GOVERNMENT DEGREE COLLEGE, KORATLA.

(AFFILIATED TO SATAVAHANA UNIVERSITY)

DIST: JAGTIAL, TELANGANA STATE.

DEPARTMENT OF BOTANY

CERTIFICATE COURSE

ON

AZOLLA CULTIVATION

Date: **10/01/2022**

ORGANIZER

1. B.NAGARAJU
Lecturer in BOTANY

Details of Enclosures:

1. Certificate course file

- **1.Permission letter**
- **2.Circular**
- **3.syllabus**
- **4.Objectives and outcomes**
- **5.Course schedule**
- **6.Student list**
- **7.Attendence sheet**
- **8.Certificates**
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GOVT. DEGREE COLLEGE, KORATLA-505 326 DIST: JAGTIAL

CERTIFICATE COURSE IN CULTIVATION OF AZOLLA

PERMISSION LETTER

To
The Principal,
GDC, Koratla.

Respected Madam,

Subject: Seeking permission to start Certificate course in ***Cultivation of Azolla*** in our college Request - Reg……..

…@.....@....

We, the Department of Botany would like to start Certificate course in ***Cultivation of Azolla*** in our college for the academic year 2021-22 for the betterment of all students for their bright future and career.

Hence, you are requested to permit us to start the above mentioned Certificate course for the academic year 2021-22.

Thanking you Madam,

(B.Nagaraju)
Lecturer in Botany

Yours faithfully,

(B.NAGARAJU)
Department of Botany.

CIRCULAR

It is here by informed all the students that We, the Department of Botany start *Cultivation of Azolla* for a period of thirty days for this academic year 2021-22. The classes will be conducted during zero hours that is from 4.30 pm to 5.30 pm on all working days. The detailed schedule will be intimated soon. Interested candidate may enroll their name with Mr. B.NAGARAJU, Lecturer in Botany on or before__09/01/2022_____. If the enrolled candidates are more than thirty, a formal entrance test will be conducted and based on the performance the selected students will be short listed.

C.B.Nagaraju
Lecturer in Botany

Principal
GOVT. DEGREE COLLEGE
KORATLA Dist.Jagtial-505 326

Department of Botany

Principal

SYLLABUS
CULTIVATION OF AZOLLA

Introduction:

Kingdom: Plant
Order: Salviniales
Class: Fern
Family: Salviniaceae
Scientific name: Azolla

Azolla

In the recent past agriculture as a profession is losing its charm among the farmers. This has been attributed to several reasons; important among them are spiraling cost of inputs coupled with uncertainty in the price of the product. This has been aggravated by non-availability of assured irrigation due to depletion in ground water. This has in turn manifested as distress among the farmers in substantial areas in Andhra Pradesh, Telangana, Maharashtra, Karnataka and Kerala, which are otherwise considered as agriculturally developed areas. A couple of committees have gone into the root cause of distress and suggested that alternate income generating opportunities can be a major remedy for such disappointment among the farming community. Animal husbandry is one such alternative available to such distressed farmers. Again, availability of quality fodder to the animals is the major impediment in scientific management of animals because India, having only 2.4% of the world's geographical area sustains 11% of the world’s livestock population. It accounts for 55% of the world’s buffalo population, 20% of the goat population and 16% of the cattle population. This has put unbearable burden on our natural vegetation. Azolla, hitherto used mainly as a green manure in paddy has tremendous potential to meet the growing demand for fodder among the small farmers taking up animal husbandry.

2. About Azolla:

Azolla is an aquatic floating fern, found in temperate climate suitable for paddy cultivation. The fern appears as a green mat over water. The Blue Green Algae cyanobacteria (Anabaena azollae) present as a symbiont with this fern in the lower cavities actually fixes atmospheric nitrogen. The rate of nitrogen fixed is around 25 kg/ha. As green manure, Azolla is grown alone for two to three weeks in flooded fields. Afterwards, water is drained out and Azolla fern is incorporated in the field before transplanting of paddy. Otherwise, 4-5 q of fresh Azolla is applied in standing water one week after planting of paddy. Dry Azolla flakes can be used as poultry feed and green Azolla is also a good feed for fish. It can be used as a bio-fertilizer, a mosquito repellent, in the preparation of salads and above all as a bio-scavenger as it takes away all heavy metals.

