

Workshop Paraty, RJ, 08-09 Dec 2010

Ecology of reef fish in southeastern Brazilian coastal islands: are there artisanal fishing effects?



Photo S. Green



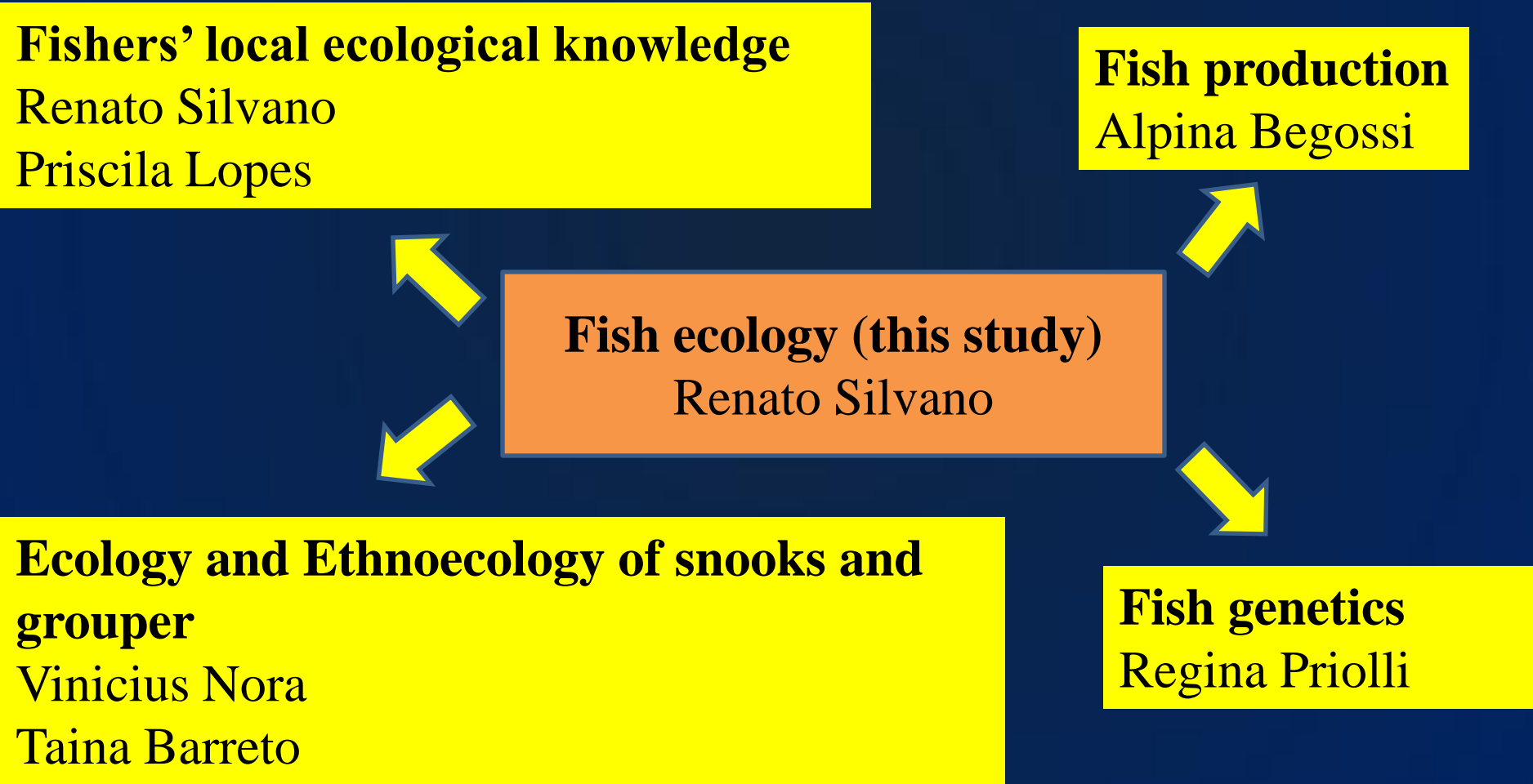
Research team: diving volunteers (to be found)

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Main Goals

- Analyze the density of commercial reef fishes in islands exploited by fishing communities in the Paraty bay
- Compare environmental and fishing variables
- Compare with fishers' LEK



Questions and Hypotheses

1. Which factors are related to the density of commercial fishes in the studied islands? Relationship: density of fishes X fishing intensity

H1: Negative relationship: fishing effects?

