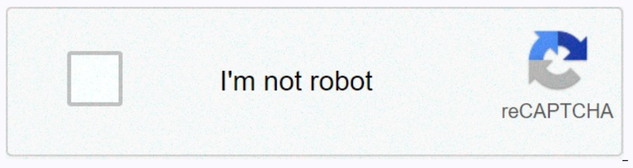

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Big head carp

Hypophthalmichthys nobilis Richardson, 1845 [Cyprinidae]FAO Names: En - Bighead carp, Fr - Carpe à grosse tête, Es - Carpa cabezona Images gallery (Photo: Thierry Dubrail)The historical backdrop of Bighead carp culture was first launched in areas along the Yangtze River and the Pearl River in southern China, much later than the culture of common carp. According to historical records, the beginning of bighead carp culture was closely linked to the will of the current governor. In the Tang dynasty, the emperor's family name was pronounced the same as the Chinese name for ordinary carp, the only fish that was cultured at the time. The royal family has forbidden the people to sell and kill common carp. Therefore, large carp are selected by farmers as a substitute for aquaculture, along with silver carp, grass carp and black carp; this is because the seeds of these fish were readily available in areas along the Yangtze and Pearl rivers. Bighead carp culture remained relatively small in scale, due to dependence on the natural supply of seeds. Success in induced farming technology significantly promoted its culture. Fish was introduced in more than 20 other countries. There has been a growing trend in the production of farmed carp since the 1970s. China is by far the main producer (1.7 million tonnes in 2002, 98.7 percent of the global total). Countries of the main producerMean countries and regions report bighead carp production to the FAO, but only some of them (China, Taiwan Province China, Islamic Republic of Iran, People's Democratic Republic of Lao, Nepal, Malaysia and Myanmar) reported production of over 1,000 tons. It is also believed that production exceeds this level in the United States.The main producer countries of Hypophthalmichthys nobilis (FAO Fishery Statistics, 2006).* Lao People's Democratic Republic.** Islamic Republic of Iran.Habitat and biologyBighead carp is a eurythermic fish, which can tolerate water temperatures of 0.5-38 °C. It is an autochthonous freshwater fish in China, with a wide distribution from the drainage areas of the Pearl River in southern China to those of the Heilongjiang River in the north. It inhabits lakes, rivers and reservoirs. Bighead carp usually resides in the upper layer of the water column and prefers high-fertility water with abundant natural food. Although it has been introduced in many other countries (mainly Asia and Eastern Europe), very little information is available on the distribution of the species in natural water bodies in these countries. However, it is reported that a natural population of bighead carp has been found in the Red River in the Viet Nam. Bighead carp is a synchronous and gonohoist species that is born every year for tens of years during its lifespan. There's only one spawning season in which takes place at the beginning of summer. Bighead is a semi-migratory fish. Broodstock migrates from lakes and lower river flows to spawning grounds in the upper reaches of china's main rivers in spawning season. Running water and water level changes are an essential environmental stimulus for natural spawning. Slow eggs are laid that are suspended in the water column when there is electricity. Bighead carp can reach sexual maturation in captivity, but it can not spawn naturally in these conditions. Hormonal injection and environmental stimulus such as running water are essential for induced spawning. This species is basically a zooplankton feeder during its lifetime under natural conditions. In culture, bighead carp will also accept artificial foods, such as po-products from cereal processing and organic detritus, in addition to natural foods. Bighead carp grow rapidly and become very large, reaching a maximum weight of 40 kg. Production cycleProduction cycle Hypophthalmichthys nobilisProduction systemsDue natural features of bighead carp, the systems used for its culture are quite limited. Extensive culture in open water and polyculture on the lake are the main systems used. The most important factor involved in the production of bigheads is to ensure a sufficient supply of quality seeds. Relatively, it is more difficult to breed bighead than other fish, due to their slow gonadal development. It is also more difficult to produce large fingers, due to their slow growth at an early developmental stage. Artificial reproduction is the main stock of seeds for bighead carp culture, although natural seeds are still available in some Chinese rivers. Seeds collected from natural waters are mainly used to maintain litter quality. Litter used for