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Research Article

ZOOPLANKTON ANALYSIS OF SEEDLING POND OF PRAWN POND BY FOLDSCOPE

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ABSTRACT

Many farmers in the coastal region of Andhra Pradesh are converting their paddy fields into shrimp culture ponds and shrimp seed farms. The microscopic world of shrimp seed farm was studied by the Fold scope. The paper Fold scope is an inexpensive, light weight microscope with battery powered LED for illumination. In this paper Fold scope has been used to study different species under the microscope of 10X magnification. The results revealed the presence of Daphnia, copepods, cladocera, rotifers and diatoms.

Key Words:

The paper Fold scope is an inexpensive, light weight microscope with battery powered LED for illumination.

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INTRODUCTION

A microscope is basically made of curved pieces of glass which are known as lenses inside the tube. The lenses force light waves to bend and they pass through the object. As the light waves bend, they spread out, so that object appears bigger in size. The simplest microscope which we use daily is a magnifying glass. This magnifying glass is made of convex lens. Bardell David, Henry C. King et.al, Atti Della Foundazioni et.al. Convex lens causes the rays of light to bend, stretch, converge on a spot on the other side of the lens. Image gets magnified by the principles of geometry. The magnification depends on curvature of the lens and depends on the distance between the lens and object and lens and eye. Advanced microscopes use a combination of different type of lenses and it can be used for various purposes.

A Foldscope⁴ is device developed and designed by Manu Prakash, Stanford University. This Foldscope is a paper based microscope based on the "origami" Japanese Art. Cybulski J.S., F. Denero et.al, Simone Ahuja. Foldscope can be attached to the smart phone I. Hernandez- Neuta et.al with the help of magnet. This smart phone attached Foldscope can be successfully used in the field studies and for laboratory studies. J. Moya Salazaret.al, J. Rajchgot et.al, Isaac Bogoch, Bogochll

et.al, Jean T. Coulibaly et.al, Bogoch II et.al, Lovire. Coulibaly. J.T et.al, D. Ambrosio MV et.al. The Foldscope is compact, light hand held then compared to the conventional microscopes. Ephriam R.K.D et.al, S.G.P Sanchez.

Aqua Culture production has grown tremendously in recent years. Many farmers in the coastal region of Andhra Pradesh and especially West Godavari District near Bhimavaram region are converting their paddy fields into the aqua culture ponds Priyamvada Devi et.al. Shrimp farming and its activities contribute to the economy of Andhra Pradesh State and Andhra Pradesh developed a new policy in 2015-2016²³ regarding the cultivation of fisheries. A few farmers are following traditional methods and their production is very low. But many farmers started to stock the shrimp seeds produced from shrimp seed farms or hatcheries D. Yuvaraj et.al, Anil Bisht et.al. Supply of quality shrimp seed to the farmers is highly essential for scientific cultivation and management M. Suriya et.al, M.S. Islam et.al. So many hatcheries or private shrimp seed farms are established, developed in selected study area due to high salinity in their water bodies.

As the Author / Investigator Team were interested to promote the Foldscope in rural area (in the west Godavari district) and to study the seedling pond water investigator gave the Foldscope, supplied by DBT to the private hatcheries persons

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to observe and to give water samples of hatcheries pond. The water samples were collected and slides were prepared were analysed by standard keys.

