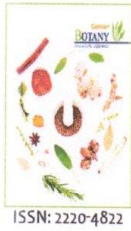


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Morphological and phytochemical studies of *Suaeda maritima* (L.) Dumort growing along the coastal belt of Purba Medinipur District, West Bengal, India in search of the prospective variation

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ABSTRACT

Suaeda maritima (L.) Dumort of the family Chenopodiaceae is an annual succulent mangrove herb. This annual salt marsh is quite regularly used by the local people for food and pharmaceutical. This species has been cursorily noted to have variation in some morphological characters. Earlier reports indicated the presence of triterpenoid e.g. alpha amyirin in some species of *Suaeda*. However, no report on the variation in the quantity of it in this species was presented. The present study has furnished an account of subtle variation in morphology of this herb growing on different sites in the area under study. It also shows a difference in the amount of alpha amyirin in the plant individuals of different places, revealed through the HPTLC study. Morphological variations have been noted mostly in respect of the characteristics of the stem and leaf of the species.

KEYWORDS: *Suaeda maritima*, Morphological diversity, Alpha amyirin, Chromatographic analysis

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INTRODUCTION

Mangrove vegetations grow along with the coastal belts of tropical and sub-tropical regions, usually between 25° N and 25° S latitude throughout the world (Tomlinson, 1986). Annual succulent herbs of the species of *Suaeda* grow naturally in soils having a high concentration of salt of mangroves (Untawale, 1984). *Suaeda maritima* grows luxuriantly along the coastal belt of Purba Medinipur district of West Bengal in India, right from Hijli-Sarif of Khejuri to Udaypur of Digha (Das, 2015). This range of coast in Purba Medinipur district is lying between 21° 51' 27" N to 21° 36' 5" N latitude and 87° 29' 88" E to 88° 12' 40" E longitude. There is a record of its use as a vegetable and also in curing malady (Trease & Evans, 2002) and such uses are also noticed among the local people of the area under study. Though this herb grows almost continuously along the entire stretch of the region mentioned here, shows subtle variation in gross morphology along the site of its growing. Such diversity might be more due to the variation in the chemical and physical

properties of the soil along the region, rather than the genetic property of the plants for this contiguously and naturally growing herb. Such variation might also have a bearing on the biochemical constitution of them, too. Early literatures recount several different phytochemical compounds like triterpenoid, sterols, alkaloids, acids, glycosides (Krishchenko *et al.*, 1984; Kapadia *et al.*, 1985; Miftakhova *et al.*, 1999), proteins and amino acids (Marie, 1965) to occur in this species. Alpha amyirin, a pentacyclic triterpenoid, a biomolecule of worth, has earlier been reported to occur in this species (Ghosh *et al.*, 1985). α and β amyirins are two structural isomers possessing a wide spectrum of pharmaceutical and biological functions like, antimicrobial, insecticidal (Bandeira *et al.*, 2006; Ekalu *et al.*, 2019), anti-arthritis, anti-inflammatory, anti-nociceptive, anti-depressant, anti-hyperglycemic (Siani *et al.*, 1999; Oliveira *et al.*, 2004a; Oliveira *et al.*, 2005b; Aragao *et al.*, 2006; Aragao *et al.*, 2007; Holanda *et al.*, 2008; Melo *et al.*, 2010; Barros *et al.*, 2011; Melo *et al.*, 2011; Santos *et al.*, 2012; Aragao *et al.*, 2015; Carvalho *et al.*, 2017; Pinto *et al.*, 2017), anti-ulcer, gastroprotective

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Genetic Relationship Between Populations of *Suaeda maritima* (L) Dumort. Growing along the Coastal Belt of Purba Medinipur District, West Bengal, India in Respect of AFLP Performance

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ABSTRACT

Suaeda maritima (L.) Dumort., a halophyte herb of the family Chenopodiaceae, grows gregariously along the coastal belt of Purba Medinipur district of West Bengal in India. The geographical location of this area is in between 21°63'16"N to 21°70'50"N latitude and 87°54'63"E to 88°12'40"E longitude. This annual salt marsh species is regularly used by the local people as food and also for curing many a disease. Earlier works report on phenotypic plasticity of it and other aspects of morpho-anatomical features as well as useful phytochemical elements of it. Since the populations of this species in this coast are not growing contiguously, in search of any plasticity due to genetic difference amongst the individuals of different populations AFLP analyses were carried out. The studied area was transected into eight zones. The genetic distances were calculated based on the AFLP bands that had been amplified using the 12 primer combinations. The similarity indices (SI) ranged from 0.19 to 0.83. The dendrogram was created using the UPGMA and the genotypes were found to be classified into 2 major groups. This study revealed the existence of genetic diversity even among the individuals of closely growing populations of this species, indicating significant dynamism in it, a fact which may be quite imperative of its ability to cope up with the fragile physical environment it grows in.

