

MEDITERRANEAN LIONFISH INVASION



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OUTLINE

- Invasiveness
- West-East exchanges
- Invasiveness
- Mediterranean distribution
- Why we should be worried
- Current Mediterranean knowledge
- Predators
- Prey
- First aid
- Message



INVASIVENESS

'Poster child' for invasive fish.

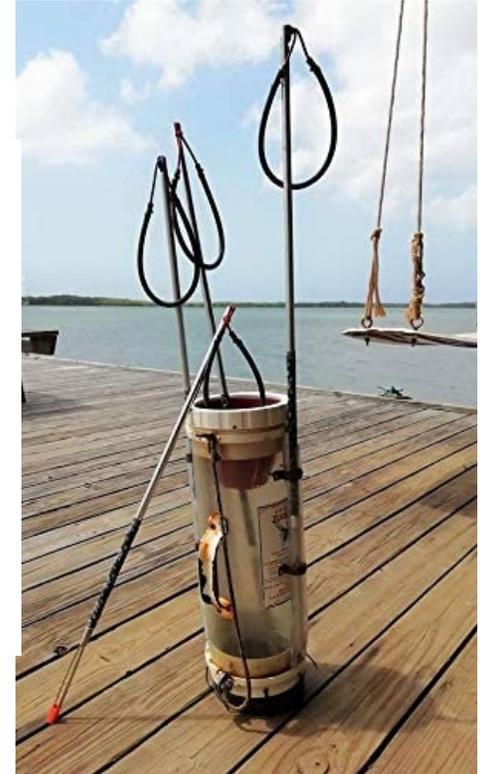


- ✓ Sharp spines,
 - ✓ venom,
 - ✓ bright colouring (warning),
 - ✓ camouflage,
 - ✓ incredible appetite,
 - ✓ fasting ability,
 - ✓ large mouth,
 - ✓ expanding stomach,
 - ✓ huge ecological niche,
 - ✓ high fecundity,
 - ✓ hidden eggs,
-
- ✓ **Very low predation.**

AMERICAN - MEDITERRANEAN EXCHANGES

LIONFISH UNIVERSE

- Extremely well-studied, best guidance
- Regular exchanges
- Eg., advice to be optimistic in media
- Proper gear, fishing derbies, jewelry making, recipe ideas, marketing roadmap
- Future collaborations comparing invasions
- Urgency that we begin to control!



WHY TO BE WORRIED

- Native biodiversity and fisheries ↓ as Invasive species ↑;
- Lionfish targeting native species
- Lionfish generally consume all benthic prey in one area before moving
- Their explosion will reduce native biodiversity, recruitment, and richness making the ecosystem less stable
- However, once market demand begins, natural control will occur.



RESEARCH OBJECTIVES

- Collaborate research studies/methodologies between various Mediterranean countries
 - Biological aspects
 - Abundance
 - Predators
 - Diet composition (alien vs. native species)
 - Reproduction: fecundity and spawning season
 - MPA effectiveness
 - Parasites and lesions (natural control)
-



