STATISTICS ON TUNA SURFACE FISHERY'S BYCATCH LANDED IN ABIDJAN, CÔTE D'IVOIRE, FOR THE 1982-2009 PERIOD

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SUMMARY

This document updates the total series of landings sold as "faux poisson" on the local market at Abidjan, Côte d'Ivoire, since 1982. This local market concerns major tunas that are rejected by canneries, undersize and little tunas (skipjack, bullet tuna, yellowfin, bigeye, little tunny) and also appreciated species caught as by-catch such as marlin, sailfish, wahoo, dolphinfish, barracuda, triggerfish and shark. Based on this indicator, some comments are given on main events that occurred in the tuna surface fishery since the beginning of the monitoring system in the 1980s like, among others, the development of fishing on FADs, the moratorium and the recent development of Ghanaian fishery landings. Species composition and length frequency of main tuna species are also presented. Finally, the question of the best way to introduce the faux poisson series in the ICCAT statistical base is discussed.

RÉSUMÉ

Ce document a pour objectif d'actualiser la série des quantités totales commercialisées sur le marché local dit du faux poisson au port thonier d'Abidjan depuis 1982. Cette commercialisation concerne des thons refusés par les conserveries, des petits thons sous taille (listao, auxide, albacore, patudo, thonine) mais aussi des espèces appréciées par les consommateurs et capturées comme espèces accessoires comme les marlins et les voiliers, les wahoos, les dorades coryphènes, les barracudas, les balistes et les requins. La série permet d'illustrer certains évènements importants survenus depuis la mise en place de ce suivi dans les années 80 comme, entre autres, le développement de la pêche sous épave, le moratoire et le développement récent des débarquements de la pêche ghanéenne. Sont présentées les compositions spécifiques ainsi que les structures de tailles des principales espèces de thonidés. Finalement est discutée la question de l'introduction de ces données dans la base de données statistiques de l'ICCAT.

RESUMEN

Este documento tiene el objetivo de actualizar las cantidades totales comercializadas en el mercado local denominado "faux poisson" en el puerto atunero de Abiján desde 1982. Esta comercialización afecta a los atunes rechazados por las conserveras; pequeños túnidos con talla inferior a la regulada (listado, melva, rabil, patudo, bacoreta), y también a especies apreciadas por los consumidores y capturadas como especies accesorias, como marlines y peces vela, peto, lampuga, barracuda, pejepuerco moteado y tiburones. Basándose en este indicador, se proporcionan algunos cometarios sobre los principales desarrollos que han tenido lugar en la pesquería de superficie de túnidos desde el inicio del sistema de seguimiento en los ochenta, como, por ejemplo, el desarrollo de la pesca con DCP, la moratoria y el reciente desarrollo de los desembarques de la pesquería de Ghana. También se presenta la composición por especies y las frecuencias de tallas para las principales especies de túnidos. Finalmente, se debate el mejor modo de introducir estos datos en las bases de datos estadísticas de ICCAT.

KEYWORDS

Fishery statistics, by catch, fishery products, purse seining

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1. Introduction

In the beginning of the 1980s, the development of the log fishing practice for purse seiners (Fonteneau et Marcille, 1988) produced quantities of juvenile major tunas, minor tunas or by-catch species (see for example Ariz et al. 1992, Hallier et al. 1999, Fonteneau et al. 2000, Delgado de Molina et al. 2000, Amandé et al. 2009) that started to be landed in Abidjan for consumption according to a Nigerian (Houssa) recipe, « the garba ». This very cheap meal became much appreciated and now supports a growing demand mainly from the urban market of Abidjan.

This document intends to present an actualized series of quantities landed by fleets, species composition and length frequency issued from a statistical monitoring system presently financed by the EU Data Collection Framework (EU). The last publication in ICCAT concerning this by-product has been presented by N'Da et al. (2007). We will focus here on presenting main characteristics of the series and will discuss ways to make these statistics available in ICCAT statistical database for assessment studies.