Key words: *Suaeda maritima*, AFLP, Cluster analysis, Coastal belt

The genus *Suaeda* Forssk. ex J.F. Gmel., under the family Chenopodiaceae, comprises 110 species of halophytic herbs or shrubs distributed worldwide along the seashores [1-3]. Most of the species of *Suaeda* are generally found to grow along the coastal belts of tropical and sub-tropical regions between 25°N to 25°S latitude throughout the world [4-5]. They are annual, herbaceous, succulent bushy mangrove associate plants with preferably growing in the soils rich in salt [6-7]. *Suaeda maritima* (L.) Dumort. is one of the most important species under the genus due to its use as vegetable and for curing different maladies [8] on having cardio-protective and hepato-protective properties due to presence of triterpenoid - alpha amyirin [9-11]. It grows along the coastal belts of Indian subcontinent [12] and so also grows luxuriantly in the coastal belt of Purba Medinipur district of West Bengal in India [13]. However, it does not grow contiguously on the said coastal belt, instead occurs as punctuated populations exhibiting the

morphological and phyto-chemical variation amongst them [14]. In this parlance AFLP analysis of the sample individuals representing different populations of the species has been carried out in search of diversity.

Amplified fragment length polymorphism (AFLP) has been widely used for the identification, standardization, and determination of genetic diversity of plants [15-16]. Moreover, the marker can be used to survey a whole genome without any prior sequence knowledge [17]. AFLP markers have been used favourably to identify herbal plants and to evaluate genetic diversity in various species [18-19]. There are reports on molecular phylogenetic analysis of the subfamily Suaedoideae [20-22]. By using ribosomal DNA and chloroplast DNA markers researchers reflected a discordant relationship among few species of *Suaeda* [23-24]. The populations of *Suaeda maritima*, here understudy, show subtle phenotypic variation that might be having some genetic cause behind. AFLP among the samples of the populations has revealed the presence of subtle genetic variation.

MATERIALS AND METHODS

Plant materials

The fresh young leaves of *Suaeda maritima* (L.) Dumort. were collected from eight distantly situated locations of the study area at the coastal belt of Purba Medinipur district of West

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RESEARCH ARTICLE

EFFECT OF DIFFERENT PLANT EXTRACTS AGAINST CARBUNCLE CAUSING PATHOGEN STAPHYLOCOCCUS AUREUS - A COMPARATIVE ACCOUNT

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ABSTRACT

The use of plants in the treatment of carbuncle is common in traditional medicine at Purulia. Based on ethnopharmacological and taxonomic information, antibacterial activities of aqueous, ethanol, acetone, petroleum benzene and chloroform extracts of four medicinal plants were determined by in vitro agar diffusion method against *Staphylococcus aureus* which causes for Carbuncle. The roots, bulb, aerial part, and leaves of four different plants, of different family were studied for antibacterial activity. Powdered materials of all the selected plant parts were extracted with the help of different solvents (water, ethanol, acetone, petroleum benzene and chloroform) using soxhlet apparatus and antibacterial activity was observed against *S aureus*. The significant results were obtained in *U indica* bulbs and *C anthemoides* roots. This study experimentally strengthen the concept of the tribal traditional knowledge to cure carbuncle.

INTRODUCTION

The use of plant and its products has a long history that began with folk medicine and through the years has been incorporated into traditional & allopathic medicine (1). Since antiquity, many plants species reported to have Pharmacological properties as they are known to possess various secondary metabolites like glycosides, saponins, flavonoids, Steroids, tannins, alkaloids, phenols, terpenoids which is therefore should be utilized to combat the disease causing pathogen (2-4).

