

The 6th International Carp Conference



Status and trends in carp supply chain in Asia

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Carp Aquaculture

◆ Chinese carps

- ◆ Silver carp, *Hypophthalmichthys molitrix*
- ◆ Bighead carp, *Hypophthalmichthys nobilis*
- ◆ Grass carp, *Ctenopharyngodon idellus*
- ◆ Black carp, *Mylopharyngodon piceus*

◆ Indian carps

- ◆ Catla, *Labeo catla*
- ◆ Rohu, *Labeo rohita*
- ◆ Mrigal, *Cirrhinus mrigala*

Carp Aquaculture

- ◆ Common carp, *Cyprinus carpio*
- ◆ Crucian carp, *Carassius spp.*
- ◆ Wuchang bream, *Megalobrama amblycephala*



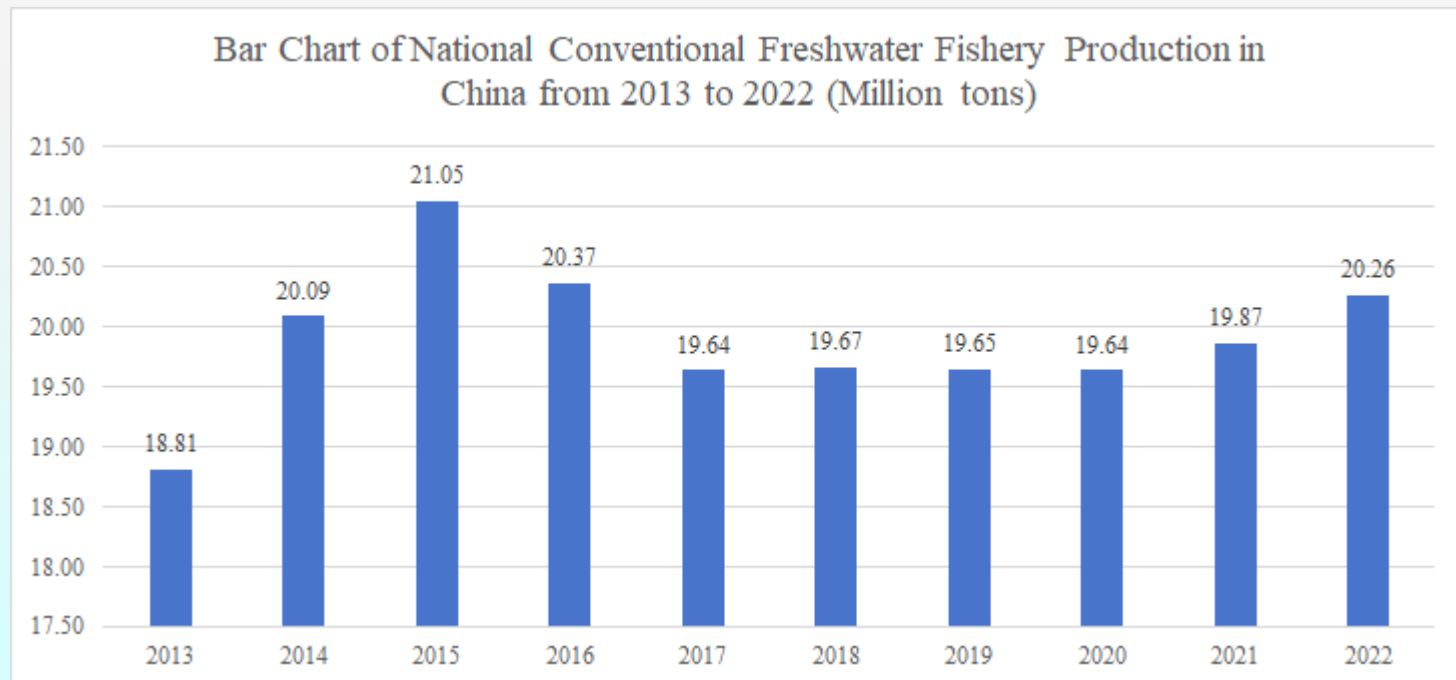
World carp production

- ◆ The world carp production in 2020 was 28.37 million MT
- ◆ 27.58 million MT in Asia

