Beche-de-mer of Actinopyga echinata
A new and valuable resource for the Indian Beche-de-mer Industry

The sea cucumber species known as Paar Attai (Actinopyga echinites Jaeger) was so far not reported from India. Recently it was processed at Kilakarai, Vedalai and Periapatnam in the Gulf of Mannar. This valuable resource is now being monitored by Dr. D. B. James, Scientist S.G. and Shri M. Bahrudeen, Technical Officer of Tuticorin Research Centre of CMFRI.

Although the Indian Beche-de-mer industry is in existence for more than one thousand years the species that is chiefly processed is Holothuria scabra (Vella Attai) and to a very minor extent Holothuria spinifera (Raja Attai or Cheena Attai). In recent years due to the attractive price offered for Beche-de-mer in the International market, another sea cucumber Bohadschia marmorata (Noal Attai) is also processed to a minor extent at Kilakarai. India is now earning a foreign exchange of more than one crore rupees by exporting chiefly Holothuria scabra.

In 1989, for the first time another sea cucumber locally known as Paar Attai was processed at Kilakarai and about 10 tonnes of this species was exported. This year the same species is processed from Vedalai, Kilakarai and Periapatnam in the Gulf of Mannar. This species is known as Paar Attai since it was found attached to...
the Paars in the Gulf of Mannar. This species has been identified as *Actinopyga echinites* Jaeger commonly known as Deep Water Red Fish. It enjoys a wide distribution and is collected from several places in the Indo-Pacific region. It is also recorded from Sri Lanka but so far not collected from the Indian side since the divers did not visit their natural grounds between 4-6 metres depth earlier. This species is collected from the Andaman and Nicobar Islands and also from the Lakshadweep near the shore and it is not processed there at present. Other species of *Actinopyga* are also collected along with Paar Attai.

At present this species is collected four to five kilometres beyond Krusadai, Maunali, Hare and other Islands at a depth of 4-6 metres in the Gulf of Mannar. So far more than two lakh specimens have landed at the three landing centres this year. Last year nearly 100 tonnes of this species was processed. At present 12 boats are engaged in fishing for this species. About 15-20 persons go in a boat. They leave in the morning at 6 a.m. and return by 2 p.m. Each specimen is paid Rs. 2.50 to 3/- depending on the size. This year the fishery started for this species in August. Each diver earns Rs. 200/- to Rs. 1000/- per day depending on favourable conditions.

This species is said to command a better price than *Vella Attai* in the International market. According to a recent report from the Phillipines the beche-de-mer of this species is six times costlier than that of *Holothuria scabra*. At present the merchants are purchasing processed material at Rs. 65/- per Kg. The processing method is also different from other species. In the living condition it is uniformly brown all over. The length of the specimens varies from 130 to 210 mm and the weight varies from 125 to 420 g. Processed material varies in length from 50 to 150 mm and the weight varies from 20 to 120 g. Many of the large specimens were fully mature with ripe eggs.

**TAGGED CHANKS RECAPTURED AT MANDAPAM**

During August/September 1990, the traditional holothurian divers brought two tagged chanks released from the Mandapam Regional Centre of CMFRI. The chanks (Xancus pyrum) bearing code number MR/57 and MR/23 were recovered after 235 and 261 days respectively and they have grown breadth-wise to 14.78 mm and 13.82 mm respectively. During this period, the chanks have migrated about 5 km southeastwards from their site of release. The tagging of chank, Xancus pyrum formed a part of PF/IP/5 project.
The Effect of Repeated Harvesting on the Growth of Commercially Important Seaweeds in Mandapam Area

The Investigations made by the team consisting of Dr. N. Kaliaperumal, Shri S. Kalimuthu and J. R. Ramalingam revealed that commercial exploitation of seaweeds should be made only during peak periods of growth for each species leaving enough time for their regeneration.

