

AQUACULTURE I


4. WEEK

HISTORY OF AQUACULTURE



WEEKLY TOPICS

WEEK	TOPICS
1. WEEK	WHAT IS AQUACULTURE?
2. WEEK	IMPORTANCE OF AQUACULTURE
3. WEEK	AQUACULTURE: ANIMAL PROTEIN
4. WEEK	HISTORY OF AQUACULTURE
5. WEEK	ORGANISATION OF AQUACULTURE
6. WEEK	CHARACTERISTICS OF AQUACULTURE
7. WEEK	POND CULTURE
8. WEEK	IN STATIC FRESHWATER PONDS
9. WEEK	IN BRACKISH-WATER PONDS
10. WEEK	RUNNING WATER CULTURE
11. WEEK	CULTURE IN RE-CIRCULATORY SYSTEMS (RAS)
12. WEEK	AQUACULTURE IN RACEWAYS, CAGES, AND ENCLOSURES
13. WEEK	MONOCULTURE AND POLYCULTURE
14. WEEK	RECENT ADVANCES IN AQUACULTURE



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- ▶ Aquaculture consists in farming aquatic organisms. Around 500 BCE, the Romans farmed oysters and fish in Mediterranean lagoons, whereas freshwater aquaculture developed empirically some 1000 years earlier in China. Farming carp in ponds led to the complete domestication of this species in the Middle Ages, which is also when mussel farming began, following a technique that remained largely unchanged until the 20th century.



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- ▶ **Farming in ponds through the ages**

- ▶ The earliest evidence of fish farming dates back to before **1000 BCE** in **China**. The Zhou dynasty (1112-221 BCE), then the politician Fan Li, around 500 BCE, were the first to describe **carp**, a symbol of good luck and fortune, as being **farmed for food**. During the Tang dynasty, around 618, the Emperor Li, whose name means 'carp', forbade farming the fish that bore his name. Farmers then turned their attention to similar fish in the *Cyprinidae* family and developed the first form of **polyculture**. Liquid manure from livestock farming was also used to stimulate algae growth in ponds and make it more nutritious. The pond beds were then drained so that they in turn were also used as fertiliser. The **first integrated agriculture-aquaculture systems** emerged in China, where they are still implemented today.

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- ▶ During the **1970s**, **marine species** aquaculture enjoyed a **revival**, thanks to new, lighter, more hard-wearing and less expensive building materials (fibre glass, plastic tubes) and the use of floating cages rather than expensive glass and cast iron saltwater ponds. However, these new facilities turned out to be commercially non-viable and the **optimisation** and **stabilisation** of **marine fish production** was a major **concern** in the following decade. The start of the **21st century** saw aquaculture take on **great importance** worldwide. According to a report on fishing and aquaculture by the Food and Agriculture Organization of the United Nations (FAO) in 2016, “In terms of global production volume, that of farmed fish and aquatic plants combined surpassed that of capture fisheries in 2013”.

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- ▶ **MILESTONES IN AQUACULTURE DEVELOPMENT**

- ▶ **2000–1000 B.C.**

- ▶ C. F. Hickling the English aquaculture author, citing S. Y. Lin a noted Chinese aquaculturist, considered the earliest beginnings of aquaculture as during the period 2000–1000 B.C. This indicated that aquaculture has a long history dating as far as 4000 years ago. However, during the period, and especially before the advent of printing, no records were available except the narratives handed down from one generation to another especially those found in the seat of power during those periods. Admittedly, China was the cradle of the beginning of aquaculture utilizing mainly the common carp (Cyprinus carpio). It is said that aquaculture as a husbandry developed in China resulting from the fact that population started to have a settled condition and has been kept as an unbroken tradition. No detailed description of aquaculture practices was however available during that early period.

- ▶ **500 B.C. (473 B.C. or 475 B.C.)**

- ▶ This year is considered of very great significance in the annals of the history of aquaculture. Many authors round the year as 500 B.C. although most agree that the exact year is 475 B.C. and some even use 473 B.C. as the period when Fan Lai (also spelled Li or Lee by some authors) wrote his book, "The Classic of Fish Culture". This book consisted the earliest monograph of, fish culture. Although the narrative also dealt on fantasies and metaphysical aspects, it is the first to record and describe the structure of ponds, the method of propagation of the common carp and the growth of fry. Excerpts of an English translation and Chinese facsimile of this book are appended (Appendix 1 and 2).