artificial reproduction is usually grown in captivity by seeds from the wild or from breeding cells, where good natural stock is maintained. Induced breeding is applied for bighead. Well-ripe breeders are released into a spawning tank (round cement tank with a diameter of 6-10 m; water depth ~ 2 m) after being injected with hormone inducing (usually HCG and PG). Water circulation is maintained throughout the spawning period. Eggs are transferred to a hatching track or hatching jar, either by hand or by gravity. Hatching paths, which are round or ellipses in the form of cement structures, are usually used for large-scale production. Their width is usually 0.8 m, and their depth is 0.8-1.0 m. The inlets are mounted at the bottom of each path, and open in the same direction and at an angle of about 15° to the lower surface. The screens are mounted on the inner wall for regular discharge of water. In the end, the water can be completely drained through the socket at the bottom. During the period of laying, a current is maintained to retain eggs and larvae in the water column. Earth ponds are used for the care of bighead carp. Ponds are usually 0.1-0.2 ha in the area and 1.5-2.0 m deep. Ponds are chemically cleaned, usually with fast carnation, to eliminate all harmful organisms after complete drying. The usual dose is 900-1125 kg/ha. Organic fertilizer - animal manure and/or plant waste (green manure) is usually used to increase the natural biomass of zooplankton 5-10 days before the sock, according to the water temperature. The amount of organic fertiliser used is usually 3000 kg/ha for animal manure or 4500 kg/ha for green manure. Green and animal gus can be used simultaneously, but the amount of each of them should be reduced accordingly. Monoculture is practiced at the kindergarten stage, with population density usually between 1.2-1.8 million / ha, depending on the length of cultivation and the target size. Kindergarten operation usually takes 2-3 weeks in China. Organic fertilization is carried out at frequencies and rates sufficient to maintain the high fertility of ponds, and therefore a good supply of natural food organisms (especially zooplankton) for fish. The amount ranges from 1500-3000 kg/ha once every 4-5 days for animal manure or green manure, depending on the existing water fertility. Soy milk can also be used as direct food and fertilizer to replace organic fertilizer at the nursery stage. The normal amount is 3-5 kg (dry soybeans)/100 000 fish per day. This usually means that production costs are high. The use of paste-shaped soy cakes or other by-products from the processing of cereals may be necessary if in the later part of the breeding period poor growth of fish is observed. The amount is usually 1.5-2.5 kg/100 000 fish per day. Normal survival rates in nurseries are 70-80 percent, although it can reach over 90 percent under good management. Fish usually reach a size of about 30 mm in length after 2-3 weeks of breeding. They are called summer fingers in China and are ready for the stage of growing fingers. Conditioning, careful mesh and keeping the fish at high density for a while (several hours) is necessary before transferring summer fingers to the pond for fingers. This practice is designed to increase fish's tolerance to stress before they are transported. Summer fingers are not suitable for direct sock in breeding ponds; first it is necessary to grow them to the stage of the finger (13-15 cm in length). The technique of growing fingers is quite similar to the operation of nurseries, including the feeding and fertilization regimen. The main differences include the following: Relatively larger (0.2-0.3 ha) and deeper earthen ponds are used for growing fingers. Contrary to the nursery stage, polyculture is usually adopted for the production of bighead carp. Bighead carp can be polycultural with other types of carp, but not silver carp. Monoculture is practiced in the manufacture of bighead carp fingers. Population density is about 120,000/ha when the main species is in a pond or 30,000-60,000/ha when it's a secondary species. Finger breeding usually takes 4-6 months for the above size and density of socks in China. The period can be significantly shortened in warmer climatic areas or if lower density socks are used. The normal survival rate throughout the entire finger-growing period should be above 95 percent. In viet nam, breeding bighead carp before the growth phase is divided into two periods. Fry first rise to 2.5-3 cm, with a density of socks in the pond that is slightly larger than carp grass (c/f grass carp). Then the fish are additionally raised to a size of 6-12 cm at a