Seaweeds are the only source for the production of phytochemicals such as agar, carrageenan and alginites which are widely used in many industries mostly as gelling, stabilizing and thickening agents. They are also used as human food, animal feed and manure. In India, seaweeds are mainly used as raw material for the manufacture of agar and sodium alginate. At present the red algae Gelidiella and Gracilaria are used for the extraction of agar and brown algae Sargassum and Turbinaria for sodium alginate. Now there are about 12 agar industries and 10 alginate industries actively functioning at different places in the maritime states of Tamil Nadu, Andhra Pradesh, Kerala, Karnataka and Gujarat. All these seaweed based industries depend on the raw material being exploited from the natural seaweed beds occurring mainly in the southeast coast of Tamil Nadu from Rameswaram to Kanyakumari.

Because of the extensive and unrestricted commercial harvest of seaweeds, particularly agar yielding seaweeds, there is depletion in the stock of agarophytes from the natural beds in Mandapam area during recent years. In order to find out the effect of repeated harvesting on the regeneration, growth and interval required for attaining harvestable size and also suitable period for commercial exploitation, studies were made for a period of 1-2 years for each algae during the years 1986-89 on commercially important agar yielding seaweeds Gelidiella acerosa and Gracilaria corticata and algin yielding seaweeds Sargassum cristaeolium, S. ilicifolium, S. myrio cystum, S. wightii and Turbinaria conoides growing in the vicinity of Mandapam namely Krusadai Island, Pudumadam and Kilakkarai.

For studying the effect of repeated harvesting on the growth of these algae, 12 numbers of permanent quadrats (1 sq. m. area each) for each species were marked randomly in their natural beds by fixing four iron pegs at the four corners of each quadrat. At the start of the experiment, the plants were harvested from all 12 quadrats by hand picking as followed in commercial exploitation leaving the basal portion of the plants. To study the effect of repeated harvesting, the quadrats were systematically harvested as follows. After one month period the first quadrat with one month regrown plants was harvested. In the second month the first and second quadrats with one month and two months regrown plants respectively were harvested. This method of harvesting was continued till the end of the experiment. The wet weight of the harvested plants from each quadrat was taken every month.

The regrowth of these algae depended on the harvesting period and interval between successive harvests. The regeneration of these seaweeds continues as long as the basal remnants of the plants in intact with the substratum. Hence harvest should be done by pruning the plants leaving the basal part instead of removing the whole plants. The present study reveals that plants with maximum biomass and stature occur during April to July for G. acerosa, April-June and September- November for G. corticata and September-January for species of Sargassum and Turbinaria and these seaweed require an interval of 3 to 8 months for their regrowth to harvestable size from the remnants. Hence commercial exploitation of these seaweeds should be made only during the peak growth periods mentioned above for each species leaving enough time for their regeneration to harvestable size plants.
Mrs. Reeta Jayasankar,
Scientist, Regional Centre of
CMFRI, Mandapam, achieved
success in growing the spores
of Gracilaria edulis to germ-
lings under running sea water
outside the aquarium. The
germlings grew to a size of
34 mm after seven months of
their output from the cysto-
carps.

**Gracilaria** is a commercially valuable agarophyte and its many species are distributed throughout temperate and tropical seas. **Gracilaria edulis** is the common agar yielding seaweed in India. The life history of **Gracilaria** consists of an alternation of isomorphic phase with unisexual gametophyte. The spermatia are produced in the cavities or shallow depression of the male plants. Cystocarps are usually prominent, hemispherical structures projecting from the thallus surface having a large number of carposporangia.

Basically there are two methods for the cultivation of seaweed: one by means of vegetative propagation using the fragments and the other by means of spores such as tetraspores, carpospores and oospores. Since 1972, CMFRI is involved in the experimental culture of **Gracilaria edulis**. The Institute has developed a viable technique for large scale cultivation of **G. edulis** by fragment culture methods. However, hitherto the propagation of **Gracilaria** by spore culture method was not done. In the present work germlings of **G. edulis** could be developed from carpospores and tetraspores in outdoor tank provided with round the clock circulation of seawater.