With the advancement in Science and Technology, remarkable Progress has been achieved in the field of medicine with the discoveries of many natural and Synthetic drugs (5). Antibiotics are undeniably one of the most important therapeutic discoveries of the 20th century that had effectiveness against serious bacterial infections. However only one third of the infectious disease known have been treated from these synthetic products (6). This is because of the emergence of resistant pathogens that is beyond doubt the consequence of years of widespread indiscriminate use, incessant and misuse of antibiotics (7,8). In general, bacteria have the genetic ability to transmit and acquire resistance to drugs, which are utilized as therapeutic agents (9).

The Problem of microbial resistance is growing and the outlook for the use of antimicrobial drugs in the future is still uncertain. Therefore, actions must be taken to reduce this problem, for example, to control the use of antibiotic, develop research to better understand the genetic mechanisms of resistance & to continue studies to develop new drugs, either synthetic or natural. The ultimate goal is to offer appropriate and efficient antimicrobial drugs to the patient.

Over the past twenty years, there has been a lot of interest in the investigation of natural materials as source of new antibacterial agents (10, 11). Until natural Products have been approved as new antibacterial drugs, there is an urgent need to identify novel substances active towards highly resistant pathogens (12, 13). According to WHO the traditional medicine are proven to be efficacious & safe(14)and about 80 % of the world population is dependent on the traditional medicines and a major part of traditional therapies involves the use of plant extracts or their active constituents' Purulia is the good source of medicinal plants in west Bengal. About 85% of the rural Populations of Purulia depends on wild plants for the treatment of carbuncle. Folk herbal remedies used against carbuncle in Purulia, the antibacterial activity of that herbals has been dealt with in the present work. Carbuncle is group of



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INVESTIGATION OF ETHNO MEDICINAL PLANTS FOR THE TREATMENT OF CARBUNCLES FROM PURULIA DISTRICT OF WEST BENGAL

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Abstract: Purulia, the western most district of West Bengal lies between 22°60' and 23°50' north latitude and 85°76' and 86°65' east latitude. Almost twelve ethnic groups (Bhumij, Birhor, Gond, Ho, Kharia, Kharwar, Kurmi, Lodha, Malpaharya, Munda Oraon, Santal) present in this district. The tribal people who reside in a very remote rural areas are fully dependent upon the herbals for the treatment of their different diseases as the nursing home and hospitals are far away from them. About 32 plant species have been recorded from this district for the treatment of carbuncle disease. The method of preparation of medicine, mode of administration and dosage application have been recorded from the tribal people and local herbal practitioners or healers of the district. In most of the cases leaves of the investigated Plants were used for the treatment of carbuncle.

Key words: Carbuncle; Ethnobotany; Purulia.

INTRODUCTION

Botanicals have always served as a source of food, fodder, fibre, timber, and medicine. Plants have been used for important medicinal constituents in indigenous medical systems since ancient times. The tribal people who reside in very remote rural areas are fully dependent upon the herbals. Local herbal practitioners or healers practice the use of medicinal plants for common people in a very low expense.

In India over 53 million tribals belonging to 550 tribal communities under 227 linguistic groups have been reported. They very often use the phyto resources of their surroundings to prevent and cure various ailments of their own and domesticated animals. According to WHO the traditional medicine are proven to be efficacious and safe (1) and 80% of the world population is dependent on the traditional medicine and a major part of traditional therapies involves the use of plant extracts or their active constituents. In developing countries a huge number of people lives in extreme poverty and some are suffering and dying for want of safe water and medicine, they have no alternative for primary health care (2). India has 45,000 plant species, of which 15,000 species are of flowering plants and 7,000 species identified as medicinal plants. Purulia is the good source of medicinal plants in West Bengal. About 85% of the rural population of Purulia depends on wild plants for the treatment of carbuncle. Folklore and traditional knowledge at present in the process of degeneration due to disruption of forest covers, uprooting of tribal population due to industrialization. So there is urgent need to document the available information in detail for future application and scientific investigation.

The knowledge of traditional medical practitioners as well as of the wise men and women regarding the art of healing especially the refractory diseases has been proved to be immensely valuable for welfare of mankind. Since the healers most often belong to their own community, people seek their help for the treatment instead of consulting with allopathic doctors.

