

Final results of the jelly-FAD performance with Ugavi fleet

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Paradigm shift: The jelly-FAD design



Nature inspired innovation:

- Neutral buoyancy
- Reduces structural stress
- Provides slow drift decreasing its size
- Reduces the need for plastic flotation

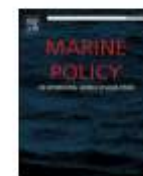
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The Jelly-FAD: A paradigm shift in the design of biodegradable Fish Aggregating Devices

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Jelly-FADs tested



Surface buoy

Submerged raft

Submerged buoy

Main rope (cotton)

Main rope (plastic)

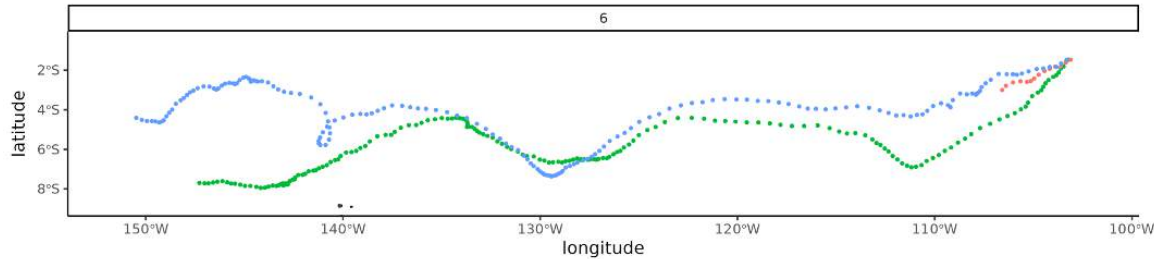
Cube (drogue)

Category II. *The FAD is made of 100% biodegradable materials except for plastic-based flotation components*

Category IV. *The FAD is made of 100% biodegradable materials except for plastic-based flotation components*

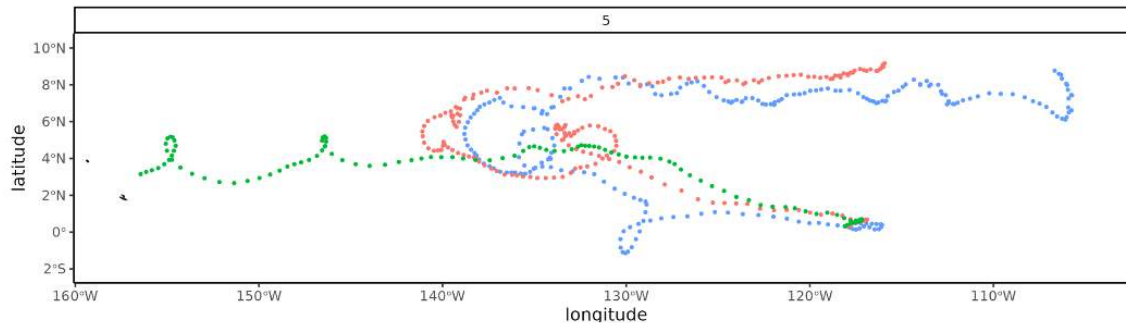
Deployment in pairs: JellyFAD and conventional FAD

Pair 6-BIO-CON. 2021-2022. UGAVI (OPO)



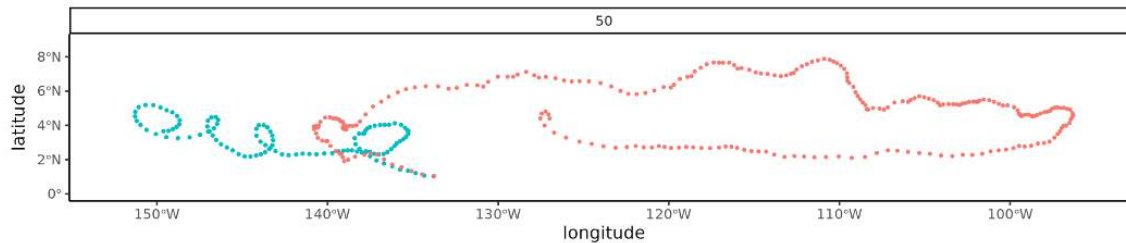
Similar trajectory

Pair 5-BIO-CON. 2021-2022. UGAVI (OPO)



