

INTER-AMERICAN TROPICAL TUNA COMMISSION

SCIENTIFIC ADVISORY COMMITTEE

17TH MEETING

La Jolla, California (USA)

8-12 June 2026

DOCUMENT SAC-17 INF-G

ENHANCED MONITORING PROGRAM - 2025 REPORT

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SUMMARY

The Enhanced Monitoring Program (EMP) began sampling trips of prioritized Class-6 purse-seine vessels, in both, Manta and Posorja, Ecuador in March 2023, with 2025 marking the third year of the program. During 2025 the EMP sampled 382 wells from 43 trips of 19 vessels from the fleets of Ecuador, Nicaragua, Panama and the EU (Spain). Estimates of bigeye tuna (BET) catch per trip for the sampled trips ranged from 1 to 689 metric tons (t), and the coefficients of variation (CVs) of those estimates ranged from 0.09 to 0.87, with median of 0.25. The higher CVs on lower estimated BET catches are the result of greater variability in the proportion of BET among the sampled wells of individual trips.

In 2025, the EMP was implemented with a reduction in sampling coverage, in comparison to 2024, due to budgetary limitations that caused the loss of the sampling team based in Posorja, Ecuador; i.e. in 2025, sampling technicians were only based in Manta. However, limited travel expenses allowed for sampling technicians to carry out occasional sampling in Posorja, with five trips sampled at that location. Furthermore, as a result of a voluntary contribution made by the United States, in 2025 the EMP was able to expand its data collection responsibilities to the collection of morphometric data of tropical tunas and prioritized bycatch species during the unloading of Class-6 purse seine vessels in Manta, and in Mazatlan, Mexico. As of December 31, the lengths and weights of 22,655 individuals have been measured (10,010 yellowfin tuna (YFT), 1,918 bigeye tunas, 9,545 skipjack tunas (SKJ) and 1,182 from bycatch species). The

sampling will continue as part of the Integrated Port Sampling Program (IPSP) through at least 2026 (SAC-17-04), and data collected will be analyzed to further update and strengthen the morphometric relationships for both tropical tunas and prioritized bycatch species, while also providing robust insight into temporal and spatial variability in those relationships.

Finally, port-sampling data collected by the EMP have significantly contributed to scientific studies in support of management, such as the development of the sampling protocol for fleet-level catch estimation being implemented in 2026 by the IPSP.

1. BACKGROUND

Resolution C-24-01 includes a management measure, directed at decreasing the fishing mortality on bigeye tuna (BET) by encouraging vessels to avoid sets where large amounts of BET are present, which is based on individual-vessel catch thresholds (IVTs). This measure established the Enhanced Monitoring Program (EMP) as a science-based support tool, responsible for the implementation of data collection during catch unloading in port. The port-sampling data collected by the EMP were used to estimate the BET catch, by trip, for trips of vessels sampled by the EMP, as well as a measure of precision on those estimates. The EMP began sampling of trips of prioritized Class-6 purse-seine vessels, in both Manta and Posorja, Ecuador in March 2023, and 2025 marks the third year of the program.

This document presents results of the EMP for 2025 and provides information about scientific research using EMP data carried out by the scientific staff. Section 2 outlines the data collection and BET catch estimation processes conducted by the EMP in 2025. Section 3 presents a summary of scientific research carried out by the scientific staff to date that uses data collected by the EMP. Section 4 reports on trip-level BET catch estimation starting in 2026, with the use of a model based on well-level relationships between species composition estimates from port-sampling data and observer data. Section 5 provides information about morphometric sampling carried out by the EMP in 2025 for the the improvement of length-weight relationships of the three main tropical tuna species.

2. RESULTS OF THE ENHANCED MONITORING PROGRAM IN 2025

2.1. Data collection

Between January and December 2025, the EMP sampled 43 fishing trips of 19 purse-seine vessels from the fleets of Ecuador, Nicaragua, Panama and the EU (Spain). For 12 of these vessels, at least two trips were sampled (Figure 1). The number of trips sampled for each vessel varied, based on several factors, such as the frequency with which the vessel unloaded in ports where the EMP operates and the availability of sampling technicians at the time of unloading.

The selection of trips for sampling was based on the extent to which fishing activity during a trip involved set types and areas that were considered a priority for data collection ([SAC-14-10](#)), where wells with catch from floating-object (OBJ) sets made in the western area of the EPO (west of 95°W; OBJ OFF and OBJ IN-west strata) (Figure 2) were top priority. In total, the EMP sampled 382 wells in 2025.

2.2. Estimates of BET catch per trip and their coefficients of variation

The BET catch estimates for trips sampled by the EMP were obtained using the methodology described in document [SAC-14-10](#). For each trip this involved obtaining an estimate of the BET catch for each stratum of the trip, and summing those estimates to obtain the trip-level estimate. For strata of the trip that were not sampled by the EMP, estimates from the observer Set Summary data, also known as Resumen De Lances (RDL) in Spanish, were used. For 81% of the sampled trips for which a trip-level coefficient of

variation could be computed (34 out of 42¹), the trip-level BET estimate was based entirely (14 trips), or almost entirely (20 trips²), on the species composition obtained from EMP data (Figure 3). For the remaining 19%, the RDL species composition data had to be used more extensively due to a higher number of strata per trip that could not be sampled by the EMP (Figure 3).

BET catch estimates per trip for the 43 trips sampled in 2025 ranged from 1 to 689 t. Comparing the 2025 estimates with those obtained for 2023 (March – December) and 2024, a decreasing temporal trend in the estimates can be seen in the latter part of all three years (from about August onwards), although the estimates at the end of 2024 and 2025 were lower than those at the end of 2023 (Figure 4). While the highest BET catch estimates tended to occur prior to August in all three years, the estimates at the beginning of 2025 were more similar to those at the beginning of 2023 than 2024; BET estimates at the beginning of 2024 were relatively low.

The coefficients of variation (CV³) obtained for the 2025 trip-level BET catch estimates ranged from 0.09 to 0.87, with median of 0.25. When analyzing the CVs of the estimates since the beginning of the program in March 2023, the overall median is 0.23. Similar to 2023 and 2024, the 2025 CVs showed an increase in the latter part of the year (Figure 5). This increase coincides with considerably lower BET catches estimates during that time period (Figure 4). The higher CVs on lower estimated BET catches are the result of greater variability in the proportion of BET among the sampled wells for individual trips (examples of this for 2023 were presented in [SAC-15 INF-H](#)). Overall, the CVs obtained in 2025 are consistent with what was anticipated based on results of simulations run last year by the scientific staff ([SAC-15 INF-H](#)).

3. SCIENTIFIC RESEARCH BASED ON EMP DATA

The port-sampling data collected by the EMP have significantly expanded research opportunities for the scientific staff to improve science to support management. In addition to the use of EMP data for estimation of BET catch per trip, the EMP data are making possible studies aimed at maximizing the scientific benefits of other existing data sources for estimating fleet-level catch of all three tropical tuna species.

3.1. BET catch estimates per trip from other data sources

In addition to the EMP data, the scientific staff has access to BET catch per trip data from three primary sources: the AIDCP observer program, fishing logbooks, and canneries (processing plants). These data are made available to CPCs through a webpage on the IATTC website ([BET Totals](#)), where BET catch estimates per trip from available primary data sources are presented for Class 4 – 6 vessels under their flag. For 2025, 100% of trips from Class-6 vessels had observer data, thanks to the AIDCP on-board observer program. Information from fishing logbooks was available for 62% of all Class 4 – 6 trips. In the case of data from canneries, the IATTC database, as of 15 January 2026, contained information for 38% of the trips made in 2025 (Table 1). The trip-level BET catch estimates from the three primary data sources showed a similar temporal trend in 2025 to that of the EMP estimates (Figure 6 (a-c)). For each of the three primary data sources, there were some trips with estimates very similar to those of the EMP, and others with estimates outside the 95% confidence intervals on the EMP estimates, either above or below the confidence interval bounds.

¹ Not included in this calculation is one trip for which it was not possible to make trip-level CV estimates. For this trip, it was not possible to obtain a representative sample of wells for the trip for logistical reasons. As a result, the EMP data were used to make estimates of BET in the individual wells that were sampled and the observer RDL data were used to make estimates of BET in the other wells of the trip.