3. Advantages of Azolla:

1. It easily grows in wild and can grow under controlled condition also.
2. It can easily be produced in large quantity required as green manure in both the seasons – Kharif and Rabi.
3. It can fix atmospheric CO_2 and nitrogen to form carbohydrates and ammonia respectively and after decomposition it adds available nitrogen for crop uptake and organic carbon content to the soil.
4. The oxygen released due to oxygenic photosynthesis, helps the respiration of root system of the crops as well as other soil microorganisms.
5. It solubulises Zn, Fe and Mn and make them available to the rice.
6. Azolla suppresses tender weeds such as Chara and Nitella in a paddy field.
7. Azolla releases plant growth regulators and vitamins which enhance the growth of the rice plant.
8. Azolla can be a substitute for chemical nitrogenous fertilizers to a certain extent (20 kg/ha) and it increases the crop yield and quality
9. It increases the utilisation efficiency of chemical fertilizers.
10. It reduces evaporation rate from the irrigated rice field.

4. Nutrition value in Azolla:

Azolla is very rich in protein (25-35%), Calcium (67 mg/100g) and Iron (7.3 mg/100g). The comparative analysis of the nutrient content of azolla vis-à-vis other fodder source is depicted in the following table. Table: Comparison of biomass and protein content of Azolla with other fodder S.N o. Item Annual production of biomass (MT/ha) Dry matter content (MT/ha) Protein content (%) 1 Hybrid Napier 250 50 4 2 Kolkata grass 40 8 0.8 3 Lucerne 80 16 3.2 4 Cowpea 35 7 1.4 5 Subabool 80 16 3.2 6 Sorghum 40 3.2 0.6 7 Azolla 1,000 80 24

5. The material requirement for Azolla Farming:

The following materials are required for Azolla Farming:

- Silpauline sheet of density 150 gcm(gram per cubic cm)
- Sieved fertile soil
- Vermin compost
- Organic manure(cow dug)
- Powder of rock phosphate
- Azolla culture
- Micronutrients
- Clean water
- Shade net
- Farming and gardening tools
- BRICKS

6. Azolla cultivation procedure:

1. Create an artificial pond for growing Azolla.
2. For creating Azolla cultivation pond, select partially shaded area because Azolla needs 30% sunlight too much sunlight will destroy the plant. The area under the tree is preferable.
3. If you decide to grow an Azolla for the large scale you can make small concrete tanks otherwise you can make the pond any size you want.
4. Dig out the soil for pond and level the soil after that spread the plastic sheet around the ground to prevent water loss. Make sure the pond is at least 20 CM Deep.
5. Add some soil uniformly on the plastic sheet in the pond. For 2M X 2M size pond add 10-15 kg soil.
6. Azolla needs Phosphorus to grow well you can use Super Phosphate along with cow dung slurry. Cow dung increases the available nutrients. Use, cow dung 4-5 days old.
7. Next, fill the pond with water to a level of about 10 cm this will allow the short route of the Azolla Plant to float freely then leave the pond for 2 to 3 days so the ingredients can settle.
8. After 2-3 days add Azolla culture in the pond by gently rubbing Azolla in hands. It helps break Azolla into smaller pieces for faster multiplication.
9. After two-week start harvesting. Form pond of 2M X 2M size, you can harvest 1kg Azolla each day.

7. Important tips to grow Azolla:

1. Azolla rapidly grows so maintain Azolla biomass 300 gms – 350 gms/sq.meter hence harvest daily to avoid overcrowding.
2. Add once in 5 days mixture of Super Phosphate, and cow dung also add mixture containing magnesium, iron, copper,
   Sulfur etc. at weekly intervals to enhance the mineral content of Azolla.
3. Replace 25 to 30% old water with fresh water, once in 10 days; it helps to prevent nitrogen build up in the pond.
4. Replace complete water and soil, at least once in six months and then add Fresh Azolla seeds.
5. Maintain the water level of at least 10 cm, so Azolla root doesn't grow in the soil by keeping the roots floating it becomes easy to harvest.
6. Harvested Azolla wash thoroughly, so it removes dirt and smell of cow dung and then feeds them to animals.

8. Harvesting of Azolla:

- After 15-20 days, the thick layer of Azolla will develop having weight about 100-150kg.
- Harvest the two third of Azolla and use it in the rice field.
- Leave for one-third of Azolla's part per reproduction in the pit.
- After 15 days, one can harvest 3kg. Of Azolla per day.

9. Preservation of inoculums:

Azolla does not thrive under adverse conditions: extreme cold or heat. But it can be preserved even under such adverse conditions in very slow moving water bodies such as streams, canals, sewage channels, small p[ponds and tanks and unused wells. They are known as inoculums banks. The optimum temperature for azolla ranges between 15-35 ^{o} C.

10. Conclusion:

Azolla is ideal feed for livestock. If you take good care of your Azolla pond, you can harvest good quality weed every day, and it definitely reduces your cost on feed and fertilize.