Partially similar trajectory

Pair 50-BIO-CON. 2021-2022. UGAVI (OPO)



Divergent trajectory

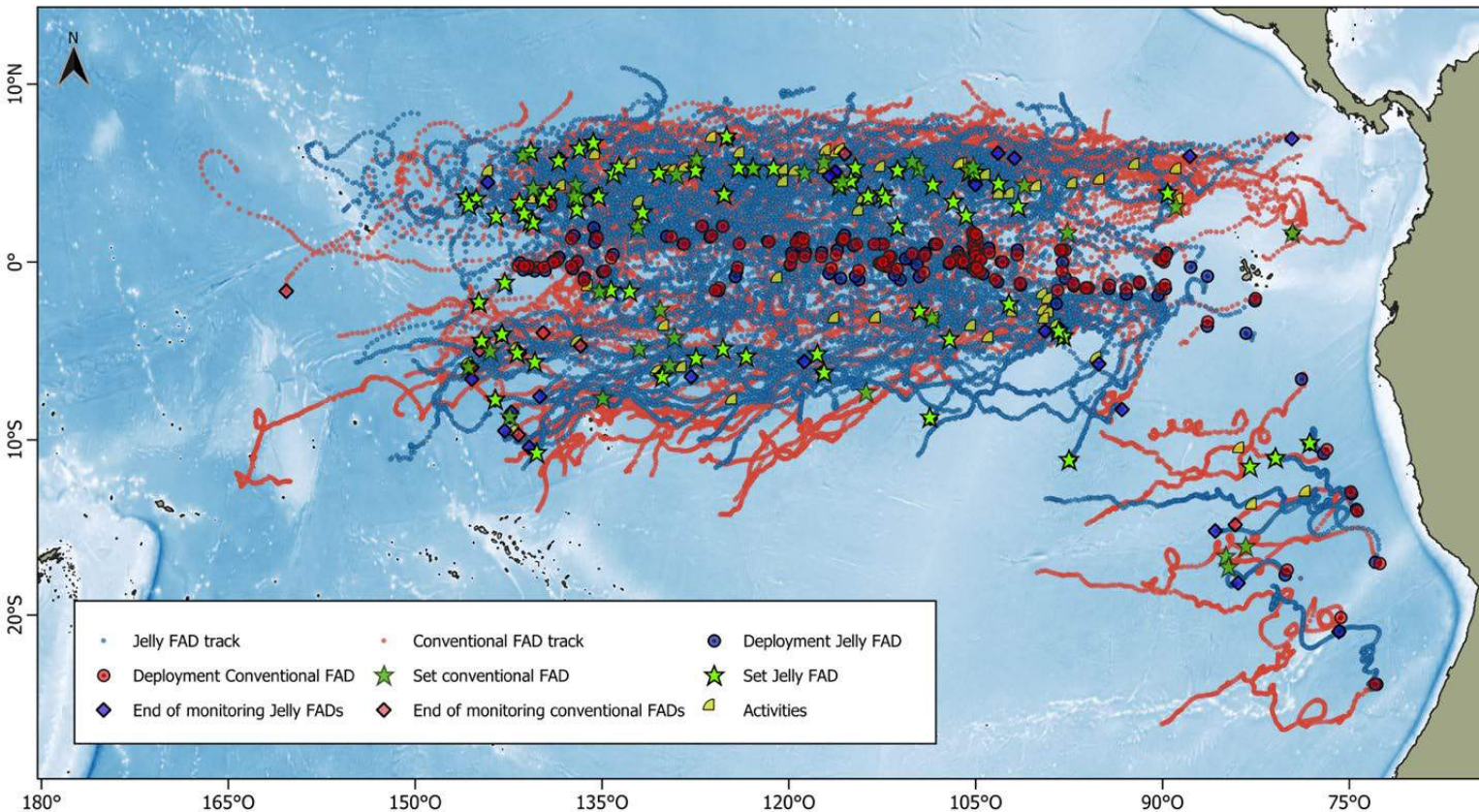
Only pairs that drifted together were studied: **95 pairs**