Grass carp	5.79
Silver carp	4.90
Common carp	4.24
Catla	3.54
Bighead carp	3.19
Crucian carp	2.75
Roho	2.48
Wuchang bream	0.78
Black carp	0.70
Total	28.37

Carp aquaculture in China

- ◆ 19.64 million MT in 2020 (69.2% of the World, 71.2% of Asia)
- ◆ 20.26 million MT in 2022



History of carp aquaculture

- ◆ China has a common carp aquaculture history as long as 8,000 years
- ◆ The first record of common carp aquaculture was in China 2500 years ago

nature
ecology & evolution

BRIEF COMMUNICATION

<https://doi.org/10.1038/s41559-019-0974-3>

Common carp aquaculture in Neolithic China
dates back 8,000 years

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Carp supply chain

- ◆ Seed of carps
- ◆ Food fish of carps
- ◆ Processing products of carps
- ◆ Tertiary industry of carps



Seed supply



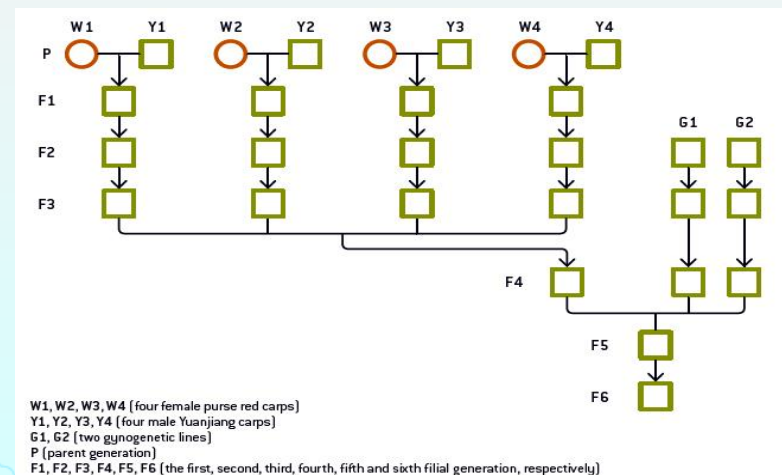
Carp seed supply

- ◆ The first successful induced breeding of fish was realized in Chinese major carps (1958-1961)
- ◆ Genetic breeding methods were applied to improve stock quality



Genetic breeding of carps

- ◆ Started with common carp in 1950s
- ◆ Traditional breeding methods
 - ◆ Selective breeding
 - ◆ Hybridization
- ◆ Modern breeding methods
 - ◆ Cytological engineering
 - ◆ Molecular engineering



Genetic breeding of carps

- ◆ The genetic improvement of carps in Asian countries
 - ◆ China
 - ◆ Vietnam
 - ◆ India
 - ◆ Bangladesh
 - ◆ Nepal
 - ◆



Certified fine breeds of carps in China

- ◆ Silver carp: 2
- ◆ Bighead carp: 1
- ◆ Grass carp: 0
- ◆ Black carp: 0
- ◆ Common carp: 33
- ◆ Crucian carp: 18
- ◆ Wuchang bream: 3



Fishery original and fine breed system

- ◆ The program for construction of fishery original breed and fine breed system was framed and brought into effect during the period from 1998 to 2003
- ◆ It is an organic unity consists of interrelated links including conservation of original and fine breeds, selection, introduction, propagation and dissemination
- ◆ Establish infrastructures including genetic breeding centers, original breed farms, fine breed farms, introduction and conservation centers, key hatcheries and germplasm detection centers

Achievements in fishery original and fine breed system

- Seed production area 460,000 ha, freshwater hatching facilities 5,850,000 m², marine hatching facilities 10,810,000 m²
- Total seed production in 2017 was 5500 billion individuals, production value was 68 billion RMB
- Specialist in fishery seed breeding almost 50,000
- Large scale cultured species reach 530, including 280 indigenous species and 50 introduced species

Food fish supply



Food fish culture models

- ◆ Pond culture
- ◆ Cage culture
- ◆ Paddy filed culture
- ◆ Container culture
- ◆ Race way culture