1991

Mediterranean Invasion history



2008



Italy

Montenegro

Kosovo

Bulgaria

North
Macedonia

Albania

Greece

Turkey

Tyrrhenian Sea

Malta

Kalymnos Island

Mediterranean Sea

Tunisia

Lebanon

Israel

2012



2013



2014



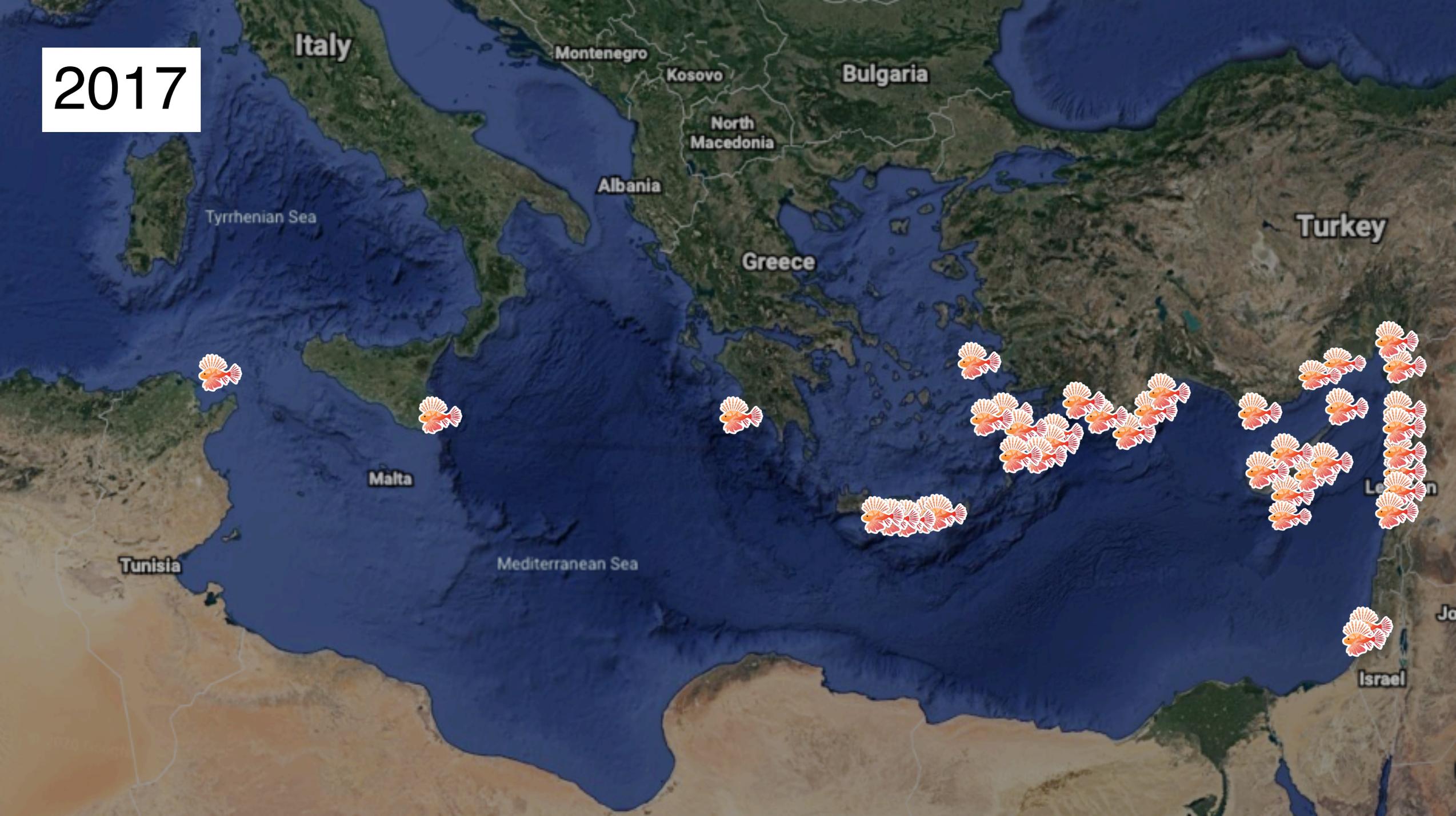
2015



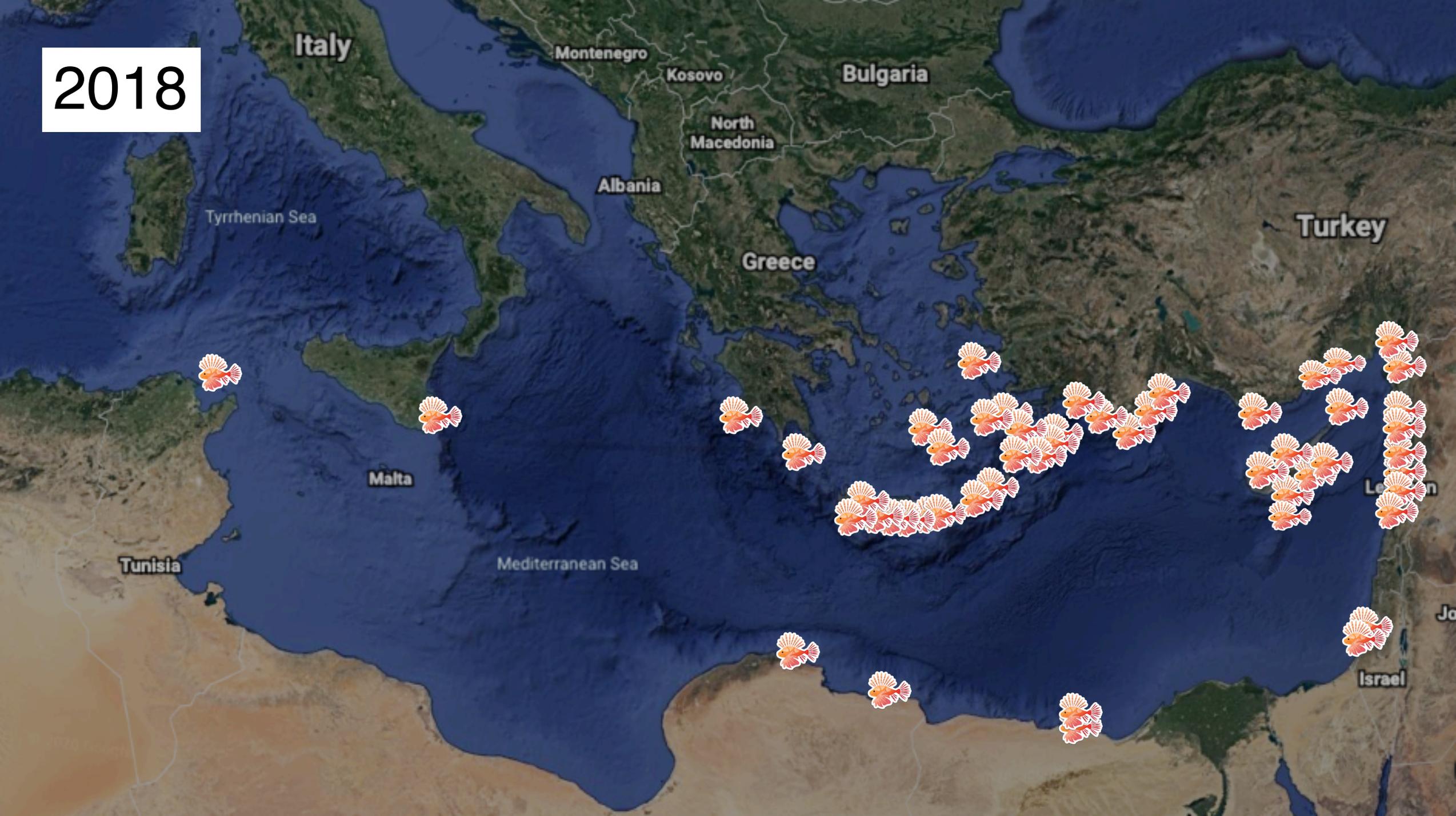
2016



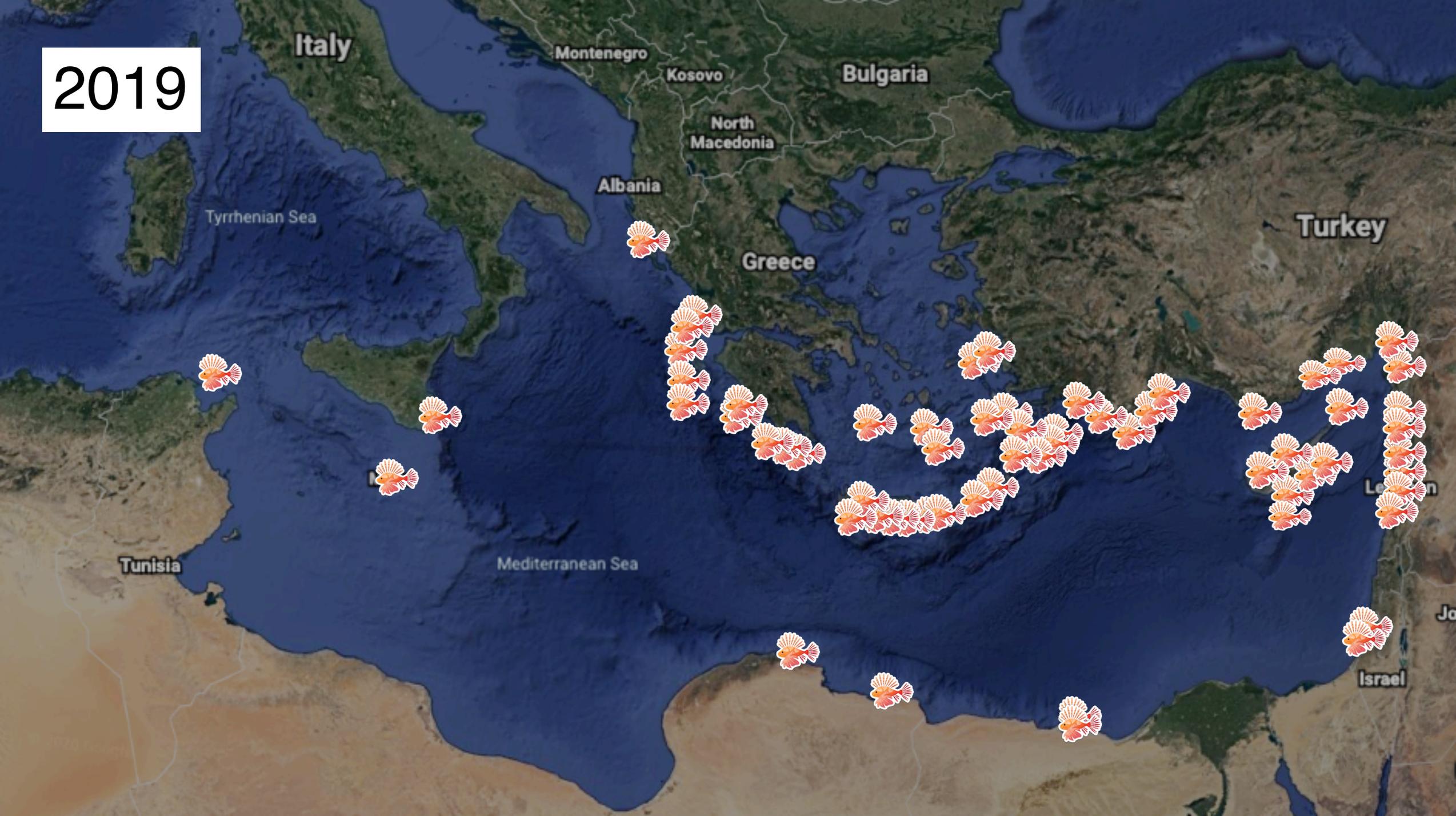
2017



2018

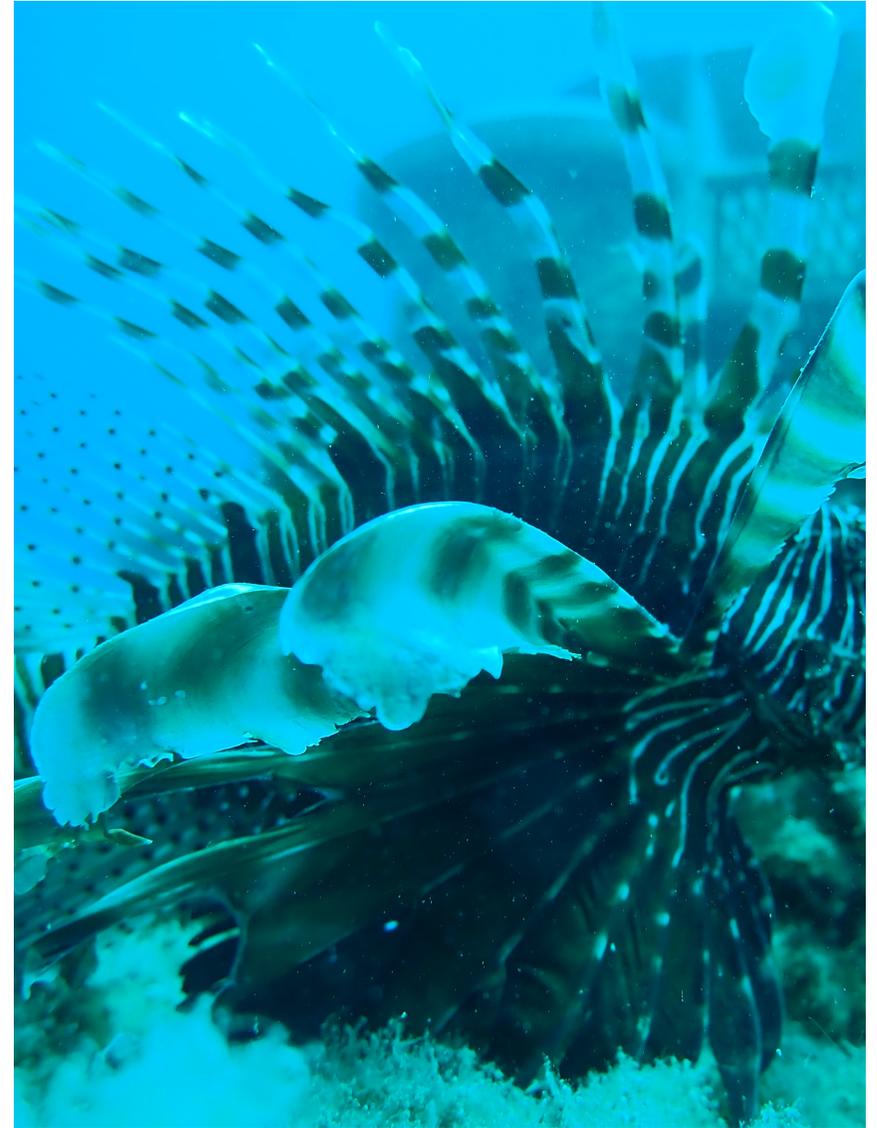


2019



CURRENT MEDITERRANEAN KNOWLEDGE

- Population derived from 2 Red Sea haplotypes
- Suez Canal most likely introduction pathway
- In the USA, $< 9\text{ }^{\circ}\text{C}$ survival temperature, stop feeding at $< 15\text{ }^{\circ}\text{C}$.
- Modeling has shown only North Aegean, North Adriatic and NW Mediterranean may avoid the invasion
- Central Mediterranean $2\text{ }^{\circ}\text{C}$ warmer, Eastern Med. $3\text{ }^{\circ}\text{C}$ $>$ normal
- Can fast for 3 months, cooler water may not offer control