The Foldscope Pictures

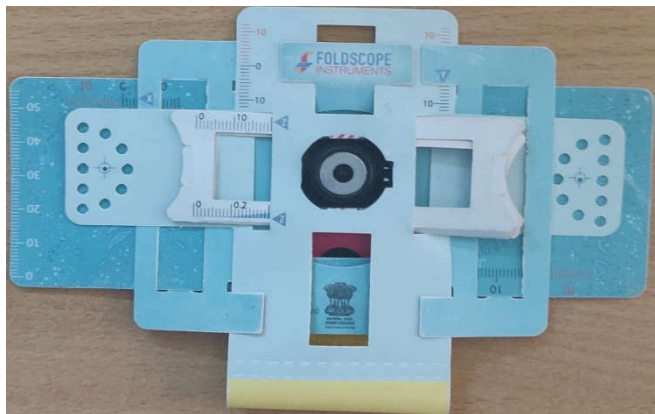


Figure 1 Foldscope

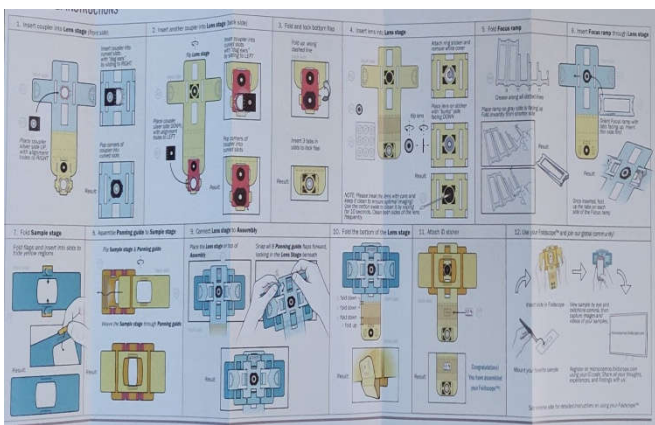


Figure 2 Instruction Manual - Foldscope



Figure 3 Origami Sheet - Foldscope

Selection of Study Area

Two ponds in the Srungavruksham village were selected. This Village is in Palakoderu Mandal of west Godavari District. It is located 64kms east from district Headquarters Eluru.

It is located 64kms towards East from district headquarters Eluru, the latitude is 17.246991 and longitude is 82.440441. It is 11 meters above sea level. It is 402 kms from Telangana State Capital Hyderabad. The local language is Telugu the total population of this village the people of this village is 11080

cultivate fish and shrimp. This area has many hatcheries which supply fish (Prawn seedlings to entire region. Taking that factor into consideration, present study has taken up this area.