² For these trips, 90% - 99% of their catch was from EMP-sampled strata.

³ Methodology used to compute the CVs can be found in Appendix B of SAC-15 INF-H.

A positive correlation was found between the EMP estimates and those of the three primary data sources (Figure 7). For 2025, there was a tendency for observer estimates to be greater than the EMP estimates for the same trips, while the pattern between cannery estimates and EMP estimates shows better agreement. These tendencies are also apparent in Figure 6. Similar patterns between EMP and observer estimates, and EMP and cannery estimates, were seen for 2024 (Figure 7). To statistically assess the 2025 relationships, simple linear regression models were fitted to the paired trip-level estimates using weighted least squares, with weights equal to the inverse of the variance of the EMP estimates, to mitigate the impact of less precise EMP estimates on the fitted relationship. The estimated slopes for the three linear relationships for 2025—each with a p-value < 0.001—are as follows: 0.35 (s.e. = 0.049) for EMP vs. observer; 0.84 (s.e. = 0.072) for EMP vs. cannery; and 0.35 (s.e. = 0.061) for EMP vs. fishing logbook (Figure 7). Although statistical comparison of the slopes of the three linear relationships is feasible, interpreting the results is complicated by the fact that the scientific staff did not have logbook estimates for about 25% of the 42 trips⁴ at the time the analysis was conducted.

3.2. Research for improvement of fleet-level species catch estimation

Improvements to data collection for fleet-level catch estimation ([SAC-16-05](#)) have been possible thanks to lessons learned during the development of the EMP trip-level sampling protocol. Scientific research related to the development of the EMP trip-level sampling protocol for OBJ-set wells identified several potential areas of improvement for the Traditional Port Sampling (TPS) protocol for fleet-level catch estimation, for all three species. This work resulted in the developed of a new sampling protocol for fleet-level species catch estimation that is being implemented by the IPSP starting 2026 ([SAC-17-04](#)). The IPSP sampling protocol minimizes the opportunistic aspects of the TPS protocol, while increasing flexibility in trip and well selection and increasing within-well coverage of OBJ-set wells.

4. BET TRIP-LEVEL CATCH ESTIMATION IN 2026

In 2025, the scientific staff developed a model for the well-level relationship between species composition estimates from port-sampling data and catch data collected by observers ([SAC-16 INF-1](#)). This statistical model was developed using EMP data from OBJ-set wells of prioritized vessels. Starting in 2026, the staff will use a model of this type to provide BET trip-level catch estimates for prioritized vessels in support of the IVT measure, as required in [Resolution C-25-01](#). Because the within-well sampling protocol of the IPSP for OBJ-set wells is the same as that used by the EMP during 2023 to 2025, generating the same high-quality port-sampling data, the model will be based on a combined EMP and IPSP data set. The trip-level estimates will also include estimated BET catch for NOA-set wells. The trip-level estimates and details of the estimation methodology will be available on the IATTC website.

5. MORPHOMETRIC SAMPLING

The collection of morphometric measurements to refine length-weight, length-length, and weight-weight relationships for the three tropical tuna species and prioritized bycatch species has been implemented in Manta, Ecuador, and Mazatlan, Mexico, with support from an additional voluntary financial contribution from the United States. Development of the sampling strategy and protocols began in the fourth quarter of 2024, with a key focus on ensuring broad spatial and temporal coverage across the active fishery (Figure 8). Initial sampling trials in Manta, Ecuador, during November and December 2024 identified protocol shortcomings, which were subsequently addressed to enhance data collection. Full scale sampling began on schedule on January 9, 2025.

By the end of 2025, samples had been collected from 469 wells across 188 fishing trips of class-6 purse-seine vessels, covering 14 of the 18 spatial areas (Figure 9). These efforts have resulted in the collection

⁴ Not included in this calculation is the trip for which it was not possible to make a trip-level CV estimate.

of data from 10,010 YFT, 1,918 BET, and 9,545 SKJ, along with 1,219 measurements from 23 bycatch species (Table 2). Preliminary plots illustrating the length-weight relationships for YFT, BET, and SKJ are presented in Figures 10 (a–c), while Figures 11 (a–c) depict the relationship between straight fork-length and curved fork-length.⁵ Ongoing sampling efforts are expected to further strengthen these relationships for both tropical tunas and prioritized bycatch species, also providing robust insights into temporal and spatial variability.

6. ACKNOWLEDGMENTS

The authors would like to give special thanks to the EMP team Jennifer Aguilar, Grace Álvarez, Iván Borbor, Carlos Bravo, Jairon Cabrera, Grecia Cedeño, Luis Chompoy, David Crespo, Pablo Delgado, Jonathan Gaibor, Juan Galarza, Jessenia Gilces, José Guillén, Richard Lindao, Javier Mejía, James Méndez, Diego Montehermoso, Andrea Montenegro, Marcos Muñoz, Luis Ortiz, Darío Quimi, Shanelka Quiñonez, Alex Santana, Diego Ureta, Wellington Vásquez, Víctor Vincés, Ledin Vizueta, Robinson Zambrano, Tommy Zamora and Alisson Zúñiga in Ecuador, and Fabián Bejarano and Emmanuel Herrera in Mexico; to the staff of the field office in Manta, Playas and Mazatlán; to the national observer programs; and to the fishing industry and national fisheries authorities for their support in the implementation of the program.

⁵ Straight fork-length (SFL) is measured from the tip of the snout to the fork in the tail using a rigid measuring stick with calipers. Curved fork-length (CFL) is measured from the tip of the snout following the curve of the body to the fork in the tail using a flexible measuring tape.

TABLE 1. Information available by trip from the main data sources (logbook, cannery and observer) for trips made in 2025 by Class 4-6 vessels (as of January 15, 2026).

TABLA 1. Información disponible por viaje de las fuentes de datos primarias (bitácoras, enlatadoras y observadores) de los viajes realizados en 2025 por buques clases 4-6 (al 15 de enero del 2026).

Vessel class	2025 trips	Logbook		Cannery		Observer	
		Trips	%	Trip	%	Trip	%
4	126	96	76%	20	16%	50	40%
5	160	121	76%	54	34%	129	81%
6	1,123	663	95%	457	41%	1123	100%
TOTAL	1,409	880	62%	531	38%	1302	92%

TABLE 2. Numbers of morphometric measurements collected by species, from three eastern Pacific ports (Manta, Mazatlan, and Posorja). Species are identified by three-letter codes: BET (Bigeye Tuna), YFT (Yellowfin Tuna), SKJ (Skipjack Tuna), BKJ (Black Skipjack), FRI (Frigate Tuna), FRZ (Bullet Tuna), DOL (Dolphinfish/Mahi-mahi), WAH (Wahoo), and PLS (Pelagic Stingray).

TABLA 2. Número de medidas morfométricas recolectadas por especie, en tres puertos del Pacífico oriental (Manta, Mazatlán y Posorja). Las especies se identifican por códigos de tres letras: BET (atún patudo), YFT (atún aleta amarilla), SKJ (aún barrilete), BKJ (barrilete negro), FRI (Melva), FRZ (Melvera), DOL (Dorado/Mahi-mahi), WAH (Peto), y PLS (Raya látigo violeta).

