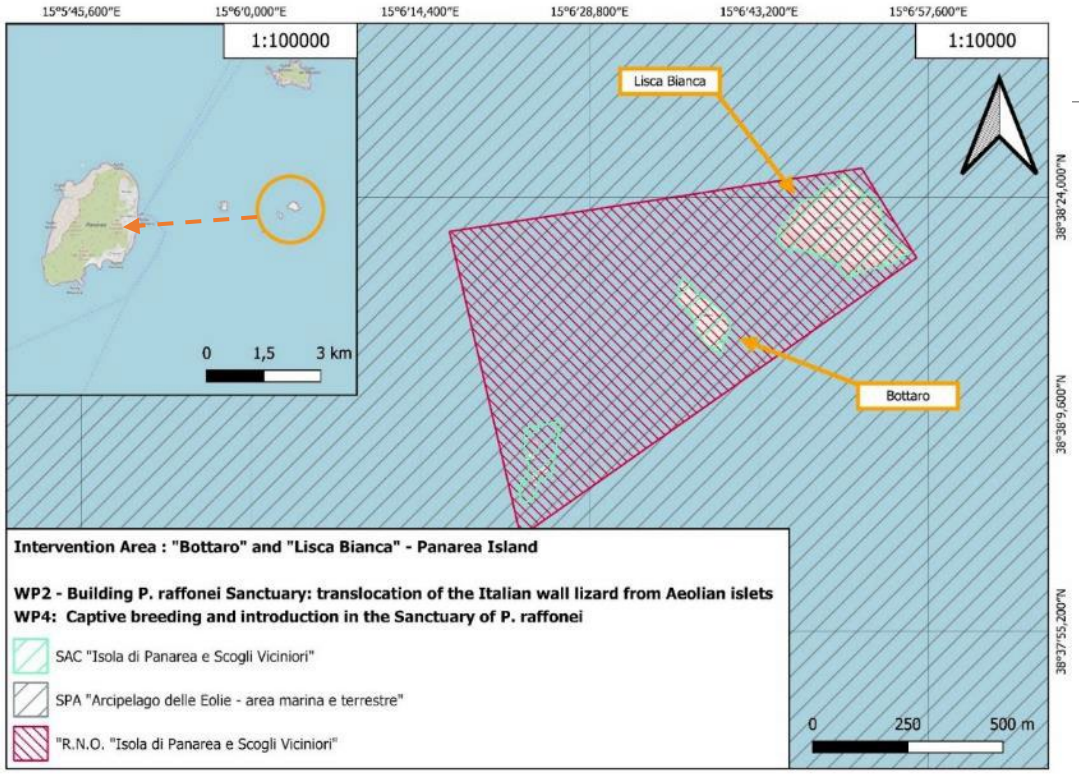
Two-hundred skink-hunting hens on Great Barrier Island have produced more than 30,000 eggs for the Auckland City Mission's food parcels.

Is it eradicable from an islet?

Points for discussion

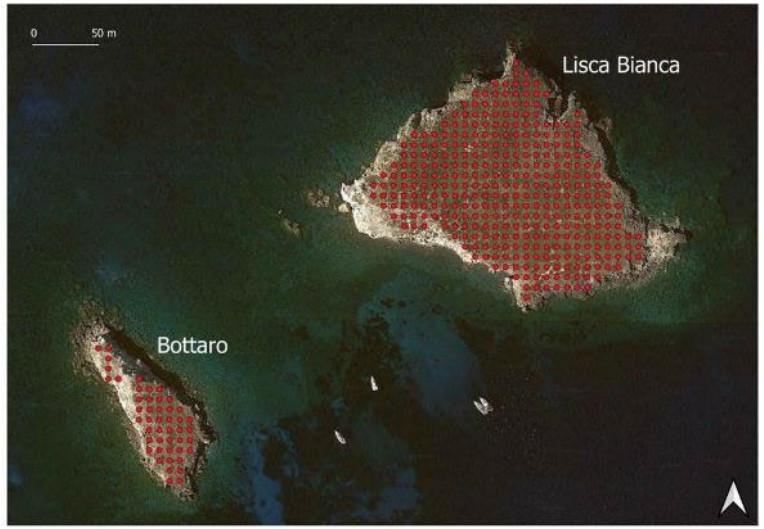
- Sanctuary islands – removing competing species Italian wall lizard

Is it eradicable from an islet?