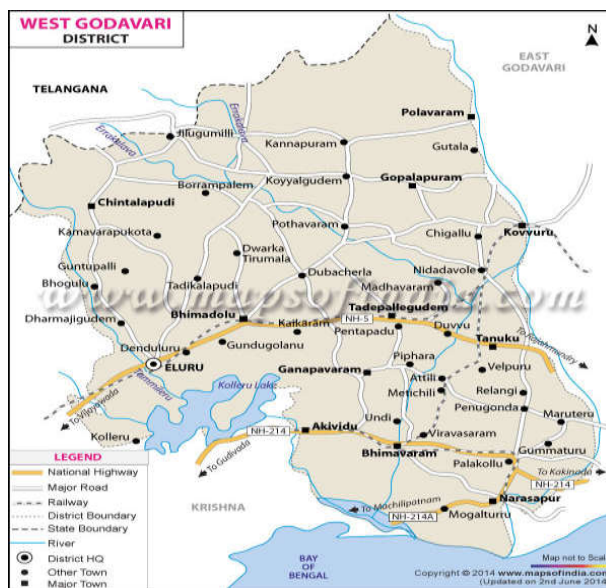


Figure 4 Study Area, West Godavari District, Andhra Pradesh

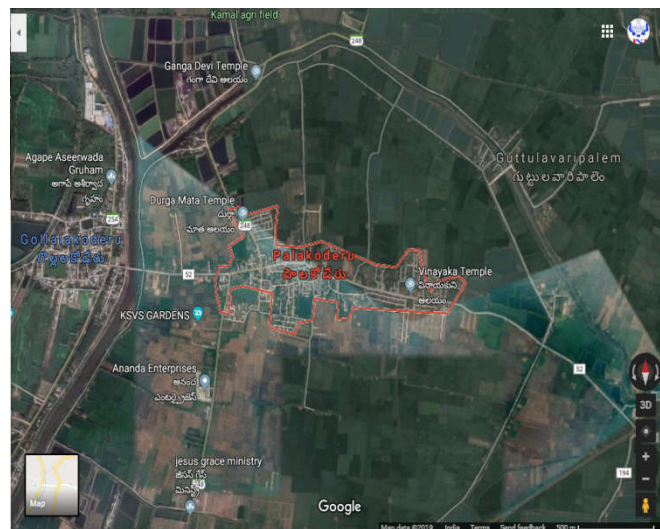


Figure 5 PalakoderuMandal, West Godavari District, Andhra Pradesh

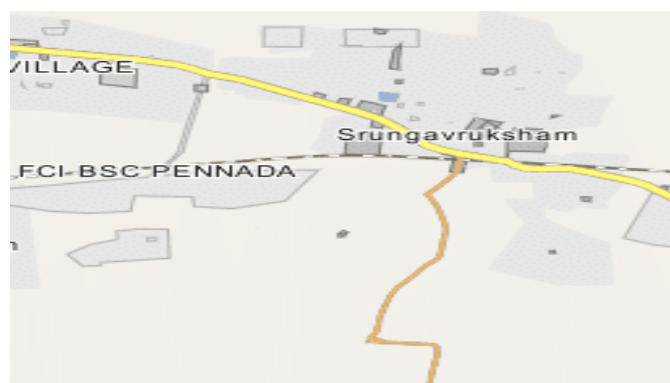


Figure 6 Srungavruksham, PalakoderuMandal, West Godavari District, A.P

Photographs of Sample Collection



METHODS AND MATERIALS

Sample Collection

The water samples are collected from Shrimp seed farm of Srungavruksham Village of PalakoderuMandal of West Godavari District. The water samples are collected from the pond by the 25 um mesh by lowering the mesh into seedling tank. The water samples were examined under the Foldscope.

Collection of water samples for quantitative and qualitative Analysis

Zooplankton samples were collected from the seedling ponds. Plankton net, made up of bolting silk cloth no. 21 (mesh size approximately 0.6mm) was used for collecting the samples. The bolting cloth was attached to collecting bottle of 100ml capacity. Samples were collected from surface water.

For each sample 50 litres of water was filtered through the net and transferred to screw capped bottle of 100ml capacity. All the samples were preserved using 4% formalin and brought to the laboratory for observation. The plankton were observed under Foldscope and identified upto genera with the help of standard keys.

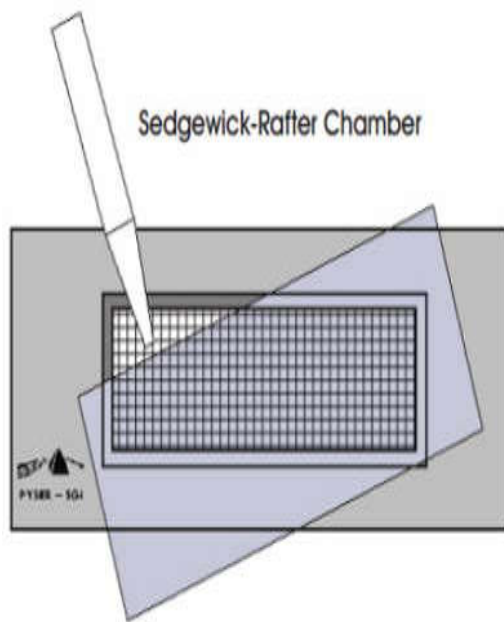
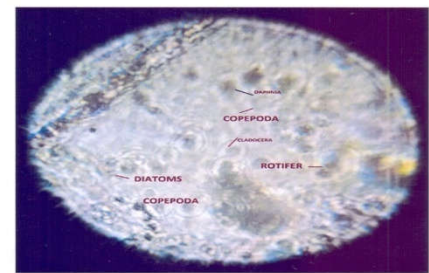


FIG-5
PRAWN SAMPLE



LEGEND FOR FIGURE

The water sample shows different zooplanktons like

- DAPHNIA
- COPEPODS
- CLADOCERA
- ROTIFERS AND
- DIATOMS

Qualitative Study

The preserved samples were centrifuged and settled plankton were used for quantitative study for Zooplankton count by using Sedgewick rafter counting cell.

RESULTS AND DISCUSSIONS

The collected water samples were analysed for its colour, odour, turbidity, dissolved oxygen, pH and temperature. The results were given in Table I.



S.No.	Characteristic Property	Observation	Results
1	Colour	Greenish – Brown	Indicates the presence of green brown algae
2	Odour	Fishy Smell	
3	Turbidity	Slightly turbid	has to be managed for reduction of turbidity
4	Temperature	22°C	Suitable for growth of prawn
5	Dissolved oxygen	2.9 ppm	has to be increased and modified
6	pH	6.8	
7	Salinity	18 ppt	

DISCUSSIONS

The Foldscope was very easy to handle the image quality is superior when Foldscope is connected to smart phone with the help of magnet. The results showed in the picture shows the presence of Daphnia, Copepods, Cladocera, Rotifers and Diatoms.

