



**Adusumilli Gopalakrishnaiah & Sugarcane Growers
Siddhartha Degree College of Arts & Science**

Vuyyuru – 521165, Krishna District, Andhra Pradesh

(An Autonomous College in the Jurisdiction of Krishna University, Machilipatnam)

Accredited by NAAC with "A" Grade

ISO 9001:2015 Certified Institution

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<http://agsgsc.edu.in>

**DEPARTMENT OF ZOOLOGY
VALUE ADDED COURSE
2022-2023**



Striped barbs



Rosy barb



Redline Torpedo barb



Rasboras



Danios



Lionhead goldfish

DURATION:-30 DAYS

1-11-22 to 5-12-22

COURSE CODE:-VACZOO-06

A.G. & S.G. Siddhartha Degree College of Arts & Science

Vuyyuru-521165, Krishna District, Andhra Pradesh

(Managed by: Siddhartha Academy of General & Technical Education, Vijayawada-10)

An Autonomous College in the Jurisdiction of Krishna University

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2022-2023



DEPARTMENT OF ZOOLOGY

Value Added Course

Title: ORNAMENTAL FISH BREEDING

Name of the Lecturer	:	D.A.Kiranmayee
Class	:	I.B.Sc Aquaculture
Duration of the Course	:	30 Days (01.11.2022 to 05.12.2022)
VAC Code	:	VACZOO-06

Value Added Course

Title: ORNAMENTAL FISH BREEDING

Objectives :

1. To impart hands on training on breeding technology
2. To impart hands on training on setting up of aquaria and maintenance
3. To generate expert-oriented employment in rural and urban households through ornamental fish production.
4. To impart hands on training on culture, feeding and breeding of commercially important ornamental fishes
5. To mass-produce a large number of varieties of ornamental fish species to create a large supply of ornamental fish and increase the overall exports.
6. To promote employment and entrepreneurship in the ornamental fish sector by graduates in fisheries, aquaculture and biological sciences.

Methodology : Teacher Centered Method

Duration : 01.11.2022 to 05.12.2022

A.G. & S.G. Siddhartha Degree College of Arts & Science

Vuyyuru-521165, Krishna District, Andhra Pradesh

Value Added Course

Student Enrolment Sheet

Class : I SEM- I B.Sc Aquaculture

S. No	Roll No.	Name of the Student	Signature
1	22-901	J.CHANDANA SEERSHIKA	J.chandana.
2	22-902	B.BHANU PRAKASH	B. Bhanu Prakash
3	22-903	B.VAMSI	B. Vamsi
4	22-904	SHAIK FARZANA	Sk. Farzana.
5	22-905	MD.SHARMILA BEGUM	MD. Sharmila
6	22-906	SHAIK SADIYA SULTANA.	Sk. Sadiya Sultana
7	22-907	KODALI SWETHA	k. Swetha
8	22-908	ABDUL.SABEERUNNISA	Ab. Sab eerunnisa
9	22-909	S.VUHA	S. Vuha.
10	22-910	CH.LAKSHMI PRIYANKA	Ch. lakshmi priya
11	22-911	SHAIK SHAKEERUNNISA	Sk. Shakeerunnisa
12	22-912	A.SAWGANDHIKA	A. Sawgandhika
13	22-913	S.VASAVI SATYA SRI	S. Vasavisatyasri
14	22-915	B.VIVEKANANDA	B. Vivekananda
15	22-916	PEDAPUDI SRUTHI	P. Sruthi
16	22-918	Y.DIVYA JYOTHI	Y. Divya Jyothi
17	22-919	G.SUSHMA	G. Sushma
18	22-921	S.DIVYA SAI	S. Divya sai
19	22-922	P.SRUTHI	P. Sruthi.
20	22-923	M.LAKSHMI NAVEENA	M. lakshmi naveena.

