

IOTC – 4th AD HOC WORKING GROUP ON FAD
29-30 MAY 2023

Update on BIODEGRADABLE dFADS: CURRENT STATUS AND FUTURE PROSPECTS

IOTC-2023-WGFAD04-06

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Biodegradable dFADs: current status and prospects

WGFAD03 Adopted recommendations

IOTC FAD WG03 – Recommendations related to biodegradable dFAD :

- WGFAD03.02 (Para 147) The WGFAD **AGREED** on the need to move towards biodegradable FADs and **RECOMMENDED** that the WPTT endorse this process.
- The WGFAD **NOTED** that the definitions or classifications of biodegradable FADs are not consistent between oceans and that this should be reviewed and resolved to the extent possible.

Biodegradable dFADs: current status and prospects

Current situation at t-FRMOs



ICCAT – Rec. 21-01:

- When designing dFADs the use of biodegradable materials should be prioritized.
- Endeavour that as of January 2021 all dFADs deployed are non-entangling, and constructed from biodegradable materials, including non-plastics, with the exception of materials used in the construction of dFAD tracking buoys.
- We found some inconsistencies between Spanish and English version of the Recommendation.
- Biodegradable dFAD definition and categories no defined yet.



IOTC – Res 23/02:

- Transitioning to the use of biodegradable dFADs (New categories), with the exception of materials used for the instrumented buoys, by their flag vessel is proposed from 1 January 2024.
- Meshed material is NOT permitted for surface/sub-surface constructions.
- The sub-surface structure shall be limited to a length of 50 meters.
- Biodegradable dFAD definition and categories adopted. Timeline adopted.



IATTC – C-19-01 / C-21-04

- To reduce the amount of synthetic marine debris, the use of natural or biodegradable materials (such as hessian canvas, hemp ropes, etc.) for drifting dFADs should be promoted.
- CPCs, ..., shall encourage the design and use of biodegradable nonentangling FADs.
- Biodegradable dFAD definition and categories adopted. Timeline be adopted.



WCPFC – CMM 21-01

- To reduce the amount of synthetic marine debris, the use of natural or biodegradable materials for dFADs should be promoted.
- The use of non-plastic and biodegradable materials in the construction of dFADs is encouraged.
- Meshed materials are NOT permitted for surface/sub-surface constructions from 1 January 2024.
- Biodegradable dFAD definition and categories adopted. Timeline be adopted.

Biodegradable dFADs: current status and prospects

Biodegradable dFADs definition

Zudaire et al., 2023:

“A biodegradable dFAD would be composed of non-netting form renewable lignocellulosic materials (i.e., plant dry matter - here described as natural material) and/or bio-based compounds that comply with international relevant standards or certification labels for plastic biodegradability in marine environments. In addition, the substances resulting from the degradation of these materials should not be toxic for the marine and coastal ecosystems or include heavy metals in their composition.”

Intersessional IOTC FADWG (Based on IATTC 6th FAD Working group & WCPFC SC 18 recommendations):

“Non-synthetic materials¹ and/or bio-based alternatives that are consistent with international standards² for materials that are biodegradable in marine environments. The components resulting from the degradation of these materials should not be damaging to the marine and coastal ecosystems or include heavy metals or plastics in their composition.”

IOTC Resolution 23/02: (*)

“biodegradable materials” means renewable lignocellulosic materials (i.e., plant dry matter - here described as natural material). Those materials shall degrade in normal conditions of the use of DFADs and both be biodegradable in marine environments in accordance with international relevant standards for full biodegradability in marine environments and on land under natural environmental conditions. In addition, the substances resulting from the degradation of these materials shall not be toxic for the marine and coastal ecosystems or include heavy metals in their composition.”

