



University of Cyprus
Department of Biological
Sciences

Marine IAS Monitoring in Cyprus

How can citizen science help?

Capacity Building in Monitoring and Surveillance of Native and Non-native species

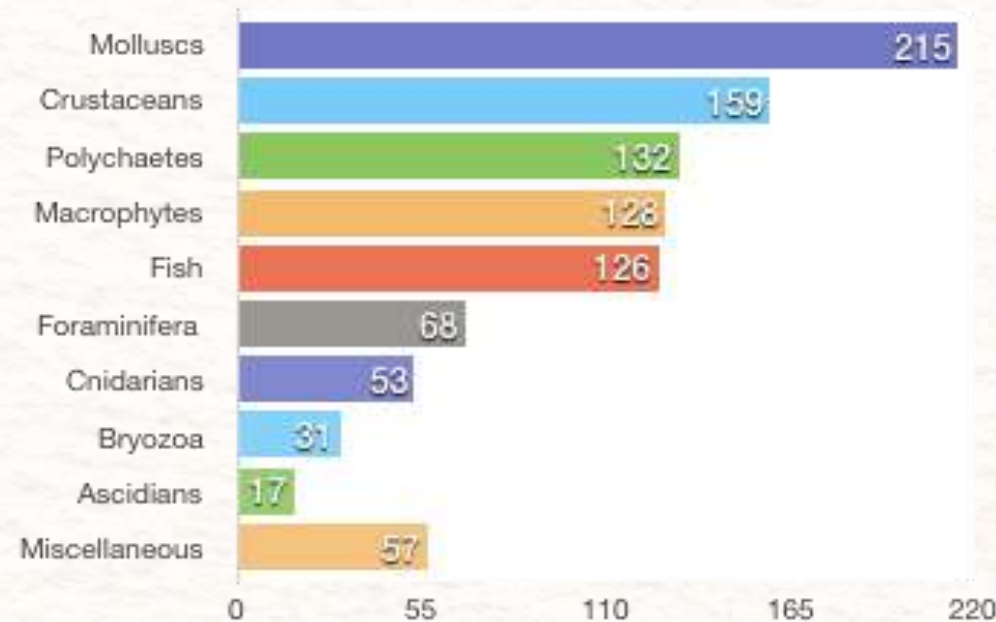
Akrotiri Environmental Education and Information Centre (AEEIC)