Translocation *Podarcis siculus*

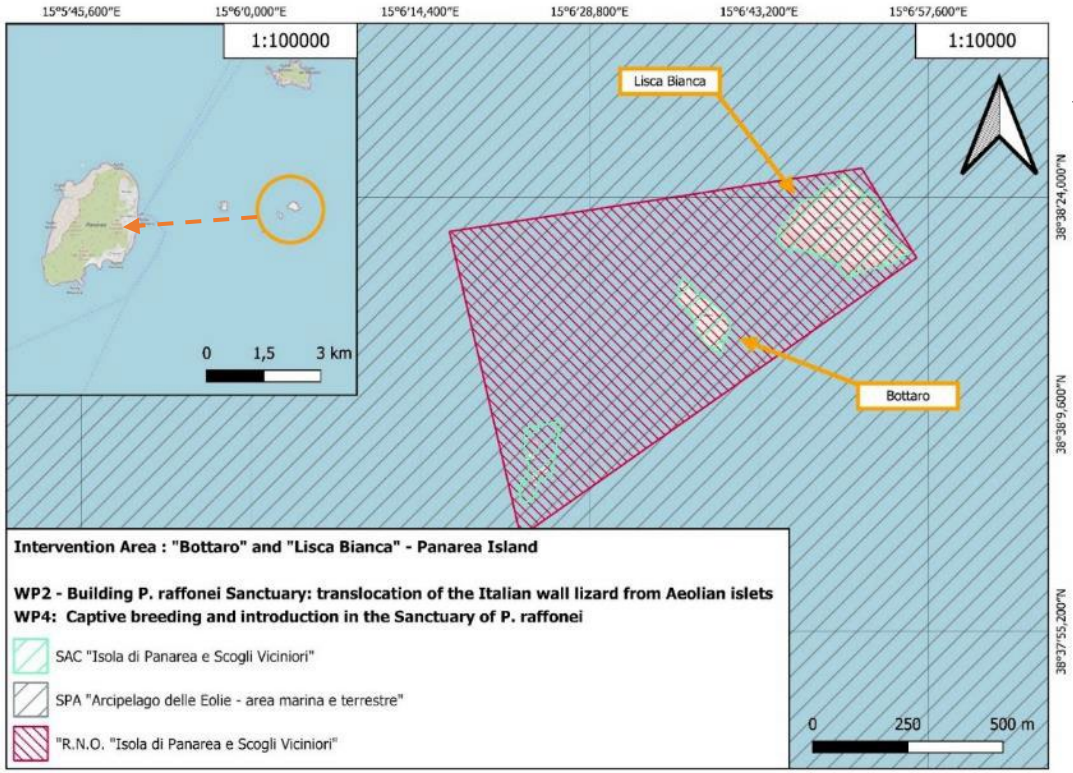
Capture of all *P. siculus* individuals present on the two islets by means of pitfall traps. The traps used will be 350 on Lisca Bianca and 50 on Bottaro, positioned at the intersection points of an 8x8 m virtual grid. The traps will be baited with small amounts of fruit juice and the captured lizards will be kept in captivity waiting to be translocated to Panarea.



Points for discussion

- Sanctuary islands – removing competing species Italian wall lizard

Is it eradicable from an islet?



Capture of all *P. sicul* eans of pitfall traps. The t on Bottaro, positioned a grid. The traps will be bait captured lizards will d to Panarea.

Points for discussion

- Sanctuary islands – removing competing species Itali

What threats do we face to conserve native lizards?

Different spatial scale

whole range ⟷ **local**

Invasive lizards

Rats

Rats

Rattus rattus

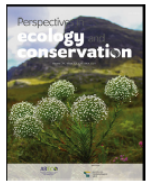
Perspectives in Ecology and Conservation 18 (2021) 294–303

ABECO
ASSOCIAÇÃO BRASILEIRA DE CIÊNCIA ECOLÓGICA E CONSERVAÇÃO

Perspectives in ecology and conservation

Supported by Instituto Tecnológico Vale

www.perspectecolconserv.com



Research Letters

Diet of invasive cats, rats and tegu lizards reveals impact over threatened species in a tropical island

Biodivers Conserv (2012) 21:1893–1899
DOI 10.1007/s10531-012-0276-4

BRIEF COMMUNICATION

Do invasive rodents impact endangered insular iguana populations?

New Zealand Journal of Ecology (2021) 45(1): 3423 © 2021 New Zealand Ecological Society.

NEW ZEALAND JOURNAL OF ECOLOGY

RESEARCH

Twenty years on: changes in lizard encounter rates following eradication of rats from Kāpiti Island

Published in Weber, Samantha, and David Harmon, eds. 2008. Rethinking Protected Areas in a Changing World: Proceedings of the 2007 GWS Biennial Conference on Parks, Protected Areas, and Cultural Sites. Hancock, Michigan: The George Wright Society.