* **Biodegradable biobased material** not included: Def: *“polymers derived from renewable biological resources (bio-based) and polymers that are considered biodegradable, and for which the degradation results from the action of naturally occurring micro-organisms in marine environment”*

Biodegradable dFADs: current status and prospects

Biodegradable dFAD implementation: approach

Intersessional IOTC FADWG (Based on IATTC 6th FAD Working group & WCPFC SC 18 recommendations):

- ✓ Category I. The FAD is made of 100% biodegradable materials.
- ✓ Category II. The FAD is made of 100% biodegradable materials except for plastic-based flotation components (e.g., plastic buoys, foam, purse-seine corks).
- ✓ Category III. The subsurface part of the FAD is made of 100% biodegradable materials, whereas the surface part and any flotation components contain non-biodegradable materials (e.g., synthetic raffia, metallic frame, plastic floats, nylon ropes).
- ✓ Category IV. The subsurface part of the FAD contains non-biodegradable materials, whereas the surface part is made of 100% biodegradable materials, except for, possibly, flotation components.
- ✓ Category V. The surface and subsurface parts of the FAD contain non-biodegradable materials.

IOTC Resolution 23/02:

- ✓ Category I (2027): All parts (i.e., raft and tail and floating components) of the DFAD, with the exception of materials used for the instrumented buoys, are built with biodegradable materials.
- ✓ Category II (2026): All elements (i.e., raft and tail) of the DFAD, with the exception of materials used for the instrumented buoys and floating components, are built with fully biodegradable materials.
- ✓ Category III (2024): The tail and other underwater hanging parts of the DFAD are fully biodegradable materials, whilst the raft and materials used for the instrumented buoys are made of non-biodegradable materials.
- ✓ Category IV (2023): All parts of the DFAD (i.e., raft, tail and instrumented buoy) are built partly or fully with non-biodegradable materials.

Biodegradable dFADs: current status and prospects

Data collection procedures

IOTC Resolution 23/02:

Annex II; paragraph f:

In the case of floating objects that are DFADs, **information on the design characteristics, including the presence of meshing elements, the biodegradability category, the materials and the dimensions.** These information are mandatory at the time of DFAD deployment. They should be provided to the extent possible during DFAD visits (i.e., without having to lift the DFAD out of the water)

Data sources:

FAD LOGBOOK / OBSERVERS DATA:

- Information on **FOBs** (FADs and other floating objects)
- Date, Time [GMT], position of each activity
- **Type of vessel** (supplies and purse seiners)
- **Identification:** Vessel and trip ID
Buoy [ID of the manufacturer and owner]
- **FOB Type:** CECOFAD categories or enough information for posterior classification on CECOFAD categories.
- **FOB structure:** Main structure dimension [aaxbb] and Depth of the Hanging Structure [m] or structure type; Materials [NE character given by the mesh size and configuration; **and nature of materials partially described**]
- **Activity with FOB and buoys** [CECOFAD categories] or enough information to posterior classification on CECOFAD categories.
- **Estimation of the Catch:** Target species [tn, Fate= retained, discarded]
Bycatch [n° or tn, Fate = retained, discarded, released in case of sensitive species]

Need to adapt existing forms to identify biodegradable categories **considering the existing difficulties...**

Biodegradable dFADs: current status and prospects

Data collection procedures

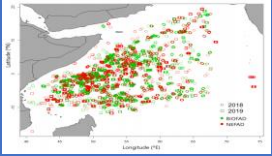


Difficulties for data collection on biodegradable materials.

- FADs are constructed on vessels and therefore:
 - ✓ port visit allow to evaluate only partly the biodegradable character of FADs.
 - ✓ FADs cannot be classified in biodegradable categories proposed by IOTC in port visits.
- Difficulties in determining the biodegradable character of material in activities at sea.

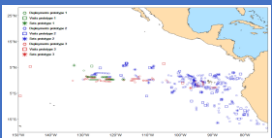
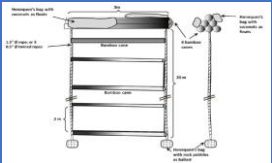
PAST LARGE-SCALE TRIALS

BIOFAD – IO (2017-2019)



- 771 BIOFAD deployed
 - 3 tested models
 - Raft and ropes biodegradable (except floats & weight)
 - 40-81% less synthetic material.
 - 1-50% weight reduction
 - Lifespan > 365 days
- Murua et al., 2023*

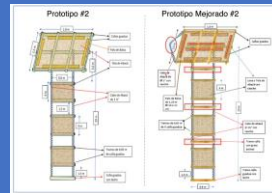
NEDs – EPO (2018-2021)