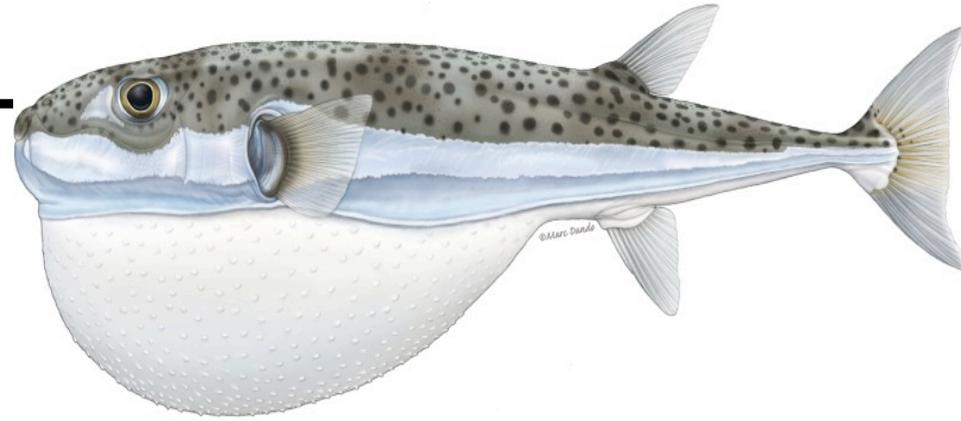


CURRENT KNOWLEDGE CONT'D

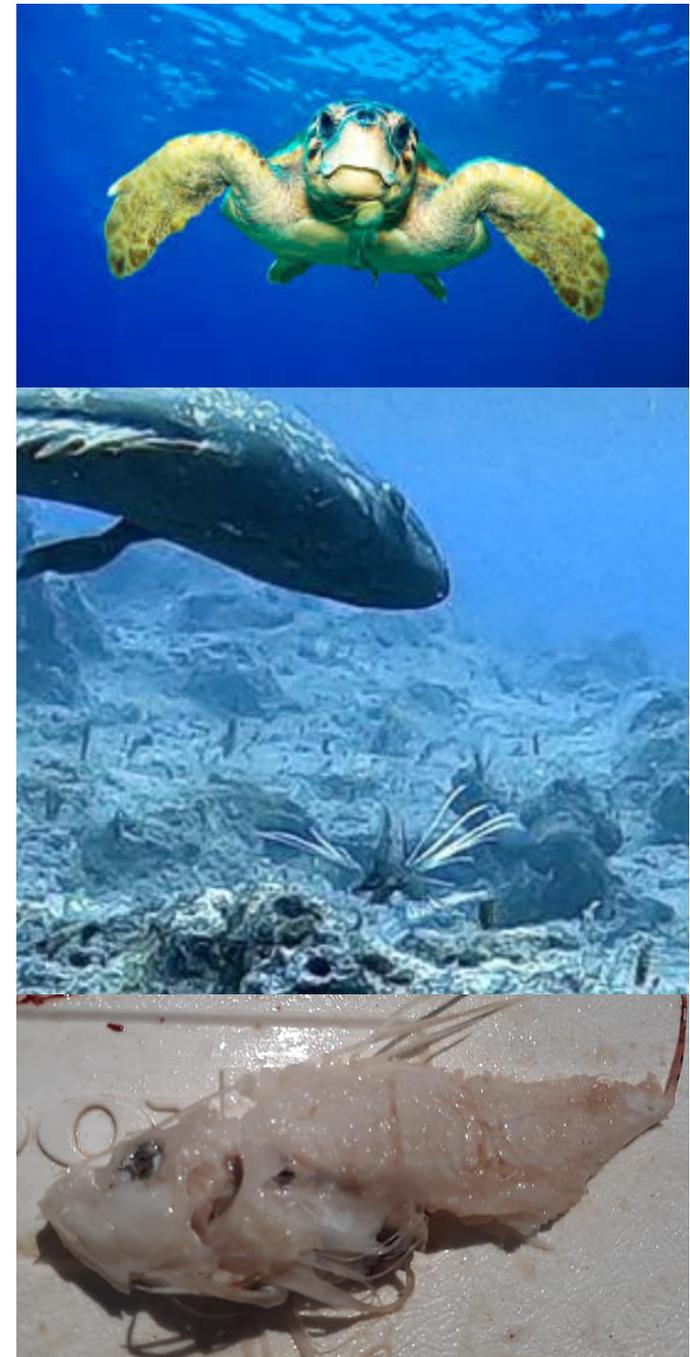
- Abundances exploded in Eastern Mediterranean
 - Most adults between 20-30 m in Turkey, 10-20 m in Cyprus
 - Females highest GSI (gonad development) in summer
 - Seems they can spawn throughout the year
 - Reach 16.4 cm at 1 year (Savva et al. 2020)
 - 1st maturity at 15.8 cm for females (Savva et al. 2020)
 - Grow *faster* and *larger* than native range, high 2:1 female/male ratio in Cyprus and Turkey
 - Maximum length native range: 35 cm (fishbase)
 - Maximum length Mediterranean: 37.1 cm (Jimenez et al. 2018)
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PREDATORS