Healthy cystocarpic tetrasporic plants were brought to the laboratory in plastic bags from the natural environment. They were washed thoroughly in seawater and spread on a nylon cloth in stagnant seawater. The spores released from the plant sunk to the bottom. Below the nylon mesh different substrates like cement blocks, coir ropes and glass slides were placed for the attachment of the spores. The spores got attached to the substrate within 12 hours of their release. The plants were removed and the substrates were kept under 24 hours of seawater circulation. Moderate aeration was provided in the night.

Diameter of the spores was measured regularly using an ocular micrometer till the 15-17 days of their growth. Sporelings appeared in the form of erect frond from the spores. Once the germlings became visible their length were measured regularly using vernier-caliper. Mean diameter of the spores soon after their release was 133/μm. It increased to 557/μm in 17 days. Measurements of germlings were taken after 47 days of spore output. At this stage the range in the length of the germlings was 1.40-3.80 mm. On the completion of 165 days the range in germlings length increased to 15.90-34.00 mm.

Further work is being pursued to enhance the growth rate of the germlings by providing enriched seawater medium kept under controlled environment. Following this nursery rearing, the germlings can be transplanted to the sea for further growth.
National Project on Seed Production of Seabass

With the increased emphasis given by the Indian Council of Agricultural Research to aquaculture, there is a growing demand for fish seed requirement by fish farmers and private entrepreneurs. To increase the production of commercially important finfishes such as seabass, *Lates calcarifer* (Block) by means of aquaculture methods in the coastal waters, the Central Marine Fisheries Research Institute started a National project at Mandapam to produce the seed of seabass by induced breeding so as to pave the way for commercial culture.

The seabass *Lates calcarifer* known as giant perch is an economically important food fish in tropical and subtropical regions of the Pacific and Indian Oceans. Owing to its fast growth delicate flavoured flesh and high market value, it forms one of the more popular cultured species in Thailand, Singapore and Philippines. In India, successful breeding would go a long way for providing the seed of this fish for commercial culture.

Initial breeding and success of grey mullets, *Mugil cephalus* and *Liza macrolepis* have been already achieved. With a view to breed seabass by induced breeding, preliminary survey on the availability of spawners in and around Mandapam and other areas in Gulf of Mannar and Palk Bay was undertaken. Three live breeders of seabass were collected and at present they are being maintained in the 200 Sq. ft. concrete cement tank near the Marine Aquarium, Mandapam Camp for conducting induced breeding experiments. This project has been initiated during April 1990 at the Mandapam Regional Centre of CMFRI.

Hindi week was celebrated

In the valedictory function held on 20 September, the Chief Guest Dr. P. V. Vijayan, Professor, Cochin University of Science & Technology, distributed prizes to the winners in the different competitions.

Veraval

Hindi week was celebrated jointly by Veraval Research Centre of CMFRI, CIFT, Sub-Regional Centre of MPEDA, Veraval and Export Inspection Agency, Veraval. Competitions were held for the members of the staff in songs, handwriting, essay writing, Idioms & Phrases writing and Elocution etc. in Hindi. The Chief Guest Shri Joshi, Port Officer, Veraval distributed prizes to the winners of competitions.

Staff Research Council Meeting

The 42nd meeting of the Staff Research Council of CMFRI was held at Cochin on 28 July to review the progress of the scientific work carried out during the year 89-90.
Calicut

Hindi Week was celebrated at Calicut Centre of CMFRI jointly with CIFT. A public function was arranged in this connection and was chaired by Dr. R. S. Lal Mohan. Mr. Dubay, Vice Principal of Kendriya Vidyalaya, Calicut and Mr. Varghese, Hindi Pandit of St. Joseph's School, Calicut were the Chief Guests. Competitions in songs, extempore speech and essay writing were conducted in Hindi and first and second prize winners were awarded prizes.

Mangalore

Hindi Day was celebrated on 14 September at Mangalore Research Centre of CMFRI. A meeting was organised and was presided over by Dr. M. V. Pai, Retired Principal Scientist of CMFRI. The Chief Guest of the Day was Shri Vijayanath Bhat, Assistant General Manager, Corporation Bank, Mangalore.

Bombay

Hindi Week was celebrated by Bombay Research Centre of CMFRI in a befitting way. Competitions in Hindi were held for the members of the staff in songs, action play and jokes.

