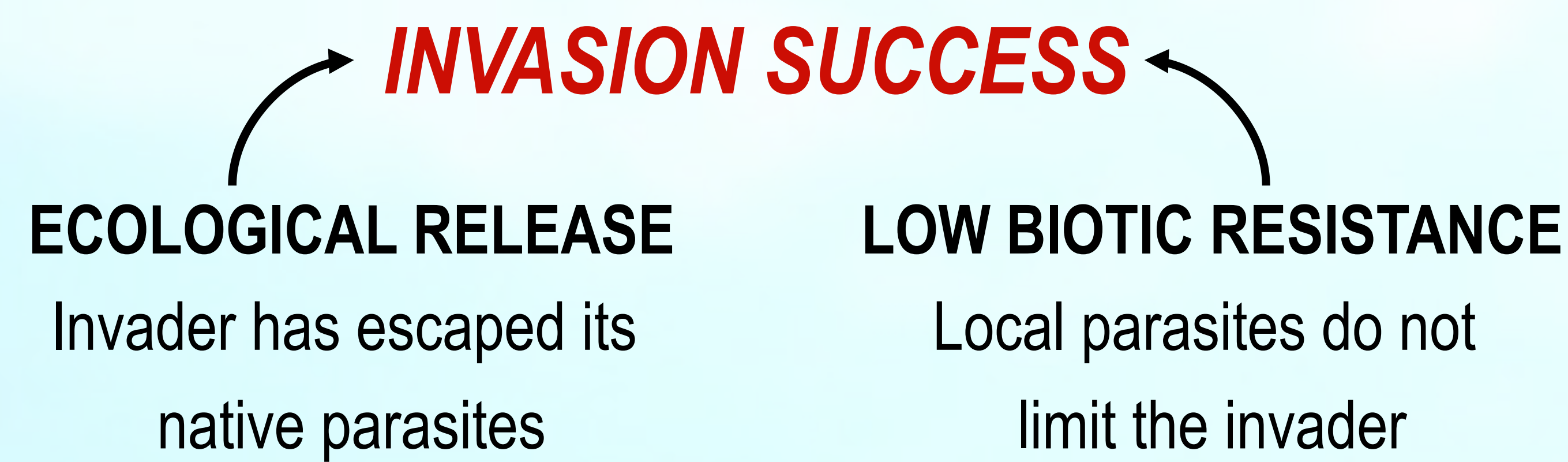


Comparative parasite communities of invasive red lionfish (*Pterois volitans*) and native fishes on Atlantic coral reefs

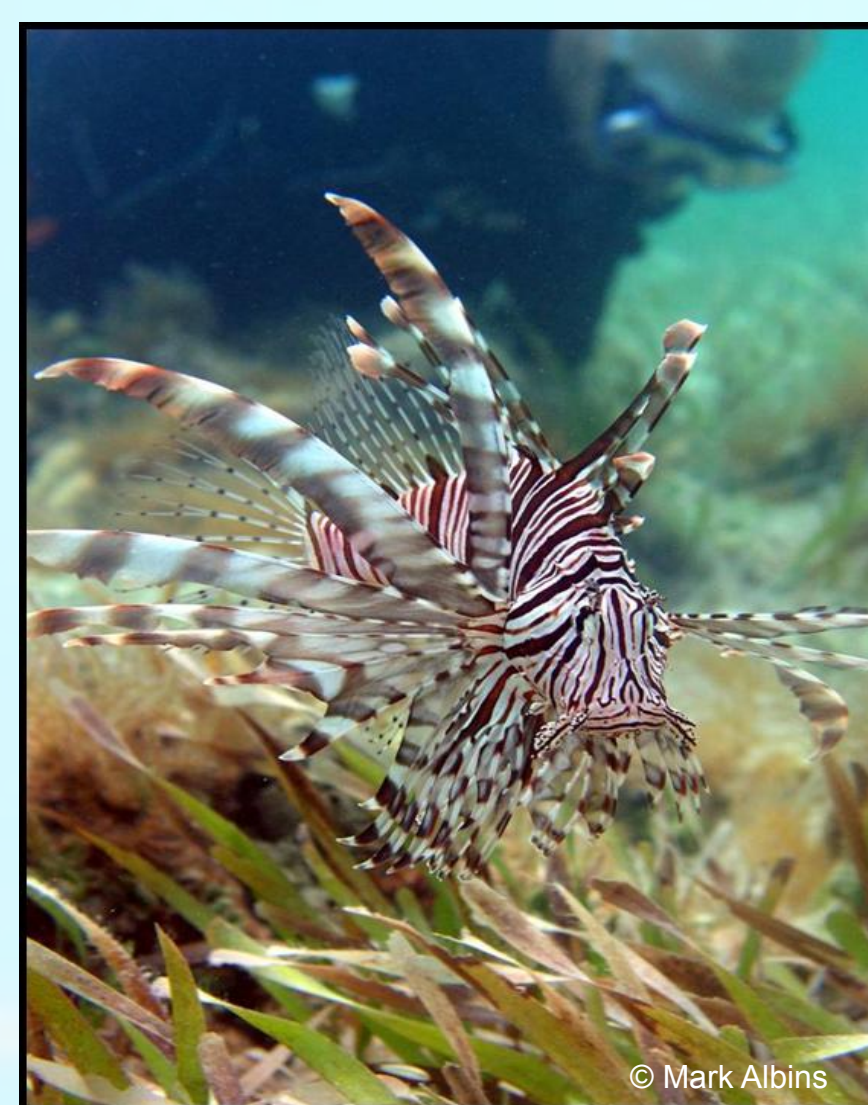
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Lionfish, Parasites, & Invasions: Oh my!