Akrotiri, Cyprus

31st August 2017

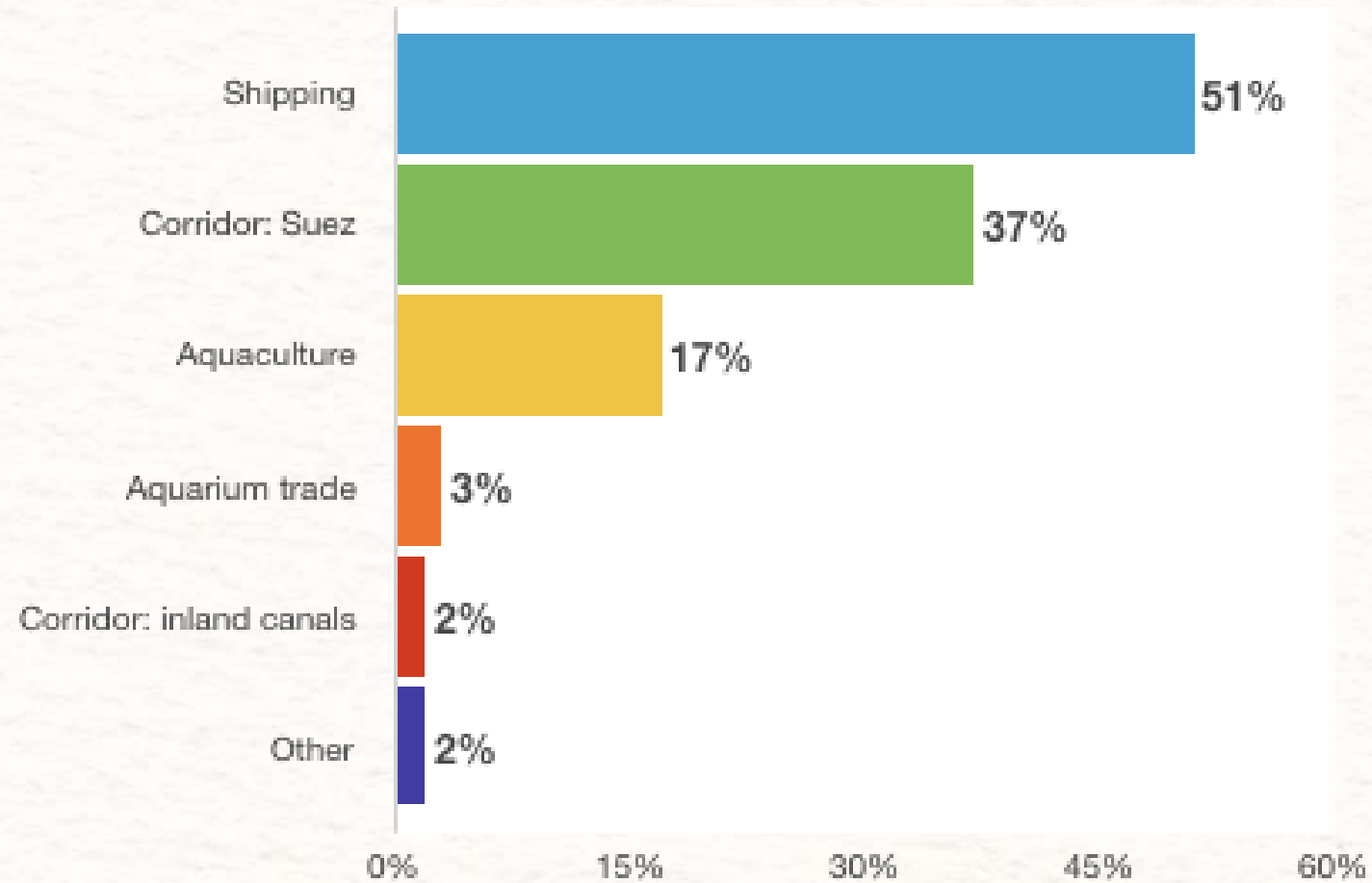
Marine IAS

- Regarded as one of the main causes of biodiversity loss in the Mediterranean.
- Impacts on the environment, economy and human health.
- Over 5% of the marine species in the Mediterranean are now considered non-native species.
- Vast majority of alien species occur in the eastern Mediterranean.



Number of marine IAS per major groups in the Mediterranean Sea. From Zenetos et al., 2012.

Pathways of Introduction



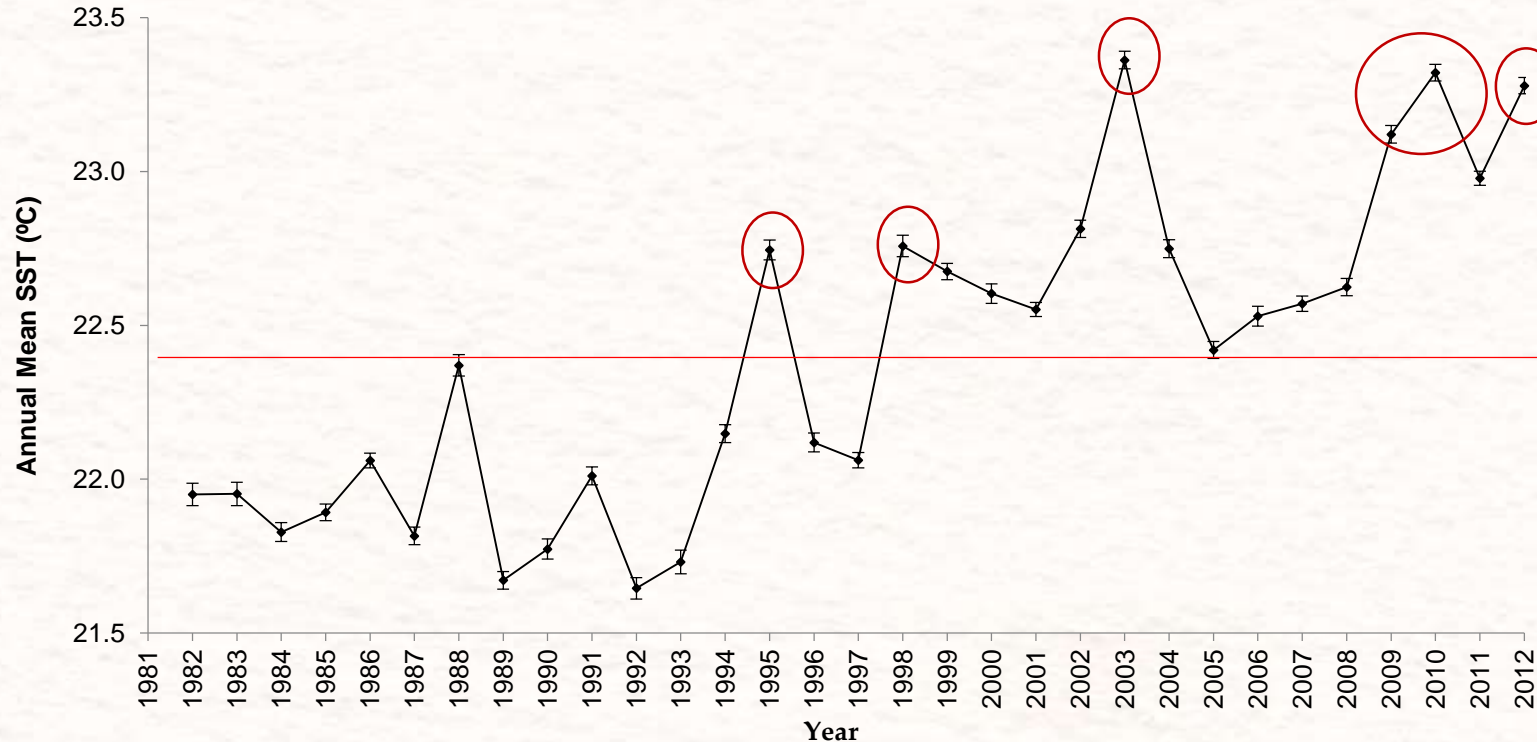
Main pathways of introduction of marine IAS in European Seas. From www.eea.europa.eu