Madras

Hindi Week was celebrated at this Centre from 14 to 20 September. In this connection a meeting was held on 20 September under the Chairmanship of Dr. K. SatyanarayanaR Rao, Officer-in-Charge in which he stressed the need for the staff members studying and learning the Official Language of India.

Tuticorin

Hindi Day was celebrated at the Tuticorin Research Centre of CMFRI on 17 September. Dr. K. A. Narasimham, Chairman, OIC and OIC, Tuticorin Research Centre of CMFRI, presided over the function. Talent contests in Hindi were arranged and prizes were distributed to the successful participants by the President.

Kakinada

Hindi Day was celebrated at Kakinada Research Centre of CMFRI, Kakinada on 14th September. As part of this, a meeting was held in which various decisions were taken for the propagation of the Official Language Hindi.

Mandapam

The Regional Centre of CMFRI, Mandapam Camp organised Hindi Week from 14 to 20 September. A meeting was organised in this connection in which Shri R. Marichami delivered the inaugural address and spoke on the objectives of the Hindi Day/Week organisation and acquainted the staff about the Official Language Policy of the Government. Various competitions in Hindi were held for the members of the staff during the week.

Visakhapatnam

Visakhapatnam Research Centre of CMFRI organised Hindi Week on 14 September, 1990. Books and journals in Hindi were displayed during the Week.

Appointments

Miss. G. Ponnamma, as Jr. Clerk at Cochin, 5 July.
Miss N. M. Ponnamma, as Jr. Clerk at Cochin, 9 July.

Visakhapatnam Research Centre of CMFRI organised Hindi Week on 14 September, 1990. Books and journals in Hindi were displayed during the Week.

Appointments

Miss. G. Ponnamma, as Jr. Clerk at Cochin, 5 July.
Miss N. M. Ponnamma, as Jr. Clerk at Cochin, 9 July.
Shri S. K. Murali, rejoined duty as Sr. Clerk at Madras from CIBA on expiry of deputation, 16 July.

Shri S. Kannadass, as SSG I (Messenger), at Mandapam Camp, 2 July.
Shri M. Seeni, as SSG (L.A.) at Mandapam Camp, 3 July.
Shri P. B. Jeevaraj, as SSG I (Fieldman) at Cochin, 17 Aug.
Shri P. S. Alloycious, as SSG I (Fieldman) at Cochin, 18 August.
Shri P. V. Joy, as SSG I (Fieldman) at Cochin, 20 Aug.

Visakhapatnam Research Centre of CMFRI organised Hindi Week on 14 September, 1990. Books and journals in Hindi were displayed during the Week.

Appointments

Miss. G. Ponnamma, as Jr. Clerk at Cochin, 5 July.
Miss N. M. Ponnamma, as Jr. Clerk at Cochin, 9 July.
Shri S. K. Murali, rejoined duty as Sr. Clerk at Madras from CIBA on expiry of deputation, 16 July.

Shri S. Kannadass, as SSG I (Messenger), at Mandapam Camp, 2 July.
Shri M. Seeni, as SSG (L.A.) at Mandapam Camp, 3 July.
Shri P. B. Jeevaraj, as SSG I (Fieldman) at Cochin, 17 Aug.
Shri P. S. Alloycious, as SSG I (Fieldman) at Cochin, 18 August.
Shri P. V. Joy, as SSG I (Fieldman) at Cochin, 20 Aug.

Engagements

Dr. P. S. B. R. James, Director attended the following meetings:

Meeting of the Expert Consultation on Stock Assessment of Tuna at Bangkok, 2-6 July.
Review meeting of the VIII Five Year Plan proposal at New Delhi, 7-8 August.
Meeting with the Director-General, ICAR at New Delhi, 24 August.
Central School Management Committee meeting at Mandapam Camp, 18 September.

Dr. P. S. B. R. James visited the different sites in and around Nellore for setting up College of Fisheries in Nellore and finalised the report at Hyderabad, 17-19 August.