"Rats and Weeds and Lizards—Oh My!" Eradication of *Rattus rattus* and Control of Invasive Exotic Plants on Buck Island, U.S. Virgin Islands

Current Zoology, 2022, 68(2), 211–219
doi: 10.1093/cz/zoab038
Advance Access Publication Date: 13 May 2021
Article

OXFORD

Article

Trophic niche changes associated with the eradication of invasive mammals in an insular lizard: an assessment using isotopes

Biodiversity Journal, 2012, 3 (4): 493-500

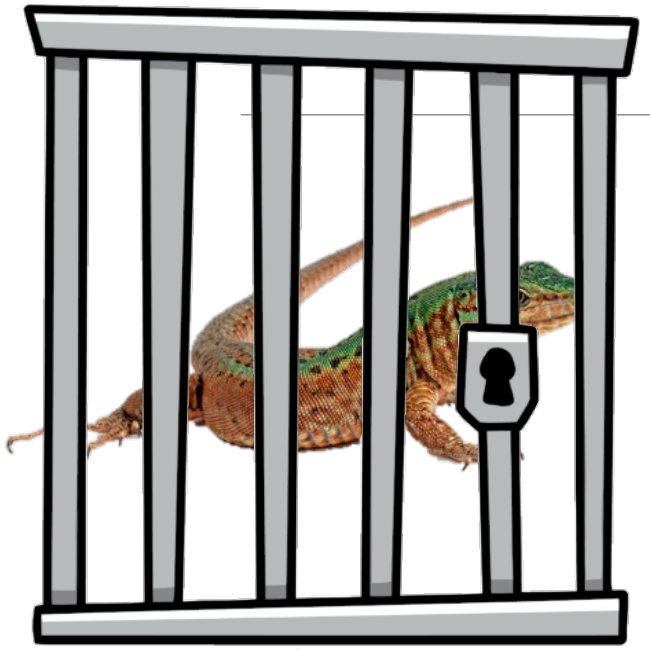
Presence of black rat *Rattus rattus* (Linnaeus, 1758) (Mammalia Rodentia) and possible extinction risk for micro insular populations of *Podarcis sicula* (Rafinesque, 1810) (Reptilia Lacertidae): the example of Lachea islet (Sicily, Italy)

Our own preliminary DNA meta-barcoding data did not confirm predation of black rat on *P. raffonei* on Capo Grosso

Points for discussion

- Controlling predators/competitors

Building a Sanctuary island for the long-term conservation of the Aeolian wall lizard



Points for discussion

- Sanctuary islands – removing competing species Italian wall lizard
- Make it feasible!

Where?

Where?

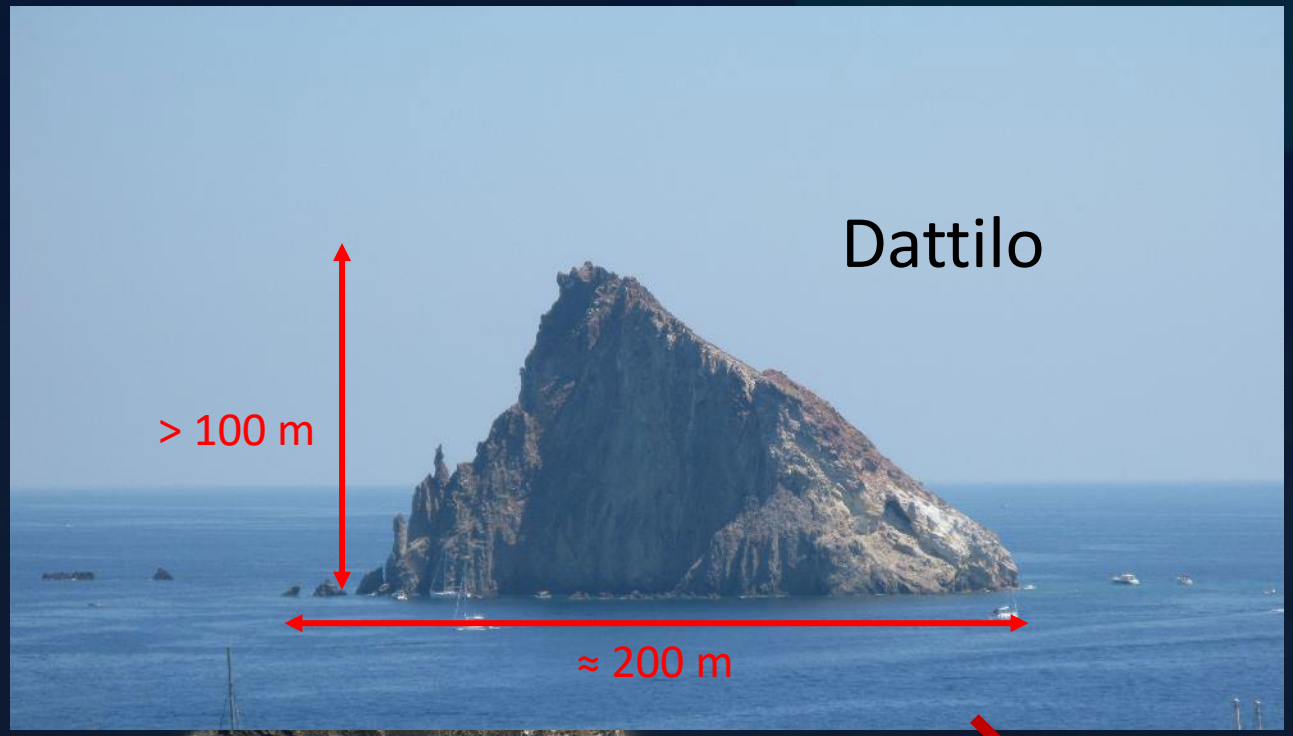
Where?

