

Present Status of Common Carp Genetics and Breeding at MCFAD Sukabumi

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I. Background

- Carps are the most important cultured species in Indonesia
- Cultured in three environments: ponds, floating cages and rice fields
- Total production in 2004 was reported 192,461 tons consist of pond culture: 79 900 tons, cage culture: 16,495 tons, floating net: 42 381, and rice field are 53 685 tons
- After KHV attack, genetic quality of seed and broodstock common carp decrease; fish hatchery and growout industries collapse generally in rural areas

I. Background

- In order to provide the high quality of the common carp broodstock to the region,
- MCFAD, as National Broodstock Center planned the breeding program, collaboration with Bogor Agriculture University and Agency for the Assessment and Application of Technology for producing high quality of broodstock has been started in 2007.

II. Genetics and Breeding

- MCFAD has a mandate for producing high quality of broodstock
- since 1986 produced and maintained common carp broodstock such as Majalaya, Sinyonya, and Punten.
- Since 1986 this center also producing pure line of Majalaya and Sinyonya by using gynogenetic technique
- In 2002 KHV disease had attacked to the common carp broodstock in this center, and more than 60% of broodstock died
- Since 2007, MCFAD as National Common carp Broodstock Center (NCBC): common carp breeding program, and genetic laboratory has been set up
- The main purpose of this program:
 - to produce high quality of common carp broodstock in term of growth rate and disease resistance, possibly specific pathogen resistance to KHV.

II. Genetics and Breeding

Main activities of the breeding program as follows:

- Collection of 7 common carp races: Majalaya, Sinyonya, Punten, Cangkringan, Rajadanu, Wildan, and Szarvas.
- Characterization by using DNA analysis (AFLP, RAPD, and Microsatellite)
- Individual selection
- Crossbreeding
- Pure line propagation of Majalaya and Sinyonya
- Transgenic

Broodstock Collections



Majalaya


- The color of the scales is grayish green and the margin of each scale is darker in color and taller toward the back.
- The snout is more flattened and the stomach wall is thicker than that of other strains.



Punten

- The color of the scales is blackish green, the body is relatively shorter than that of other strains, the back is high, and the eyes are rather bulging.

Broodstock Collections



Rajadanu

- The color of the scales is grayish green

Wildan

- The color of the scales is grayish green more alike Majalaya and the margin of each scale is darker in color and taller toward the back

Broodstock Collections



Sinyonya

- The color of the scales is light yellow, the body is slim and the back is shorter than that of the punten strain.
- The eyes are narrow in adult fish but round in young fish.

Cangkringan

- The color of the scales is yellowish red
- The body is relatively long and the eyes are somewhat bulging

Broodstock Collections



Szarvas

- Introduced to Indonesia in October 2005 from Hungary
- Scaliness: full scaled, homozygote
- Colour: silver-yellowish white
- Lateral line: typical of other species
- Fins: regular, vigorous growth

Tentative Schedule Breeding Activities 2007 - 2014

No.	Year	Activities
1.	2007	Strain collection and characterization of common carp
2.	2008	Crossbreeding, selective breeding, gene transfer and challenge test
3.	2009	Selective breeding, immunostimulant test and gene transfer
4.	2010	Selective breeding, Challenge test, gene transfer, and Vaccine test
5.	2011	Selective breeding, challenge test, and gene transfer

Tentative Schedule Breeding Activities 2007 - 2014

No.	Year	Activities
6.	2012	Selective breeding, challenge test, and gene transfer
7.	2013	Selective breeding, and gene transfer
9.	2014	Selective breeding, and assessment super-G strain

III. Laboratory Equipments



Real time PCR

Laboratory Equipments



Refrigerate centrifuge

Laboratory Equipments



Refrigerator -40 °C

Laboratory Equipments



Microscope and equipments for gene transfer by microinjection and detect GFP expression

Laboratory Equipments



Grinder unit to make micro needle

Laboratory Equipments

1. Vertical gel for DNA microsatellite analysis
2. Microchip tag
3. Micropipette
4. Shaker



Ponds Facilities



IV. Affiliated Institution

1. Department of Aquaculture, Faculty of Fisheries and Marine Science, Bogor Agricultural University
2. Agency for the Assessment and Application of Technology

V. Expected from the Consortium

1. Strengthening the genetics and breeding network among consortium members
2. Strengthening the capacity building
3. Training course for genetics molecular

Thank for your kind attention