Dr. M. Peer Mohamed, Principal Scientist, attended the Seminar on 'Problems and prospects of Chemical and Marine based Industries' and delivered a talk on 'Chemicals and Drugs from Marine Organisms', 8 Aug.

Dr. P. Nammalwar, Scientist (SG) participated in the National Seminar on 'Recent advances in Coastal Marine Sciences', held at Anna University, Madras, 9-11 July.
Deputation abroad

Dr. P. S. B. R. James, Director and Dr. P. Parameswaran Pillai, Scientist (SG) participated in the Expert Consultation of Stock Assessment of Tunas in the Indian Ocean held at Bangkok from 2-6 July.

Visitors

Cochin

Cambodian Delegates comprising of:

- Dr. Mok Mareth, honourable Vice Minister of Agriculture,
- Mr. Li Kim Han, Director General of Fisheries,
- Mr. Touch Seang Tana, Administrator of Fisheries, State of Cambodia, and
- Mr. M. C. Aereira, Agronomist, CIDSE Programme in Cambodia.

The team consisting of:

- Mr. E. E. Lodzeni, Administrative Officer, O/o the President & Cabinet, Malawi.
- Mr. W. C. A. Mkandawire, Administrative Officer, O/o The President & Cabinet, Malawi.
- Mr. Almawossen Habtie, Planning & Programming Expert, Dept. of Planning & Programming, Ethiopia.
- Mr. Seife Ayele, Junior Expert, National Committee for Central Planning, Ethiopia.
- Mr. Danton M. Vibar, Operations Officer, Dept. of Local Govt., Philippines.
- Mr. Feliciano P. Deguplo, Senior Agriculturist cum Officer in-charge of Dept. of Agriculture, Philippines.

- Mr. Gerardo Balista, Chief Municipal Implementor, Department of Agrarian Reforms, Philippines.
- Mr. Jamil Anwar Mohamed, Head, Rural Development at Agriculture Planning Dept., Ministry of Planning, Afghanistan.
- Mr. Mohammed Abdel Monieum Tewfik, Member of Ministry's Cabinet, Ministry of Insurance & Social Affairs, Egypt.
- Mr. Pedro Alejandro, Jimenez Soler Projector, National Enterprise of Agri-Projects, Cuba.
- Mr. R. Randin, Senior Regional Development Officer, Home Affairs, Prime Minister's Office, National Development Unit, Mauritius.
- Mr. G. S. Omburo, Planning Officer, Ministry of Planning & National Development, Kenya.

Kakinada

- Dr. K. Alagarwami, Director CIBA, Madras.
- Shri G. Chandra Chud, Agricultural Officer, Bank of India, Bombay.

Tuticorin

- Shri S. John Joseph, IPS, Principal Chief Conservator of Forests, Tamil Nadu.
- Shri Arun Ramanathan, IAS Registrar of Co-operative Societies, Madras.
- Shri Amitab Khan, IAS, Deputy Secretary, Ministry of Commerce, Government of India, New Delhi.
- Dr. K. Gopinathan & Shri A. Mishra, Scientists, CIBA, Madras.

Mandapam

- Shri R. Sellamuthu, IAS, Dist. Collector, Ramanathapuram.
- Mr. Thiruvengadam, President, Tamil Nadu Legislative Assembly Estimate Committee.
- Dr. A. K. Bandyopadhyay, Director, Central Agricultural Research Institute, Port Blair.

Promotion

- Shri G. Balakrishnan, Field Officer (T-6) as Field Officer (T-7) at Cochin, 1 July 1987.

Transfer

- Shri V. Gandhi, Scientist (SG) from Mandapam Camp to Karwar.
- Shri K. Chittibabu, Technical Assistant (T-II-3) from Kakinada to Visakhapatnam, 22 August.
- Shri K. Ramasomayajulu, Technical Assistant (T-II-3) from Visakhapatnam to Kakinada, 1 September.
- Shri Ch. Ellithathayya, Junior Tech. Assistant (T-2) from Gopalpur Field Centre to Kakinada 3 July.
- Shri C. S. Xavier, Motor Driver (T-2) from Cochin to KVK, Narakkal.