Tropicalisation of the Mediterranean



- Climatic and biogeographic hinge between tropical and temperate seas.
- Climate change could alter the pattern of water circulation, affecting the dispersal ability of marine organisms.
- **CIESM Tropical Signals Program:** monitoring macrodescriptor species of climate warming
Track and evaluate the effects of tropicalization of the Mediterranean Sea using biological macrodescriptors of climate warming → 86 climate macrodescriptor species (macrophytes, marine invertebrates and fish)
- Use of the ACFOR abundance scale: provides a time-effective method to collect semi-quantitative data, while allowing large areas to be surveyed.

Levantine Annual mean satellite SST



Levantine:

1982-2012 general increase: $\sim 1.33^{\circ}\text{C}$

1982-2012 average: 22.39°C

$0.045^{\circ}\text{C/year}$

World Oceans:

1985-2004: $0.017 \pm 0.005^{\circ}\text{C/year}$ (Good et al., 2007)

Since 1950s: $0.014^{\circ}\text{C/year}$ (Scott et al., 2010)

Since 1970s: $0.0048^{\circ}\text{C/year}$ (Abraham et al., 2013)

Lev SSTs are increasing at least twice as much as the global SSTs

Citizen Science

- The process by which any non-scientist collects data or uses the scientific method under the guidance or mentorship of a scientist.
- It can be an effective and rigorous method for advancing marine conservation and management.
- Advantages of citizen science:
 - Data collection at a much larger scale.
 - Stimulates the participation and increases the interest of general public in science.

How can citizen science advance monitoring of marine IAS species in Cyprus?

- Limited resources create a gap in marine data collection.
- Citizen science can provide data (long-term time series), necessary for monitoring changes in the marine environment and understanding the impacts of IAS.
 - Data reporting using online forms and smartphone apps.
 - Data collection using simple and replicable methods, requiring minimum training.

- The **CIESM Jelly Watch Program** was set up to gather for the first time baseline data on the frequency and extent of jellyfish outbreaks across the Mediterranean Sea.
- Common, standardized protocol including systematic recording of presence/absence data.
- Assessment of the geographic and temporal scale of “jellyfish blooms”.
- Will allow a trend analysis and short term forecasting of jellyfish bloom transport.
- 2012-2015: 11 species of jellyfish.
- Most frequently reported species: *Mnemiopsis leidyi* and *Cassiopea andromeda*.
- The majority of jellyfish recorded observations were from the east coast of Cyprus in comparison with the west coast.