2. Origin of data and computing methods

Monitoring *faux poisson* is by nature a very difficult task. Local scientists with their European counterparts decided in the beginning of the 80s to set in place a monitoring system aiming at quantifying this flow of by-products that was not monitored by traditional systems (Bard et Amon Kothias 1985, Amon Kothias 1986, Bard et Hervé 1993, Amon Kothias, Hervé et Bard 1994, Hervé, A. et al. 2005). Since the beginning, it has been considered unrealistic neither to collect formal data (formularies, invoices …) neither to estimate directly weights of FP. It then has been preferred to evaluate the number of transports units associated with weight coefficient. For specimens (billfishes, sharks), numbering of heads are used in order to avoid double counting associated with a mean weight by types of specimen. As the *faux poisson* became important in volume, it has been noticed a tendency to overfill vans or trucks in order to minimize the fishing port exit taxes. In recent years, an inverse tendency was observed with reduced charge of vans and trucks due probably to *faux poisson* becoming a very valuable product. Weight coefficients by transport units were fixed empirically periodically by observers and try to reflect these tendencies (**Figure 1**). Since May 2009, a weighbridge has been installed just before the fishing port exit and generates exact weights of transport unit each one being inventoried and its specific net weight defined.

All industrial vessels, in principle, are systematically monitored for their *faux poisson* landings whatever their nationality and their type (fishing or cargo vessels). Total estimates are obtained by summing up the product of the numbering of transport units (vehicle, bags, pieces …) by their reference weights. When direct weights are available, they are also used. The precise origin of the product (vessels, type of boats, nationality and date of landings) is therefore known. Since 2005, an attempt to estimate the species composition of the landings is set in place. The observer estimates visually the percentage of species for each vehicle. Length measurements have been set in place in a regular manner since 2007. They occur on board vessel (all type and all nationality) and concerns uniquely tuna fish species (major and minor).

3. Results

Commercialized quantities of *faux poisson* on the local market of Abidjan (**Figure 2**) fluctuated importantly since the beginning of the monitoring system reaching twice 23 000 tons respectively in 1993 and 2007 and then growing sharply since this time. Time series indicates major fluctuations with a sharp growth at the end of the 80s, a reduction in 1994, 1998 and 2002. Finally a recent augmentation is observed since 2003 prevailing nowadays with 30 000 tons in 2009.

Until 2003, *faux poisson* landings by purse seiners predominate. Since 2004, the series indicate a growing importance of cargo vessels representing 48% of *faux poisson* landings. The main fleets concerned by this commercialization are:

- The European fleet gathering here vessels with Spain and French flags and few other associated vessels with other flags. These vessels are all purse seiners.

− Vessels with other flags like mainly Ghana, Guinea Conakry and Cambodia. Ghanaian vessels are cargo vessels, purse seiners and vessels using pole and line. Guinea Conakry has only cargo vessels and purse seiners and Cambodia has only one cargo vessel transporting tunas unloaded from Guinean purse seiners.

Mean quantities of *faux poisson* by landing operation grow significantly since the beginning of the monitoring system (**Figures 4 and 5**). During the 80s, mean landing of *faux poisson* was around 25 tons, it then doubled in the 1990s and finally reaches 80 tons in the 2000s. In recent years (2000s), European vessels (purse seiners) mean landing of *faux poisson* is around 48 tons with a significant difference (near the double) between French (20-30 t/landing) and Spanish (50-60 t/landing). Others flags are all higher either for fishing vessels 167 tons/landing or cargo vessel 455 t/landing.

Species composition of *faux poisson* is estimated visually since 2005. The main species-categories encountered are:

- Listao (SKJ)
- Albacore (YFT)
- Patudo (BET)
- Germon (ALB)
- Auxide, thonine (Minor tuna)
- Mixed tuna
- Baliste, barracuda, wahoo, carangids, dolphinfish, poisson banane, mix (Finfish)
- Blue marlin, marlin, swordfish, sailfish (Billfish)
- Shark
- Unknown or others

Figure 6 indicates that the skipjack is the main species landed with around 10 000 t and 43 % of the total tonnage for the period 2005-2009. It is followed by Minor tunas (4 000 t and 18 %) and the category Mixed tuna (2800 t and 12 %). The European fleet lands similar species composition (**Figure 7**). The other flags display higher proportion of skipjack and less minor tunas. Proportions of Bigeye (BET) and Yellow fin (YFT) tunas are similar for all fleets with YFT (6 - 7%, 1 500t), BET (5 - 6%, 1 300 t).