Wedding

- Shri M. Ravindran, Messenger, married Kum. S. Vijayalakshmi, at Madras, 23 August.
भारतीय बेश - द - मर

उद्योग के लिए नई और मुल्यवान संपदा

भारत में पार अटके नाम से जाति (एकिनोपायन एकिन- 
विनिर्मल वोर) के वारे में अभी तक अधिक 
जातियों की प्रति नहीं पड़ी है। हाल ही में 
मानन की फ़ाकटर, केबाउन और 
विशिष्ट उद्योग में इसका संवाद किया 
गया। तीन एक तरह बाज़ार के दूरी- 
कोरिंग अनुसंधान अनुक्रम वेविंग के बा. ती. च. 
जेस. वैश्विक प्रभाव कोडी और 
ए.बी.जी.दी. तकनीकी अधिकारी 
द्वारा अभी इस मूल्यवान संपदा का 
मॉनिटरिंग किया जा रहा है।

यदि भारत के बार द - मर उद्योग 
बहु होकर एक हजार वर्ष से अधिक 
होगा यहाँ विश्वसन्दर्भ का 
संवाद हो पाया है और इसका इस 
होकर विश्वसन्दर्भ भरी 
तालिका अटके का संवाद भी। हाल 
के वर्षों में अंतरराष्ट्रीय बाजार में इसका 
मूल जड़ जाने के कारण खिलाफ ने 
जब एक नुहुरा कहाँ होकरहुकिया 
मार्केटिंग (पूँजी बाज़ार) का 
संशोधन 
होकर अपनी अन्य व्यापारिक नियोजन 
से अभी भारत एक कर वे अधिक समय 
की विवेक दु:ख। कमी है।

वर्ष 1989 में खिलाफ ने 
स्थानीय 
मूल जड़ की संशोधन प्रबंध बाला 
किया गया और 10 टन नियात किया। 
इस नये में मानन्य बाजेर के बेकार, किस- 
करण और विकार में ही सस्ती जड़ 
का संशोधन हुआ। मानन्य बाजेर के 
पार में लगाने के कारण इस पार अटके 
कहलाते हैं। इस जटि की एकिकोन- 
पायथम एकतकता नगर ने सहयोग 
कर और सामाय सुज और हाजिर वार्त 
रेखाखंड कहलाते हैं। इंटो परिवार 
के बाहर स्थापना में इसका भावनात्मक 
है। बी.डबल्यू.एम. इनक्लो धम इन 
की उपलब्धि है 
लेकिन निर्माता ने 4-6 
रोट भार की गहराई में जहाँ इसका 
स्वाभाविक घरावङ है वहाँ तक न पहुँचने 
के कारण भारत के इसका संवाद नहीं 
हुआ। अंतर्राष्ट्रीय और निर्माताओं 
और स्वामित्व के तरीकों में भी 
इस जटि का लंबाई हो रहा है 
लेकिन 
यही अभी इसका संवाद नहीं होता है। 
पार अटके के बाहर एकिनोपायन की 
होकर जटि का संवाद भी हो रहा है।

अन्तरराष्ट्रीय बाजार में बेल्स अटके 
को अपेक्षा इस जटि का मूल्य अभिक 
है। फिलिशियन में हाल ही में राज 
भाषाएं के बहुसंख्य हवा जटि बेश - द मर 
बहु होकरहुकिया स्थान की अवधि 
मुआ महान है। अब व्यापारी लोग 
प्रति विक्रय को 65.00 रु. वैकर 
संसाधित सामग्री बोन्हेम है। कबी 
जटि की अपेक्षा इसकी संवाद 
रीति भी निम्न है। ज्ञाने यहाँ विवेक 
में यह भूमा रिया का है संबंध 60 ला 
मिल गया है और वर्त 125 ला 420 
पा. तक। संसाधित सामग्री का संबंध 50 
से 150 निम्न है और वर्त 20 ला 120 पा. तक। भविष्यकाल बंटे 
नमूने प्रोट्र की रिपोर्ट बांधकु ल भूमा है।
मंडपम क्षेत्र में वाणिज्य प्रधान समुद्री शैवालों को बुद्धि पर बारंबार संश्लेषण का प्रभाव