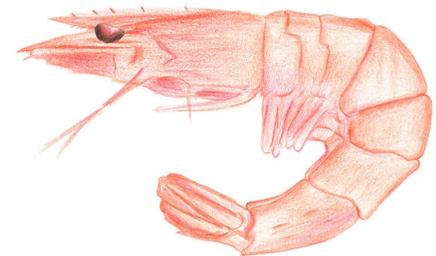
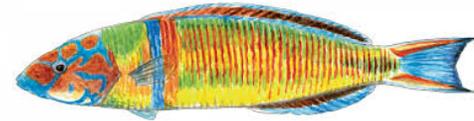
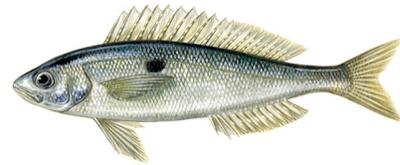


- Pufferfish (*Lagocephalus sceleratus*) predation in Turkey and Cyprus (A Ulman and H Akbora, unpublished data)
 - Dusky grouper predation confirmed many times now from Turkey, Lebanon and Greece
 - Loggerhead turtles feeding on live pufferfish (Egypt) and dead lionfish in Kaş
 - Since fish are cold-blooded, venom has much less effect on them
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PREY

- Camouflage and 'newness' to Mediterranean, prey *naïvety*
- Mostly fish diet but some crustaceans and cephalopods
- They are eating baby groupers!!!
- All you can eat buffet- Damselfish, picarel, cardinalfish and ornate wrasse
- Risk of localized native fish extirpations, especially solitary benthic species
- Invasive species not coming near lionfish, due to evolutionary history





= HOT WATER

- Fishers suffering
 - Social media, newspapers, posters and fishery magazines
 - **First-aid = immersion in very hot water (40-50 °C)**
 - Venom only potent in fresh fish
 - Heating and freezing neutralizes the venom
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LIONFISH JEWELRY



Shop @ www.mersea.org/store or lionfish.bijoux on



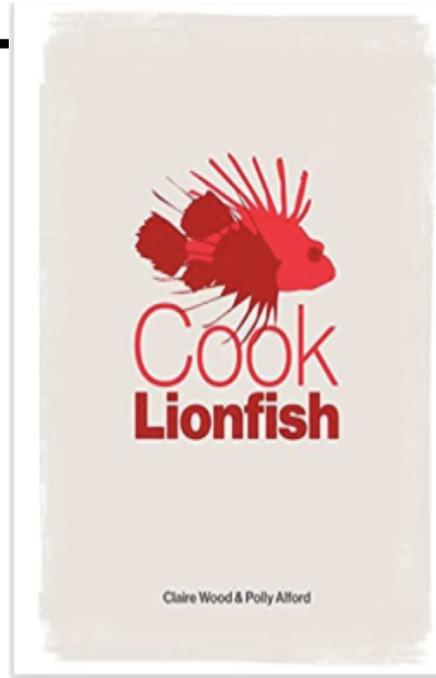
CONCLUSIONS

- Urgently needs control
- Lionfish spearfishing can be a new of scuba tourism
- PADI Invasive Lionfish Tracker Speciality Course
- *But*, tourist season is short here
- Add lionfish to fisheries reporting
- Safe-handling and first aid awareness
- Marketing motivation suggestion: '*aganigi-naganigi*' = energy and power
- \uparrow sales \equiv \uparrow control and benefits to fisheries



MESSAGES

- ✓ Optimistic
- ✓ A new favourite fish
- ✓ Help create awareness
- ✓ Other markets, new industries
- ✓ Commercialization best control
- ✓ American lessons: Supermarkets, restaurants, dinner tables, lionfish wings, dog treats, jewelry etc.
- ✓ **Lionfish will eat many more groupers than spearfishers will hunt**
- ✓ Create more MPAs to boost more grouper predators, and improve turtle conservation (win-win for all)





**THANK YOU FOR YOUR
TIME!**

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