Exotic species in their invaded range may...

1. Leave behind specialist parasites from their native range¹.
2. Be more resistant to generalist parasites than local species^{1,2}.
3. Introduce parasites to which they have high resistance, but to which other species have limited or no resistance¹.
4. Be more susceptible to specialist or generalist parasites¹.

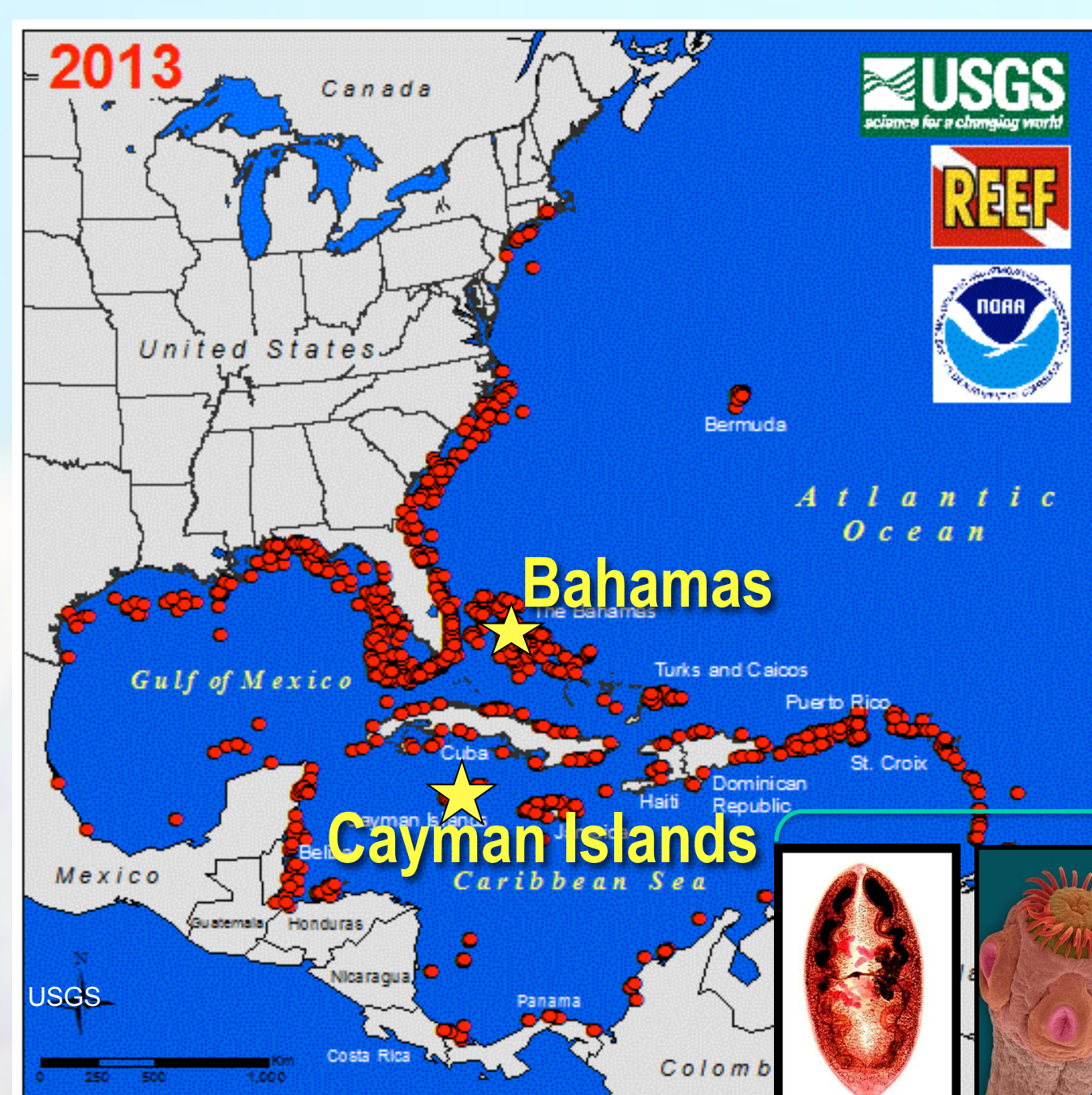


Lionfish: A Brief History