Species	Manta	Mazatlan	Posorja	Total
BET	1,607	311		1,918
YFT	3,571	6,439		10,010
SKJ	6,233	3,312		9,545
BKJ	89	85		174
FRI	15	93		108
DOL	326	10	3	339
WAH	97	1	4	35
PLS	3	97		22
RRU	124	51	8	183
TOTAL	12,065	10,399	15	22,334

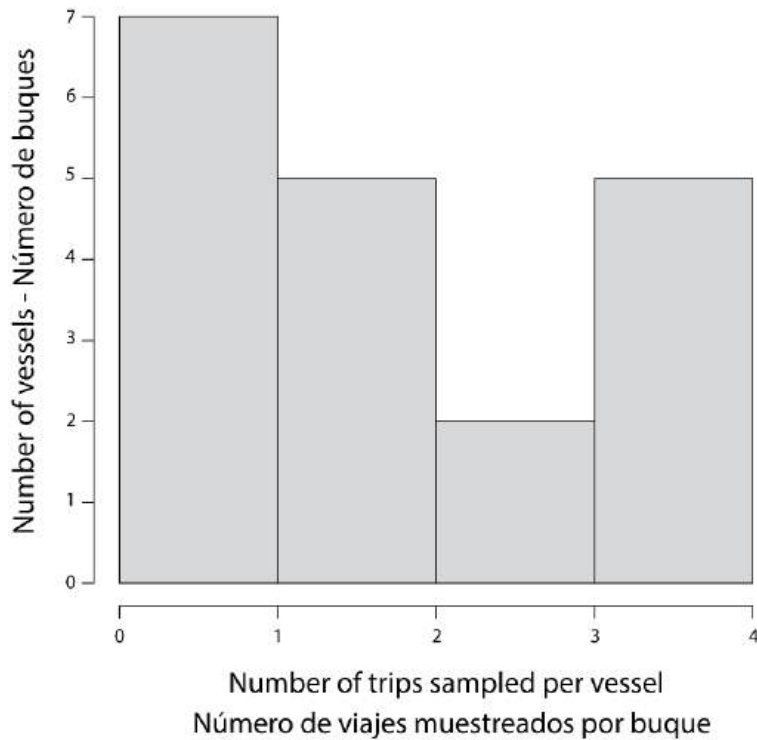


FIGURE 1. Number of trips sampled per vessel for the 43 trips sampled by the EMP in 2025.
FIGURA 1. Número de viajes muestreados por buque para los 43 viajes muestreados por el PRM en 2025.

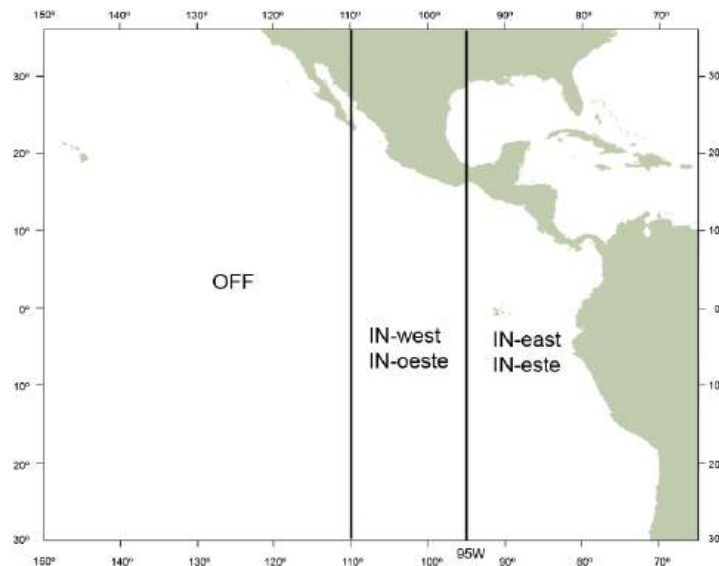
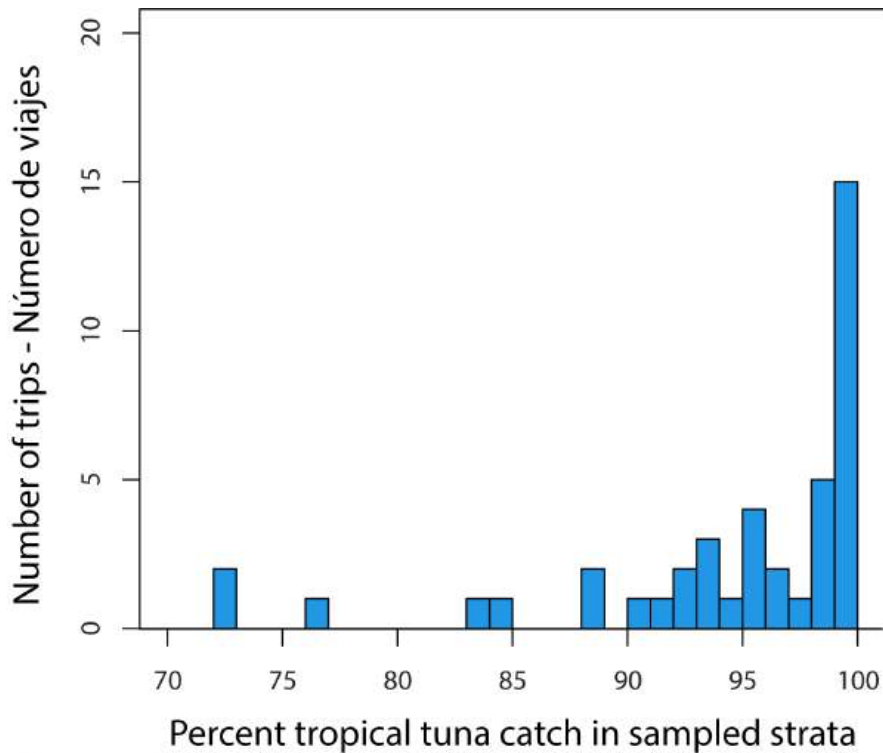


FIGURE 2. Fishing areas established by the EMP for estimates of BET catch per trip. OFF: sets made west of 110°W; OBJ IN-west: sets made between 110°W and 95°W; OBJ IN-east: sets made east of 95°W. The combination of the catch area and the set type used (NOA, OBJ or DEL) defines the strata established by the EMP.

FIGURA 2. Áreas de pesca establecidas por el PRM para las estimaciones de captura de BET por viaje. OFF: lances realizados al oeste de 110°O; OBJ IN-oeste: lances realizados entre 110°O y 95°O; OBJ IN-este: lances realizados al este de 95°O. La combinación del área de captura y el tipo de lance empleado (NOA, OBJ o DEL) define los estratos establecidos por el PRM.



Porcentaje de captura de atunes tropicales en estratos muestreados

FIGURE 3. Frequency distribution of the percentage of tropical tuna catch of a trip that was present in the EMP-sampled strata for the trip (tropical tuna catch obtained from sets made outside the EPO is not considered in this figure; wells with catch from outside the EPO were not sampled by the EMP and did not factor into the EMP estimation). Not included are the data of one trip (out of 43) for which it was not possible to make trip-level CV estimate.

FIGURA 3. Distribución de frecuencia del porcentaje de captura de atunes tropicales, por viaje, presente en los estratos muestreados por el PRM (la captura de atunes tropicales obtenida de lances realizados fuera del OPO no fue considerada en esta figura; bodegas con capturas realizadas fuera del OPO no fueron muestreadas y por tanto no fueron un factor en las estimaciones del PRM). No se incluyen los datos de un viaje (del total de 43) para el que no fue posible realizar estimación de CV a nivel de viaje.

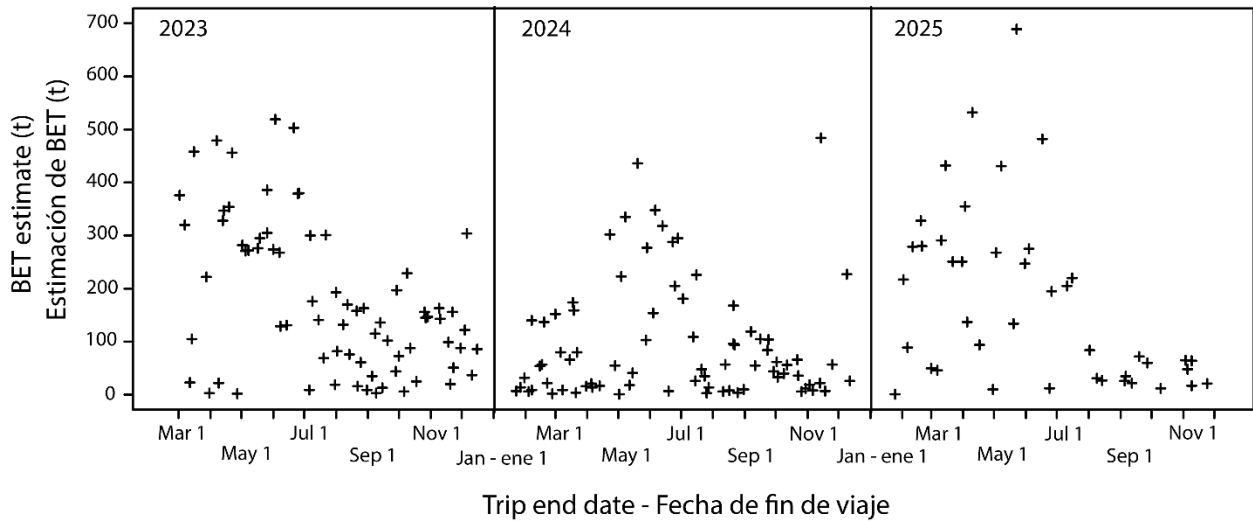


FIGURE 4. Trip-level estimates of BET catch (in metric tons), ordered according to the date of the end of the trip, between March 2023 and December 2025. Every cross symbol represents an individual trip. For any trip with strata that were not sampled by the EMP, the RDL estimate of BET, by stratum, was added to the EMP estimates for sampled strata to obtain the trip estimate. Not shown are the data of five trips (two in 2023, two in 2024 and one in 2025, out of a total 198 trips) for which it was not possible to make trip-level CV estimates.