A.G. & S.G. Siddhartha Degree College of Arts & Science

Vuyyuru-521165, Krishna District, Andhra Pradesh

Value Added Course

Title: ORNAMENTAL FISH BREEDING

Date :- 01.11.2022 to 05.12.2022

Date	Content	Module No.
01.11.22 to 07.11.22	Introduction to Aquaculture and Ornamental Fishes Trading Basics of aquaculture definition and scope. History of aquaculture: Present global and national scenario. World trade of ornamental fish and export potential. Different varieties of exotic and indigenous fishes. Ornamental fisheries- new dimensions in aquaculture entrepreneurship	I
08.11.22 to 14.11.22	Introduction to Ornamental fishes Introduction to aquarium and aquarium accessories. Basic knowledge on profile of ornamental fishes in world Fish Breeding and rearing in Live Bearers Breeding of ornamental fish with reference to live bearer species. Breeding of Guppies, Mollies, Sword tail fish and Platy fish Introduction hatchery management system for live bearers Nursery management of live bearers • Rearing of live bearers	II
15.11.22 to 22.11.22	Fish Breeding and rearing in Egg layers Ornamental fish farming-Management Aspects Ornamental Fish-diseases and their management Live Food culture for tropical ornamental fish Feeding for breeding and maintenance of ornamental fish	III
23.11.22 to 05.12.22	Engineering Aspect and construction of aquarium Design and construction of public fresh Construction, settings and maintenance of aquarium Construction of ornamental fish unit Engineering aspect in Ornamental Fish Farming	IV

Value Added Course

Title: ORNAMENTAL FISH BREEDING

Test Exercise:

5x10=50

1. Explain about World trade of ornamental fish
2. Different varieties of exotic and indigenous fishes
3. Breeding of ornamental fish with reference to live bearer species.
4. Live Food culture for tropical ornamental fish
5. Construction, settings and maintenance of aquarium

Value Added Course

Title: ORNAMENTAL FISH BREEDING

Key:

1. Ornamental fish culture also known as aquaculture, is the culture of attractive, colorful fishes of peaceful nature in confined aquatic systems. Ornamental fishes are also called as "living jewels".

The international market for ornamental fishes is valued at about US \$ 5.9 billion. The world export of ornamental fish in 2006 was 282.6 million US \$ and imports valued at 308.9 million US \$. Around 200 million ornamental fishes are sold every year of which 80% are freshwater and 20% are marine. In freshwater 90% are captive bred and in marine 99% are wild caught. More than 120 countries are involved in ornamental fish trade and there are about 1800 species of ornamental fishes available in the market of which 1000 are fresh water. Guppy is the dominating species followed by Neon tetra. India is still in a marginal position just contributing 1% of total ornamental fish trade. An estimate carried out by Marine Products Exports Development Authority of India shows that there are one million ornamental fish hobbyists in India. The internal trade is estimated to be about 3.26 million US \$ and the export trade is about 0.38 million US \$ in India. The annual growth rate of ornamental fish trade is 14%. A rich diversity of species and favourable climate, cheap labour make India suitable for ornamental fish culture. Tamilnadu, Kerala and West Bengal are the major states involved in ornamental fish farming. Two categories of ornamental fishes are being marketed from India - exotic and native. The exotic varieties have been marketed domestically and dominating with 99%. Already 288 exotic varieties have been recorded in Indian market. More than 200 species of these freshwater fish are bred in different part of India. Mostly native ornamental fishes are exported. North eastern states, West Bengal, Kerala and Tamilnadu are blessed with highly potential indigenous ornamental fishes. Around 85% of native fishes are from North eastern states. 90% of native ornamental species are collected and reared to meet export demand. Presently about 100 native fish species have been earmarked as aquarium fish. Kolkata, Mumbai and Chennai are major exporting centres. About 90% of India exports go from Kolkata followed by 8% from Mumbai and 2% from Chennai. Around 4000 peoples involved in this trade including breeding, live food collection, trading and exporting. There are 20 registered exporters.

2. The terms "exotic" and "indigenous" are used to describe fish species in relation to a particular geographical area. Here's the difference between exotic and indigenous fish:

Exotic Fish: Exotic fish are species that are not native to a specific geographic region but have been introduced to that area by human activity. They are typically introduced intentionally or accidentally, often for purposes such as aquaculture, sport fishing, or ornamental purposes. Exotic fish may come from different parts of the world and may have different ecological requirements than the native species in the area. Depending on their interactions with the local ecosystem, exotic fish can sometimes have significant impacts on the environment, including competition with native species, predation, habitat alteration, and introduction of diseases.

Indigenous Fish: Indigenous fish, also known as native or endemic fish, are species that naturally occur and are native to a specific geographic region. These fish have evolved and adapted to the local ecosystem over time and are an integral part of the natural biodiversity in that area. Indigenous fish species have established

ecological relationships with other native species, depend on local habitats, and play important roles in the functioning of the ecosystem. They are often well-adapted to the local environmental conditions, such as water temperature, pH levels, and food availability.

It's important to note that the distinction between exotic and indigenous fish can vary depending on the specific geographic region in question. A fish species that is considered exotic in one area may be native in another. Therefore, it's crucial to consider the specific context and geographical reference when using these terms.

3. In live bearing fish, the eggs are situated in the egg duct where they are fertilized. Upon hatching, the fry are not immediately delivered, but they remain in the safety of the mother's body until they reach a stage of development equivalent to the young of egg layers that have absorbed the yolk sac and become free swimming. The ideal temperature must be 27°C.