- 780 NEDs deployed
- 3 tested models
- FAD all biodegradable
- Lifespan > 790 days

[FAD-07-02 - Biodegradable FADs project report](#)

Eco-FADs – EPO (2018-2021)



- > 1400 Eco-FADs deployed
- TUNACONS fleet
- 2 tested models
- FAD all biodegradable
- Lifespan > 100 days
- TUNACONS deploying 20% Eco-FADs

INF-C. Implementation of biodegradable FADs in the Eastern Pacific Ocean

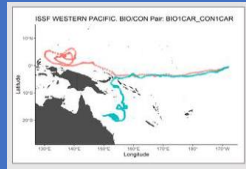
Biodegradable dFADs: current status and prospects

Past, present and future actions

PAST & ONGOING JELLYFAD LARGE-SCALE TRIALS

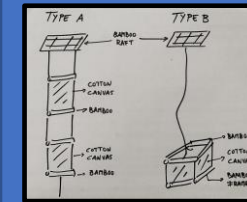
Moreno et al., 2023

JellyFAD – WCPO (2020-2023)



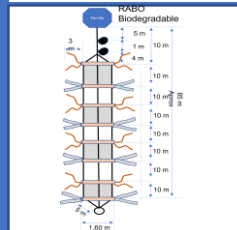
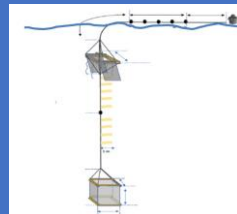
- 150 JellyFAD deployed
- CFC fleet
- 2 tested models of JellyFAD
- Tail all biodegradable
- Lifespan ~ 331 days

JellyFAD – AO (2018-2021)



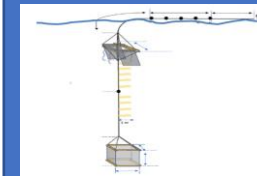
- 147 JellyFAD deployed
- Ghanaian fleet
- 2 models of JellyFAD
- Raft and ropes biodegradable (except floats & weight)
- Lifespan ~ 130-190 days

JellyFAD – AO (2021-2023)



- 214 BIOFAD deployed
- OPAGAC fleet
- 1 model of JellyFAD
- Raft and ropes biodegradable (except floats & weight)
- Lifespan ~ 340 days
- 1 model of biodegradable tail to be tested in 2023

JellyFAD – EPO (2020-2023)



- 1200 JellyFADs deployed (30% of total deployments)
- UGAVI fleet
- 1 tested model
- Raft and ropes biodegradable (except floats & weight)
- Lifespan ~ 338 days
- Total catch around 2404 tns

PAST & ONGOING JELLYFAD LARGE-SCALE TRIALS

Ongoing trials with the following fleets:

- **Ugavi:** + 1200 jelly-FADs (Pacífic O.)
- **Caroline Fisheries Corporation (FSM):** 150 FSM (WPO)
- **USA:** 260 jelly-FADs (East & West Pacific)
- **Nirsa (Ecuador):** 100 jelly-FADs (EPO)
- **Silla (Korea):** 34 jelly-FADs (WCPO)
- **FCF (Taiwan):** 50 jelly-FADs (WCPO)
- **Pevasa (Anabac, Spain):** +100 Jelly-FADs (Atlantic O.)
- **Via Ocean (France):** 60 Jelly-FADs (Atlantic Ocean)

Biodegradable dFADs: current status and prospects

Recommendations

- Agreed biodegradable definition by t-RFMOs. – **DONE** (IOTC Resolution 23/02)
- Different levels/categories of biodegradability of biodegradable dFADs,. – **DONE** (IOTC Resolution 23/02)
- A stepwise process, including a timeline, towards the implementation of fully biodegradable dFADs – **DONE** (IOTC Resolution 23/02)
- Further research on natural and synthetic materials that meet the biodegradable definition is required. – **IN PROCESS**
- Gradual modification of current dFAD design at a short term. – **IN PROCESS**
- Define data collection procedure on biodegradable material for categories classification – **IN PROCESS**