Available Data

FAD Type	Deployments	Sets	
JellyFAD_hybrid (Cat IV)	60	36	
JellyFAD_organic (Cat II)	47	34	
Total JellyFAD	107	70	
Conventional FAD	137	45	

1. Catch performance of the pairs

Biodegradable and conventional FAD pairs in the Pacific Ocean. 2021-2023



Red dot: Conventional FAD track and deployments

Green dot: Jelly-FAD track and deployment

Green star: SET jelly-FAD

Dark green star: SET conventional FAD

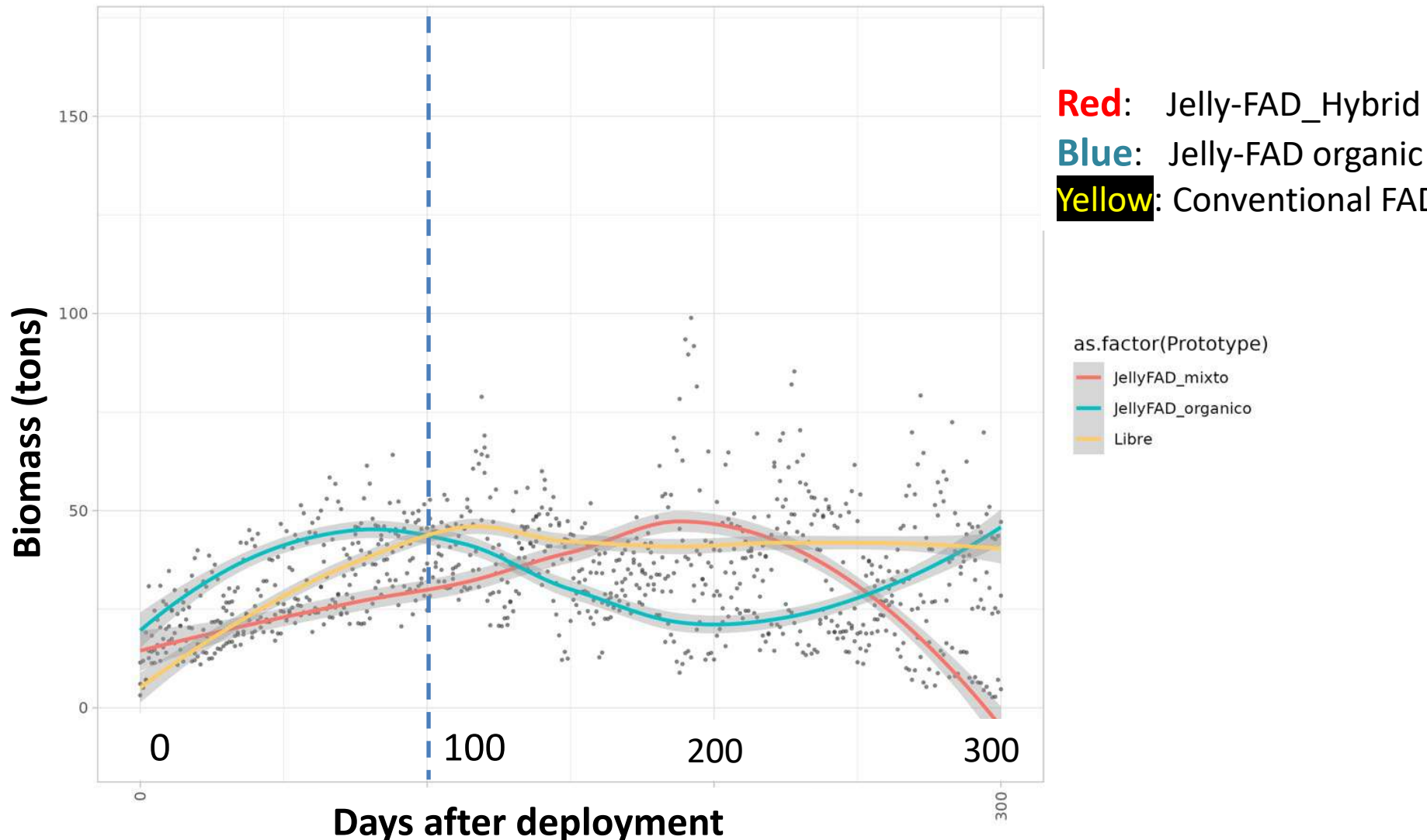
Catch performance

FAD Prototype	N	Soaking Time (days)			Catch (tons)		
		min	mean	max	min	mean	max
JellyFAD_organic (Cat II)	34	37	132	335	0	38,5	125
JellyFAD_hybrid (Cat IV)	36	33	113	238	0	40,2	120
JellyFAD_total	70	33	122	335	0	39,4	125
Conventional	46	28	106	267	0	35,9	265

Prototype	FAD ID	eploymen	# of fishing set	Fishing set date	Soaking time (days/month)	Total catch (tons)
JellyFAD_organic	14	25/1/22	1	12/3/22	46 days (1.5 months)	125