Near 180 000 tuna fishes landed as *faux poisson* were measured from 2007 to 2009. **Figure 8** indicates the length structure for the 3 main target species for the three main fleets. Length distributions are similar with modes respectively at:

- 37 à 39 cm LF pour le SKJ,
- 36 à 42 cm LF pour le YFT,
- 37 à 38 cm pour le BET.

The French fleet seems systematically land higher length classes than the two other fleets. Statistical tests have to confirm these observations.

4. Discussion

This statistical monitoring system bears on informal activities. It is therefore subject to bias concerning numbering of vehicle and also their reference weights. Observers may not always be present to insure counting and uncontrolled flow of fish may occur. Reference weights have not been always objectively fixed and their values used for computing quantities may be uncertain. These statistics must therefore be considered as relatively imprecise. Nevertheless, it seems necessary that these significant quantities be documented and inserted in ICCAT database for assessment purposes. These statistics have some characteristics that must be taken into account:

- Localization of capture is not available. *faux poisson* is caught in the Atlantic Ocean but information on detailed localization is not available
- *faux poisson* are predominantly from the surface fishery (pole and line and purse seine) but gear separation is not always possible for cargo vessels
- *faux poisson* have a particular status. It is an undeclared by-product of the surface fishery and, for some fleets, it is a by-catch that is punctually not discarded.

It seems therefore that *faux poisson* must be stored in ICCAT database and kept distinct from the declared production and, of course, from discards.

It is also important to note that quantities reported here are observed in Abidjan. We do not have similar estimation for other ports like Dakar (Senegal) and Tema (Ghana) for example where similar commercialization may occur. It seems also important to be able to verify that *faux poisson* landed by cargo vessels are not already declared through other systems (logbooks …)

5. Conclusion

Marketing of *faux poisson* on the local market of Abidjan is a significant economical activity supported by a demanding urban market and by an organized network of fish wholesalers. Due to the informal character of this circulation of product, the statistical monitoring system set in place in the 1980s had to be adaptive and, consequently, suffers biases and approximations. Nevertheless, clear fluctuations observed of this indicator during almost three decades and our ability to interpret and correlate these fluctuations with changes in the fishery demonstrate clearly that it measures in a sensitive ways phenomenon occurring in the fishery and need to be maintain and strengthened. Furthermore, it allowed measuring fisheries trends and events that are not observable through other traditional monitoring systems.

Acknowledgements

Thanks to scientists who conceive this monitoring systems very early and also to the various port samplers who daily have to deal with the complexity of this informal market since 28 years.

6. References

Amon Kothias, J.B. 1986, Analyse des débarquements de thonidés mineurs et poissons porte épées en Côte d'Ivoire en 1984-1985. Collect. Vol. Sci. Pap. ICCAT, 25: 262-264

Amon Kothias, J.B., Bard, F.X., Hervé, A. 1996, Mise à jour des quantités de « faux poissons » débarqués par les senneurs à Abidjan. Collect. Vol. Sci. Pap. ICCAT, 45(3): 227-228.

Amon Kothias, J.B., Hervé, A., Bard, F.X. 1994, Update of quantities of minor tunas and small tunas landed as market fish in Abidjan. Collect. Vol. Sci. Pap. ICCAT, 42(2): 337-380.

Ariz, J., Delgado de Molina, A., Fonteneau , A., Gonzales Costas,, F. and Pallares P. 1992, Logs and Tunas in the eastern tropical Atlantic. A review of present knowledge and uncertainties. Collect. Vol. Sci. Pap. ICCAT, 40(2): 421-446.