- Invasive predator from the Indo-Pacific: red lionfish (*Pterois volitans*)
- Spread throughout the western tropical Atlantic after aquarium releases
- One lionfish can cause a 79% decline in small fish on a coral patch reef³
- Rare reports of predators or parasites^{2,4-6}

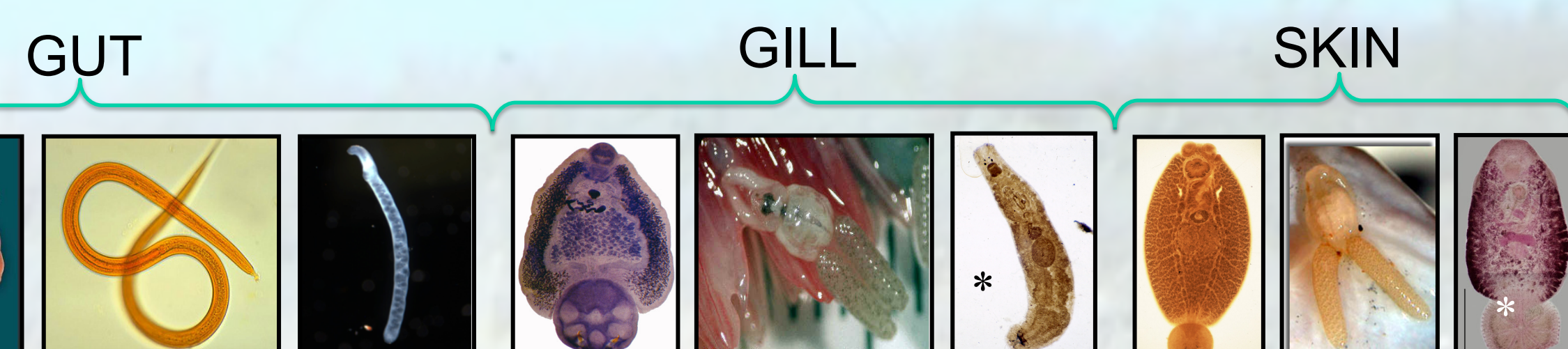
Research Questions & Methods

- Are invasive lionfish infected by parasites in the Atlantic?
- Are parasite communities similar between invasive lionfish and native fish hosts?