JellyFAD_organic	14	25/1/22	2	14/3/22	48 (1.6 months)	0
JellyFAD_organic	35	28/1/22	1	2/5/22	94 (3 months)	70
JellyFAD_organic	35	28/1/22	2	30/10/22	275 (9 months)	40
JellyFAD_organic	35	28/1/22	3	29/12/22	335 (11 months)	65
JellyFAD_hybrid	36	20/6/22	1	3/10/22	105 (3 months)	75
JellyFAD_hybrid	36	20/6/22	2	10/10/22	112 (4 months)	20
JellyFAD_organic	50	14/4/22	1	17/6/22	64 (2 months)	15
JellyFAD_organic	50	14/4/22	2	5/8/22	113 (4 months)	15
JellyFAD_organic	51	25/1/22	1	21/6/22	147 (5months)	10
JellyFAD_organic	51	25/1/22	2	13/8/22	200 (7 months)	15
JellyFAD_organic	52	24/1/22	1	26/6/22	153 (5 months)	35
JellyFAD_organic	52	24/1/22	2	7/10/22	256 (9 months)	30
JellyFAD_organic	77	27/1/22	1	17/4/22	80 (2,7 months)	115
JellyFAD_organic	77	27/1/22	2	10/5/22	103 (3,4)	23
JellyFAD_organic	2	29/10/21	1	1/3/22	123 (4 months)	120
JellyFAD_organic	2	29/10/21	2	13/7/22	257 (9 months)	10