S.No.	Name of Zooplankton	Density of Zooplankton
1.	Daphnia	700 / litre
2.	Copepods	1200 / litre
3.	Cladocera	260 / litre
4.	Rotifers	140 / litre
5.	Diatoms	1050 / litre

CONCLUSIONS

It is very difficult to carry the compound microscope to the field and many precautions has to be taken. The Microscope should be maintained carefully. They should be kept at dry places at room temperatures, eyepiece lens, iris diaphragm should be kept free from dust. Foldscope is easy to handle and not costly Rebecca Calder et.al, Soumitra Banerjee. Farmers were excited to see the microscope in their hands and there are no technical hurdles involved in the usage of the Foldscope. They were happy to use them as they do not require electricity and they can take them to the field in their pockets. As it is affordable farmers will have better understanding about the microscopic world surrounding their daily life.

Microscopic Study

The water samples are examined under the microscope using 10X magnification and observed different Zoo planktons and Larvae / eggs of shrimp / fishes. The slides made up of water samples were studied by Foldscope and images were photographed. The species were identified and labelled.

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Research tool. The author is thankful to Registrar, JNIAS and Department of Zoology, St. Anns College for Women, Hyderabad.

References

1. Bardell David (May 2004) "The invention of the Microscope" 2005Bios 75(2), 78-84.
2. Henry C.King, Harold Spencer Jones "The history of the telescope" published Courier Dover Publication 2003, 25-27.
3. Atti Della Fondazioni, Giorgio Ronchi E, Contribution Dell'1 statute national Di Ottica, 30 Lafondazione, 1975, 554.
4. Foldscope Instruments, Inc our story (2018) <https://www.foldscope.com/our-story>.
5. Cybulski J.S.etal "Foldscope: original –based paper micro scope" plos on 9.6 2014 e 98781.
6. F.Denero,M.Gabriel,A.NoS.NyagaDeveloping tools for stem education.The Foldscope a very inexpensive monocular microscope for biological Research, Microscopy and Microanalysis 2018, 24, 1374-75.
7. Simone Ahuja Cost VS Value +Empathy a new formula for Frugal Science, Design Management Review 2014, 25.2 52-55.
8. I.Hernandez- Neuta F. Neumann, Bright Meyer.T.Ba.Tis N. MadaboosiQ.Weil A. Ozcan.M Nilsson "Smart phone-based clinical diagnostics, towards democratization of evidence – based health Care". Journal of Internal Medicine.
9. J. Moya Salazar M. Brun Rojas- ZumaranBhamals, Prakash M Rev. LatinomerpatalClin"Implementation of the Foldscope as a device for cervical cancer diagnosis –A verification and evaluation study"2016, 63(3) 141-147.
10. J. Rajchgot, J. Coulibay, J. Kaisers jurgutzinager Nathan, C.Lo. Michael K. Momry Jason, R. Andrews, Isaac Bogoch"Mobile phone and hand held microscopy for neglected tropical diseases"PlosNegal Trop Dis 2017, 11(7).
11. Isaac Bogoch, Johan Lundin, Nathanco and Jason Andrews "Mobile Phone and Hand held microscopes for public health application" LANCET 2017,2(8), e355.
12. BogochLL Andrews JR speech B.et.al Mobile Phone Microscopy for the diagnosis of soil-transmitted helminth inflections: A proof of concepts studyAm.J.Trop.Med.Hyg2013, 88, 626-629.
13. Jean T. Coulibaly, MamadouQuattara, Michaelv, D AmbrosioDanielA Fletcher, Jennifer Kaiser, JurgUtzingler, Elienzer N. Goran, Jason R, Andrews, Isaac L. BagochAccuracy of Mobile phone and handheld light microscopy for diagnosis of schistosomiasis and intestinal protozoa infections in cote d'Ivoire PLOSNegL Trop Dis 2016, 10(6), e0004768.