<http://www.fao.org/docrep/field/009/ag158e/AG158E02.htm>



- ▶ **MILESTONES IN AQUACULTURE DEVELOPMENT**

- ▶ **500 B.C.-500 A.D.**

- ▶ This period can be considered the Golden Age of common carp culture which has continued to develop in China as well as in neighboring countries where the Chinese people migrated or have some form of foreign relations. Not only is actual progress attained in the techniques of culture but also scattered records of the culture systems were made during this period. At about this time in the Indian sub-continent, specifically during the period 321 to 300 B.C., the use of reservoirs to hold fish was first described.

- ▶ **618 to 906 A.D. (Tang Dynasty in China)**

- ▶ The reign of the Tang Dynasty is particularly significant in the history of world aquaculture. The Tang emperor in China had the family name of Li which happened to be the common name of the widely-cultivated common carp. Because of this coincidence, an imperial decree was issued prohibiting the culture as well as other activities connected with this fish. This decree, however, instead of putting a constraint to the development of aquaculture turned to be a blessing in disguise. The Chinese people who were then at the time very much engrossed in fish culture as a source of food and livelihood, looked for other species of fish for pond culture. This resulted in the discovery of the silver carp, the big-head carp, the grass carp and the mud carp, all very suitable pond culture species. It was also found that when raised in polyculture in the same pond, these species complement each other by eating different types of food and staying in different environmental strata within the pond. This led not only in the discovery of new species for culture but also in maximizing the productivity of freshwater pond culture,

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- ▶ **MILESTONES IN AQUACULTURE DEVELOPMENT**

- ▶ **906 to 1900 A.D.**

- ▶ **906 to 1120 (Sung Dynasty),**

- ▶ The initiative to collect fry of cultivable species seasonally along the rivers was started during the Tang Dynasty as a result of the prohibition decree on the common carp. Systematic fry collection and dispersal in natural waters was highly developed during following period under the Sung Dynasty. At about this time in India, the published work Namasollasa presented a compilation describing the fattening of fish in reservoirs. In China, in 1243, Chow Mit published his Kwei Sin Chek Shik which described fry transport in bamboo baskets.

- ▶ **1368 to 1644 (Ming Dynasty).**

- ▶ It was during the Ming period that works describing the complete aquaculture process were detailed. Methods for culturing fry to adult, the structure of ponds, rearing density, polyculture, stocking/catching rotation, application of food and fertilizer and disease control were dealt with in aquaculture works during this period. In the year 1400 brackishwater aquaculture was recorded as having been started in Indonesia. This was suggested in the penal laws of the country (Kutara Menawa) which provided for the prohibition of stealing fish from ponds. In China, in 1639, the Complete Book of Agriculture which included pond fish culture was released.

- ▶ **1644 to 1911 (Ching Dynasty).**

- ▶ During this period, further detailed description of fish culture methods were emphasized. This included fry production, season of occurrence of fry, differentiation and separation of fry and transport.

<http://www.fao.org/docrep/field/009/ag158e/AG158E02.htm>





- ▶ **1900–1700 - Expansion in operation and breakthroughs in seed production**

- ▶ This period witnessed worldwide expansion of aquaculture. Easy means of communications and widespread exchange of information through national and international agencies have stimulated the acceleration of the expansion in aquaculture.
- ▶ The urgent need for seeds to fill the expanded aquaculture industry resulted in technology breakthroughs in inducing the spawning of cultivable species, the seeds or fry of which were only formerly obtained from wild waters. In this period the cultivated Asiatic carps and the Indian major carps were induced to spawn under controlled conditions. Likewise the penaeid shrimp species and the giant freshwater prawns used in culture were also hatched under control in hatcheries.

- ▶ **1970-near future - Continued expansion and selective culture of high value and exportable species and intensification**

- ▶ In this period more species were brought into culture. The industry continued to expand both in area and in quantity of production,
- ▶ A new trend to select species that are most profitable to culture was adopted by operators in the industry. Therefore, high value species especially those with high export demand were emphasized. Penaeid shrimps, high value finfishes (seabass/groupers), seaweeds and related species became important aquaculture items.
- ▶ As demand and high market value for selected species persisted, high technology methods and intensification of operations became the norm of the industry. There is competition for major markets and maintenance of product quality standards also became a major concern.

<http://www.fao.org/docrep/field/009/ag158e/AG158E02.htm>

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