THE ATLANTIC-WIDE RESEARCH PROGRAMME FOR BLUEFIN TUNA
(GBYP Phase 14)

2025 GBYP ACOUSTIC TAGGING CAMPAIGN ON BLUEFIN TUNA IN PORTUGUESE TRAP

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Background and objectives

In 2025 the GBYP Steering Committee agreed that the tagging campaign on bluefin tuna carried out in 2024 produced relevant results and that tagging should be continued in 2025, to test the efficiency of acoustic tags and the new receiver arrays deployed in recent years by the project STRAITS (https://www.europeantrackingnetwork.org/en/straits), an EU-funded infrastructure project that will instrument all four corners of Europe to monitor the movements of aquatic animals at a pan-European scale, and especially important at the Strait of Gibraltar and off the Atlantic coast of Europe, where the STRAITS partners team at Gibraltar Strait formed by IFAPA (Spain), C.O. Cádiz IEO-CSIC (Spain) and CCMAR(Portugal) have deployed a coastal receivers network and a receiver curtain at the Gibraltar Straits to acoustically track animal migrations through the Gibraltar Strait.

Accordingly, a tagging campaign was set by IPMA (EU-Portugal) in straight coordination with the Secretariat (who provided the majority of the tags), IFAPA-STRAITS (EU-Spain) that donated five acoustic tags and has an array of receivers along the Gulf of Cádiz , and the TUNIPEX tuna trap (EU-Portugal). The campaign was set aiming to tag bluefin tuna specimens both on their migration into the Mediterranean Sea, and also specimens migrating back to the Atlantic Ocean.

Preparatory work

On 20th May 2025, the tagging team prepared a total of 18 VEMCO acoustic tags, model V16, with attachment holes for external mounting , which included an ICCAT conventional spaghetti tag inside the transparent silicone tube around the tether, that has a specific unique code number, and reference to ICCAT and rewarding in case of tag recovery (see **figure 1**).

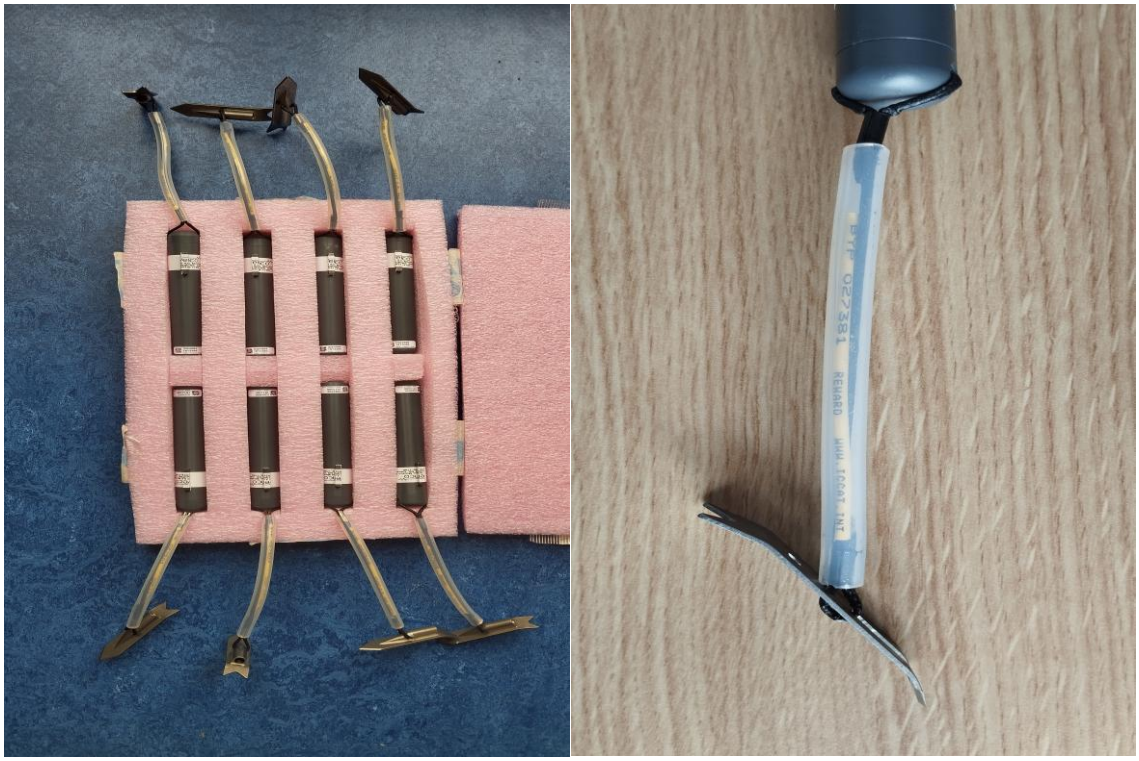

Figure 1 - VEMCO model V16 with (on the left). Detail of the conventional ICCAT spaghetti tags placed inside the transparent silicone tube around the tether (on the right).

