Evaluating potential biodegradable twines for use in the tropical tuna FAD fishery

The Problem

Increasing use of DFADs built with no biodegradable materials
Objective

• To test and develop biodegradable materials for the construction of an effective FAD that covers all the requirements of fishers and environmental needs
  ✓ By-catch reduction
  ✓ Affordable
  ✓ Reproducible
  ✓ Lifetime
  ✓ Aggregate biofouling and potentially tuna
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Materials

- Cotton
  **TWISTED**
- Reg. Cotton + Sisal
- Reg. Cotton + Linen
- Cotton + Reg. Cotton + Linen
- Reg. Cotton + Sisal + Hemp

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Methods

• Deployment of samples (160 days; 5 samplings)
Methods

- Sampling and measuring: Bio, Fmax, etc.
Results

- Breaking strength decrease ~ degradation

ANCOVA showed differences in:
1) Slopes
2) Intercept

Time to failure:
Twine 2 → 193 days
Twine 1 → 417 days
Twine 4 → 557 days
Results

- Weight increasing on time ~ Biofouling

- First increases due to saturation of sea water?
- Twisted:
  Up to two/three months → Algae
- Plaited and bulked:
  Complex fauna since first month.
Results

• Diameter increasing with time ~ Biofouling
Conclusions

• Initial descriptors are not an appropriate indicator of degradation at sea.

• Combination of construction design and material is highly significant for degradation rates.

• Different degradation rates by twine (Twine 2 → 193 d).

• All twines showed good probability of biofouling.

• Plaited and bulked twines faster complex colonization.
Prospect Work

- Explore new materials and designs?
  - A twisted and bulked cotton, sisal and linen twine.
- Increase the number of samples and soaking time.
- Testing of resulting materials at DFADs in:
  - Regular commercial fishing trips
  - Anchored FADs in tropical areas
- Discuss results with fishers and keep improving.
ESKERRIK ASKO, GRACIAS,
THANK YOU