Watch for Jelly Blooms

OCEANOGRAPHY CENTER
ΜΕΔΟΥΣΑ
Sightings of Jellyfish in Cyprus

HOME
JELLYFISH MAP
JELLYFISH SPECIES
SUBMIT A SIGHTING

Have you seen a jellyfish?
If so, tell us about it!
You can contribute to a long-term dataset by telling us about the animals you saw.
Report at jellywatch@ucy.ac.cy

Report your sighting
If you have seen one or more jellyfish report it using this form. A photograph would be very helpful if available !

* Mandatory fields

Species of jellyfish *

Location (name a/o geographic coordinates: *)

Date of record: *

Where did you see the jellyfish:

Coastal waters

Number of jellyfish seen:

Less than 10

Attach the picture of the jellyfish:
Max size: 3MB

Choose File
Αφαίρεση αρχείου

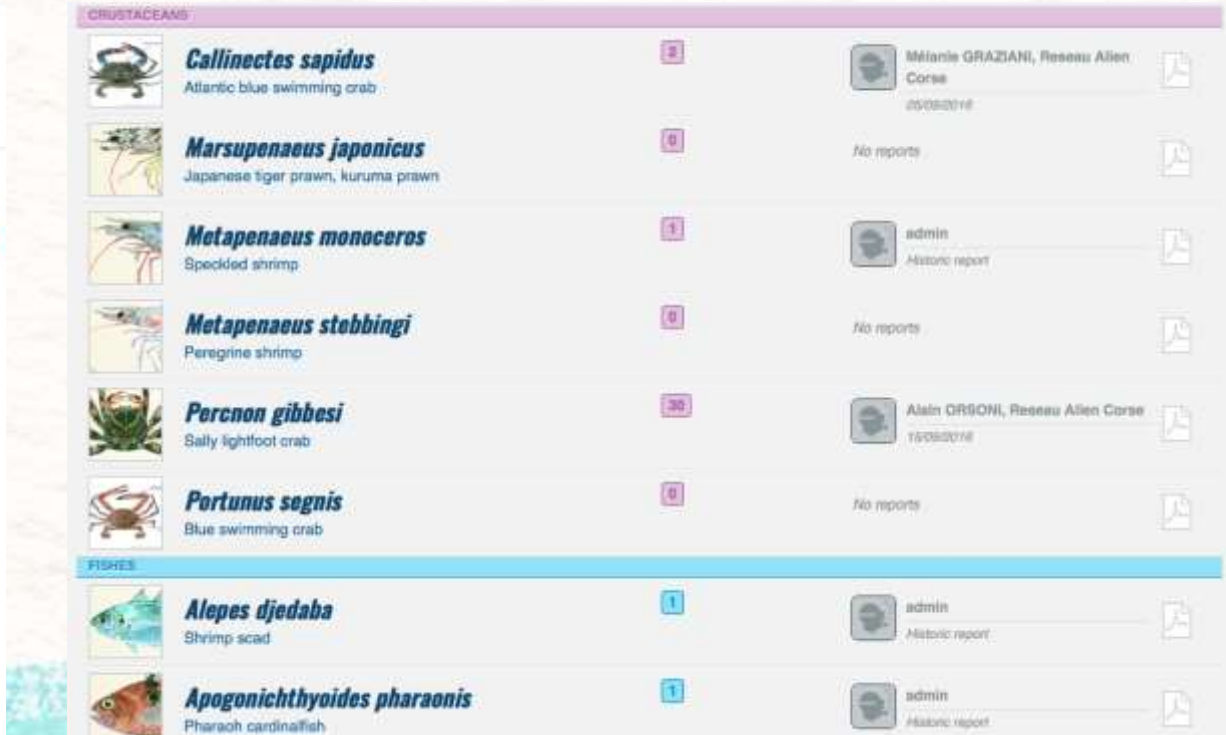
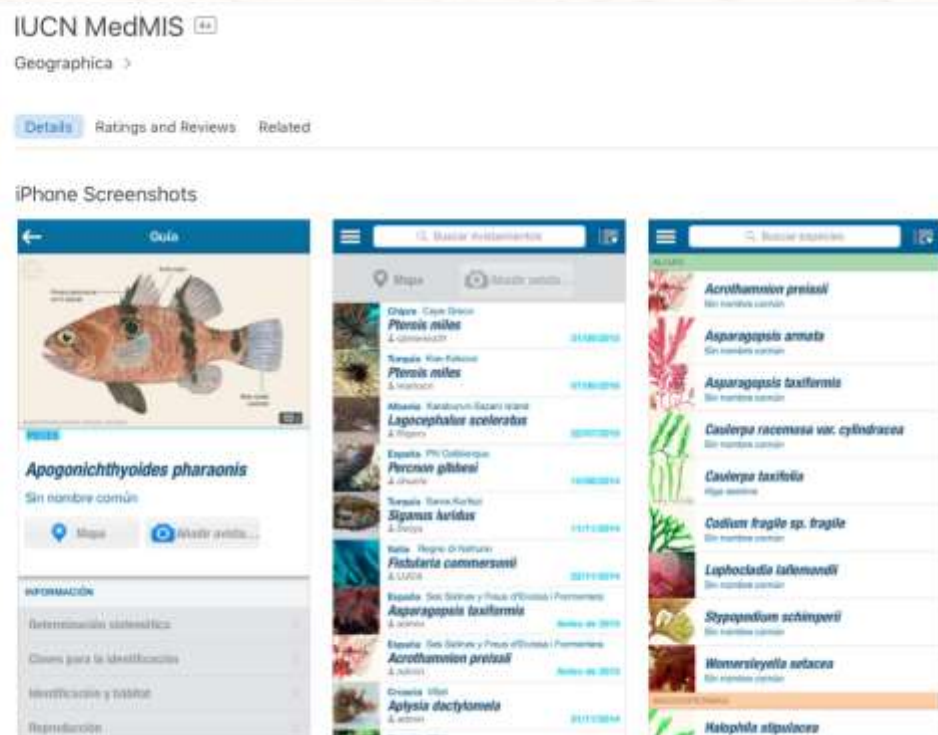
Your name: *
If you prefer, you can use a nickname, for privacy reasons