Tagging campaign

The first phase of the tagging campaign was held between 19 and 23 May 2025, at the Tunipex tuna trap platform (**figure 2**), located off the Algarve coast (Southern Portuguese coast) at 37° 01' 24''N and 007° 50' 03W. The campaign was carried out, as a cooperative action, coordinated by Dr Pedro Lino (IPMA, EU-Portugal), with assistance from Dr Miguel Santos (ICCAT Secretariat) and the TUNIPEX tuna trap (EU-Portugal) staff.

Figure 2 - TUNIPEX tuna trap: staff isolating a shoal of Bluefin tuna specimens that entered the tuna trap the same day they were tagged.

In addition, since in the tuna trap it is not possible to bring the fish on board due to the stress and potential damage induced to the fish (and associated mortality, as previously reported by Lino et al, 2019), tagging was done underwater with a pole.

Due to the bad weather conditions on 19 May, the start of the campaign was postponed by a day. Overall, between **20th and 23rd of May 2025**, a total of 18 specimens were tagged and released together with a group of additional bluefin tunas which had entered the tuna trap that same day. The tuna weights were visually estimated by the diver. The details on the tag reference numbers are provided in **Table 1**. Tags 1 to 15 are model V16-6x (provided by ICCAT), while tags 16 to 18 are model V16-4x (provided by IFAPA)

Table 1 – Details on the tags ID and reference number for VEMCO V16 and ICCAT tags deployed on the first phase (tuna migration into the Mediterranean) at the TUNIPEX tuna trap facility.

Tagging order	Date	Acoustic ID	Acoustic Number	Conventional Number	Est_LW (kg)
1	20-05-2025	24993	1613492	BYP 027502	100-120
2	20-05-2025	24994	1613493	BYP 027503	100-120
3	20-05-2025	24996	1613495	BYP 027506	100-120
4	20-05-2025	24997	1613496	BYP 027501	130-140
5	20-05-2025	24998	1613497	BYP 027507	100-120
6	20-05-2025	24999	1613498	BYP 027508	150
7	20-05-2025	25000	1613499	BYP 027509	80
8	21-05-2025	24985	1613484	BYP 027521	60
9	23-05-2025	24986	1613485	BYP 027522	80
10	21-05-2025	24987	1613486	BYP 027523	50
11	23-05-2025	24988	1613487	BYP 027525	70
12	23-05-2025	24989	1613488	BYP 027376	100-120
13	23-05-2025	24990	1613489	BYP 027377	60
14	23-05-2025	24991	1613490	BYP 027378	80
15	23-05-2025	24992	1613491	BYP 027379	50-60
16	23-05-2025	41215	1575632	BYP 027521	30-40
17	23-05-2025	41238	1575655	BYP 027378	40
18	23-05-2025	41239	1575656	BYP 027379	40

In an ad-hoc collaboration with Dr Matt Dell from Tasmanian Environmental Consultants, Manager of the Blue Fin Tuna Program at AQ1 Systems, artificial intelligence (AI) was used to estimate the length of the tagged fish, based on video records made with the AQ1 stereoscopic system. For that purpose, the acoustic tags were externally marked with reflective tapes of different colors, to produce unique color combinations (within each tagging event), as can be observed in **Figure 3**.

Figure 3 - Color combination using reflective tape to create uniquely identifiable patterns

This resulted in an estimate of individual length for 17 out of the 18 fish tagged (**Table 2**). This was an opportunistic experiment that requires further improvement, but provided relevant results. This methodology could be used in future underwater tagging experiments.

The goal of this exercise was to obtain an estimate of the length (useful for growth estimates) and additionally have a second (independent) estimate of the weight.