Bard, F.X. et Amon Kothias, J.B. 1985, Evaluation des débarquements de Thonidés mineurs et istiophoridés au port d'Abidjan - 1981-1984. Collect. Vol. Sci. Pap. ICCAT, 23(2): 333-336.

Bard, F.X. et Hervé, A. 1993, Une conséquence inattendue de la pêche thonière sous épave artificielle : l'accroissement des ventes de thonidés mineurs à Abidjan. Collect. Vol. Sci. Pap. ICCAT, 40(2): 399-400.

Delgado de Molina, A., Ariz, J., Gaertner, D. and Santana J.C. 2000, Estimación de la importancia de las capturas de especies accesorias y de descartes en la pesquería de cerco de tunidos tropicales en el océano Atlántico oriental. Collect. Vol. Sci. Pap., ICCAT, 51(6): 1859-1874.

Fonteneau, A. et Marcille, J. (eds.) 1988, Ressource pêche et biologie des thonidés tropicaux de l'Atlantique centre-est. FAO Doc. Tech. Pêches (290): 391.

Fonteneau, A., Pallares, P. and Pianet, R. 2000, A worldwide review of purse seine fisheries on FADs. In Cayré P., Le Gall J. Y. and M. Taquet, Pêche thonière et dispositifs de concentration de poissons: Colloque Caraïbe-Martinique, Trois-Ilets, 15-19 octobre 1999. Institut de recherche pour le développement, Institut français de recherche pour l'exploitation de la mer, Ecole national supérieure agronomique de Rennes. Editions Quae: 684 p.

Hallier, J.P., Parajua, J.I. 1999, Review of tuna fisheries on floating objects in the Indian Ocean. In: Scott MD, Bayliff W.H., Lennert-Cody C.E., Schaefer K.M. (eds) Proc Int Workshop on Fishing for Tunas Associated with Floating Objects, La Jolla, CA, February 11-13, 1992. Inter-Am Trop Tuna Comm Spec Rep 11:195-221.

Hervé, A. 1997, Mise à jour des quantités de « faux poissons » débarquées par les senneurs à Abidjan. Doc. Interne Centre Recherches Océanologiques, Abidjan.

Hervé ,A., Dédo, R., Diomande, S et Gobo, A., 2005, Actualisation des quantités de faux poissons débarquées par les senneurs à Abidjan de 1981 à 2004. Rapport interne, 9 pages.

N'Da, Konan, Dédo, G. et Hervé, A. 2007, Les débarquements de « faux thons » ou « faux poissons » au port de pêche d'Abidjan : phénomène de résurgence dans les données ICCAT en Côte d'Ivoire. Collect. Vol. Sci. Pap. ICCAT, 60(1): 180-184.

Romagny, B., Ménard, F., Dewals, P., Gaertner, D., N'Goran, N. 2000, Le "faux-poisson" d'Abidjan et la pêche sous DCP dérivants dans l'Atlantique tropical Est : circuit de commercialisation et rôle socio-économique. In: Le Gall J.Y. (ed.), Cayré Patrice (ed.), Taquet M. (ed.). Pêche thonière et dispositifs de concentration de poissons. Plouzané : IFREMER, 2000, p. 634-652.

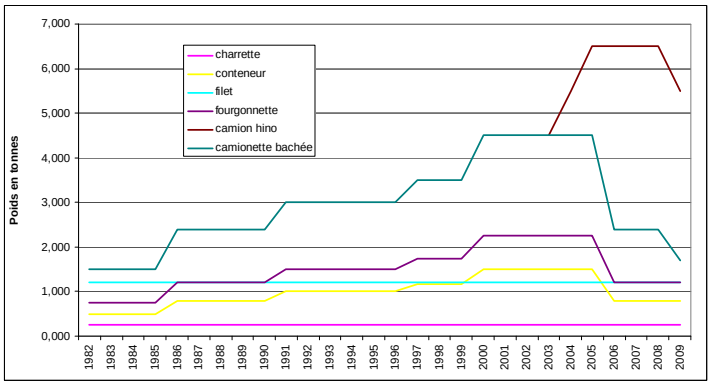


Figure 1. Reference weight of vehicle transporting *faux poisson* at Abidjan, Côte d'Ivoire.