Tuna Biomass aggregation from echosounder buoys

Similar pattern for up to 100 days at sea = observed mean soaking time



Drift performance

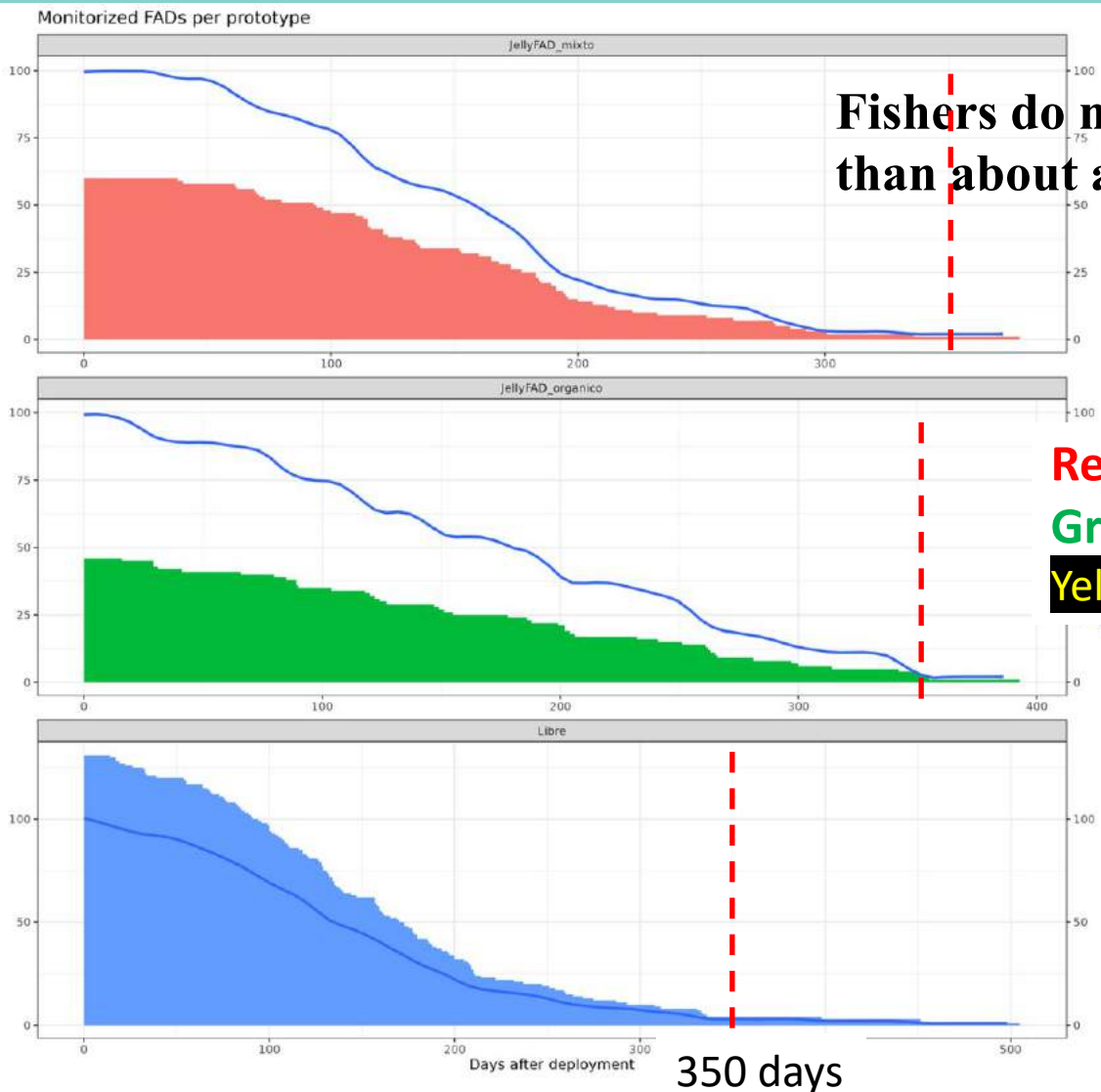
Both dFAD types (Jelly-FAD and conventional) showed similar average and maximum speed values

FAD type	N	Records	min (knots)	mean (knots)	max (Knots)
Jelly-FAD	48	178,9	0	0,8	3,7
Conventional	48	173,9	0	0,8	3,6