1986-89 के दौरान मंडपम के अनुलोकीय द्वीप, पुनर्विकास और विविधताएं के द्वारा समुद्री शैवालों के वाणिज्य प्रधान समुद्री शैवालों के अधिकारी ने जोड़े। एकारोह जंगल और फंसी-रियो का बालकर्ता और एंडसन मान्यता समुद्री शैवाल के वाणिज्य प्रधान समुद्री शैवाल के अधिकारी ने जोड़े।

इन वैद्यकों की पुनर्विकास की अवधि और अंतराक्षर संश्लेषणों के बीच के अंतराल पर आधिकारी थी। उन्होंने वैद्यकों का अवधि होने का समय होने के साथ साथ पूरी पैरों की निर्देशन के बाद विश्वभर डॉक्टर क्षेत्र में अलग।

इन समुद्री शैवालों को हमारे अनुभव के अनुसार बुद्धि पर बारंबार संश्लेषण का प्रभाव रहा। इन समुद्री शैवालों को नमूना अपनी अवधि पर बारंबार संश्लेषण का प्रभाव रहा। इन समुद्री शैवालों की दाता बुद्धि पर बारंबार संश्लेषण का प्रभाव रहा।

मंडपम में टैगिंग किए गए शैवालों का पुन: प्रधान

अगस्त/सितंबर 90 के दौरान परंपरागत होलोशिया नामक ने अपने अर्ध अंतराल में एक मंडपम के क्षेत्र के प्राकृतिक संश्लेषणों के पुनर्विकास का संकेत संस्कृत रहा है। पुनर्विकास पर आर्धित पृथ्वी, संश्लेषण गोरे वाणिज्य प्रधान करने के अंतराल, वाणिज्यम शैवालों की अनुभुति अवधि जानकारी निर्देशन के लिए इन तिमाहों पर वो वर्ष का अवधिकार किया गया।
नसरी में बोजाणुओं से प्रेसिलेरिया

इक्डुलिस का पालन-एक विशेष उपलब्धि

ही एम एक आर आई से मंडपम वेष्वी केन्द्र के लूक जीवन शास्त्री ने वर्णन में व्यक्त निर्देशक के लूक जीवन शास्त्री की भूमित्व रोही वर्णन में उपजीवनका से वाह बढ़ने समुद्र वर्ष में प्रेसिलेरिया

इक्डुलिस के बीजों के लूक जीवन शास्त्री के गुरील धारणन (gametophyte) को बाहर में उपजीवनका प्राकृतिक। सादरकर्म में वाह बढ़ने समुद्र वर्ष दक्षिण 34 मिली आझार तक वाह बढ़ गई है।

प्रेसिलेरिया सादरकर्म प्राकृतिक एपरोटीफ़िस्ट (agarophyte) है और इसकी शास्त्रवादी वातावरण शास्त्री समूह में सूचीबद्ध है। भारत में वाह का उपयोग करने वालों समूह वालों में प्रेसिलेरिया इक्डुलिस प्राकृतिक है। इक्डुलिस के कृतिन-पक में उपजीवनका यूनिवर्सल होने (unisexual gametophyte) और तहती (isomorphic) निर्देशक का प्राकृतिक होता है। शास्त्रवादी का उपजीवन पूर्ण विकास के बाहर (Cavity) में होता है। स्वतंत्र रूप से प्रति (Cystocarps) सादरकर्म सुविधा किया जा रहा है और वह कई तलेबीका (Carpospores) के लूक जीवन शास्त्री के अन्तर भाषा के बाहर निकला हुआ है।