OBJECTIVES:

- Introduction of Azolla
- About Azolla
- Advantages of Azolla
- Nutrition value of Azolla
- Cultivation process of Azolla
- Important tips to grow Azolla
- Harvesting of Azolla
- Preservation of inoculums
- conclusion

OUTCOME:

Students have understood the benefits of Azolla as follows

1. Azollae, Azolla has been used as "green manure" as a fertilizer in rice paddies and increase rice production.
2. Azolla is either incorporated as green manure at the beginning of the cropping season or grown as a dual crop along with rice, in the standing water of flooded fields.
3. Azolla has helped increase rice yields as much as 58% per year.
4. Azolla can be used and as a water purifier and for the control of weeds, mosquitoes, and the reduction of ammonia volatilization that accompanies the application of chemical nitrogen fertilizers.
5. Azolla is a great feed for live stock such as poultry, pigs, dairy, fish, goat, and sheep. However, today, let us talk about azolla benefits and its role as biofertilizer in paddy. Cultivation which finally results in reduced cultivation cost of rice, and increased yield of paddy

GOVERNMENT DEGREE COLLEGE, KORATLA.
DEPARTMENT OF BOTANY
ACADEMIC YEAR-2021-22

CULTIVATION OF AZOLLA

COURSE DATE: 10/01/2022

PROGRAMM SHEDULE

DAY	HOURS	TOPICS
1	2H	Introduction of Azolla
2	2H	About Azolla
3	2H	About Azolla
4	2H	Advantages Of Azolla
5	2H	Advantages Of Azolla
6	2H	Nutrition Value Of Azolla
7	2H	Materials required for cultivation
8	2H	Azolla cultivation process
9	2H	Azolla cultivation process
10	2H	Azolla cultivation process
11	2H	Azolla cultivation process
12	2H	Important tips grow for Azolla
13	2H	Harvesting of Azolla
14	2H	Preservation of inoculums
15	2H	Conclusion

GOVENMENT DEGREE COLLEGE, KORATLA.