Table 2 – Straight Fork Length (SFL) of tagged fished estimated using AI from underwater video captured using Stereoscopical Video Camera (estimates courtesy of Matt Dell, AQ1 Systems). Estimated SFL converted to Live Weight (LW) using ICCAT general equation for BFT

ID	Est_LW (kg)	Est_SFL (cm)	Converted_LW (kg)
24993	100-120	157-172	69-91
24994	100-120	157-172	69-91
24996	100-120	157-172	69-91
24997	130-140	185	113
24998	100-120	157-172	69-91
24999	150	236	234
25000	80	228	211
24985	60	162	76
24986	80	155	66
24987	50	147	57
24988	70	163	77
24989	100-120	181	106
24990	60	142	51
24991	80	169	86
24992	50-60	151	61
41215	30-40	133	42
41238	40	138	47
41239	40		

The second phase of the tagging campaign was held between the **1st and 2nd of July 2025**, at the same TUNIPEX tuna trap, located off the Algarve coast (Southern Portuguese coast). The campaign was carried out again as a cooperative action, coordinated by Dr Pedro Lino (IPMA, EU-Portugal), with assistance from Dr Miguel Santos (ICCAT Secretariat) and the TUNIPEX tuna trap (EU-Portugal) staff.

A different anchor was used, during the second phase of the tagging campaign, consisting of a steel anchor of about 65 mm in length, 14 mm width and 1 mm of thickness (**Figure 4**, left panel bottom). A simple traction test showed that the stainless steel anchor **Figure 4** (right panel) could not support the same level of traction as the titanium anchor (**Figure 4**, left panel top).

Figure 4 – Details on the Wildlife titanium anchor (top left) and stainless-steel anchor (bottom left) with Wildlife titanium applicator needle. The stainless-steel anchor (on the left) was correctly inserted but could not hold a traction force of approximately 40kg (right).

It was noted that the titanium anchor used was deeply inserted into the fish body (**Figure 5**) and it was not possible to remove it just by pulling it, instead there was a need to use a knife to cut the skin and flesh of the fish. Therefore, it is highly recommended to use the titanium anchor type, at least during underwater tagging of the acoustic tags.

Figure 5 – Detail on an attached acoustic tag using a titanium anchor.

Overall, between **1st and 2nd of July 2025**, a total of 15 specimens were tagged and released together with a shoal of bluefin tunas which had also entered the tuna trap the same days of the tagged specimens. The estimated individual weight and the details on the tags reference numbers are provided in T**able 3**.

Table 3 – Details on the tags ID and reference number for VEMCO V16 and ICCAT tags deployed on 1-2 July 2025 at the TUNIPEX tuna trap facility.

Tagging order	Date	Acoustic ID	Acoustic Number	Conventional Number	Est_LW (kg)
1	01-07-2025	24926	1649614	BYP 027385	180
2	01-07-2025	24927	1649615	BYP 027386	160
3	01-07-2025	24928	1649616	BYP 027387	180
4	01-07-2025	24929	1649617	BYP 027388	180
5	01-07-2025	24930	1649618	BYP 027389	190
6	01-07-2025	24931	1649619	BYP 027390	160
7	01-07-2025	24932	1649620	BYP 027391	200
8	01-07-2025	24933	1649621	BYP 027392	180
9	01-07-2025	24934	1649622	BYP 027393	200
10	02-07-2025	24935	1649623	BYP 027394	30
11	02-07-2025	24936	1649624	BYP 027396	15-20
12	02-07-2025	24937	1649625	BYP 027397	15-20
13	02-07-2025	24938	1649626	BYP 027398	15-20
14	02-07-2025	24939	1649627	BYP 027399	15-20
15	02-07-2025	24940	1649628	BYP 027400	15-20

The bluefin tuna specimens tagged during the 2nd phase of the campaign were classified as fish in a slightly poorer condition (i.e. not so fat) compared to those tagged in May 2025. This is in line with the usual seasonal migration pattern for the region, corresponding to fish that had already (possibly) spawned in the Mediterranean Sea and were returning to the Atlantic Ocean.

Final considerations

The two tagging sessions carried out in 2025 managed to tag a total of 33 bluefin tuna ranging from 20 to 200kg as requested by ICCAT. Taking into account that 28 tunas were tagged in 2024 and that all V16 tags have a potential battery life of 10 years, it is expected that these 61 tunas will return relevant results in the following years.

References

Lino, P.G., Muñoz-Lechuga, R., Nunes, M., Poço, A., Barata, I., Hirofumi, M. & Coelho, R. (2019) SHORT-TERM CONTRACT FOR BFT GROWTH IN FARMS STUDY (ICCAT-GBYP 09/2019-a) OF THE ATLANTIC-WIDE RESEARCH PROGRAMME FOR BLUEFIN TUNA (ICCAT GBYP Phase 9). Final Report. 11 p.

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