Fattening of bluefin tuna (Thunnus thynnus) caught by the French and Spanish bait boats in the Bay of Biscay

Caill-Milly N., Suquet M., Díez G., Arrizabalaga H.

in

Bridges C.R. (ed.), García A. (ed.), Gordin H. (ed.).
Domestication of the bluefin tuna Thunnus thynnus thynnus

Zaragoza : CIHEAM
Cahiers Options Méditerranéennes; n. 60

2003
pages 41-43

Fattening of bluefin tuna (*Thunnus thynnus*) caught by the French and Spanish bait boats in the Bay of Biscay

N. Caill-Milly*, M. Suquet, G. Diez*** and H. Arrizabalaga*****
*IFREMER Fisheries Resources Dpt., LHA, Technopole Izarbel, 64210 Bidart, France
**IFREMER Fish Physiology Lab. Centre de Brest, BP 70, 29280 Plouzané, France
***Azti Fisheries Resources Dpt. Txatxarramendi ugartea, z/g, 48395 Sukarrieta, Bizkaia, Spain

SUMMARY – This fattening project of bluefin tuna aims at giving a first assessment of the technical feasibility of fattening wild bluefin tuna caught by the French and Spanish bait boats in the south of the Bay of Biscay. In a context of more and more restrictive fishing for this species (Total Allowable Catch and quotas, individual weight limits, drifting gill-net prohibition, PPS and licenses, etc.), this system can constitute a way of increasing the value of the catches. The working hypothesis rests on the choice of exploitation including strong involvement of the fishermen, both for the supply of tunas and fish food, and for the maintenance of the cages. This first study (Caill-Milly *et al*., 2001a) has been built primarily on a bibliographic research and on visits to existing Mediterranean sites (Spain and Malta). The constraints and the advantages of the south of the Bay of Biscay are pointed out.

Key words: Bluefin tuna, fattening, Bay of Biscay, bait boat.

RESUME – *"Grossissement du thon rouge (*Thunnus thynnus*) capturé par des bateaux de pêche à l'appât vivant français et espagnols dans la baie de Biscaye". Ce projet de grossissement du thon rouge vise à fournir une première évaluation de la faisabilité technique du grossissement du thon rouge sauvage capturé par des bateaux de pêche à l'appât vivant français et espagnols au sud de la baie de Biscaye. Dans le contexte d'une pêche de plus en plus restreinte de cette espèce (Total Admissible de Captures et quotas, limites de poids individuel, interdiction des filets maillants dérivants, PPS et autorisations, etc.), ce système peut constituer une façon d'augmenter la valeur des captures. L'hypothèse de travail est fondée sur le choix d'une exploitation impliquant fortement les pêcheurs, à la fois pour l'offre de thonidés et d'aliments à base de poisson, et pour la maintenance des cages. Cette première étude (Caill-Milly* et al., *2001a) a été construite en premier lieu sur une recherche bibliographique et sur des visites aux sites méditerranéens existants (Espagne et Malte). Elle a mis en relief les contraintes et les avantages du sud de la baie de Biscaye.*

Mots-clés : *Thon rouge, grossissement, baie de Biscaye, bateau de pêche à l'appât vivant.*

Zootechnical requirements

Bluefin tuna presents demanding needs, related to exceptional zootechnical performances, among which its ability to regulate partially its internal body temperature. The requirements mainly concern steady conditions of salinity, low and steady turbidity, well-oxygenated water and weak breeding load (2-4 kg/m^3). For fattening of Atlantic bluefin tuna (*Thunnus thynnus thynnus*), the temperature must be in a range of 18-26°C (over 14°C for the breeding). According to the local conditions in the bay of Biscay, these requirements are constraint and seems unfavourable for a long production cycle.

Examination of the existing experiments of breeding

The visit on existing farms mainly showed the type of cages used (high volumes between 28,000 and 220,000 m^3, polyethylene, generally circular), the very significant quantities of food necessary daily (the main species used are mackerel, squid and horse mackerel, the daily ration during the fattening period is around 20 kg for a 200 kg tuna, the fishes are conserved frozen), the obligatory control of the Japanese market requirements (the main factor is the fat content, Caill-Milly *et al*., 2001b), as well as the importance of the investments carried out and manpower employed (between 50 and 100 salaried employees for the maintenance and the preparation of the fish before the export).