Monitored lifespan

Fishers do not monitor FADs longer than about a year, for any of the types

Number of FADs



Red: Jelly-FAD_Hybrid
Green: Jelly-FAD organic
Yellow: Conventional FAD

Degradation of the materials

State of FAD Elements

Canvas in cube

Cube structure

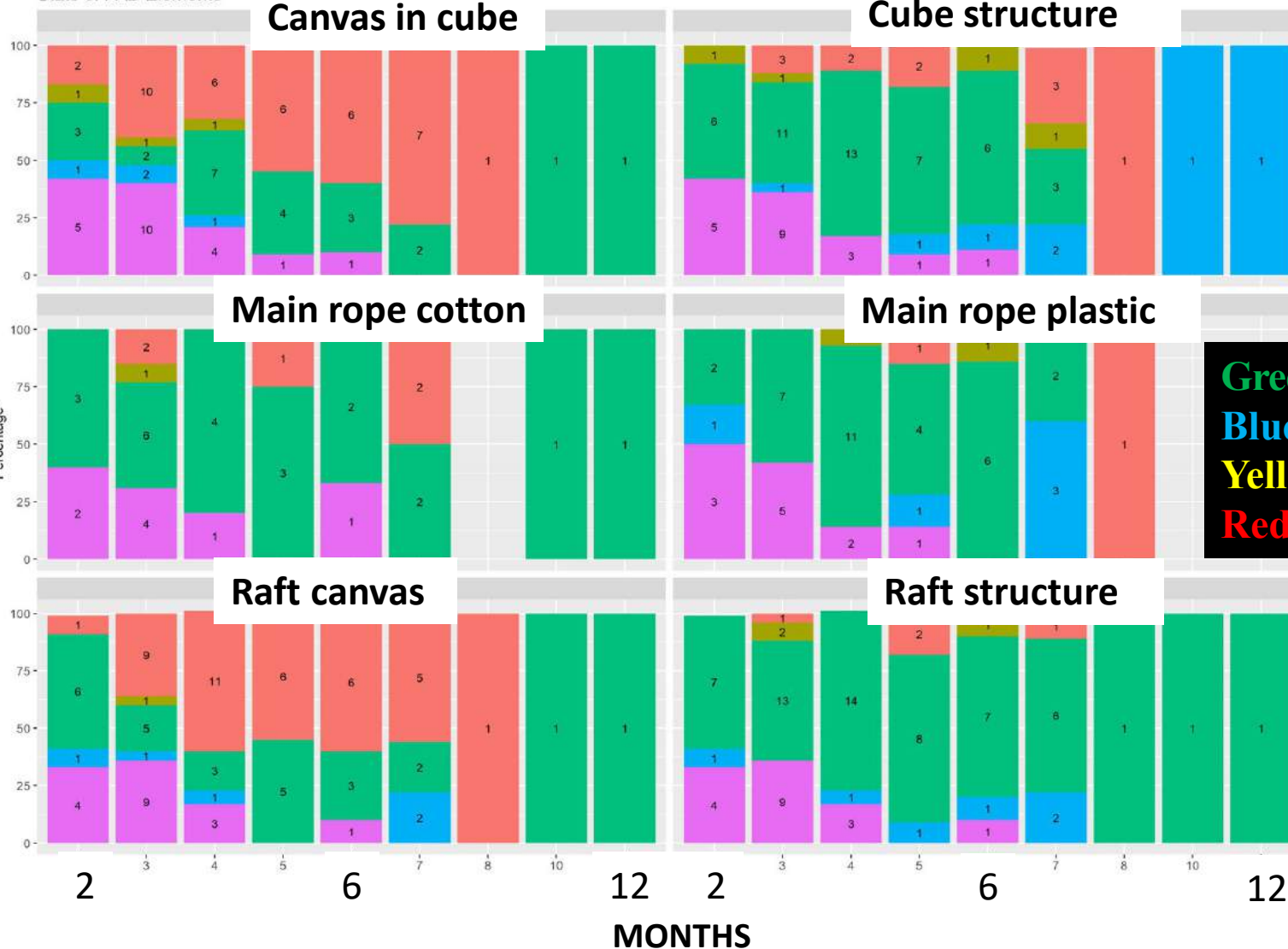
Main rope cotton

Main rope plastic

Raft canvas

Raft structure

Green = good condition
Blue = needs repair
Yellow = destroyed
Red = Absent



Conclusion from Ugavi trials

- JellyFADs **aggregate tuna** as conventional FADs do or even more.
- JellyFADs **drift** as slow as conventional FADs but with less weight and volume
- **Lifespan:** sets were made after 11 months at sea, and many occurred after 5 months with the FAD being in perfect condition and re-deployed at sea. **This meets fishers' needs for dFADs lifespan.**
- The **success** relies on the **number of Jelly-FADs deployed** which should be systematically tested supported by the shipowner and with the feedback from fishers at sea.

Other useful information

- **COST: JellyFAD cost** \$180 – \$450 (depending on the depth) + Geolocating Buoy.
- **Conventional FADs costs** from \$250 to \$900 depending on the depth and design + Geolocating Buoy.
- **Replacement of JellyFAD components:** The cube or canvas, if damaged after the set, could be replaced by another cube that fishers could have ready onboard for the JellyFAD to be re-deployed, (as fishers do with the tail and raft of conventional structures).
- This is not the last design of the Jelly-FAD, we are working to make it lighter, less weight, less material, less impact.
- Ongoing trials by US fleet, Nirsa and Ugavi in the EPO. Ruxtel starting to construct them.

A large school of blue and silver fish, likely tuna, swimming in deep blue water. The fish are arranged in a dense, coordinated pattern, moving towards the right. The background is a solid deep blue, suggesting an underwater environment.

Thanks! Gracias!

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