Documentation of this knowledge on war-footing has been one of the thrust areas of the present day scientific research followed up by the validation and development of novel drugs. In view of this, folk herbal remedies used against carbuncle in Purulia, has been dealt with in the present work. Carbuncle is a group of boils, which is caused by methicillin-resistant staphylococcus aureus (3). It is a red swollen and painful cluster of boils that are connected to each other under the skin. Most of the carbuncles are caused by *Staphylococcus aureus* which inhibits the skin surface, throat and nasal passages. If it is untreated, it may cause serious complications like sepsis and infections in other parts of the body. In this investigation, an ethno botanical attempt was taken to explore the plants used by various ethnic groups residing in tribal dominated rural belts of Purulia for the treatment of carbuncle. Although the people of Purulia traditionally used so many herbal plants for preparing drugs and medicines to treat carbuncle yet no such documentation has been done earlier. Several ethno botanical investigations have been conducted earlier in the district to explore its vast ethno medicinal Plants (4-16). The present Investigation is an attempt to investigate the ethno medicinal plants resources, the

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STUDY OF THE DIVERSITY AND SUSTENANCE OF MANGROVE BIOTA OF THE COASTAL BELT OF PURBA MEDINIPUR DISTRICT OF WEST BENGAL

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Abstract: The coastal belt of Purba Medinipur District is about 68 km starting from the Mohana of Rasulpur River at Hijli Sarif of Khejuri extended upto the udoypur beach of Digha Border. The total coastal belt is divided into 10 sections (Hijli Sarif, Petuaghat, Bankiput, Junput, Haripur, Shoula, Mandarmoni, Tajpur, Sankarpur and Digha) for the accuracy of investigation. The present comprehensive study on the mangrove vegetation reported nine mangrove species under seven genera and five families from the ten coastal sections. The dominating mangrove taxa are *Avicennia*, *Bruguiera*, *Ceriops*, *Excoecaria* and *Sonneratia*. The mangrove species are found to occur in high frequency in Hijli Sarif, Petuaghat, Bankiput, Sankarpur and Digha Mohana. The phytosociological association of the mangrove has also been studied. The richness of mangrove vegetation on the coastal belt of Purba Medinipur district is greatly hampered due to dry fish industries as well as continuous ferry activities of fisherman and daily uses of mangroves as fuels by local people. In the light of present scenario immediate steps to be taken for their sustenance.

Key words: Mangrove biota; coastal belt; Purba Medinipur; West Bengal.

INTRODUCTION

Mangrove vegetation's are generally found to grow along the coastal belts of tropical and sub-tropical regions, usually between 25°N and 25°S latitude throughout the world [1]. Mangroves once covered ¼ th of the world's tropical coastlines, often in conjunction with the coral reefs. Asia contains most of the world's mangroves with 46% followed by America with 35% and Africa with 17% [2-3]. Particular environmental factors such as temperature, warm sea current, rainfall, salinity stress, wave action, sedimentation, fresh water flow etc. determine the occurrence and development of mangroves in the local area. The world mangroves divided into two main areas i) the Indo-Pacific regions and ii) Western Africa and American regions. The five basic requirements (tropical temperature, fine grained alluvium, low wave and tidal action, salt water, large tidal range) essential for extensive mangrove development [4]. The quantitative structure of mangrove, phyto-succession and restoration of mangrove in sundarban biosphere reserve were studied in details [5-12] and other coastal parts of India also studied to get vivid information about mangroves [13-17]. The coastal belt of Purba Medinipur district of West Bengal in India is started from the Hijli-Sarif of Khejuri and extended upto Udoypur of Digha and it is situated over the northern part of Bay of Bengal and also situated at the south-western side of the mouth of Hoogly river and just opposite side of Sundarban mangrove forest. The coastal belt of Purba Medinipur district lies between