jellywatch@ucy.ac.cy

<http://www.oceanography.ucy.ac.cy/medusa/home.html>

IUCN MedMIS

- Online information system for monitoring marine IAS in MPAs.
- **I think I have identified the presence of an invasive species in my area. How do I report it?**
 - Registered member of MedMIS. Sign in with your email and password.
 - 'Add report' button: fill the report details (photograph of the observation, possible scientific name of the invasive species seen, location, range of depth, date).



Recording marine IAS in the SBA areas

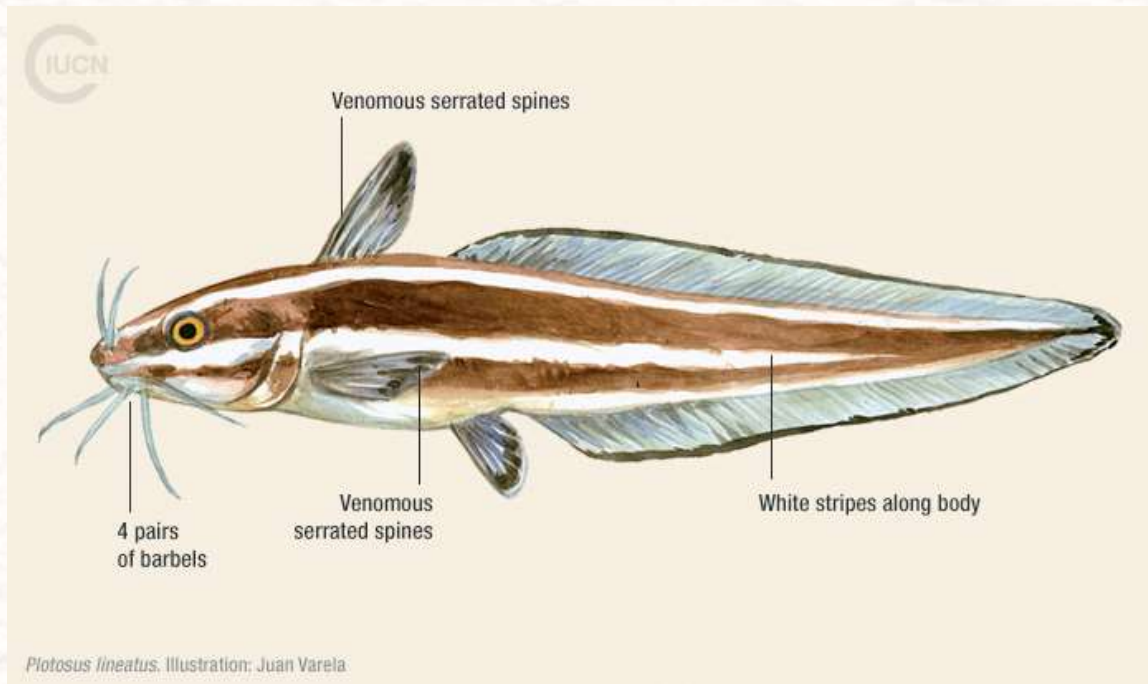
- Seasonal sampling in Akrotiri and baseline recording in Dhekelia for the mapping of marine IAS.
- Underwater Visual Census surveys (snorkeling and SCUBA).
- Volunteer divers → Citizen scientists