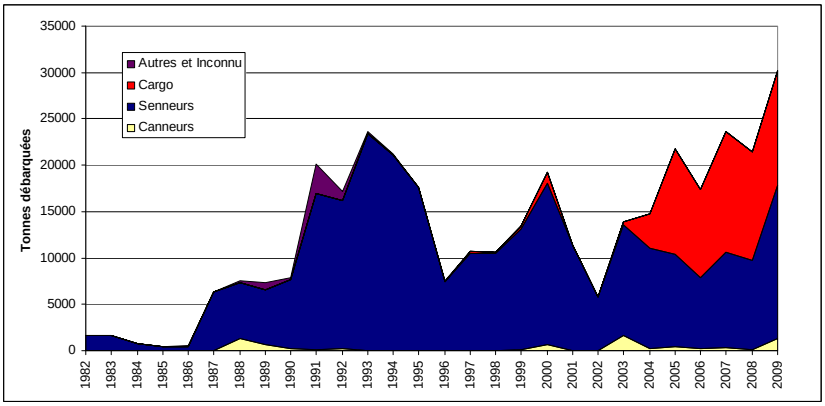


Figure 2. Landings of *faux poisson* in Abidjan (Côte d'Ivoire) by vessel type.

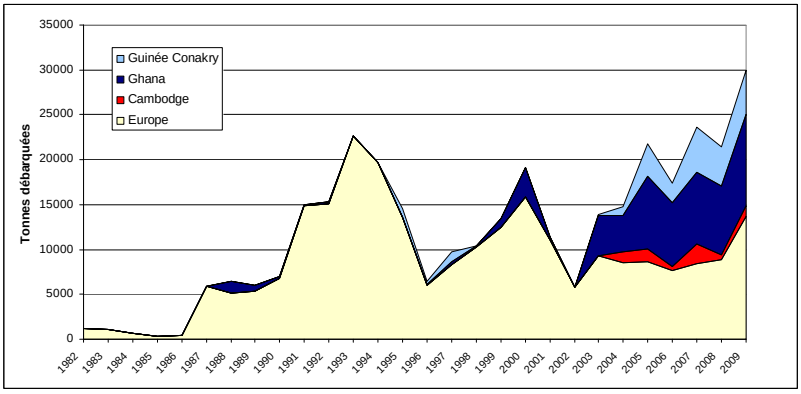


Figure 3. Landings of *faux poisson* in Abidjan (Côte d'Ivoire) by fleet and flags.

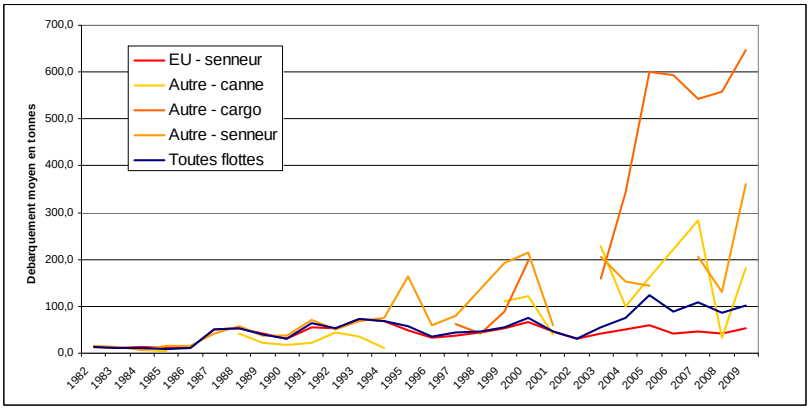


Figure 4. Mean landing of *faux poisson* by trip, vessel type and fleet in Abidjan, Côte d'Ivoire.