As the male matures, the anal fin becomes more pointed and straightened into a rigid tube like projection, which is called gonopodium. The gonopodium is carried normally close to the body and pointing rearwards. However, it is a mobile organ and can be angled in almost any direction. The males court the females with their fins erect and they chase the female until the opportunity presents itself for a lightning thrust of the gonopodium. The female is fertilized by the nearest touch of the gonopodium on her vent, and one fertilization will last for several broods. Unlike the male, the female has normal anal fin. Females can have up to eight broods from one fertilization therefore it is unnecessary to remate after the first brood. The period of gestation is being constant for every species.

Females about to give birth are said to be ripe. This condition can be determined by the appearance of the dark, crescent shaped area in the female body close to the vent known as the gravid spot, which is accompanied by a general fattening of the belly when viewed from above. The eggs develop and actually hatch out inside the mother and leave her body as fully developed fish. The number of young in a brood is largely dependent upon the size of the female. Irrespective of the number in the brood the fry are approximately all the same size at birth. Livebearers are notorious cannibals; they will devour their youngones as soon as they are born. This can be prevented by having an abundance of cover for the youngones in the form of bunched fine leaved plants, or to use a breeding trap, which restricts the female to a small part of the aquarium, but allows the fry to escape into the wider reacher of the breeding tank.

The preparation for the breeding tank is simple. It need not be too large for most species, and should be filled to a depth of about 8" (20cm) with matured water and the temperature is raised to about 25°C. The tank should be well stocked with fine leaved plants. Once the female has given birth to the full brood she can be removed. Instead of plants, nylon knitting wools can also be used. Handling livebearers when they are near the time to delivery can cause premature birth. Premature babies have not completely absorbed their yolk sac, which can be seen attached to their bellies. Livebearers normally kept in a community aquarium tank will breed indiscriminately, and will often crossbreed between similar species. If the aquarist is interested in obtaining a particular colour strain or any other feature for that matter it is imperative that the sexes are housed separately.

4. A number of live foods can be used to add colour and to condition the fish for breeding. Feeding a restricted range of live foods, and exclusion of all other kinds of foods, is unlikely to provide a balanced diet, and may even lead to nutritional or other internal disorders for the fish. As many live foods originate from ponds, streams or rivers, they may bring with them aquarium pests, such as hydra, snails, or disease causing organisms. The risk of introducing disease organisms can be reduced by collecting live foods from fish free water, but the

possibility of introducing aquarium pests still remains. It may be safer to use live foods disinfected before use.

Earthworms are an excellent, live food for all kinds of fish, including goldfish. Anyone, who has access to a garden or patch of waste ground should be able to collect enough for their fish. After collection, the earthworms must be kept for a few days in a sealed container. This should have small air holes. During this time the worms will clean themselves of solid and wastes and will then be more palatable for the fish. The worms can be given as whole or chopped, depending on their size and the size of the fish.

Sludge worms, such as *Tubifex* and other tubificid worms, are a live food familiar to most tropical fish *hobbyists*. These slim, centimeter-long, maroon worms are often used to tempt fish such as Discus to feed, and are given as a live food to adult breeding fish. Tubifex worms are not easy to culture successfully and so are most often obtained from an aquatic shop. Unfortunately, in nature these worms live in polluted stretches of rivers and streams, and it is from these unsavoury sources that most Tubifex are collected for aquarium use. Therefore, tubifex should be used sparingly in the aquarium only as an occasional food rather than as a staple diet. Before use, the worms should be rinsed gently in cold running tap water for several hours. Once cleaned, *Tubifex* worms live for some time in a shallow dish of cold water.

Water fleas are tiny planktonic crustaceans, such as *Daphnia* and *Cyclops*. Like tubifex, they are a popular live food among tropical aquarists. This is suitable for larger fish fry or to condition adult fish for spawning. However, like *Tubifex*, using water fleas as a live food may result in the introduction of unwanted pests or disease causing organisms. Unfortunately, *Daphnia* and related forms are less easily disinfected than Tubifex, ideally therefore they should be obtained from a safe fish-free pond.

Bloodworms are the aquatic larval stage of a two-winged fly. Difficult to culture, they are best obtained from aquatic shops and are particularly useful in the winter months, when other live foods may be scarce.