We collected 262 hosts, from 5 families, and inspected them for macroparasites:

- Grunts (Haemulidae)
- Squirrelfishes (Holocentridae)
- Snappers (Lutjanidae)
- Groupers (Serranidae)
- Lionfish (Scorpaenidae)



Results

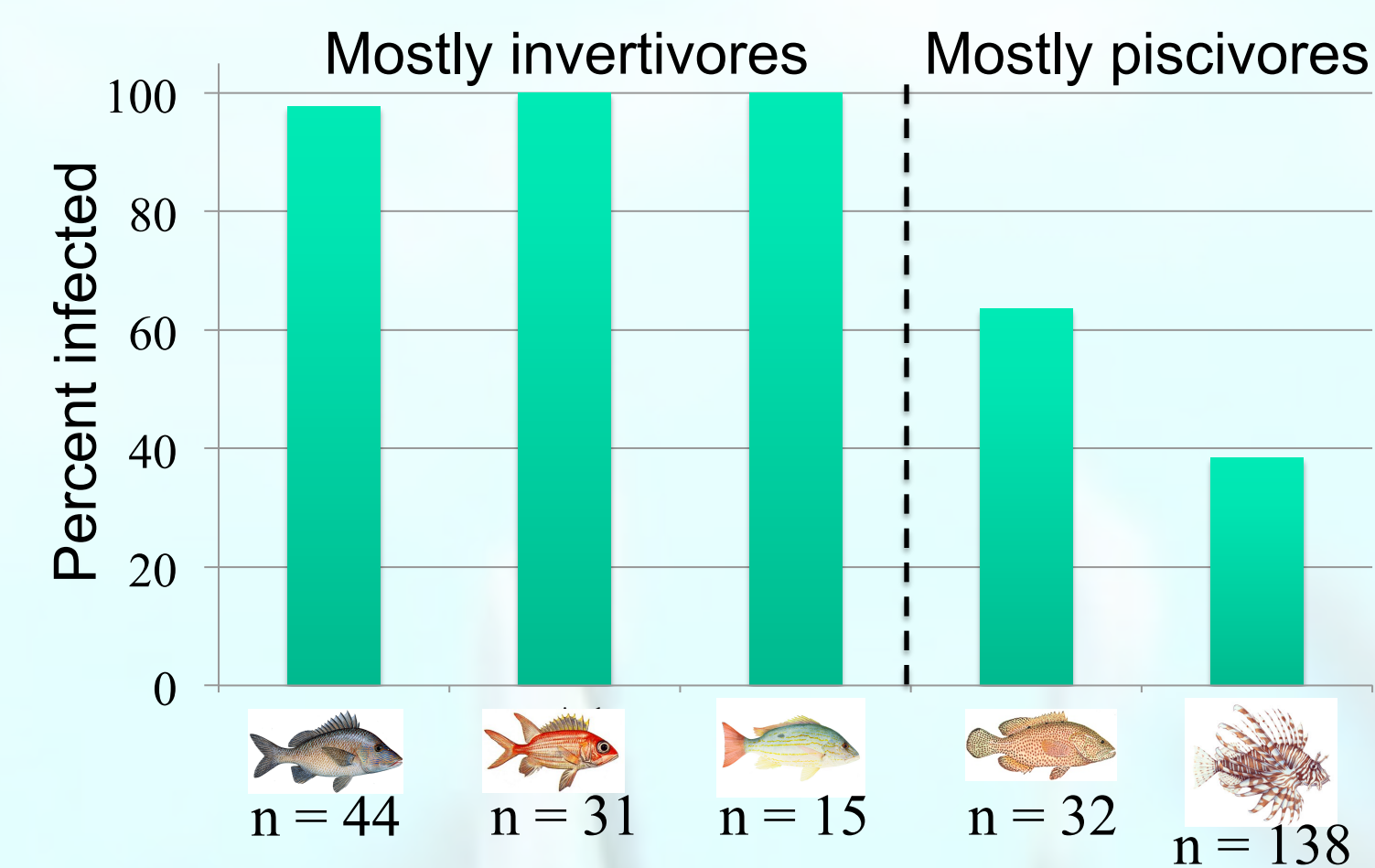


Fig. 1. Prevalence of macroparasite infection, by host family.