H2: Positive relationship: environmental variables?


2. Do the islands that show a higher fishing CPUE have more fish?

H: Islands where fishers catch more fish would have higher fish density.

3. How patterns on fish density relate to fish genetics?

Where? Study site

10 islands and 'lajes' (submerged rocks) in Paraty bay
Fish landings data (n= 293) from Nov 2009 to Aug 2010: Vinicius and Robson



Islands	Fish landings	% of total landings
1. Ilha dos Meros	1	0.3
2. Parcel dos Meros	17	6
3. Ilha Rapada	18	6
4. Ilha da Espia	0	0
5. Saco Mamanguá	0	0
6. Ilha dos Ganchos	19	6
7. Laje Branca	4	1
8. Ilha do Algodão	0	0
9. Ilha Araçatiba	36	12
10. Ilha Araraquara	4	1



Map from Begossi et al. 2010

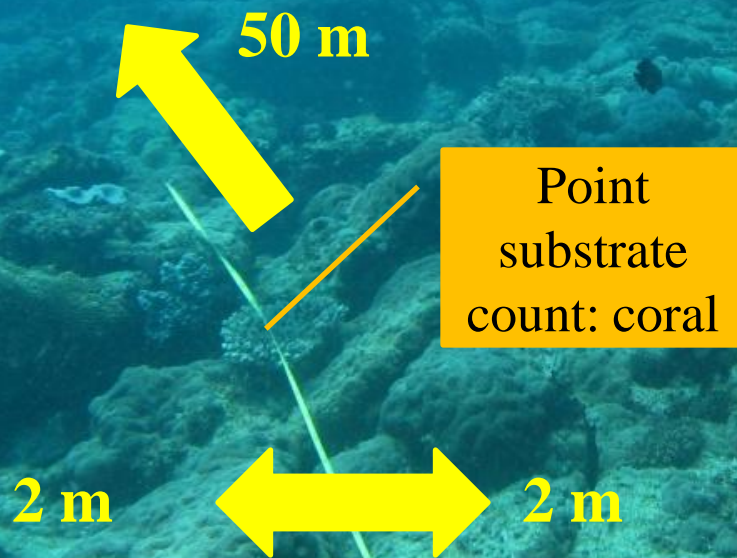
- Logistics: distance and diving conditions
- Only the island side facing the mainland

Additional potential sampling sites: from the recorded fishing landings

Islands and sites	Fish landings	% of total landings
11. Galeta	32	11
12. Ingaeiro	19	6
13. 7 Cabeças	12	4
14. Ponta de Leste	10	3
15. Tapicirica	7	2
16. Ilha do Cedro	6	2
17. Ilha do Araújo	6	2
18. I. do Ventura	4	1
19. I. Carço	3	1

How? Sampling methods

- Underwater visual census (UVC) of reef fish
- Transects: count fish > 5 cm over a tape at the bottom (200 m²)
- One to three transects per island (depending on size): **islands are replicates**
- Size estimated to 5 cm classes, studied species identified on site
- Point records of substrate at each 2 m



When? Jan and Feb 2011



Commercial reef fishes:

Serranidae (groupers): *Epinephelus* spp., *Mycteroperca* spp.

Lutjanidae (snappers): *Lutjanus* spp.

Centropomidae (snooks): *Centropomus* spp.

Epinephelus



Lutjanus



Mycteroperca



Centropomus



Non-commercial fish species: controls to fishing effects

Haemulon aurolineatum (Haemulidae)

Abudefdux saxatilis (Pomacentridae)



H. aurolineatum



A. saxatilis



Data analyses: multiple regression, correlations

Dependent Variables:

➤ **Fish density** (fish/ m²) in number and biomass (estimated from size)

Independent (explanatory) variables:

➤ **Environmental:** depth, habitat complexity (bottom cover), lunar phase, distance from the coast

➤ **Fishing:** fishing intensity (number of fish landings), number of fishermen that mentioned the island, catch per unit of effort (data from fishing project), management regimes?

Expected results

Provide data that may contribute to:

- **Conciliate fishing, fish conservation and maintenance of fish stocks**
- Understand fish distribution patterns
- Baseline data to future monitoring
- Compare fish landings, fishers' LEK surveys and fish density:
insights to management

Acknowledgements

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- To you by your attention