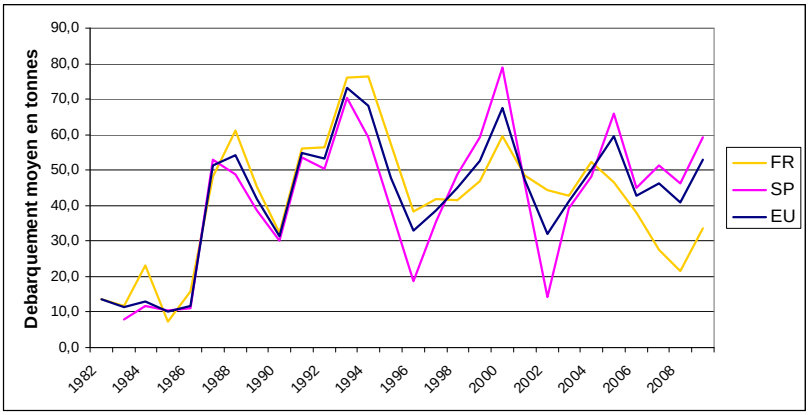


Figure 5. Mean landing of *faux poisson* by trip according to flag for the European fleet Abidjan, Côte d'Ivoire.

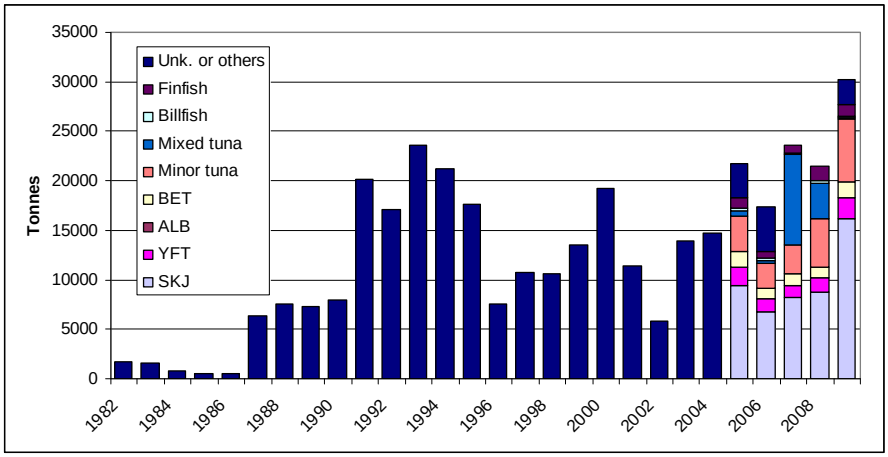


Figure 6. Estimated species composition of *faux poisson* landings in Abidjan, Côte d'Ivoire.