FIGURA 4. Estimaciones de captura de BET a nivel de viaje (en toneladas métricas), ordenadas según la fecha de finalización del viaje, entre marzo de 2023 y diciembre de 2025. Cada símbolo de cruz representa un viaje individual. Para cada viaje con estratos que no fueron muestreados por el PRM, la estimación de BET del RDL, por estrato, fue incluido a la estimación de estratos muestreados por el PRM para obtener la estimación a nivel de viaje. No se incluyen los datos de cinco viajes (dos en 2023, dos en 2024 y uno en 2025, de un total de 198 viajes) para los que no fue posible realizar estimaciones de CV a nivel de viaje.

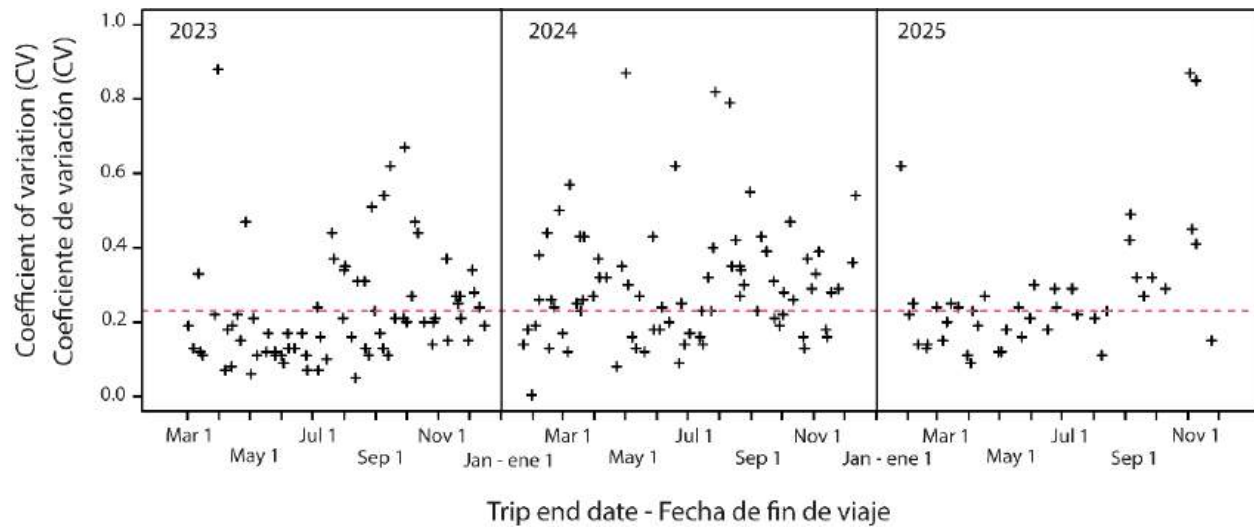


FIGURE 5. Coefficient of variation (CV) of BET catch estimates per trip sampled between January 2023 and December 2025. Each cross symbol represents a sampled trip. The red dashed line indicates the overall median CV value of 0.23. Not shown are the data of five trips (two in 2023, two in 2024 and one in 2025, out of a total 198 trips) for which it was not possible to make trip-level CV estimates.

FIGURA 5. Coeficiente de variación (CV) de las estimaciones de captura de BET por viaje muestreado entre enero de 2023 y diciembre de 2025. Cada símbolo de cruz representa un viaje muestreado. La línea discontinua roja indica el valor mediano global de CV de 0.23. No se incluyen los datos de cinco viajes (dos en 2023, dos en 2024 y uno en 2025, de un total de 198 viajes) para los que no fue posible realizar estimaciones de CV a nivel de viaje.

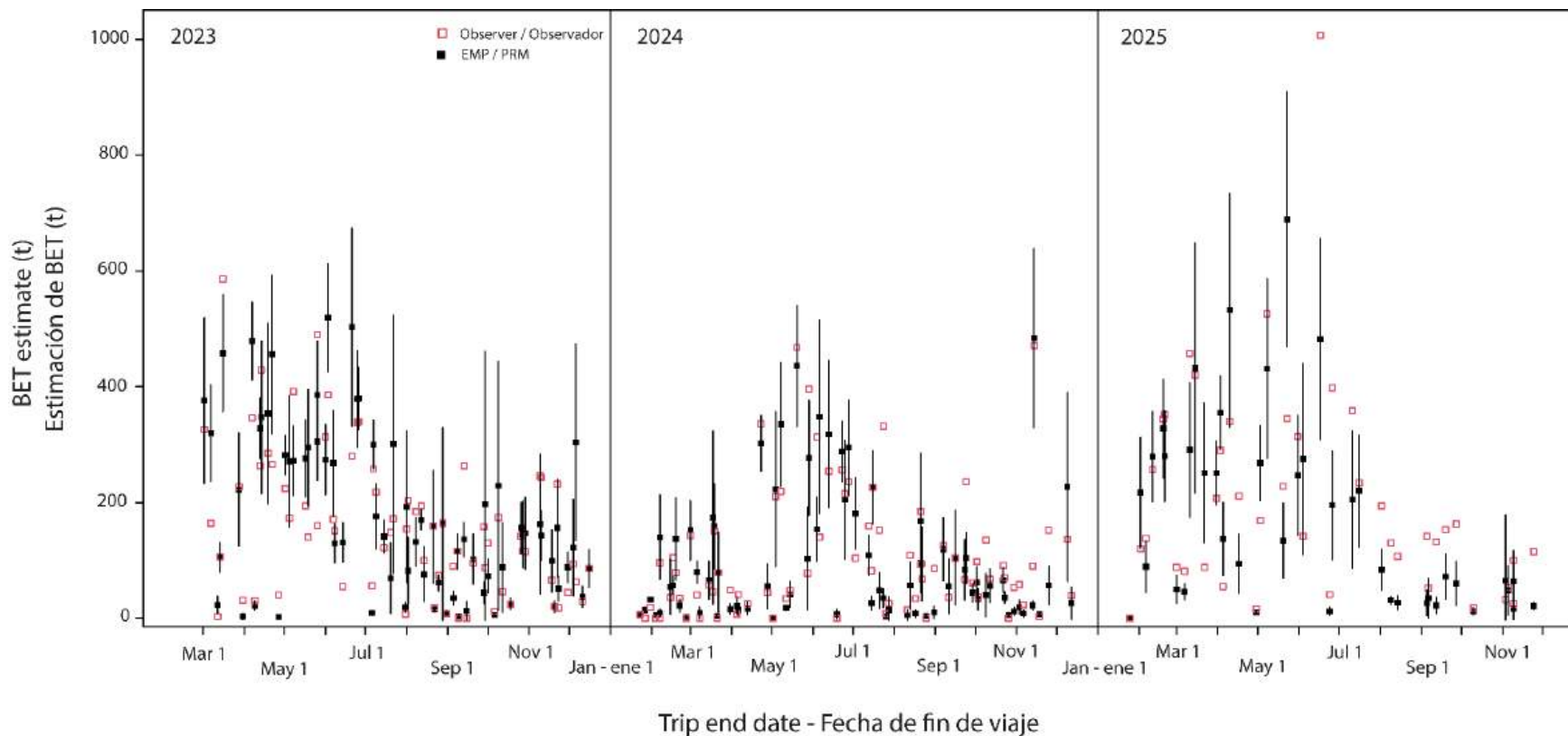


FIGURE 6a. Estimated BET catch (in metric tons), by trip, for the EMP (black filled squares; vertical bars are the 95% confidence intervals), along with estimates from observers (RDL; open red squares). Estimates shown in this figure were obtained from the IATTC web page on March 31 2026. The number of trips shown is 193. Not shown are the data of five trips (two in 2023, two in 2024 and one in 2025) for which it was not possible to make trip-level CV estimates.