21°51'27" N to 21°36'5" N latitude and 87°29'88" E to 88°12'40" E longitude. Various types of mangroves were found to grow along the coastal stretch of Purba Medinipur district and this mangrove vegetation had been over exploited ruthlessly and severely affected by felling down the mangrove trees for fuels and timbers, spreading of dry fish industries, immense and unscientific uses of chemicals (Chlorpyrifos 20%EC) by dry fish industries, aquaculture of prawns, settlement of refugees, continuous ferry activities of fishermen and pollution due to fishing harbour. The mangrove vegetation of the coastal belt of Purba Medinipur district is being denuded day after day and is under severe threat at present. The investigated area divided into ten sections and all the sections immersed during tide and opened during flow. Naturally all the mangroves become immersed every day. Sea water rises 150 to 200 ft above towards the sea-shore and covered almost 500 ft above the sea water level during full moon, new moon and rainy seasons. The mangrove vegetation pattern is remarkable and the variation was investigated in ten sections thoroughly in different seasons of the consecutive five years [18]. Floristic study of West Bengal and Medinipur district was done earlier [19-22]. There was no information about the mangrove species occurred on the tidal and intertidal zone of the sea coast of Purba Medinipur district until now. Therefore the present study is an attempt to assess the composition and variation of mangrove vegetation of the coastal belt and also to assess the ecological disturbances by the operation of biotic

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STUDY OF ECO-FLORISTIC DIVERSITY OF HARIPUR (PURBA MEDINIPUR DISTRICT), WEST BENGAL: A PROPOSED SITE FOR NUCLEAR POWER PLANT

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Abstract: The coastal stretch of Purba Medinipur district of West Bengal 68 km long and very much rich in plant diversity comprising of herbs, shrubs, trees and lianes. The total coastal belt is divided into ten sections of which Haripur is selected for the establishment of "The Haripur Nuclear Power Plant of India" from the joint collaboration of India, USA, Russia Govt. Haripur occupied about 6 sqkm area of which 3.6 sq/km required for the nuclear power plant. The comprehensive floristic study of Haripur at present investigated for the first time and about 300 angiospermic species have been recorded. This proposed Nuclear power plant may hamper and damage the richness of plant biodiversity of Haripur and its neighbouring coastal areas of Purba Medinipur district in future.

Key words: Ecofloristic diversity, Haripur, Nuclear power plant, Purba Medinipur, West Bengal, India.

INTRODUCTION

The demand of electricity in India is increasing at the rate of 9% annually. Govt. is trying to fulfill the demand of power by introducing the new power plant projects in India whether its nuclear power plants, thermal power plants, coal based power plants etc. To fulfill the scarcity of electricity India Govt. agreed to settle seven new Nuclear power plants in India in collaboration with USA and Russia Govt. during 2006-2008 at different states [1]. In West Bengal Haripur in Purba Medinipur district was selected by the Department of Atomic Energy of India for setting up a new nuclear power plant having the capacity of producing 10000MW electricity with the help of the company Rosatom from Russian federation and National Power Corporation from India. Haripur is under Maglalput Gram Panchayet in Contai subdivision of Purba Medinipur district of West Bengal and occupies about 6sq km coastal zone consisting of Haripur and Samrajilpai villages and 156 km distance away from Kolkata and 30 km distance away from Haldia port. It lies between 21°41.964' N to 21°43.232' N latitude and 87°45.845'E to 87°48.884'E longitude.

The study of vegetation and flora of Haripur in West Bengal is essential for the reflection of the status of plant biodiversity of that region as well as to predict the exploitation of plant biodiversity after setting up of the nuclear power plant. The southern part of Haripur is richer with 6 types of mangroves and mangrove associated 6 marshy species which are immersed during tide and opened during flow while the terrestrial species were found to grow on sand dune at the sea shore. The forest department planted some

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Mangroves *Bruguiera gymnorrhiza*, *Excoecaria agallocha* and xerophyte *Casuarina equisetifolia* [2]. The northern eastern and western part of Haripur contain various types of mesophytes, hydrophytes and xerophytes. About 286 angiospermic species under 218 genera 77 families of different economic purposes have been investigated from Haripur. The West Bengal flora and Midnapore district flora were studied [3-5]. A 12-membered site selection committee of the Department of Atomic Energy (DAE) submitted the final report to Atomic Energy Commission of India after their supervision of a number of coastal district in India (Nov/2006) but there was no floristic information of the Haripur of Purba Medinipur district. Hence the present study is an attempt to assess the composition and variation of flora of Haripur and an attempt to reflect the loss of plant biodiversity in future due to the implantation of the "Haripur Nuclear Power Plant" at Haripur.