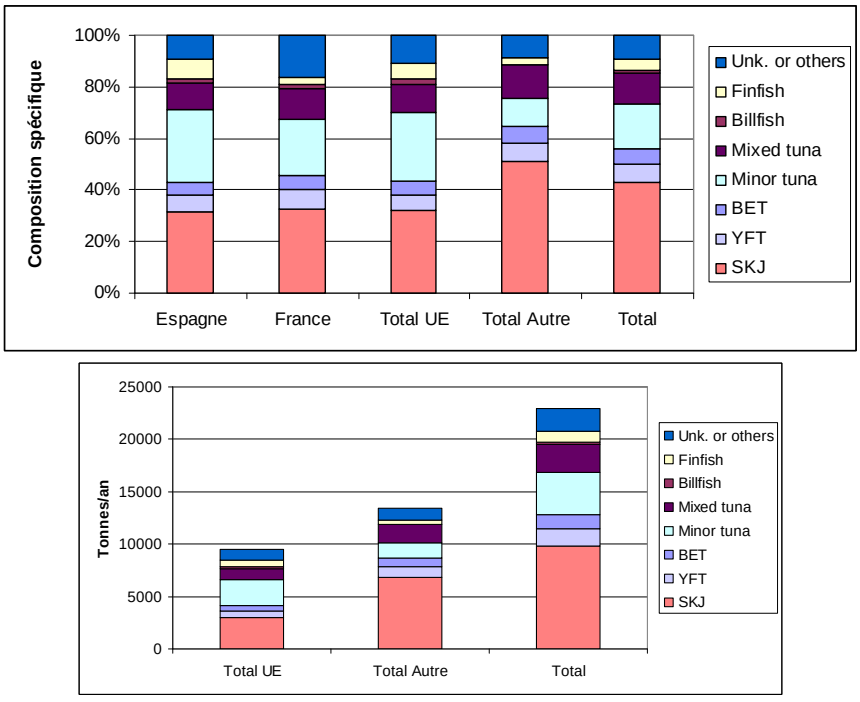
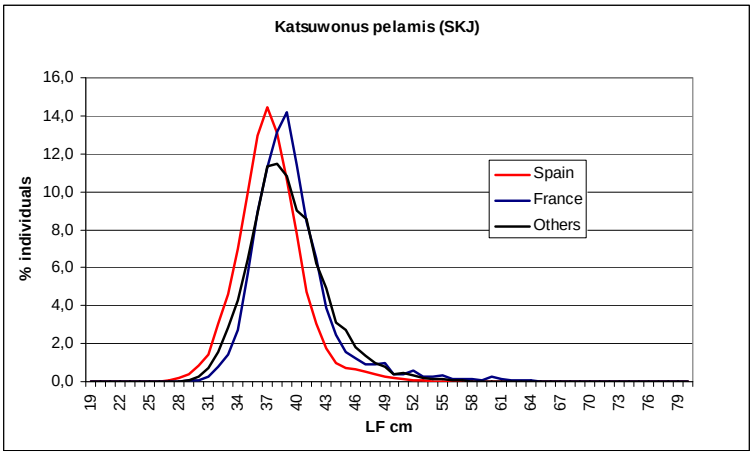
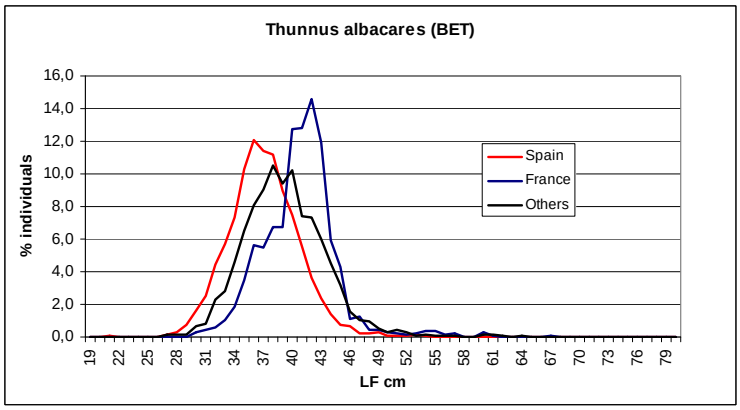


Figure 7. *Faux poisson* species composition by fleets landed in Abidjan, Côte d'Ivoire, for the 2005-2009 period.





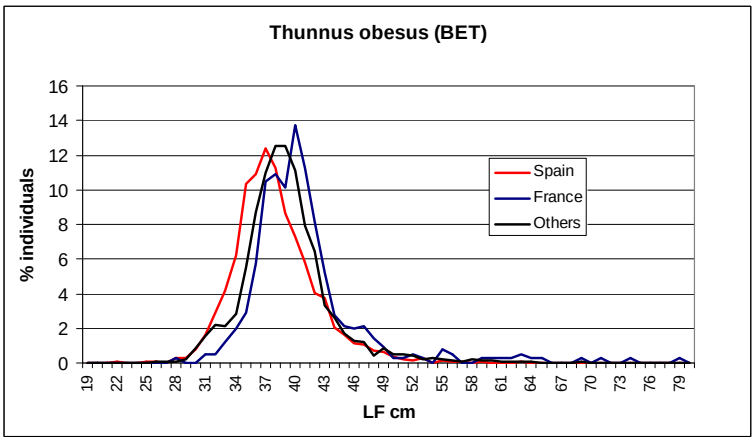


Figure 8. Length structure of the three main tuna species (SKJ, YFT and BET) found in *"faux poisson"* landed in Abidjan, Côte d'Ivoire, in 2005-2009 by the three main fleets.