DEPARTMENT OF BOTANY

List of Students Enrolled for certificate course

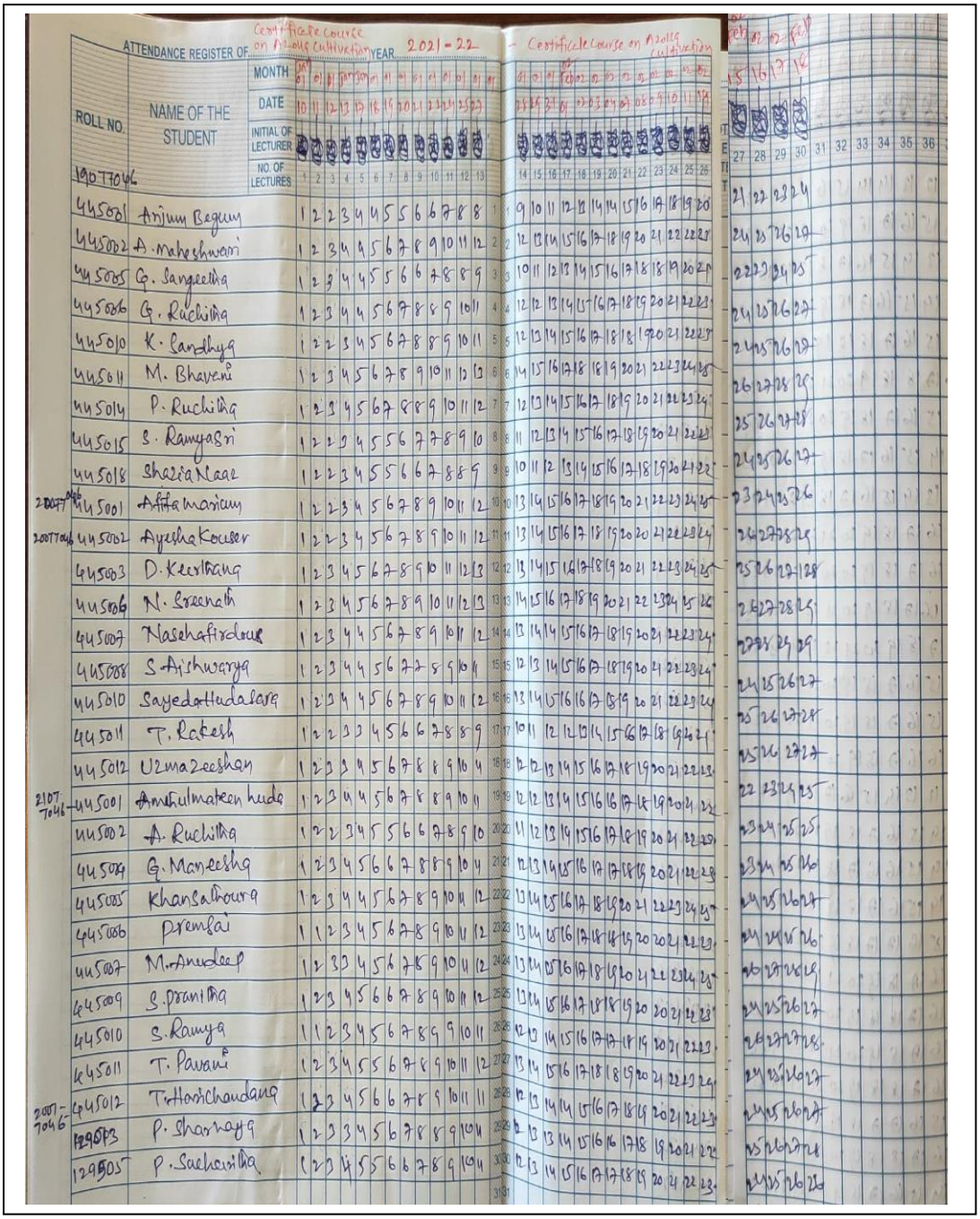
S.NO.	H.T.NO	NAME OF THE STUDENT	COURSE AND YEAR
1	19077046445001	Anjum Begum	B.SC.B.Z.C-IIIYR
2	19077046445002	A.Maheshwari	B.SC.B.Z.C-III YR
3	19077046445005	G.Sangeetha	B.SC.B.Z.C-III YR
4	19077046445006	G.Ruchitha	B.SC.B.Z.C-III YR
5	19077046445010	K.Sandhya	B.SC.B.Z.C-III YR
6	19077046445011	M.Bhavani	B.SC.B.Z.C-III YR
7	19077046445014	P.Ruchitha	B.SC.B.Z.C-III YR
8	19077046445015	S.Ramyasri	B.SC.B.Z.C-III YR
9	19077046445018	ShaziaNaaz	B.SC.B.Z.C-III YR
10	20077046445001	Afifa marium	B.SC.B.Z.C-II YR
11	20077046445002	Ayesha kouser	B.SC.B.Z.C-II YR
12	20077046445003	D.Keerthana	B.SC.B.Z.C-II YR
13	20077046445006	N.Sreenath	B.SC.B.Z.C-II YR
14	20077046445007	Nasehafirdous	B.SC.B.Z.C-II YR
15	20077046445008	S.Aishwarya	B.SC.B.Z.C-IIYR
16	20077046445010	Sayeda Huda sara	B.SC.B.Z.C-IIYR
17	20077046445011	T.Rakesh	B.SC.B.Z.C-II YR
18	20077046445012	Uzmazeeshan	B.SC.B.Z.C-II YR
19	21077046445001	Amthulmateen huda	B.SC.B.Z.C-I YR
20	21077046445002	A.Ruchitha	B.SC.B.Z.C-I YR
21	21077046445004	G.Maneesha	B.SC.B.Z.C-IYR
22	21077046445005	Khansatahura	B.SC.B.Z.C-I YR
23	21077046445006	Premsai	B.SC.B.Z.C-IYR
24	21077046445007	M.Anudeep	B.SC.B.Z.C-IYR
25	21077046445009	S.Pranitha	B.SC.B.Z.C-I YR
26	21077046445010	S.Ramya	B.SC.B.Z.C-I YR
27	21077046445011	T.Pavani	B.SC.B.Z.C-IYR
28	21077046445012	T.Harichandana	B.SC.B.Z.C-I YR
29	20077046129013	P.Sharnya	B.A III- III YR
30	20077046129505	P.Sucharitha	B.A III- III YR

C.S.Nagaraju
Lecturer in Botany

Principal
GOVT. DEGREE COLLEGE
KORATLA Dist.Jagtial-505 326

Dept.of .Botany **principal**

STUDENTS ATTENDANCE



Principal
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KORATLA, Dist. Jagtial-505 326

PHOTOS

PHOTO SHOWING AZOLLA

GOVT. DEGREE COLLEGE, KORATLA, DIST: JAGTIAL.

CERTIFICATE OF APPRECIATION

This is certify that Mr/Miss_____ is studying _____with Hall Ticket No._____has attended the "**CULTIVATION OF AZOLLA**" Certificate Course from_____to_____at the Department of English and his/her participation is highly appreciable.

Head
Department of Botany

Principal.