The success of these farms lies in the offer of a product presenting the optimal quality criteria for Japan (high fat content, limitation of the stress, etc.) when the demand is particularly high.

Definition of the product at the beginning of the breeding

The choice of the product in entry of exploitation was defined according to the characteristics of the fisheries practised in the south of the bay of Biscay, the Japanese sale conditions and bluefin tuna growth data in the considered zone. In the Basque Country, the baitboat fishing season goes from June up to November, with a maximum between July and September. In 1998, the catches respectively raised 163 and 2736 tonnes for the North and the South of the Basque Country. Almost 70% of the fishes weigh below 25 kg (45% are below 10 kg). The demand expressed by the Japanese market mainly concern fishes above 30 kg. The highest prices are generally obtained for big tunas (over 100 kg) and for fishes proposed between the end and the beginning of the year (above 30 euro/kg). Tuna of less than 20 kg may correspond to a demand in Japan, but also to the need of the European Asiatic communities. These outlets have to be confirmed. In the bay of Biscay, the bluefin tuna growth is very rapid from May up to November. According to information collected, the product corresponds to a fish of about 15 kg caught from July (theoretical final weight: 25-30 kg at the end of the year).

Evaluation of 7 potential sites

In order to propose a first selection of potential sites for cages, temperature, salinity, swell, wind, currents and turbidity characteristics were taken into account. For floating cages such as those used in the Mediterranean sea, this preliminary choice concerns zones with depth of 30-50 m and sheltered from the north-west winds. Moreover, these sites have to be closed from the fishing ports so as to facilitate the maintenance, far away from the tourist areas and out of the zones influenced by river flows (responsible for high turbidity). The preliminary choice relates to seven zones: 5 on the Spanish side and 2 on the French side. Because of the high constraints to consider, another solution would be the use of offshore cages. Complementary technical and financial studies are necessary.

Conditions of bait boat fishing

With the local conditions of fishing, the monthly theoretical quantity of fishes available from the bait boats rises a hundred tonnes. According to the Japanese and Australian experiments, the capture with the hook for the provisioning of cage seems as much less traumatizing if the fish is small (less than 20 kg) and if the boat presents specific deck laying out (covered by fitted carpet, rubber, etc.). The estimated survival rate for the catch and the transport phases is 70%. The caught tunas cannot be stored in fish ponds on the boats because of their major occupation for the bait, of the low volume available and of necessary fish recaptures. A system of floating cage collected by a specific unit appears more suitable and has to be considered.

Conclusion

The high constraints of the Basque Country are the short favourable temperature period of the sea water, the limitation of the available supply from the bait boats, the high turbidity of the water due to river flows and the space occupation by other users (mainly for the French side). The advantages are the practice of a not very traumatizing fishing technique for small tunas, the existence of small pelagic fisheries able to provide food for the tunas and the existence of first contacts with purchasers for the Japanese market.

Under these conditions, the system that can be proposed is a very short production cycle focused on summer and autumn, with an initial tuna individual weight of approximately 15 kg (theoretical final weight: 25-30 kg), transfer of caught tunas in floating cages that have to be collected by a specific boat, settling of the tunas in offshore cages (about one mile from the coast). The technical and economic viability of the system is subjected to preliminary works which will quickly be proposed to European grants: (i) practical studies on bait boat catches (quantity, survival rate) and the transport (floating cages); (ii) practical experimentation of fattening small size BFT under the local conditions (growth rate, lipid); (iii) market researches (Japanese and European Asiatic Communities); (iv) precise studies on the hydrological conditions of selected sites; (v) engineering studies on the design of offshore cages; and (vi) synthesis of information on the law applied to cage installation.

Acknowledgements

Financial support provided by EU grant Interreg IIC, Ifremer and AZTI

References

Caill-Milly, N., Suquet, M., Arrizabalaga, H. and Guzman, D. (2001a). *Embouche du thon rouge pêché à la canne par les flottilles françaises et espagnoles*. Ifremer and AZTI report, Saint-Pée sur Nivelle, 103 pages + appendix reports.

Caill-Milly, N., Milly, D. and Etienne, M. (2001b). Evaluation des principaux critères de qualité des thons rouges capturés pour le marché japonais. *Sciences des Aliments*, 21(3): 255-270.