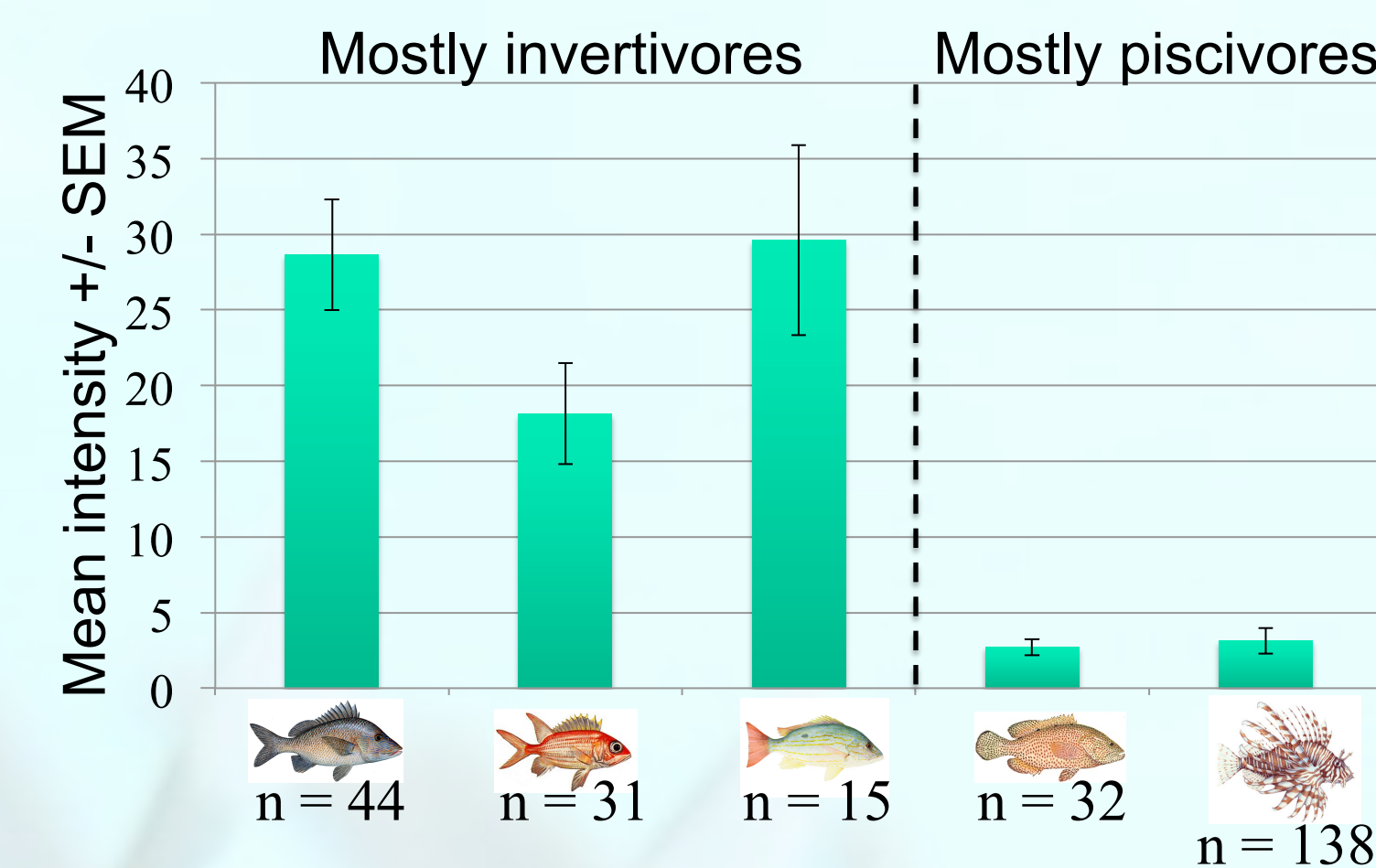


Fig. 2. Mean intensity of macroparasite infection, by host family.