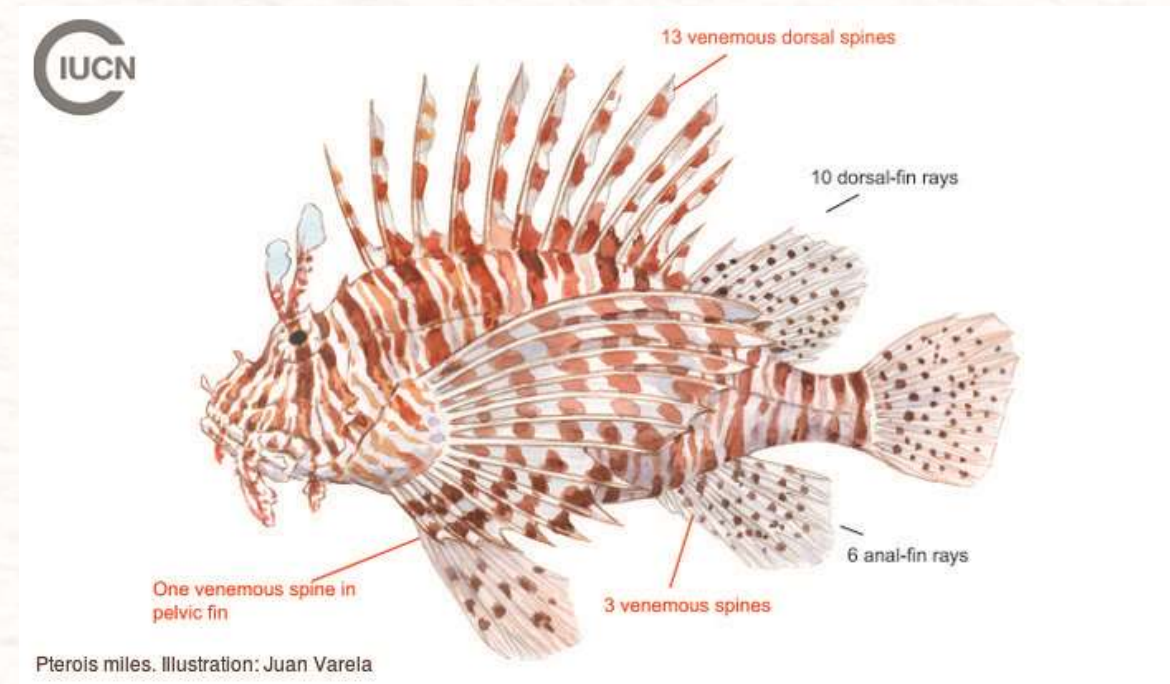
- Simple underwater visual census methods that can be applied by experts and non-experts alike.
- Recording at two different depths, so that snorkellers and divers can participate in data collection.
- Underwater action cameras → miniaturization revolution which makes accurate data collection for citizen-science divers easier by allowing them to take high definition photographs of marine life, reducing or eliminating a major source of data bias: the diver.



- Horizon Scanning: prioritised list of species with the potential to arrive, establish and threaten biodiversity in the next 10 years.
- Data recorded by citizen scientists will provide an early-detection system, ensuring the recording of species that could otherwise be missed.



Striped eel catfish



Lionfish

Conclusion

- IAS may displace native species, modify habitats, change community structure, affect food-web properties and ecosystem processes, impede the provision of ecosystem services, impact human health, and cause substantial economic losses.
- However: some IAS may have positive impacts on ecosystem services and biodiversity (acting as ecosystem engineers, controlling other invasive species, providing food).
- Challenge → Understand the role of biological invasions in modifying biodiversity patterns and the functionality of ecosystems
- The effects of climate change, mainly through the introduction of non-indigenous species will affect the coastal ecosystem of Cyprus.
- Expansion of surveys in a wide range of habitats → Citizen science
 - Motivation supplied by the personal interests of the individuals involved.
 - Collection of scientific data which have been proven to be as scientifically reliable as those collected by professional scientists.



Thank you