much lower density. Here, the cultivation of bighead carp seeds usually takes 45-50 days. Fish are usually fed with soy powder, corn powder and rice bran. The most commonly adopted techniques for ongrowing (grow-out) bighead carp are polyculture in ponds and pencils and extensive culture in lakes and reservoirs. Polyculture in ponds and pencilsU China, bighead carp usually culture as a secondary species along with other types of carp. The population density for breeding is 750-1500/ha of 13-15 cm of fingers. If selective harvesting is to be practiced, a certain proportion of fish of larger quantities (up to 250 g) are also supplied. There is no special feeding/fertilization required for a bighead when herbivores and omnivorous fish are cultured as the main species. However, organic fertilizer is usually used to raise natural food if bighead and silver carp are cultured as the main species. Fish can reach a sleamy size (750-1500 g) within 8-10 months in China. The period of culture can be much shorter in tropical and subtropical areas. The yield of bighead carp is usually 500-1000 kg/ha, which makes up 10-15 percent of total production. In Viet Nam, bighead grow-out is carried out through polyculture with other species, such as grassy carp, silver carp, rohu, mrigala, ordinary carp and tilapia. Bighead carp is supplied as a smaller species in ponds, usually accounting for 3-5 percent of the total. However, bighead carp typically account for 5-7 percent of total production. Special feeding of bighead carp is not practiced. The size of the bighead carp market is 2.5-3 kg. Extensive culture in small lakes and reservoirs In this system, bighead carp are usually supplied as the main species, with a population density of 150-750 / ha, depending on the size and fertility of the body of water. This level represents about 40-50 percent of the total number of fish supplied. The size of the sock is usually 13-15 cm. A small percentage of large fingers (up to 250 g) are also supplied for selective harvesting to make full use of water and available natural food. Neither food nor fertiliser is used in form of cultivation. Production of bigheads can reach 150-400 kg/ha, which makes up 40-60 percent of total production. Selective harvests are taken in the later part of the period of culture and are usually carried out in the early morning hours (when temperatures are relatively low, and for morning marketing). Individuals of market size are selected after the net (one net per harvest). Several partial harvests are usually carried out before the pond is completely drained for the final harvest. At this final harvest, the fish is either placed on the market or used for restocking (individuals below the easy size) for the next production cycle. Bighead is usually consumed fresh, with the exception of some reservoir fishing, where it is difficult to market them all freshly because of their remote location. Part of the production is canned. Since it is produced through natural food, there is no additional intake of food for cultivation. The main inputs are seeds and management, and sometimes fertilizers. Thus, the total cost of breeding is very low. The cost of seeds typically accounts for more than 50 percent of total production costs, which is typically less than $0.20/kg. Diseases and control measures The main diseases of bighead carp and methods of control are listed in the table below. In some cases antibiotics and other drugs have been used in the treatment, but their inclusion in this table does not imply a recommendation from the FAO. Bacterial septicemiaAeromonas sobriety; Aeromonas hydrophiles; Yersinia ruckerri; Vibrio Sp. BacteriaHyperaemia at different body positions, such as jaws, mouth cavity, operculum, fin-base and the whole body when serious; protruding eyeballs; swollen anus; enlarged abdomen; raised scales; gill rotten and reduced feeding; high mortality of infected fishDisinfecting fish and culture environment with quicklime and potassium permanganat; Yu Tai III (a commercial drug ingredient with multiple herbs) via medicinal foodsStigmatosisAeromonas interctata sub. punctataBacteriumRound red spot on the skin and muscles near the anus of the fish; loose scale; rotting skin and muscles even reaching the bone; physically weak and slow movement; significantly reduced feeding; die from exhaustion Spraying bleaching powder or furazolidone solution in the pond; immersion of infected fish in a solution of potassium permangate or furazolidone; antibioticsWhite head-mouth diseaseMyxococcus sp. BacteriaAish color in the mouth and front of the head; swollen lips; difficulty breathing due to loss of control in the