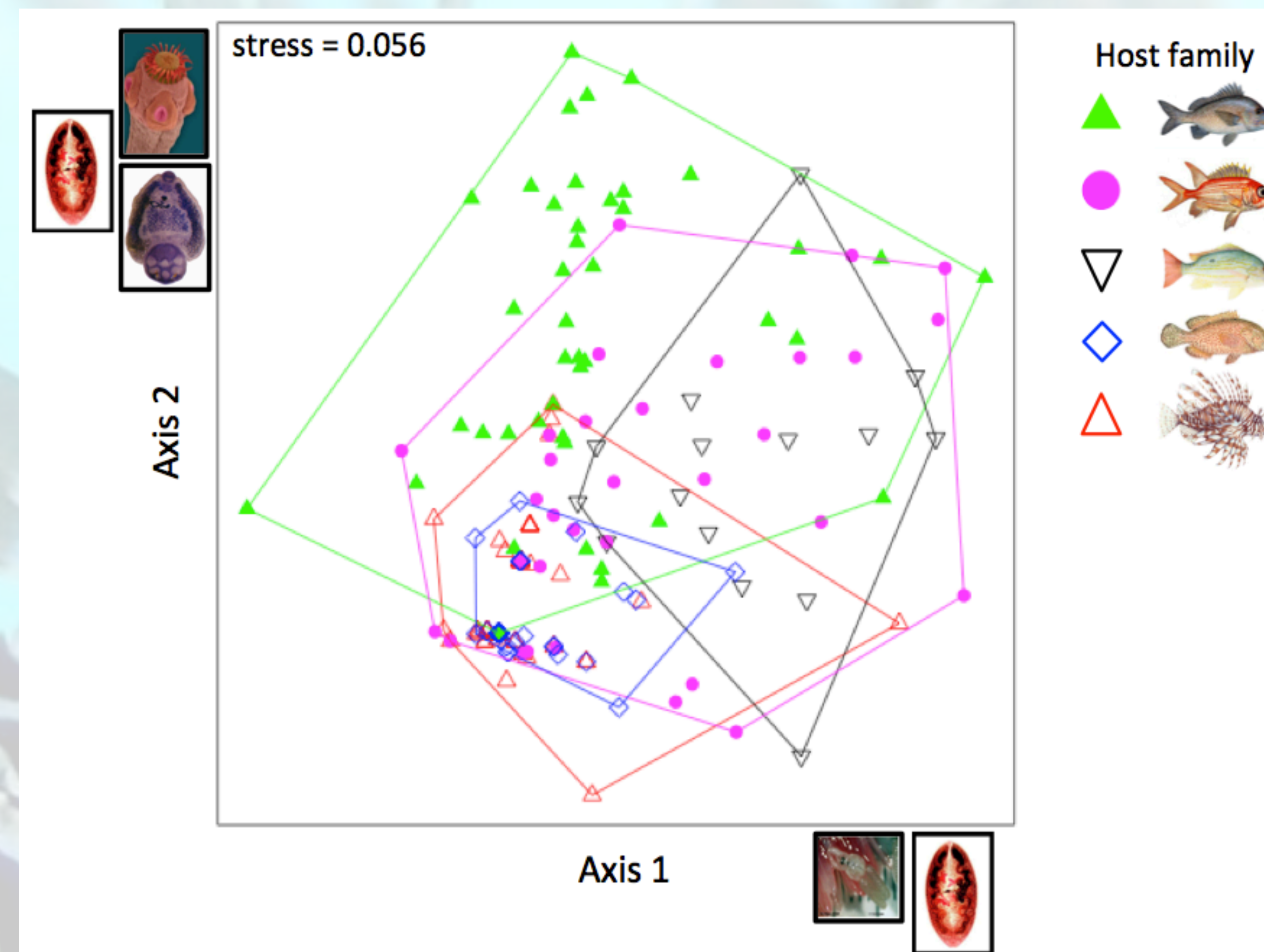


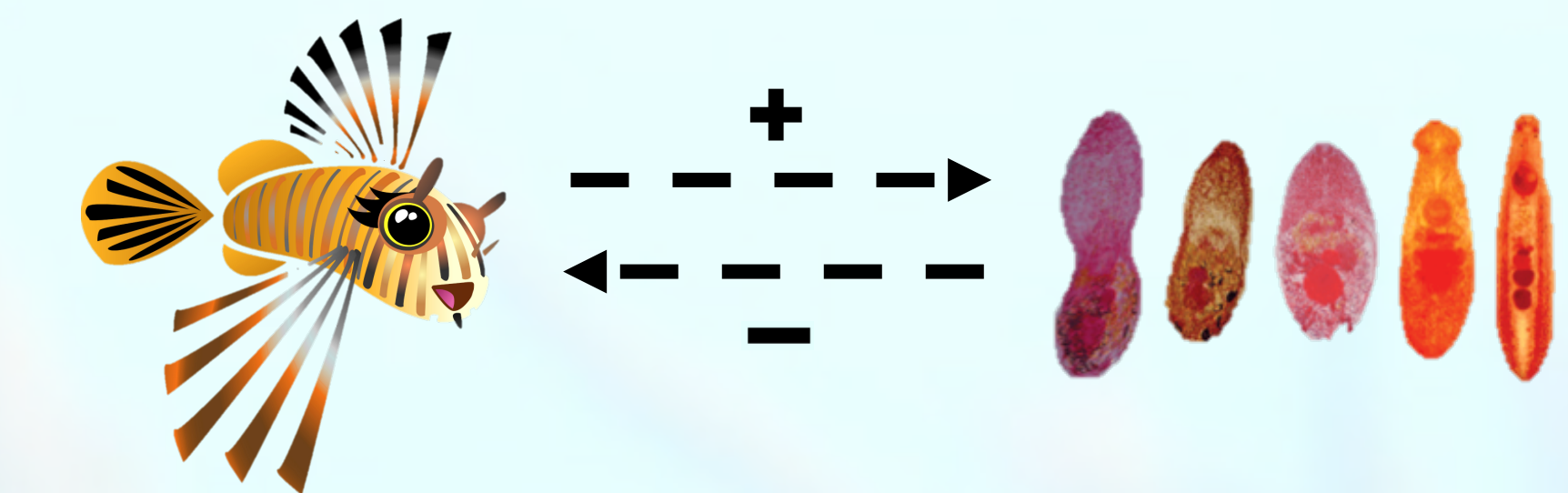
Fig. 3. Non-metric multidimensional scaling plot of relative parasite abundance, by host family. Host families occupied different regions of parasite space (multi-response permutation procedure, A=0.28, p<0.001).

Table 1. Macroparasite species infecting Atlantic lionfish

Parasite species of lionfish	Locality (Bahamas, Cayman Islands)	Number (%) infected	Mean intensity (range)	Specialist or Generalist?
Nematoda				
<i>Goezia</i> spp.	B	1 (0.7%)	1.0 (1)	G
<i>Raphidascaris</i> spp.	B, CI	3 (2.2%)	1.0 (1)	G
<i>Spirocavalanus</i> sp.	CI	2 (1.4%)	1.0 (1)	S?
Unidentified sp.	CI	1 (0.7%)	1.0 (1)	
Isopoda				
<i>Aegiochus tenuipes</i>	CI	1 (0.7%)	1.0 (1)	G
<i>Carpis serricaudus</i>	CI	1 (0.7%)	1.0 (1)	?
<i>Eurydice convexa</i>	B	1 (0.7%)	1.0 (1)	?
<i>Excorallana quadricornis</i>	B	1 (0.7%)	1.0 (1)	?
<i>Gnathia</i> spp.	B	1 (0.7%)	1.0 (1)	G
Cestoda				