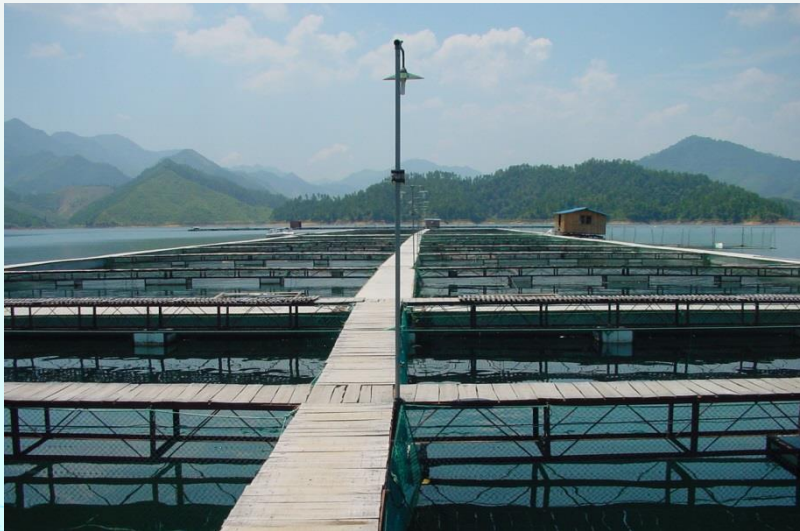
Carp culture in pond

- ◆ A common culture model for carps, usually is polyculture
 - ◆ Major species: feeding species
 - ◆ Minor species: filtering species



Carp culture in cage

- ◇ Usually is monoculture
 - ◇ Feeding species
 - ◇ Filtering species



Carp culture in paddy field

- ◆ Ecological and profitable culture model
 - ◆ Common carp
 - ◆ Crucian carp



Carp culture in container

- ◆ New model covering less land area
 - ◆ Circulating system
 - ◆ High culture density



Carp culture in race way

- ◆ An ecological engineering culture model



Processing products supply



Processing products

- ◆ Fish ball
- ◆ Fish paste
- ◆ Fermented fillet



Ready-made dish

- ◆ Steamed fish head (silver carp, bighead carp) with chili
- ◆ Boiled fish (grass carp) with pickled cabbage and chili
- ◆ Sauce common carp



Instant snack

- ◆ Fish pieces
- ◆ Fish tofu



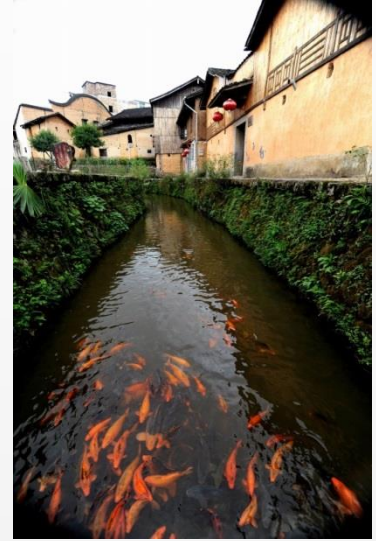
Tertiary industry of carps

-Culture & tourism



Culture & tourism

- ◆ Legends and tales
 - ◆ Carps jumping over the Dragon Gate
 - ◆ Auspicious happiness in superabundance
- ◆ Common carp brook
- ◆ Fish tomb



Culture & tourism

- ◆ Giant net fishing in Qian Dao Lake
- ◆ Netting under ice in winter Cha Gan Lake
- ◆ Catering



Future directions



Carp breeding

- ◆ Multiple traits selection
 - ◆ Growth rate
 - ◆ Survival rate
 - ◆ Resistance to stress or disease
 - ◆ Meat quality

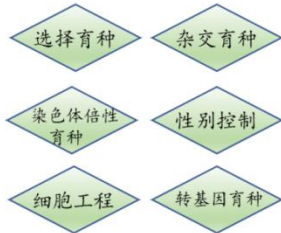


Carp breeding

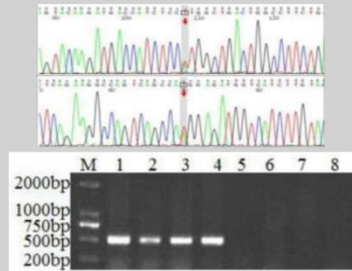
- ◆ Genomic selection and gene editing will effectively create improved strains of carps