In egg laying fish species, nutrients trapped in the egg sac would be normally sufficient to the hatchlings. Afterwards, the tender hatchlings are fed with green water consisting of microscopicalgal species of *Protococcus*, *Tetrasphaerium*, *Chalmydomonas*, *Chlorella*, *Volvox*, *Eudorina*, *Pandorina*, etc. Certain filamentous algal species of *Spirogyra* are known to serve as an ideal food source for the fry and juvenile fishes. The above green water is a viable food source especially during the first two weeks of growth.

Aquarium fish, depending on their feeding habits and preference may be fed with live foods. Such as mosquito larvae, fruit flies, bloodworms, tubificids, *Cyclops*, daphnids, rotifers, brine shrimps earthworms white worm and microworm or with moist pellets, dry pellets, flakes and chopped bits of fish, shrimp, beef, oyster, crab and liver, spleen, lung, heart and brain of cattle.

5. Following a maintenance schedule will prevent your aquarium from becoming overly dirty or hazardous to your fish's health. This schedule should consist of daily, weekly, and monthly tasks.

Daily aquarium maintenance

You can keep your tank's water clean by performing these simple tasks every day:

Ensure all pumps, filters, and lights are working properly.

Observe fish for negative side effects. If any side effects are evident, test the water immediately. If the water is fine but the fish remain ill, check the filters and pumps for any malfunctions.

Remove excess food from the tank

Top off the tank with treated water

Check the water's temperature. Most freshwater tanks should remain between 75° and 80° Fahrenheit. However, some fish require different temperature ranges. Ensure that the temperature of your tank is suitable for all of your marine life.

Weekly/semi-weekly aquarium maintenance

Every one or two weeks, you should clean your fish tank and replace no more than 25% of your tank's water.

How to clean a fish tank

Cleaning your tank every one to two weeks will prevent any buildup of hazardous chemicals, grime, or other contaminants. While cleaning, you can keep the fish in the tank if you cautiously work around them.

What equipment do I need to clean a fish tank?

While you do not need an abundance of specialized equipment for a simple home aquarium, these tools will make maintenance simpler, quicker, and more effective:

Gravel vacuum

Algae scrubber

Filter brush

Acrylic-safe cleaner

Scissors (if your tank contains plant life)

Aquarium fertilizer (if your tank contains plant life)

Steps to deep cleaning a fish tank

Wash your hands and entire forearm.

Unplug all filters and lights. Close any open valves if you have a sump pump.

Remove 15 to 25% of your tank's water. Do not remove more than this amount of water, as it will interrupt the biological filtration inside your tank.

Remove non-living decor and gently rinse and scrub with hot water.

Monthly aquarium maintenance

Each month, you need to test the quality of water in your aquarium. This task ensures that the pH, ammonia, nitrite, nitrate, and phosphate levels in your tank are appropriate for your fish and plants.

How to test aquarium water

Aquarium water can be tested using an [aquarium water test kit](#). For most freshwater aquariums, the most important contaminants to test for are ammonia, nitrite, nitrate, phosphate, and water hardness. The pH level of your water will also need to be checked. Some kits, such as [this 6-in-1 test kit](#), can test all of these elements with a single strip. Other kits specialize in testing one contaminant and provide more accurate readings than testing strips. If you choose testing strips, ensure that they are submerged in water for the correct length of time, and allow them to sit for a short while after submersion for accurate results. If your aquarium water test shows concerning pH levels or high levels of a contaminant, you will need to perform some corrective maintenance.

S.No	Reg. NO	Category	Name of the Student	Marks 50	certificate issued & signature
1)	21-901	BC-D	V. BHANU PRAKASH	45	V. Bhanu Prakash
2	902	BC-D	A VIJAYALAKSHMI	48	A VIJAYALAKSHMI
3	905	BC-D	K. HEMANTH	47	K. Hemanth
4	908	BCE	M. SUFIYA	48	Md. Sufiya.
5	910	SC	CH. PUSHPARAJU	46	Ch. Pushpa Raju
6	911	OC	V.J.S. VARDHAN	46	V.J.C.S. Vardhan
7	912		A. NAGESWARI	40	
8	913	OC	N. GREESHMITHA	46	N. Greeshmitha.
9	914	OC	P. ANJALI	45	P. Anjali
10	915	Sc	K. MOUNIKA	47	K. Mounika
11	917	Sc	K. AKHILA	48	K. Akhila
12	919	Bce	S.SAMEENATHASILEEM	48	SK sameena Tasleem.
13	920	Sc	M. DURGA RANI	47	M. Durga Rani
14	924	BCD	K. VENKATA GOPI	45	K.V. Gopi
15	925	SC	K. SWAPNA	48	K. Swapna
16	926	SC	K. VARUN	46	K. Varun.
17	927	Sc	K. BHARGAVI	47	K. Bhargavi
18	928	SC	N. SAI TEJA	48	N. Saiteja
19	929	SC	S. NANDINI	49	S. Nandini
20	930	BC-C	Y. ABHIGAILU	49	Y. Abhigailu
21	917	Sc	Jc.		