<i>Scolex pleuronectis</i>	B, CI	7 (5.1%)	7.0 (1-38)	G
Monogenea				
<i>Udonella caligorum</i>	CI	3 (2.2%)	7.3 (1-19)	G
Digenea				
<i>Bivesicula caribbensis</i>	CI	1 (0.7%)	1.0 (1)	S?
<i>Neotorticaecum</i> spp.	B, CI	11 (8.0%)	3.0 (1-21)	G
<i>Lecithochirium floridense</i>	B, CI	20 (14.5%)	1.9 (1-7)	G
<i>Helicometrina nimia</i>	CI	2 (1.4%)	1.0 (1)	G
<i>Pachycreadium crassigulum</i>	B	1 (0.7%)	1.0 (1)	S?
Unidentified spp.	B	6 (4.3%)	1.3 (1-2)	

Discussion

Lionfish are not heavily infected by parasites at two Atlantic locations, suggesting that lionfish may be experiencing the effects of ecological release and low biotic resistance, perhaps contributing to their success as an invasive species.



Why might groupers and lionfish have relatively few parasites?

- They eat mostly fish, and parasites are often transmitted via invertebrates⁷.
- Groupers are cleaned frequently by cleaner gobies⁸.
- Lionfish have not co-evolved with Atlantic parasites.