Annexe 1

SUIVI DU DEBARQUEMENT DU FAUX POISSON AU PORT DE PECHE D'ABIDJAN

Version Juillet 2010

MOIS

Bateau & C_BAT			**Bateau & C_BAT**			**Bateau & C_BAT**		
Date d'arrivée			**Date d'arrivée**			**Date d'arrivée**		

	Poissons en vrac (esp.) %	**0**		**Poissons en vrac (esp.) %**	**0**		**Poissons en vrac (esp.) %**	**0**
Composition estimée (%)	Gros thons (40)		**Composition estimée (%)**	Gros thons (40)		**Composition estimée (%)**	Gros thons (40)	
	Albacores (1)			Albacores (1)			Albacores (1)	
	Listaos (2)			Listaos (2)			Listaos (2)	
	Patudos (3)			Patudos (3)			Patudos (3)	
	Thonine (10)			Thonine (10)			Thonine (10)	
	Auxide (6)			Auxide (6)			Auxide (6)	
	Mélange de thonidés (9)			Mélange de thonidés (9)			Mélange de thonidés (9)	
	Banane (21)			Banane (21)			Banane (21)	
	Baracuda (24)			Baracuda (24)			Baracuda (24)	
	Thon blanc (20, 25)			Thon blanc (20, 25)			Thon blanc (20, 25)	
	Balistes (23)			Balistes (23)			Balistes (23)	
	Coryphènes (22)			Coryphènes (22)			Coryphènes (22)	
	Mélanges non thonidés (29)			Mélanges non thonidés (29)			Mélanges non thonidés (29)	
	Espèces inconnues ou autres (99)			Espèces inconnues ou autres (99)			Espèces inconnues ou autres (99)	
Quantité (nombre ou poids)	Bachées (10) - nbre		**Quantité (nombre ou poids)**	Bachées (10) - nbre		**Quantité (nombre ou poids)**	Bachées (10) - nbre	
	Camions (11) - nbre			Camions (11) - nbre			Camions (11) - nbre	
	Convertisseur (7) - nbre			Convertisseur (7) - nbre			Convertisseur (7) - nbre	
	Pesées au pont bascule (20) - tonnes			Pesées au pont bascule (20) - tonnes			Pesées au pont bascule (20) - tonnes	

	Sacs et pièces (esp. - cond.)			**Sacs et pièces (esp. - cond.)**			**Sacs et pièces (esp. - cond.)**	
Quantité (nombre)	Sacs thonidés 60 kg (9 - 30) - nbre		**Quantité (nombre)**	Sacs thonidés 60 kg (9 - 30) - nbre		**Quantité (nombre)**	Sacs thonidés 60 kg (9 - 30) - nbre	
	Sacs carangidés 60 kg (26 - 30) - nbre			Sacs carangidés 60 kg (26 - 30) - nbre			Sacs carangidés 60 kg (26 - 30) - nbre	
	Sacs balistes 60 kg (23 - 30) - nbre			Sacs balistes 60 kg (23 - 30) - nbre			Sacs balistes 60 kg (23 - 30) - nbre	
	Sacs thonidés 300 kg (9 - 31) - nbre			Sacs thonidés 300 kg (9 - 31) - nbre			Sacs thonidés 300 kg (9 - 31) - nbre	
	Marlins (32 - 1) - nbre de pièce			Marlins (32 - 1) - nbre de pièce			Marlins (32 - 1) - nbre de pièce	
	Voiliers (30 - 1) - nbre de pièce			Voiliers (30 - 1) - nbre de pièce			Voiliers (30 - 1) - nbre de pièce	
	Gros thons (40 - 1) - nbre de pîèce			Gros thons (40 - 1) - nbre de pîèce			Gros thons (40 - 1) - nbre de pîèce	
	Requins (7 - 1) - nbre de pièce			Requins (7 - 1) - nbre de pièce			Requins (7 - 1) - nbre de pièce	
	TOTAL (Tonnes)	**0,000**		**TOTAL** (Tonnes)	**0,000**		**TOTAL** (Tonnes)	**0,000**

Notes		**Notes**		**Notes**	