FIGURA 6a. Estimación de captura de BET (en toneladas métricas), por viaje, para el PRM (cuadrados negros; las barras verticales son los intervalos de confianza del 95%), junto con las estimaciones de observadores (RDL; cuadrados rojos huecos). Las estimaciones mostradas en esta figura se obtuvieron de la página web de la CIAT el 31 de marzo de 2026. Se muestran 193 viajes No se incluyen los datos de cinco viajes (dos en 2023, dos en 2024 y uno en 2025) para los que no fue posible realizar estimaciones de CV a nivel de viaje.

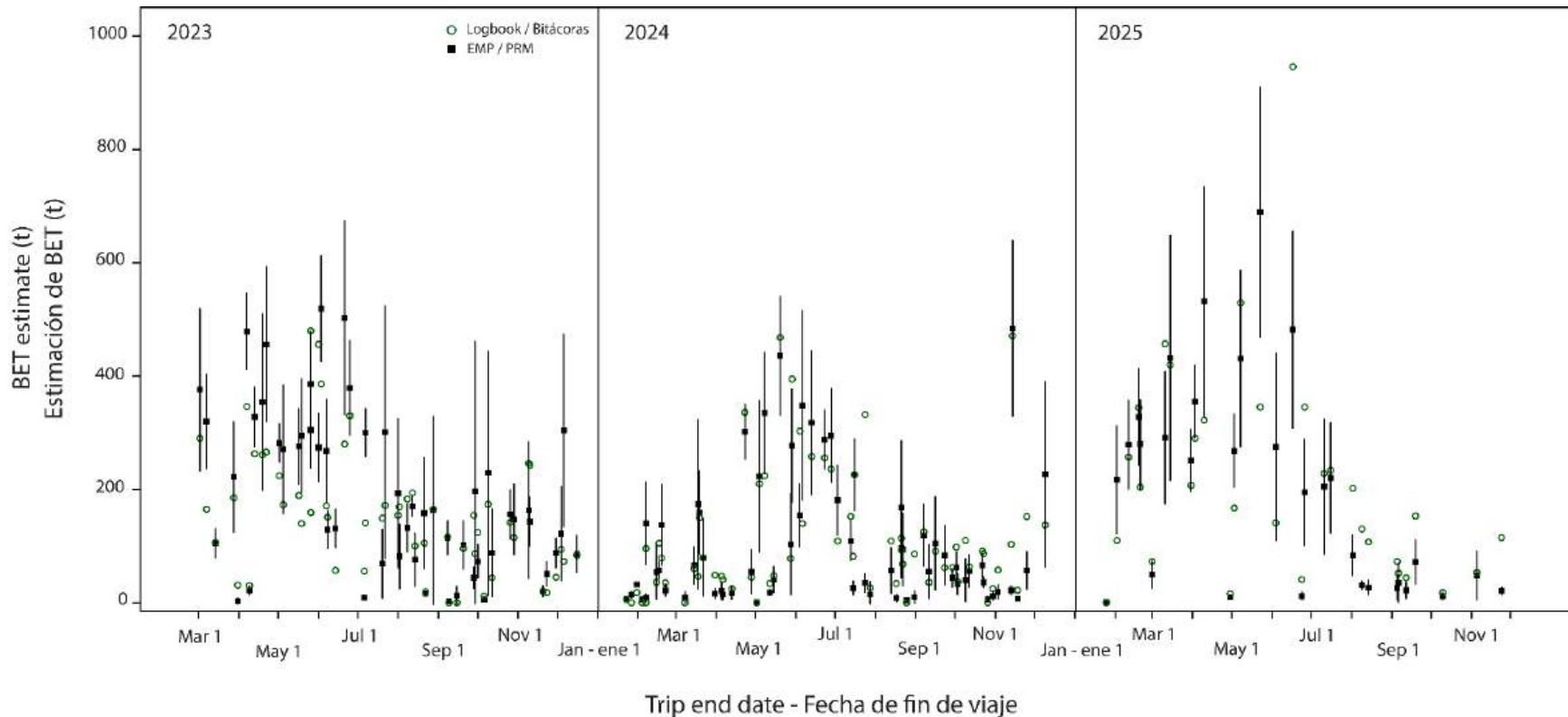


FIGURE 6b. Estimated BET catch (in metric tons), by trip, for the EMP (black filled squares; vertical bars are the 95% confidence intervals), along with estimates from logbooks (open green circles). Estimates shown in this figure were obtained from the IATTC web page on March 31 2026. The number of trips shown is 152. Not shown are the data of five trips (two in 2023, two in 2024 and one in 2025) for which it was not possible to make trip-level CV estimates.

FIGURA 6b. Estimación de captura de BET (en toneladas métricas), por viaje, para el PRM (cuadrados negros; las barras verticales son los intervalos de confianza del 95%), junto con las estimaciones de bitácoras (círculos verdes huecos). Las estimaciones mostradas en esta figura se obtuvieron de la página web de la CIAT el 31 de marzo de 2026. Se muestran 152 viajes. No se incluyen los datos de cinco viajes (dos en 2023, dos en 2024 y uno en 2025) para los que no fue posible realizar estimaciones de CV a nivel de viaje.