MATERIALS AND METHODS

In the aid of the study of floristic diversity of Haripur-extensive field work, literature survey, herbarium scrutiny and critical examination of the plant specimens were carried out from 2010-2015. The entire aquatic, terrestrial and marshy vegetation of Haripur in both tidal and nontidal zone was thoroughly scanned by repeated visits in different seasons of the year. Sampling was done to prepare a complete herbarium for future reference. Normally 4-5 specimens of each species in flowering or fruiting stage were collected and life form photographs were prepared. Relevant field notes were made on the spot, noting down the





ALLELOTOXIC EFFECTS OF *PARthenium HYSTEROPHORUS* L. LEAF AQUEOUS EXTRACT ON CYTOMORPHOLOGICAL BEHAVIOR OF *ALLIUM CEPA* L. AND *LENS ESCULENTA* MOENCH

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Abstract: *Parthenium hysterophorus* a species of Asteraceae, has gained a worldwide cognigence as an weed due to its invasiveness at many parts of the world. It is well known for its allelopathic effect to various neighboring plants. The allelopathic effect of *Parthenium* leaf extract has been noted to affect the ability of plant cell division, the chromosomal conformity as well as the growth of *Allium cepa* and *Lens esculenta*. The present study illustrated that with the increase of concentration of leaf extract the mitotic index decreases and the percentage of chromosomal abnormality increases correspondingly destabilizing the growth behavior of the studied plants.

Key words: Alleloxicity; Leaf extract; *Parthenium hysterophorus*; *Allium cepa*; *Lens esculenta*.

INTRODUCTION

Parthenium hysterophorus L. a plant of Asteraceae form tropical America has attained a worldwide distribution due to its instinct invasiveness. Its success as a weed has led to scientific investigations at different corners of world to unravel the cause of it. Allelopathy has been considered to be one of the most potent factors for imparting invasiveness to the species [1-6].

Allelopathy is a phenomenon by which individuals of one plant species can negatively or positively influence the growth and other life processes of neighboring species. Some chemical exudates of the plant, known as allelochemicals, are responsible for this. Like chemicals have been detected for *Parthenium hysterophorus* L. also. Some of these are vancillic acid, anisic acid, cornopillin, parthenin etc. [7-11]. Deleterious influences of these allelochemicals on crop plants, forest plants are well documented by a most of workers [12-14]. In India during last two decades this species has increased its population fast. The species has shown least specification regarding the choice of site of growing, thus, it grows on fellow land, forests and equally well on nutrient rich arable land; quite competitively with cultivated crops [15,16]. Allelopathic effects of the species being a well-known fact. So the present study attempts to reveal the impact of the extract of leaf residues on the cell division, chromosome morphology and growth of two agricultural plants *Allium cepa* and *Lens esculenta*.

MATERIALS AND METHODS

Matured leaves of *Parthenium hysterophorus* were taken to collect leaf extract. Seed of *Lens esculenta* and bulb of *Allium cepa* were used as the plant materials to observe the effects of leaf extract.

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Collection of leaf

Matured leaves of *Parthenium hysterophorus* were collected mostly as the leaves that has just fallen on the earth or the most mature yellow senescent leaves about to be detached from plant.

Preparation of leaf extract

Forty (40) grams of such mature leaves were pounded and dipped in 500 ml. of double distilled water for 72 hours. The leaf extract that came out by that time was collected by straining out the debris of leaf tissues with a strainer. The solution, thus obtained, was taken as stock solution. Different concentrations of the extract were prepared by adding double distilled water to the stock solution according to need.

The concentrations used are:

- Concentrated (i.e. the stock solution 100%)
- 50%
- 25%
- 12.5%
- 6.25%

Treatment of seed of *Lens esculenta* and bulb of *Allium cepa*

The plant materials were taken in two different lots-one for cytological works and the other to study the germination and growth behavior. Same experimental sets were set for both of the above mentioned lots and also for both species.