遗传改良及分子育种 Genetic improvement and molecular breeding

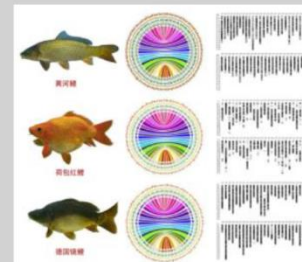
传统育种技术 Traditional breeding



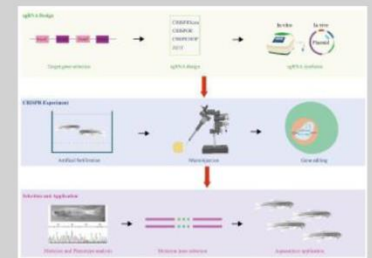
分子标记辅助育种 Molecular assisted breeding



基因组选择 Genomic selection

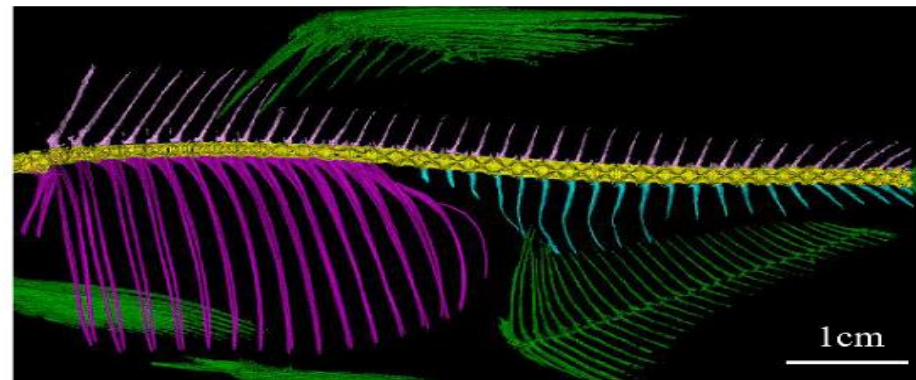
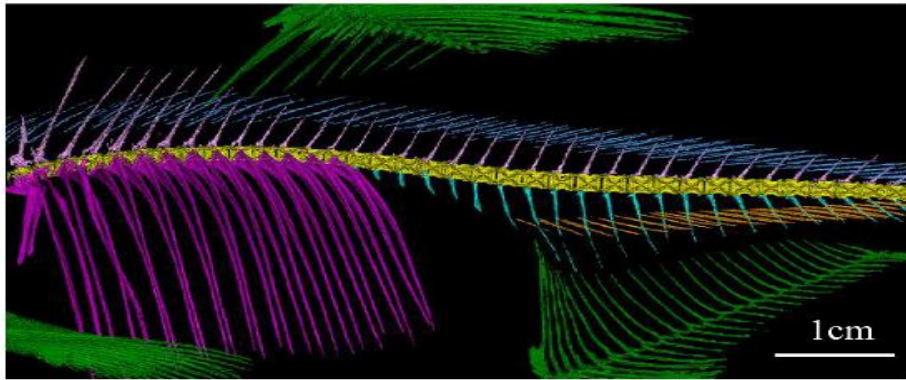


基因组编辑 Genome editing



Carp breeding

- ◇ Gene editing
 - ◇ Knocking out *runx2b* gene created intermuscular bone-free Wuchang bream and crucian carp mutants



Carp culture

- ◆ Aim at ecological, green and profitable culture model
 - ◆ In-pond tank culture system
 - ◆ Aquaponics



Added value promotion

- ◆ Carps are lower value aquaculture species
- ◆ The added value of carps could be promoted by processing and high valued variety
- ◆ Intermuscular bone free carps can make more processing products



Added value promotion

- ◆ High valued processing products
 - ◆ Hydrolyzed peptide
 - ◆ Collagen protein



Added value promotion

- ◆ High valued ornamental carps
 - ◆ Koi carp
 - ◆ Colorful crucian carp



Thanks for your attention