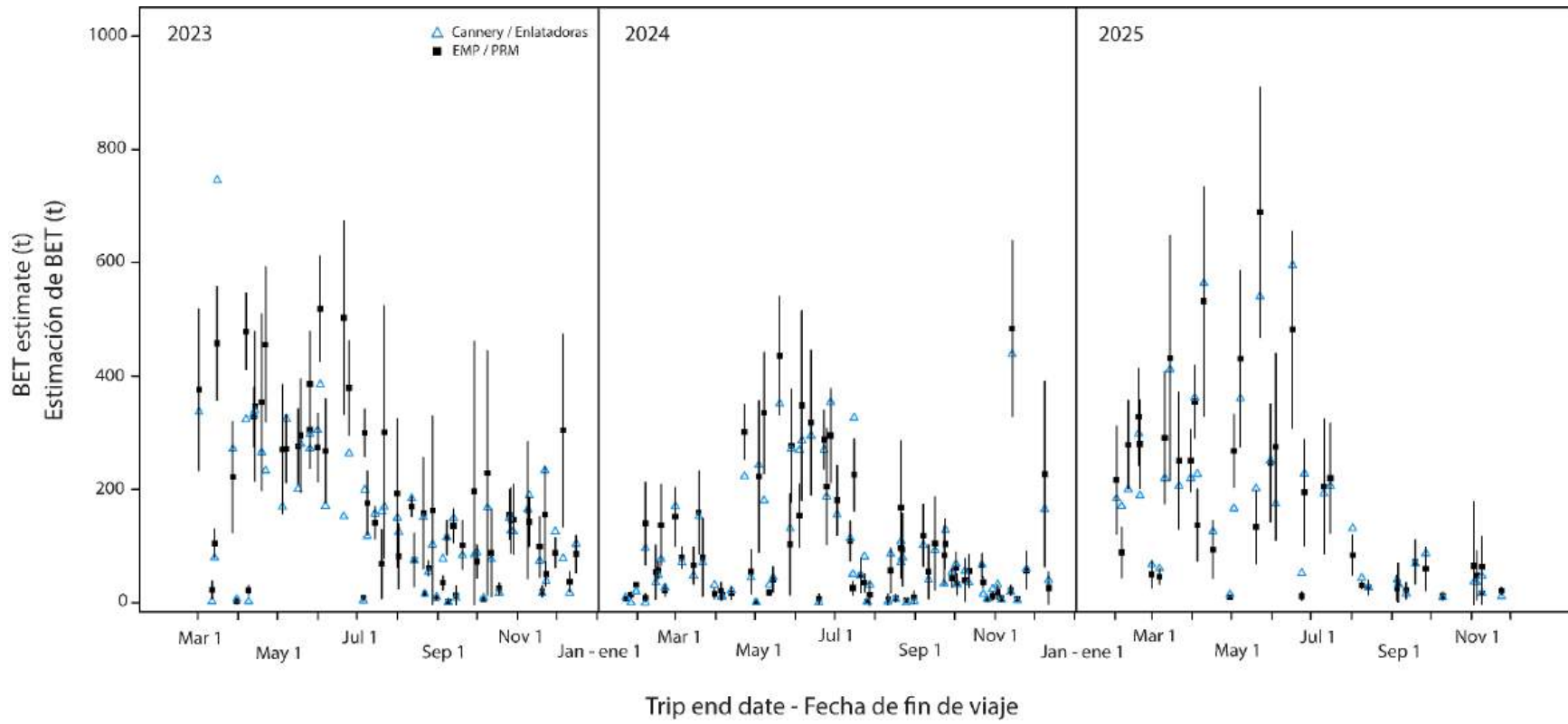


FIGURE 6c. Estimated BET catch (in metric tons), by trip, for the EMP (black filled squares; vertical bars are the 95% confidence intervals), along with estimates from canneries (open blue triangles). Estimates shown in this figure were obtained from the IATTC web page on March 31 2026. The number of trips shown is 177. Not shown are the data of five trips (two in 2023, two in 2024 and one in 2025) for which it was not possible to make trip-level CV estimates.

FIGURA 6c. Estimación de captura de BET (en toneladas métricas), por viaje, para el PRM (cuadrados negros; las barras verticales son los intervalos de confianza del 95%), junto con las estimaciones de enlatadoras (triángulos azules huecos). Las estimaciones mostradas en esta figura se obtuvieron de la página web de la CIAT el 31 de marzo de 2026. Se muestran 177 viajes. No se incluyen los datos de cinco viajes (dos en 2023, dos en 2024 y uno en 2025) para los que no fue posible realizar estimaciones de CV a nivel de viaje.

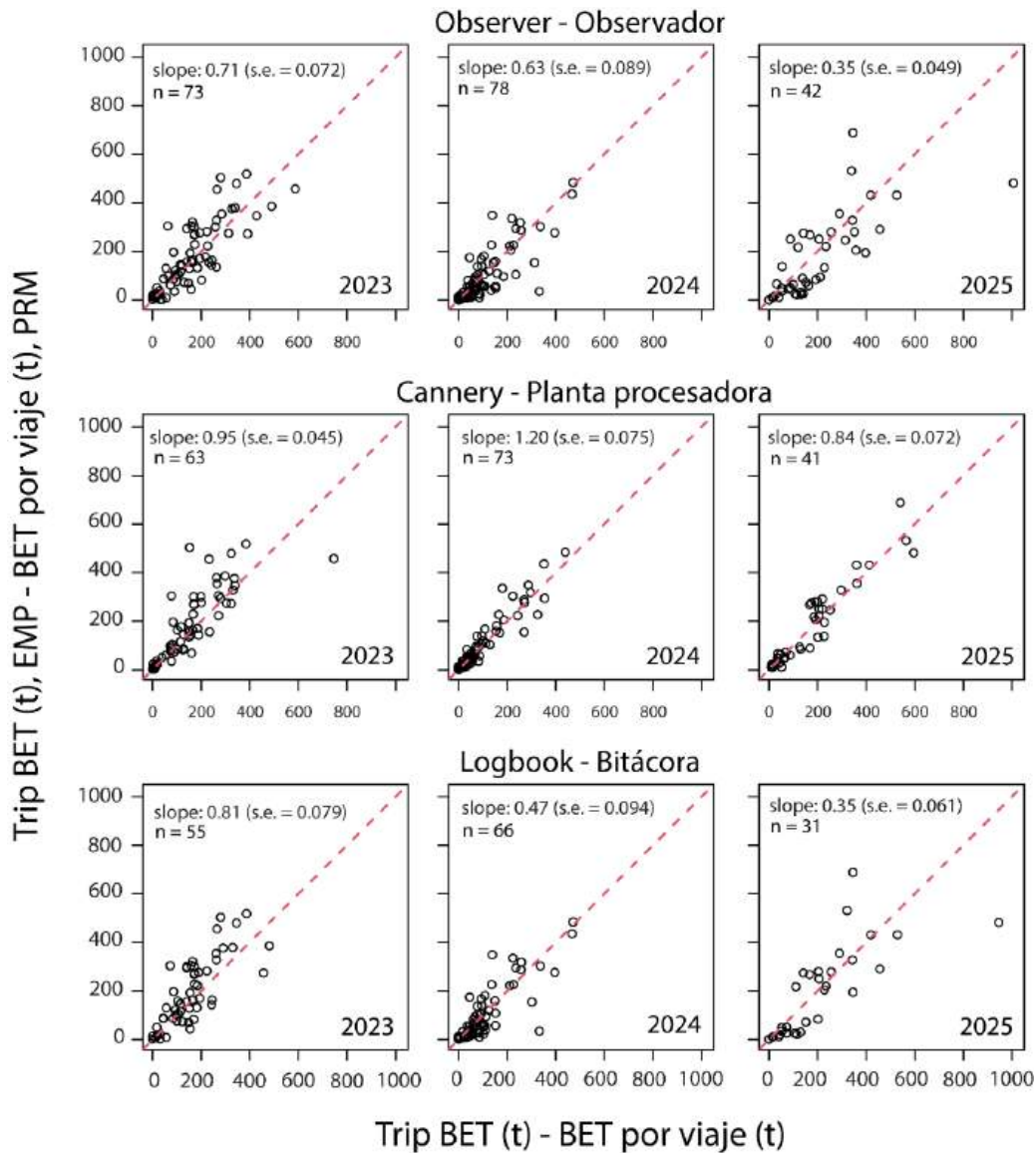


FIGURE 7. BET catch estimates (in metric tons), by trip, from the EMP versus estimates from the other three data sources, where available (observer: top row; cannery: middle row; logbook: bottom row), by year. Each open circle is an individual trip. “slope”: slope estimate for the relationship (based on weighted least squares, with variance on the EMP estimates used as weights). “s.e.”: standard error on the estimated slope. “n”: number of trips shown in each plot. The red dashed line is the 1-to-1 line. Not included in the figure are the five trips for which it was not possible to make trip-level CV estimates. Estimates shown in this figure were obtained from the IATTC web page on March 31, 2026.

FIGURA 7. Estimaciones de captura de BET (en toneladas métricas), por viaje, del PRM versus estimaciones de las otras tres fuentes de datos, conforme a su disponibilidad (observadores: fila superior; enlatadoras: fila media; bitácoras: fila inferior), por año. Cada círculo hueco es un viaje individual. “pendiente”: pendiente estimada para la relación (basado en mínimos cuadrados ponderados, con la varianza de las estimaciones del PRM utilizada como peso). “s.e.”: error estándar de la pendiente estimada. “n”: número de viajes mostrados en cada gráfico. La línea discontinua roja es la línea 1 a 1. No se incluyen los datos de cinco viajes para los que no fue posible realizar estimaciones de CV a nivel de viaje. Las estimaciones mostradas en esta figura se obtuvieron de la página web de la CIAT el 31 de marzo de 2026.