Bulb of *Allium cepa*

Bulbs in different sets have treated with the respective concentrations of extract for 3 days, roots emerged were collected for cytological studies. In another lot bulbs treated similarly were transferred to



**STUDY OF TIDAL VEGETATION OF PURBA MEDINIPUR DISTRICT OF WEST BENGAL, INDIA**Dulal Chandra Das^{1*}, Maniklal Pati¹, Ghanashyam Mahato² and Monalisa Das³¹Department of Botany, Raja N. L. Khan Women's College, Midnapore-721102, Paschim Medinipur, West Bengal, India²Department of Botany, A.M College, Jhalda, Purulia, West Bengal, India³Department of Nutrition & Dietetics, Vidyasagar Institute of Health, Midnapore-721102, Paschim Medinipur, West Bengal, India

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Abstract: The coastal part of Purba Medinipur District of West Bengal has wide variation in the composition of vegetation. Its 68 km coastal belt started from the mohana of Rasulpur river at Hijli sarif of Khejuri extended up to the Udoypur beach of Digha border. This tidal zone is the mouth of Bay of Bengal and showed a great variety of aquatic plants. The total coastal belt is divided into 10 sections: Hijli-Sarif Petuaghat, Bankiput, Junput, Haripur, Shoula, Mandarmoni, Tajpur, Sankarpur and Digha for the brevity of investigation. The present comprehensive study reported 23 angiospermic species of which 9 species are mangrove and rest 14 species are mangrove associates. Mangrove species found in high frequency in Hijli-sarif, Petuaghat, Bankiput, Sankarpur and Digha mohana. The richness of tidal vegetation is greatly hampered due to dry fish industries as well as continuous ferry activities of fisherman. At present this tidal vegetation is under severe threat.

Key words: Tidal vegetation; Angiosperms; Purba Medinipur; West Bengal; India.

INTRODUCTION

Knowledge of vegetation and flora of any region is essential for the study of its biodiversity and environment. Indeed a comprehensive and up to date floristic analysis of a region is essential for proper utilization of plant resources of this area and for planning a long term strategy for the welfare of human population. Besides, preparation of floras of smaller areas like district, protected areas, unexplored areas etc, after extensive surveys, is a prerequisite for the revision of the flora of a vast country like India. In order to ensure the protection of all major ecosystems, to minimize damage to the habitats and to safe guard loss of biodiversity, a comprehensive floristic study as well as effective conservation strategies is essential. The vegetation of the tidal zone of the seacoast region of Purba Medinipur of West Bengal is under threat due to many reasons like – immense and unscientific use of chemicals in dry fish industries and pollution due to the fishing harbor etc. The sea coast region of Purba Medinipur District starts from the mouth of Rasulpur river near Hijli Sarif of Khejuri extended upto the Udoypur of Digha border and about 68 km distance. This belt lies between 21°51'27" N to 21°36'50" N latitude and 87°29'88" E to 88°12'40" E longitude.

The investigated area is divided into ten sections. All the sections immersed during tide and openness during flow. Naturally all the herbaceous plants and the base of some shrubs become immersed every day Sea water rises 150 – 200 feet above towards the sea shore and covered almost 500 feet above during full moon, new moon and rainy season. The vegetation pattern is remarkable and the variation was investigated in ten sections thoroughly. West Bengal flora and Midnapore district flora were investigated [1-3] earlier, but there was no information about the

aquatics of the tidal zone of the sea coast of Purba Medinipur district until now. Therefore, the present study is an attempt to assess the composition and variation of aquatic flora of the coastal belt and also to assess the ecological disturbances by dry fish industries, continuous running of fishing boat and to suggest the sustainable utilization and effective conservation measure.

MATERIAL AND METHODS

Extensive field work, literature survey, herbarium scrutiny and critical examination of plant specimens were carried out from 2010 to 2015. The entire aquatic, marshy vegetation of the tidal zone was thoroughly scanned by repeated visits in different seasons of the years. Sampling was done to prepare a complete herbarium for future reference.

Normally 3-4 specimens of each species of flowering or fruiting stages were collected and the life form photographs were prepared. Relevant field notes were made on the spot, noting down interesting and diagnostic features of plants. Due attention was paid to plants of medicinal, economic importance as well as plants of rare occurrence, biotic pressure on plants, small industrialization and ecological disturbances also. The historical and geographical information was collected from DLRO & the BLRO office of the district. The aquatic vegetation of the tidal zone of the sea coast belt was investigated by walking on foot. All the collected specimens were properly processed, preserved and mounted on herbarium sheets following the standard and modern herbarium technique [4]. Specimens of all plants were critically identified in CNH at Howrah with the help of books, Journals, floras, revisions, monographs and authentic specimens [5-22].

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