Preliminary data from the Pacific support the hypothesis that the mostly piscivorous diets of groupers and lionfish may limit their exposure to trophically-transmitted parasites:

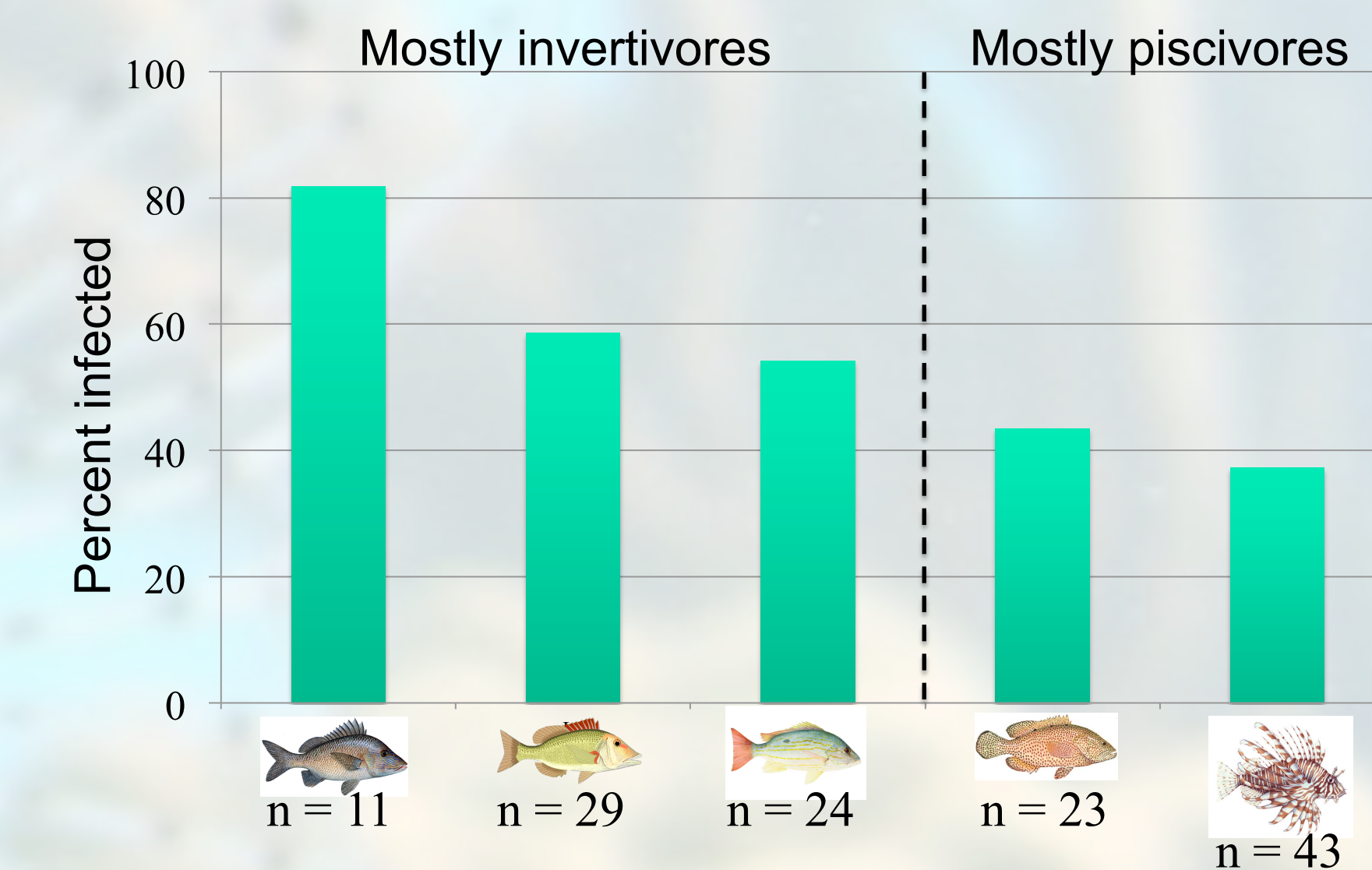


Fig. 4. Prevalence of macroparasite infection, by host family. 2 locations: Guam and the Philippines

Future work will...

1. Address biogeographic patterns in lionfish infection, and
 2. Quantify lionfish's relative energy contributions to growth, reproduction, and immunity in response to infection
- ...in both their native Pacific and invaded Atlantic ranges.

Acknowledgments & References

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