Where?

Where?

Where?

Where?



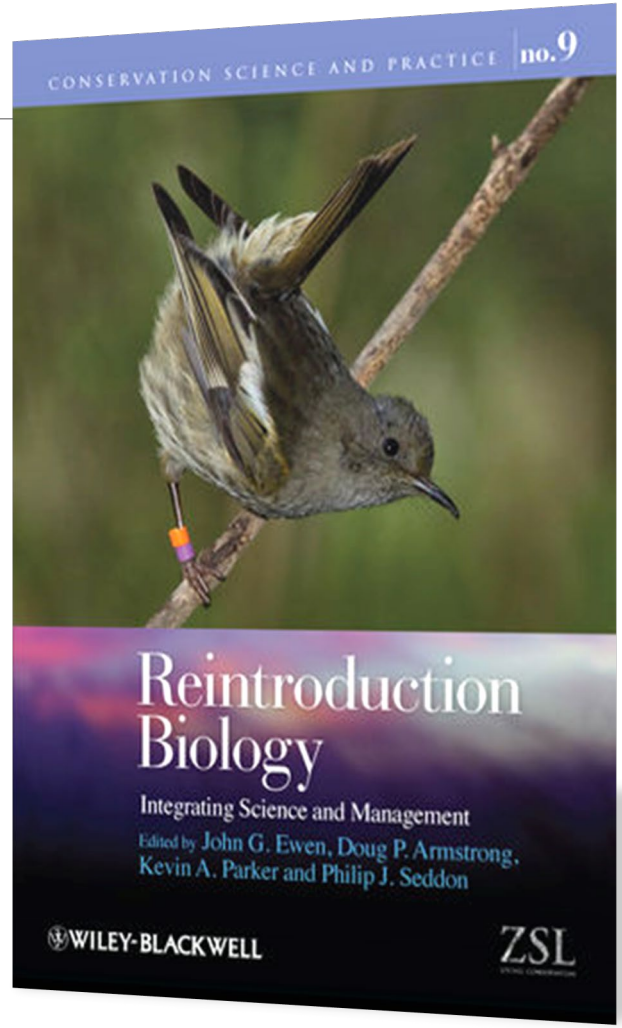
Where?

Where?

Building a Sanctuary island for the long-term conservation of the Aeolian wall lizard

Points for discussion

- General issues related to reintroduction (i.e. how to prepare areas/habitats where to release captive bred animals);
- Balancing populations with reintroductions (releasing captive bred individuals)



Building a Sanctuary island for the long-term conservation of the Aeolian wall lizard

FONDAZIONE BIOPARCO di ROMA

Captive breeding of *P. raffonei* at BIOPARCO

Points for discussion

- rescue of insular species through captive breeding (i.e., genetic selection of founders)

Building a Sanctuary island for the long-term conservation of the Aeolian wall lizard

Inevitably, terrestrial wildlife will overflow from the sanctuary to surrounding areas.

Not in islands/islets

Points for discussion

- Open Sanctuary Islands are accessible to the public. Anyone with their own boat can visit either island at any time.
- Biosecurity is an important issue and is being handled in three ways: i) through on-going monitoring on both islands, ii) through the installation of trap lines on the adjacent mainland and iii) through public education.
- Opponents. People who may oppose a sanctuary undertaking species translocation