

Management for mollusc culture in Mexico

Gestion de la conchyliculture au Mexique

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Abstract

Mollusc culture began formerly in Mexico in 1800, with the pearl oyster *Pinctada mazatlanica*.

Oyster culture began in a commercial basiss in the sixties, as an activity developed by the Mexican government in the gulf of Mexico, yet the exploitation of the species was until 1989 reserved to fishermen grouped in cooperatives. Production data shows a noticeable variability up to 1986; from then, yearly production averaged 50,000 tonnes of *Crassostrea virginica* from the gulf of Mexico. The whole yield is consumed in the country.

In order to improve the quality of this product, and to introduce it into the international market, many efforts have been made to certify appropriate areas in the pacific coast, according with FDA requirements, and projects for installation of depuration facilities are carrying out in gulf of Mexico, in Veracruz and Tabasco states. These projects consider purification of sea water through UV radiation to depurate organisms, and bottling the shucked oysters, given that it is the usual consumption in the country. An official seal, certified by the ministry of healt (secretaria de salud) accordly with the general directorate of aquaculture (direccion general de acuacultura), will guarantee the product.

The facilities are going to be used for other species from the Atlantic Ocean, in the pacific region levels of domestic pollution, pesticides and heavy metals are not present or are not of significance, so culturing bivalves in approved areas fulfill the international sanitary requirements.

Résumé

L'élevage des mollusques a démarré au Mexique en 1800, avec l'huître perlière *Pinctada mazatlanica*. L'ostréiculture à des fins commerciales a été développée au cours des années soixante par le gouvernement mexicain dans le Golfe du Mexique, mais l'exploitation de l'espèce était jusqu'en 1989 réservée à des pêcheurs groupés en coopératives. Les données de production révèlent une variabilité notable jusqu'en 1986 ; à partir de cette date, la production annuelle moyenne s'élève à environ 50.000 tonnes de *Crassostrea virginica* provenant du Golfe du Mexique. L'ensemble de la production est consommée dans le pays.

Afin d'améliorer la qualité du produit et de l'introduire sur les marchés internationaux, de gros efforts ont été réalisés pour homologuer selon les normes de la FDA certaines zones le long du littoral Pacifique, et des projets d'implantation de stations de purification sont en cours de réalisation dans le Golfe du Mexique ainsi que dans les états de Veracruz et de Tabasco. Ces projets envisagent d'utiliser un système aux ultra-violets pour purifier les organismes et mettre en bocal les huîtres écaillées, ce qui constitue la forme la plus commune de consommation dans le pays. Un cachet officiel certifié par le ministère de la Santé (Secretaria de Salud) en accord avec la Direction générale de l'aquaculture, garantira le produit.

Les installations de purification seront utilisées pour d'autres espèces originaires de l'océan Atlantique. Sur le littoral Pacifique, les niveaux de pollution endogène, de pesticides et de métaux lourds sont nuls ou négligeables, et l'élevage des mollusques bivalves dans les zones autorisées suffit à répondre aux normes sanitaires internationales.

Oyster production around the world is becoming a growing industry since natural production is decreasing. The main species used for culture belong to *Crassostrea* genus and in Mexico this is the group of oyster species that are in use for aquaculture.

Oyster production in Mexico, is one of the most important aquacultural activities, with an annual average yield of 54,000 MT from the 180,000 MT produced by aquaculture. The main species produced are *Crassostrea virginica* (American oyster) in the Gulf of Mexico, *C. gigas* (Pacific oyster) and *C. corteziensis* in the Pacific coast.

Oyster culture in the Pacific is practiced in the coast of Baja California, Baja California Sur, Sonora and Nayarit states, using racks, rafts, French racks, trays and long lines. In the Gulf of Mexico, oyster culture is based on bottom culture, practiced in Tamaulipas, Veracruz, Tabasco and Campeche states in a surface of 3,412 hectares (tables I and II).

Table I: Oysters producers in the Gulf of Mexico

State	Cooperatives Numbers	Oyster beds	
		(Hectares)	Number
Tamaulipas	27	130	121
Veracruz	14	935	558
Tabasco	6	2,250	70
Campeche	1	97	37
Total	48	3,412	786

Table II: Oysters producers in the Pacific Coast

State	Cooperatives Numbers	Culture systems	
		Type	Number
Baja California	2	Racks	2,523
		Rafts	43
		Trays	23,000
		Long line	65
Baja California Sur	11	Trays	128,000
		French Rack	100
Sonora	18	Trays	150,000
Nayarit	2	Rafts	191

Actually, oyster culture in the Gulf of Mexico produces more than 90% of the national oyster production which is sold in Mexico city and the main cities of the country. The national consumption acceptance finds to be shucked and fresh commercialised. On the other hand, the Pacific oyster produced in north-western Mexico, was formally introduced for export market, and now is consumed in Mexico and exported to the US market.

As Pacific oyster is an introduced species, seed has to be produced in hatcheries. Three hatcheries produce all the seed needed by oyster producers (table III). Some other five hatcheries are producing molluscs seed for educational and research purposes so they are not considered for commercial purposes. Seed commercial production average 71 millions yearly.