movement of the mouth; skin ulceration around the moonDipping fish in 2-2.5% salt water or 1% rhubarb Rheum officinale solution before socks; spraying a solution of rhomeum officinale rhubarb across the pond at a concentration of 2.5-3.7 ppm or a solution of furazolidone at a concentration of 0.1-0.2 ppmMyxosporidiasisMyxobolus driginiProtozoanSpore parasites visible on the body or internal body; Swimming may finally die of exhaustionDecased pond with fast mesome or nitrolime (CaN2) before sock; immersion of fish in a solution of dipterex and spraying the solution over the pond; difficult to treat due to the very resistant cover of parasiteTrichodiniasisTrichodina sp. ProtozoanDark body color; obvious macylenence (weight loss); slow movement; high mortality from young fishClearing pond with quicklime and dipping fish in 0.3% salt water or 0.5 ppm dipterex solution before socks; spraying dipterex solution over the pond at a concentration of 0.2 ppmLernaeosis (anchor worm)Lernaea sp. CopepodParasitizes into muscles; swims abnormally; feeds a little and gradually diesshood pond with quicklime before socks; spray solution of 90% dipterex in the pond at a concentration of 0.3-0.5 ppm; immersion of infected fish in a solution of potassium permangate at 10-20 ppm for 1-2 hoursSaprolegniasis: Dermatomycosis (Water mold disease)Saprolegnia spp.; Achlya spp. FungusWhitish fungus fungus fungus mycelia visible on the body; like cotton; weakened body or even die from exhaustionFormost handling of fish and disinfection of ponds with quicklime; immersion of infected fish in potassium chloride solution or malachite green solutionSuppliers of Pathology ExpertiseSuch can provide expertise in this topic:Research Institute for Hydrobiology, CAS, Wuhan City, Hubei Province, China. Shanghai University of Fisheries, Shanghai, China.Pearl River Fisheries Research Institute, CAFS, Guangzhou City, China.Freshwater Fisheries Research Centre, CAFS, Wuxi, Jiangsu Province, China.Zhejiang Provincial Institute for Freshwater Fisheries Research, Huzhou City, Zhejiang Province, China. Production statisticsGlobal production of farmed bighead carp was only 15 306 tons in 1950. It reached 1,722,832 tonnes by 2002. Bighead carp ranks fifth among all cultural freshwater fish globally. Bighead carp contributed 7.5 per cent of the world's freshwater aquaculture production in 2002 to 1.5 per cent of the world's freshwater aquaculture production in 2004. Chinese production increased by a factor of x129 times, while production elsewhere increased at a much lower rate (factor x10). Over the past decade (1993-2002), the global average annual growth rate of farmed carp production was 7.2 percent; in mainland China it was 7.3 percent, but in the rest of the world only 0.2 percent. However, china's rate of expansion has slowed recently. Between 1999 and 2002 Chinese bighead production rose to 2.3 percent/yr. The total value of bighead carp cultural production globally was $1.48 billion in 2002, an annual expansion rate between 1993 and 2013. The slower growth rate in terms of value, compared to volume, is mainly due to changes in the valuation of the Chinese RMB yuan against the US dollar. Market and tradeTraditional, bighead carp are fresh in China, as well as most other manufacturing countries. Most of the production is marketed fresh, either as whole fish or as pieces. Very little production has been processed. At this time, bighead carp is mainly consumed locally. In China, the main manufacturer, production is basically consumed locally. However, some production from Guangdong Province (southern China) is placed on the market in Hong Kong and Macau. In Chinese statistics, there are no concrete data on the amount of embroidered bighead carp. However, 41,798 tonnes and 4,932 tonnes of live fish (non-listed species) were exported to Hong Kong and Macao from mainland China in 2002. Bighead carp must have made up a large part of this total. Bighead carp is a low price of goods affordable to middle and low income classes in China and other countries. The price of bighead carp in recent years has changed little in China. Currently, the actual retail price is usually USD 0.60-0.90 / kg. There are no specific regulations relating to the marketing of bighead carp because fish is essentially for local consumption. There has been some development in techniques used in bighead carp culture, although fish have been cultivated for more than a thousand years. The most significant technical advance was success in his induced breeding, with litter erected under captivity. This ensures a sufficient supply of seeds at a low price. Other advances have mainly been in