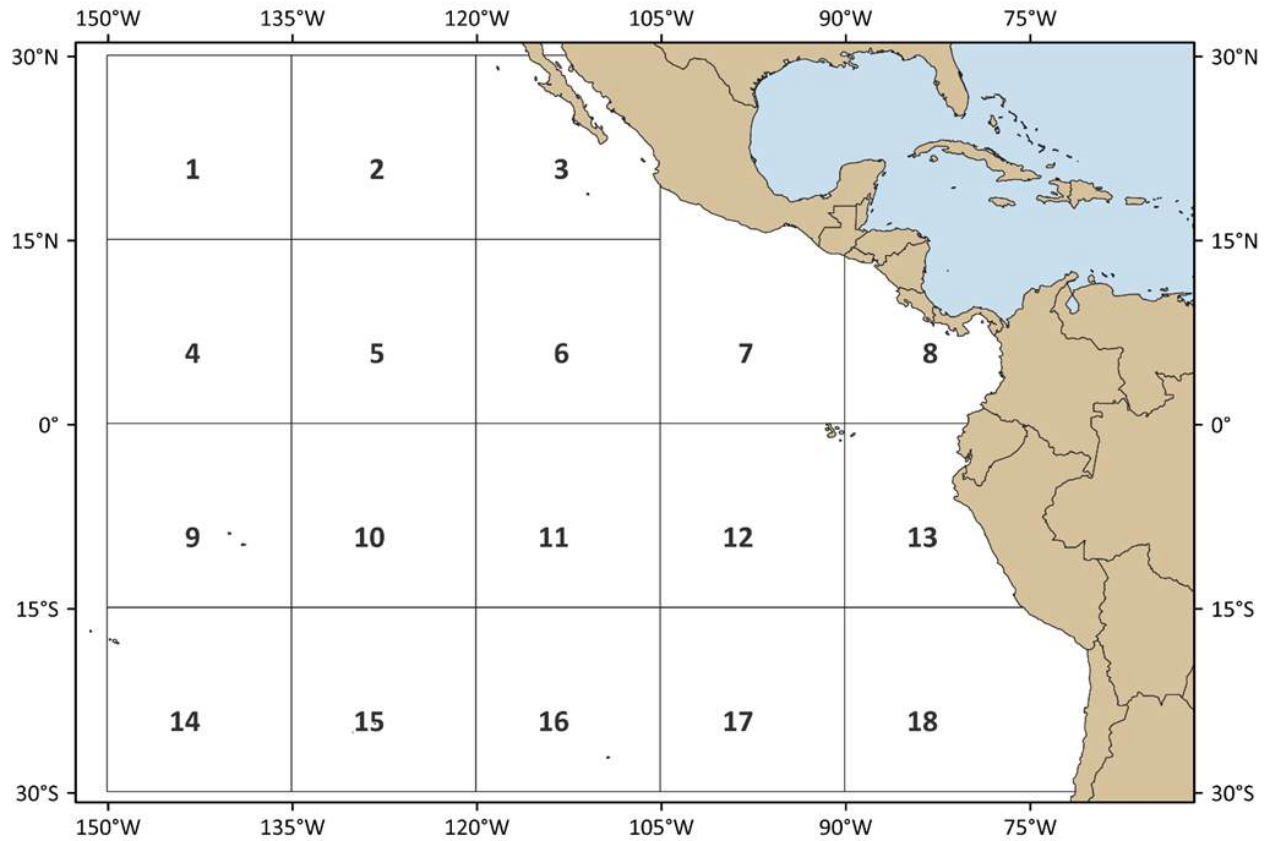


FIGURE 8. Designated areas for morphometric sampling in 2025. Each area is approximately 15° x 15° and was established to guide the prioritization of sampling efforts.

FIGURA 8. Áreas designadas para el muestreo morfométrico en 2025. Cada área es de aproximadamente 15° x 15° y fueron establecidas para orientar la priorización de los esfuerzos de muestreo.

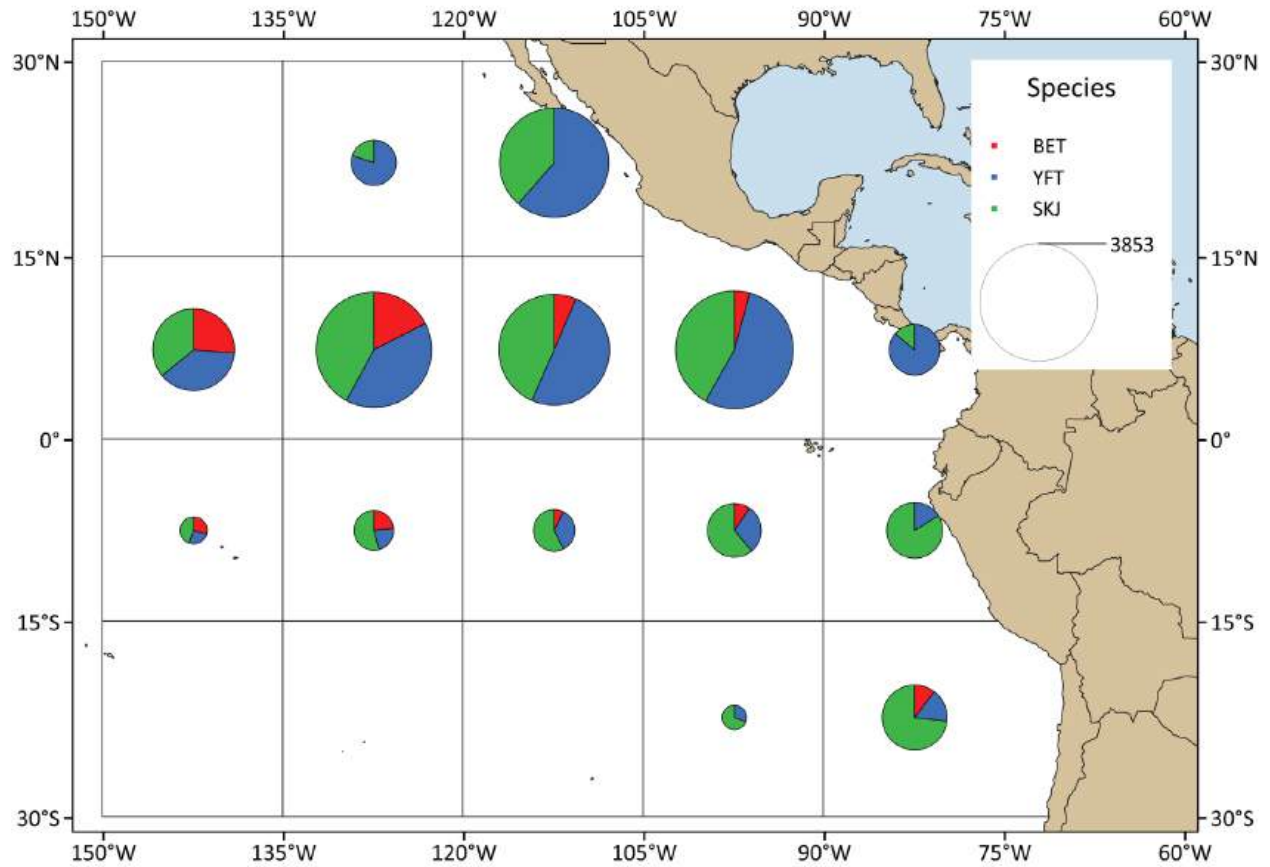


FIGURE 9. Distribution of morphometric measurements collected from bigeye (BET), yellowfin (YFT), and skipjack (SKJ) tunas, aggregated across all set types, between January 9 and December 31, 2025.

FIGURA 9. Distribución de las medidas morfométricas recolectadas de atunes patudo (BET), aleta amarilla (YFT) y barrilete (SKJ), agrupadas en todos los tipos de lance, entre el 9 de enero y el 31 de diciembre de 2025.