मूल रूप से समुद्री वैज्ञानिक की प्रक्रिया की व्रतीय स्थान अंकित (fragment) के प्रवर्तक के प्रवर्तक (Vegetative Propogation) द्वारा और हानि तेस्टियोत्र, कार्स्टर्ड और कॉन्स्टर्ड जो विज्ञान द्वारा। सर्व 1972 तक यह एक आर आई प्रेसिलेरिया इक्डुलिस की प्रवर्तक स्थापनूक में लगा हुआ है। संपादन में बच गया हुआ इक्डुलिस की प्रवर्तक की प्रवर्तक के लिए जीवन शास्त्री का विनिमय किया किया। हालाँकि अक्सर तथा विद्युच्च धारी तह्ये, प्रेसिलेरिया का उपवासर नहीं किया किया। वनस्पति तक से इक्डुलिस के गुरील धारणन को, कार्स्टर्ड और तेस्टियोत्र के समुद्र जल बाहर वाह बढ़ने वाले वाह बढ़ने वाले तेस्टियोत्र द्वारा विनिमय किया जा सकता है।

स्वयं सादरकर्म प्रति (Testicular) प्रवर्तक की प्रवर्तक प्रतिनिधि में प्रवर्तक प्रवर्तक में वाह बढ़ने वाले हैं। उन्होंने राहुल जब की अंतर त्वेत्रही के लूक जीवन शास्त्री के बाहर बढ़ने वाले हैं। वाह जब पाहे और अंतर त्वेत्रही के बाहर बढ़ने वाले हैं। नामकरण वातावरण के नॉर्म, जीवन शास्त्री को तीन तह्ये के अवसर पर रहता है। बुधवार दिन की प्रेसिलेरिया प्रवर्तक निर्धारण की सुधी वँड़र तेस्टियोत्र का आउटपुट करने के लिए केन्द्रीय समूह सादरकर्म के अनुसार वातावरण संपादन में प्रेसिलेरिया तेस्टियोत्र के आउटपुट करने की एक राहती प्रक्रिया सुनू की है।

अपनी परत से जानी जाने वाला समूह बॉय (grey mullet), मूल वित्तीय और लिखा मात्र व्यवस्था का प्राचीन प्रकृति और इसका सत्यता प्राप्त हुआ। प्रेसिलेरिया तेस्टियोत्र तेस्टियोत्र के लिए मूल वित्तीय और अन्य स्रोतों में मान्यता बढ़ायी और पाक उपजातियों में अत्यधिक की उपवर्तक प्रकृति प्राप्त हुई। स्वयं सादरकर्म दो तह्ये विद्वानें देखने वाले की समुद्र जल बाहर वाह बढ़ने वाले की उपवर्तक प्रकृति प्राप्त हुई। 200 वैज्ञानिक के केन्द्रीय तेस्टियोत्र देखने वाले।
1. The number of deaths in the first 2 weeks of October was 0661.

2. The number of deaths in the first 2 weeks of November was 0661.

3. The number of deaths in the first 2 weeks of December was 0661.

4. The number of deaths in the first 2 weeks of January was 0661.

5. The number of deaths in the first 2 weeks of February was 0661.

6. The number of deaths in the first 2 weeks of March was 0661.

7. The number of deaths in the first 2 weeks of April was 0661.

8. The number of deaths in the first 2 weeks of May was 0661.

9. The number of deaths in the first 2 weeks of June was 0661.

10. The number of deaths in the first 2 weeks of July was 0661.

11. The number of deaths in the first 2 weeks of August was 0661.

12. The number of deaths in the first 2 weeks of September was 0661.
पदोन्नति

धो. औ. वाल्लुन्न, लैँग्ल अधिकारी (डी-6) को लेख अधिकारी (डी-7) के पद पर जुलाई 1,87 को कोषीतन में।

धीमाति ए. के. अभियात, कान्तक अभियातिक को आधुनिक के पद पर फरवरी 1, 1989 को कोषीतन में।

स्थानांतरण
1. धीरी. गांधी, वेदानिक (प्र.को) को मंडपम कैन्या से कार्यालय में।
2. धी. वन. विवियाब्रु, नकली सहायक (डी-11-3) को अगस्त 22 को कार्यालय से विभागस्थलन में।
3. धीर. के. रामोमयाजुलु, नक-

शाही

धीर. ए. सेवक, सरेबाहक की शाही हुमारी ए. विभागधनी के लाय अगस्त 23 को माद्रास में संपन्न हुई।

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