SAIR

Head, Department of Zoology,
AG & SG Siddhartha Degree College,
(Autonomous)
VUYYURU - 521 165.

INTERNAL AUDIT
IQAC
AG & SG Degree College
VUYYURU - 521 165

Department of Zoology - 2022-2023

Value Added Course Student List

S.No	Rege. No	Category	Name of the student	Marks	Certificate issued & Signature
1	22-901		J. Chandana Seershika	48	J. Chandana Seershika
2	22-902	sc	B. Bharu Prakash	45	B. Bharu Prakash
3	22-903		B. Vamsi	47	B. Vamsi
4	22-904		Shaik Farzana	49	Shaik Farzana
5	22-905		md. Shanmola Begum	49	md. Shanmola Begum
6	22-906		sk. Sadiya Sultana	49	sk. S. Sultana
7	22-907		K. Swetha	46	K. Swetha
8	22-908		Ab. Sabeerunnisa	49	Ab. Sabeerunnisa
9	22-909		S. Vaha	47	S. Vaha
10	22-910	sc	ch. Lakshmi priyanka	45	ch. Lakshmi priyanka
11	22-911		Sk. Shakhegunnisa	49	Sk. Shakhegunnisa
12	22-912		A. Saugandhika	42	A. Saugandhika
13	22-913		S. Vasavi Satya Sri	48	S. V. S. Sri
14	22-915		B. Vivekananda	41	B. Vivekananda
15	22-916		P. Sruthi	48	P. Sruthi
16	22-918		Y. Divya Jyothi	47	Y. Divya Jyothi
17	22-919		G. Sushma	40	G. Sushma
18	22-921		S. Divya Sai	44	S. Divya Sai
19	22-922		P. Sruthi	49	P. Sruthi
20	22-923		M. Lakshmi Naveena	42	M. Lakshmi Naveena

is At

Head, Department of Zoology,
AG&SG Siddhartha Degree College
(Autonomous)
VUYURU - 521165.

Department of ZOOLOGY
Value Added Course

Title: ORNAMENTAL FISH BREEDING

Feed Back Form

1. Is the programme interested to you (Yes/No)
2. Have you attended all the session (Yes/No)
3. Is the content of the program is adequate (Yes/No)
4. Have the teacher covered the entire syllabus? (Yes/No)
5. Is the number of hours adequate? (Yes/No)
6. Do you have any suggestions for enhancing or reducing the number of weeks designed for the program? (Yes/No)
7. On the whole, is the program useful in terms of enriching your knowledge? (Yes/No)
8. Do you have any suggestions on the program? (Yes/No)

Ist BSC Aqua

2242907 (22-907)

K. Swetha

A. Lakshmi Mayee

HEAD, DEPARTMENT OF ZOOLOGY
AG&SG Siddhartha Degree College
(Autonomous)
VUYYURU - 521 165.


PRINCIPAL

AG & SG Siddhartha Degree College of
Arts & Science (Autonomous), Vuyyuru

Department of ZOOLOGY
Value Added Course

Title: ORNAMENTAL FISH BREEDING


Feed Back Form


1. Is the programme interested to you (Yes/No)
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7. On the whole, is the program useful in terms of enriching your knowledge? (Yes/No)
8. Do you have any suggestions on the program? (Yes/No)

Ist Bsc Aqua

2242901 (22-901)

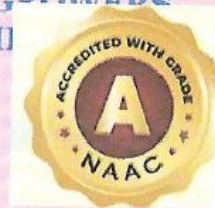
J. Chandana Seershika.


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PRINCIPAL
AG & SG Siddhartha Degree College of
Arts & Science (Autonomous), Vuyyuru



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SIDDHARTHA DEGREE COLLEGE OF ARTS AND SCI
(AUTONOMOUS) VUYYURU A.P
(Accredited at "A" level by NAAC, Bengaluru)



Department of Zoology

VALUE ADDED COURSE: **Ornamental Fish Breeding**

CERTIFICATE

This is to Certify that . B. Bhanu Prakash. Of I.B.Sc Aqua has Successfully completed value added course in **Ornamental fish Breeding** Conducted by the Department of Zoology from 01-11-2022 to 05-12-2022 We wish him her bright future

B. A. Laxmi
Co-ordinator

B. A. Laxmi
Head of Department

Praveen
Principal
AG & SG Siddhartha Degree College of
Arts & Science (Autonomous), Vuyyuru