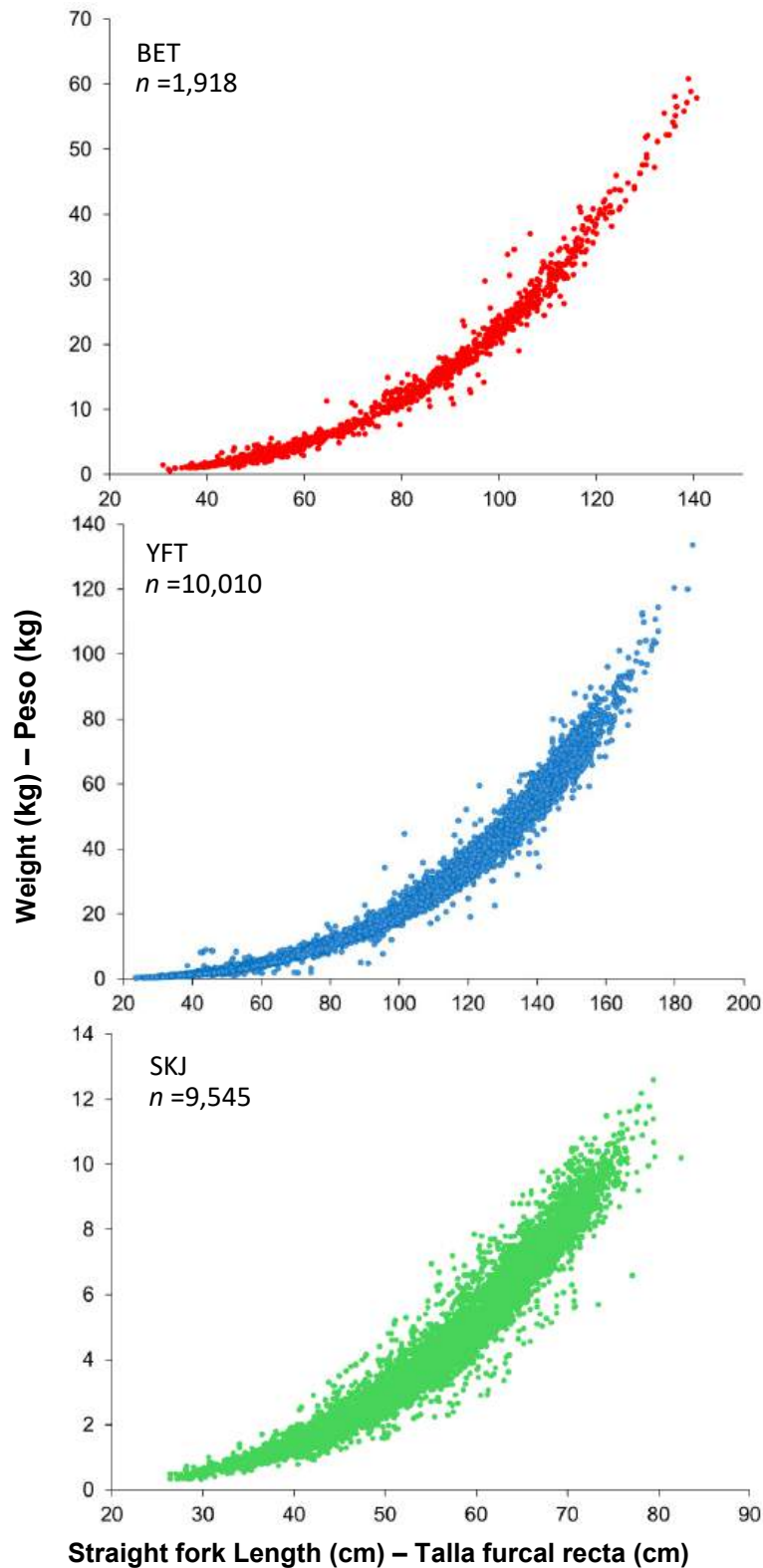


FIGURE 10. Relationship between length and weight for: bigeye (BET), yellowfin (YFT), and skipjack tunas (SKJ) collected by morphometric sampling teams in Manta, Ecuador, and Mazatlan, Mexico, between January 9 and December 31, 2025.

FIGURA 10. Relación entre talla y peso para: atunes patudo (BET), aleta amarilla (YFT) y barrilete (SKJ) recolectados por equipos de muestreo morfométrico en Manta, Ecuador, y Mazatlán, México, entre el 9 de enero y el 31 de diciembre de 2025.

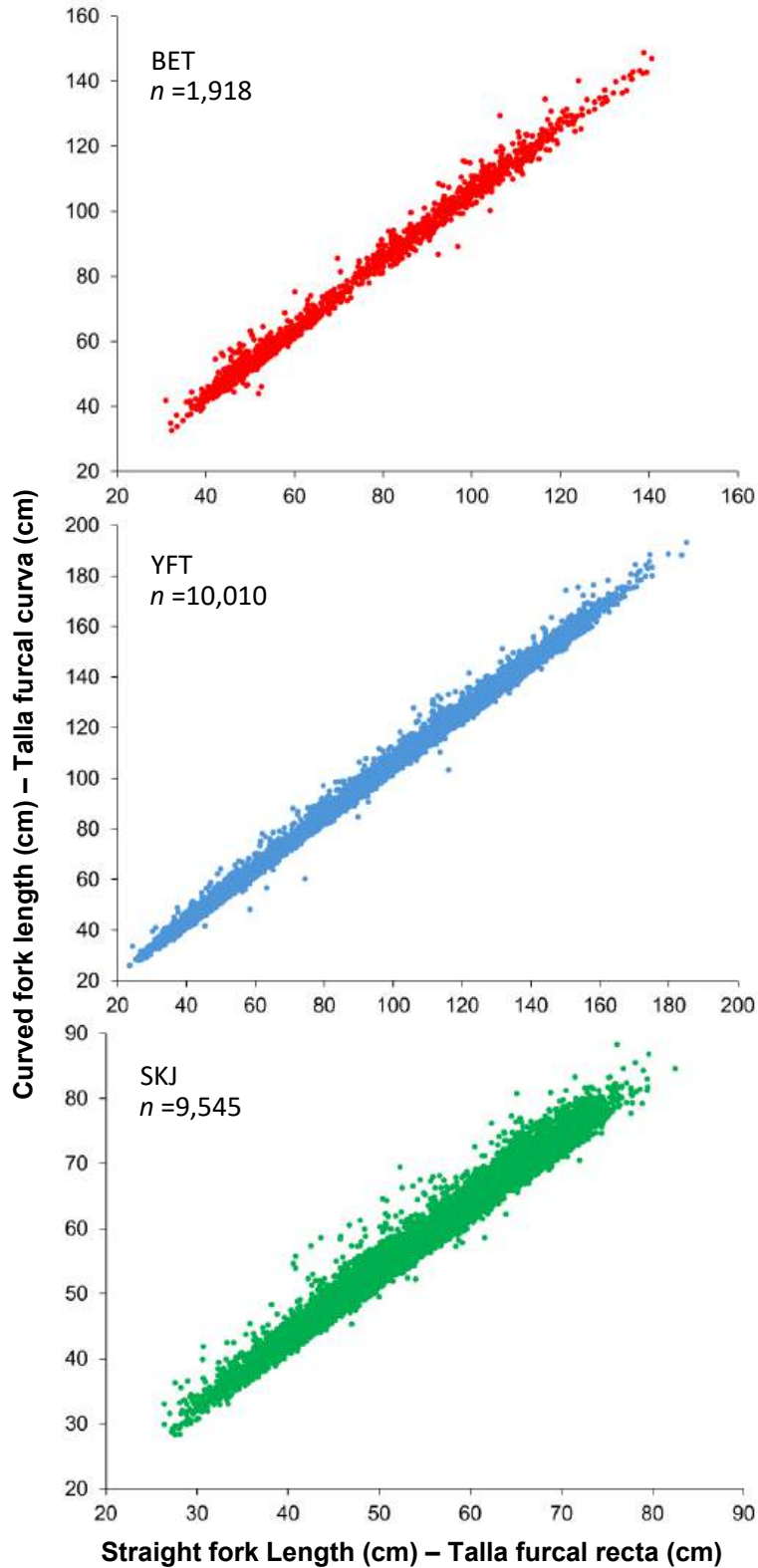


FIGURE 11. Relationship between straight fork length and curved fork length for bigeye (BET), yellowfin (YFT), and skipjack tunas (SKJ) collected by morphometric sampling teams in Manta, Ecuador, and Mazatlan, Mexico, between January 9 and December 31, 2025.

FIGURA 11. Relación entre la talla furcal recta y la talla furcal curva de los atunes patudo (BET), aleta amarilla (YFT) y barrilete (SKJ) recolectados por equipos de muestreo morfométrico en Manta, Ecuador, y Mazatlán, México, entre el 9 de enero y el 31 de diciembre de 2025.