Natural settlement for *C. virginica* is obtained by placing empty oyster shells in selected sites where natural abundance has been identified to be the highest concerning the Gulf of Mexico; a rough estimation of seed settlement per year is around 11,000 millions. In the Pacific coast in Nayarit, *C. corteziensis* settlement allows 191 rafts in operation.

In the early seventies, an increasing aquacultural management allowed an increased yield of 30,000 metric tons per year. From 1986 up to date, yields average 50,000 metric tons due to the establishment of seed settlement farms and the use of intensive culture methods for *C. gigas* (figure 1). Since 1990, due to environmental changes that allowed an increase in salinity in Veracruz state coastal lagoons, and also an increase on the population of a flat worm (*Stylococcus* spp), oyster production decreased. In 1991, this situation was critical, so production drop to half the average.

Aquacultural potential for molluscs culture in Mexico is near 253,000 hectares. Government's efforts to allow private investors to go into oyster culture together with Federal investment in productive areas and facilities, let predict an annual growing rate of 27% for oyster culture for the next four years (figure 1).

To increase production in the Gulf of Mexico it will be necessary to use intensive culture technics and it is predicted an annual growing rate of 15% (table IV). To reach this goal the Mexican government started in 1991 the project to establish two Oyster Culture Parks (Parques Ostrícolas). Federal funds will be used to built roads, set electricity and tap water lines and sanitary facilities lake

Table III: Oysters hatcheries in Mexico

Hatchery	Location	Property	Annual average production of seed
Bahia Falsa	Bahia San Quitin Baja California	Cooperative	25 millions
Bahia Magdalena	Bahia Magdalena Baja California sur	Federal	6 millions
Centro Ostricola	Bahia Kino Sonora	State	40 millions

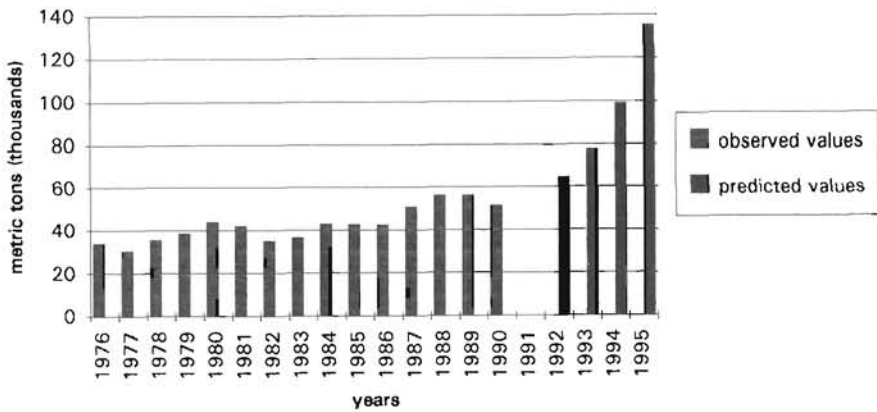


Figure 1: Oyster production in Mexico 1976-1990 and predicted production for 1992-1995

shellfish depuration plants. Private investors may establish their farms, processing plants and depuration facilities in these parks; there also will be an area for shipping and storage of the product. In order to prevent any kind of pathogenic agents that might arise in the culture areas, all facilities will follow the regulations established by the Health Ministry and the Directorate of Aquaculture.

Even though all the oyster production is entirely consumed in Mexico, the demand is still unsatisfied, so part of the predicted increments will be for the domestic market, while the rest will be for exports. The leadership that Mexico has in Latin American Oyster production (table IV), will lead this market growth to North America by means of the Free Trade Agreement with Canada and the

Table IV⁽¹⁾: Oysters production in Latin America (Metric tons)

	1983	1984	1985	1986	1987	1988
Brazil	473	550	321	483	487	520
Colombia	19	6	145	229	169	141
Cuba	2,370	2,705	2,533	2,535	2,195	2,432
Chile				498	244	324
Dominican Republic	147	32	40	9	7	6
Jamaica	1	1	1	1	1	1
Mexico ⁽²⁾	36,500	42,800	42,600	42,300	50,700	56,100
Nicaragua	59					
Venezuela	755	727	783	530	464	318
Total	40,324	46,821	46,423	46,585	54,267	59,842

(1) Source: FAO Statistics Yearbook, 1990 (*Crassostrea rhizophorae*, *C. virginica* & *Ostrea chilensis*)

(2) Including *C. corteziensis* + *C. gigas*

United States, and to the Pacific Rim countries placing Mexico among the world oyster producers leaders.

The fast development predicted for oyster culture in Mexico, is promoted by the National regulations that have changed recently. The Fisheries Federal Law, and its Operational Rules, state that any kind of corporation can develop oyster culture allowing private and foreign investors to establish this industry.

Other strategies that are actually promoted by the Mexican government, are the establishment of areas exclusive to develop aquaculture projects, and oyster aquacultural parks.

Concerning to the sanitary aspects, a National Sanitation System is actually being conformed, in order to ensure quality of shellfish products. The oyster's quality for national consumers will be increased, and related to the Free Trade Agreement, the present Memorandum of Understanding signed with the Food and Drugs Administration will be strengthened.