14. Bogochll Andrews JR, Speech B, Utzinger. T, AnesMALism Keiser J "Mobile phone microscopy for the diagnosis of soil-transmitted helminth infections: a proof – of- concepts study Am.J Trop Med Hyg2013, 88, 626-629.
15. Lovire. Coulibaly. J.T, Ouattaro M, Keiser.T. Bonfoh B. N'goran E.K Andrews J.R Bogoch.T. "Evaluation of malaria diagnosis using a handheld light microscopy in a community-based setting in rural coted'Ivoire". American Journal of Tropical medicine and hygiene 2016, 95(4), 831-834.
16. D. Ambrosio, MV Bahalar, M Bennuru S, Reberc. et.al "Point-of-care quantification of blood-borne filarial parasites with a Mobile phone microscope"Sic transl Med2015, 7, 286.
17. Ephriam R.K.D.,Cybulskis J.S, Duah E., Prakash, D. Ambrosio M.V Fletcher D.A Keiser J. BogochLLDiagnosis of schistosomahaematobium inflection with a mobile phone-mounted Foldscope and reserved-lines cell scope in Ghana Am. J. Trop.Med.Hyg2015, 92, 1253-1256.
18. Ephriam RKD, Duah.E, Cybulski, J.S Prakash M, D. Ambrosias MV, Fletcher DA Kaiser J. Andrew JR Bogoch "Diagnosis of schistosomaheamatabium inflection with mobile phones mounted Foldscope and a reserved lines cell scope in Ghana"Am.J. Trop Med Hyg 92(6), 1253-56,2015.
19. S.G.P. Sanchez, C.G.M Salcido M.R.D Castanos, S.R.P.Avila, JRA Gallegos "Evolution de Foldscope microscope de papal based en origami until para la identificacion de garrapatasRhipice phallus sanguineus,Actauniversitaria" 2018, 28 41, 19-24.
20. Bhubaneswari Devi, Moirangthem and Dhananjoychingangban Singh "New records of species of metalutzia (Dipatera culicid) from Manipur, India" International Journal of Mosquito Research 5(3), 28-31,2018.
21. S.G Parada-Sanchez,S.R.prase Avila JRA Gallegos "Evaluation of Foldscope, a paper based origami microscope useful for taxonomic identification of Rhipicephalussanguineus ticks"Actauniversitaria2018, 28 (41)
22. Priyamvada Devi, D.Sirisha and N. Gandhi "Quantitative and Qualitative analysis of zooplankton from aquaculture ponds in around Bhimavaram west Godavari district" Nature Environment and Pollution Technology 2012, 11, 3, 507.
23. Animal husbandry, Diary Development and fisheries(fish) department-Fisheries policy of Andhra Pradesh 2015-2020.
24. D. Yuvaraj, R. Karthik and R.Muthezhilan"Crop rotation as a better sanitary practice for sustainable management of LitopenaeusVannamei culture" Asian Journal of Crop science 2015, 7(3), 201-232.
25. Anil BishtShaliniAnand, SushilBhadula and Deepak Kumar pal "Fish Seed production and hatchery management –A Review"Newyork Science Journal 2013, 6(4), 42-46.
26. M. suriya S. Shanmugasundaram and P.Mayava Int. J.Curr.Res.Biol.Med"Stocking density-Survival rate and growth performance of litopenaeusVannamei (Boon, 1931) in different cultured shrimp frams". 2016, 1(5), 26-32.
27. M.S Islam M.S Rehman M.M Haque and s. sharmin J. "Economic Study on marketing and production of shrimp and prawn seed in Bangladesh"Bangladesh. Agril,univ2011, 9(2), 247-256.
28. DBT-India Microscopy for all DBT brings Foldscope to undertake research and education.
29. Rebecca Calder, Daniel Stevens, Zev Leifer. Preliminary studies in the use of Foldscope paper microscope for diagnostic analysis of crystals in urine. Issues in the analysis of liquid samples and potential applications in low budget / low tech regions of the world 4th digital pathology and artificial intelligence congress 2018.
30. Soumitra Banerjee "Foldscope, the frugal innovation and its application in foodmicroscopy – A "Review". Acta Scientific Nutritional health,2018, 2.6, S3-54.