the development of preventive and control measures for some significant diseases of this type. Almost no progress has been made in genetic improvement, despite cross-breeding studies with silver carp. Various models of socks have also been studied, in order to achieve optimal production. Bighead carp can be produced at a very low price through organic fertilization or the use of waste released by other polyculture fish in the pond. Bighead carp culture can be well integrated into crop cultivation and livestock production to make the most of natural resources. Bighead carp can be produced with very limited intakes and low costs. Seeds can be produced by artificial reproduction on a large scale at a fairly low price. This species is suitable for poor fish farmers who can not afford high production costs, such as commercial food, etc. It is also suitable for community-based aquaculture in common common bodies of water. It has significant potential for the development of freshwater aquaculture in developing countries and is proposed to be strongly promoted for this purpose. Efforts should also be made to popularize chinese technique for induced breeding of this species where there is good potential for development. Bighead mainly depends on natural food. Therefore, the yield limited by natural productivity. Production is also limited by the supply of seeds in some countries, where artificial reproduction techniques have not yet been fully mastered. In semi-intensive and intensive cultural systems, it can be supplied as a secondary species. In this case, its production depends entirely on waste from other fish and non-destroyed food. Organic fertilization can significantly increase the production of bighead carp in an extensive culture. The main limiting factor in bighead culture is the market. Small large carp are not very good at the quality of meat and have a lot of fine inter-muscular bones. This affects market price and eligibility for consumers in many countries and means profit margins are low. Today, bighead is becoming less popular with consumers in urban areas in China. However, the quality of bighead carp meat can be significantly improved by growing to a larger harvest size (> 1.5 kg). It is not very difficult to raise fish to this size in tropical and subtropical areas. It is possible to further increase the production of bighead carp by better adopting artificial propagation techniques in many countries. In addition, the front of the bighead carp (including the head) can be cooked in a very tasty soup, which is appreciated not only by the Chinese, but also by people of other ethnic origin. For this reason, the front of the bighead carp usually brings a much higher price than the rest of the body. Responsible aquaculture practicesOn the smallest two issues should be addressed in considering responsible aquaculture practices for bighead carp culture:First is the genetic quality of seeds and the protection of natural germplasma, when an extensive culture is carried out. Artificial breeding of this species has been practiced for four decades in China. Breeding control has not always been considered a major importance of every spawning plant operator in the past. Inbreeding actually took place on several farms in the past. This caused the degradation of the quality of seeds produced for culture. In an extensive culture, it is possible for supplied fish to escape into the river system and join the natural population. This could negatively affect the germplasm of the natural population. Therefore, it is necessary to carefully carry out quality control in induced breeding. The second is the use of antibiotics and other drugs in disease control when bighead carp is polycultural in intensive pond systems. Due to the high density of socks and poor water quality resulting from various wastes, such as insutiable food and fish droppings, bighead carp are often infected with bacterial and parasitic diseases. Antibiotics and other chemicals are sometimes used for treatment. This form of abuse can cause negative effects, directly or indirectly, on consumers. Efforts should to ensure reasonable population density, good feeding practices and quality feed (for other fish in the pond) and good water management are used to reduce the occurrence of these various disease problems. Relevant government regulations must be strictly observed whenever chemicals and medicines are used. Chinese Fisheries Society. 2003. 2002. Since 2010, China's statistics on imports and exports of aquatic products. Beijing. China. 356 pp. De Silva, S. 2003. Šarani. In:J.S. Lucas, & P.C. 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