

1: CiNii Books - Mangrove crabs of Karachi

Pakistan has enormous coastal resources along its southern border. Due to the geographical position and climatic condition, the coastal area of the country is known as one of the highly productive areas of the world.

Mangroves of Indus delta PQA provide immense benefits, products and unrecognized regulatory services. Products of Direct Economic Value: Fish, Minerals and food. There are Products of Natural System intangible supplies of rich nutrients to support productivity. Coastal communities benefit in a multitude of ways from Mangrove ecosystems. Collectively, these benefits are known as ecosystem services. The Mangroves are well known for their high biological productivity and their consequent importance provided to the coastal community in terms of services and products of direct and indirect value to the adjacent coastal waters. Mangrove Ecosystem services are regularly involved in the provisioning of food and services and the decomposition of organic wastes. They export organic matter, mainly in detritus form of leaf litter to the marine environment, thus providing a highly nutritious food source for themselves and for the Benthic and terrestrial animals found in the mangrove areas, as well as for those in neighboring estuarine and marine ecosystems. Apart from nutrient export, mangroves also contribute to offshore fisheries by acting as nurseries and shelters for many species of commercially important finfish and crustaceans. Rehabilitation and conservation of mangroves ecosystem in PQA is essential for sustained biological productivity in the region.

Introduction The present Indus Delta covers an area of about , hectares and is characterized by 16 major creeks and innumerable minor creeks, dominated by mud flats, and fringing mangroves. The coastal morphology is characterized by a network of tidal creeks and a number of small islands with sparse mangrove vegetation, mud banks, swamps, and lagoons formed because of changes in river courses. The major land use of the area adjoining the site includes industrial zones and port areas. The numerous estuaries and creeks connecting to the sea which characterize the tidal delta and marshy mud flats, do not receive the same quantities of nutrients that they used to get in the past to support the growth of mangroves and aquatic life. PQA is part of the Indus Delta that currently supports one of the largest single mangrove ecosystems in the tropical coastal environments. In the Indus Delta mangrove ecosystem, eight species of mangroves have been reported The *Avicenna marina* is the dominant species of the mangroves in the Indus Delta that grows on the northern and southern banks of the Phitti Creek. The Mangroves are highly nutritious food source for marine fauna. Mangroves provide a habitat and breeding ground for a variety of marine life, particularly fish, shrimps and crabs. The geographical location is given in Figure 1. The eastern coast has tidal creeks with mangrove and mudflats which are linked with a network of creeks of Indus Delta. All three are connected in a series starting from Gharo Creek at the north-eastern end to the Phitti Creek at the south-western end and located at This creek system is about 28 km long and its width ranges from to m. The Korangi Creek and Kadiro Creeks are connected with it at the north-eastern end while it acts as main waterway connected with the open sea at the south-western end. The sampling location and coordinates in the PQA area for the observing the mangrove tree heights, densities and biodiversity sampling locations are given in Table 1. Mangrove Ecosystem Services *Avicenna marina* is the most dominant species. Other mangrove species in the deltaic region such as the *Cerriopstagal* occur in localized patches and there are a few plants of *Rhizophora mucronata*. All other species are rare and have disappeared from most part of the Delta due to adverse environmental conditions. The mangrove trees growing - m away from the creek seawater in the land ward direction show an overall decline in the height of the mangrove plantations. Destabilization of mangroves in the Indus Delta has been attributed to the progressive reduction in fresh water discharge over a period of many years. Historical records indicate that the distribution of mangroves in the Indus Delta has significantly changed during the past several hundred years Figure 1. Sampling stations and coordinates. Until recently the Indus River had a largely river-dominated estuary but increased utilization of the river for agriculture etc. During remaining nine to ten months the Indus River has no estuary due to elimination of the river discharge [3]. As a result, the Indus delta mangrove ecosystem has been adversely affected. The mangroves are degrading rapidly caused by a number of factors such as cutting, browsing and by reduced silt laden river water. The mangrove forests which covered

, ha in recessed to about , ha in [4], threatening the survival of the natural resources and thereby the livelihood of a large number of fisherman. The current mangrove cover in the Indus delta and the PQA shows an increase in mangrove forest by 3. The nutrients including Phosphate, Nitrate, Nitrite and Ammonia play a vital role in the food chain of marine ecosystem in primary production of coastal and oceanic waters. They support the growth of phytoplankton which serve as the food for zooplankton as well as larval stages and juveniles of fish and crustaceans, they also serve as food for filter feeders and benthic marine invertebrate MBI. Nutrients in the PQA do not appear to be limiting to primary productivity in the channels. If there is any limitation, it is due to water turbidity that restricted the photic zone. Higher concentrations of nutrients result in overproduction and subsequently leading towards exhaustion of dissolved oxygen in the seawater. Mangroves Tree Heights and Densities Despite their strategic importance, mangroves are among the most threatened and rapidly disappearing natural environments in the world. Mangroves are a valuable resource for many of the coastal villages. They are primarily used as a source of fuel and fodder and provide the feeding grounds for shrimp, besides protecting the land from erosion. The people have been overexploiting this resource over the years. Mean tree heights of *Avicenna marina* in PQA at seven randomly selected locations ranged from 2 - 6 m Figure 2 a. Data of mangrove tree height from seven locations Table 2. Primary productivity and Potential fish productivity in the PQA area. The mangroves plants have a high biological productivity and are important to the nutrient budget of coastal waters. They export organic matter, mainly in detritus form i. Since they act as nurseries and shelters for many species of commercially important finfish and crustaceans they are important for maintaining offshore fishery, as well as habitat for wildlife, such a loss would reduce available habitat for birds and juvenile fish, and the biodiversity of the local plants and benthic marine invertebrates. Shannon Weiner Diversity Index Shannon Weiner diversity index is a tool for measuring the health of the ecosystem. Benthic Marine Invertebrate sample at stations EC 4 1. PQA is a designated industrial area, creeks system are a disturbed due to industrial activity, and therefore both species diversity and species richness are relatively low Table 5. Employment and Living Conditions PQA and its environs do not offer opportunities for employment and the population is primarily employed as Table 4. Agriculture is limited to subsistence farming due to scarcity of water. In Juma Goth and areas close to Cattle Colony there is extensive cultivation of vegetables using the effluent from the cattle yards. Livestock herding is not a healthy and reliable income generating option, and the few livestock holdings in the settlements are primarily for household and domestic use, a source of dairy consumables. Skilled labor is rare and the categories of skilled laborers are mostly drivers, welders, plumbers and electricians. Government service is rarely available. The Settlements in the Korangi Creek area are fishermen, but the village dwellers are engaged in other low level occupations as well. The employment, and therefore the earnings for a large section of population in the area is variable, dependent on, fisheries, shrimp and crab fishing from inshore waters and collection of mangroves as fodder for domestic animal is the main source of income. However, a substantial segment of population is employed on deep-sea fishing boats. Conclusion The ecological role of mangrove ecosystems PQA is, economically and socially, highly significant. The Mangroves are well known for their high biological productivity and their consequent importance to the nutrient budget of adjacent coastal waters. Thus, they support local and commercial fisheries yields. While a positive correlation between mangrove areas and fish productivity is acknowledged, the scientific information on this relationship is lacking. Conflicts of Interest The authors declare no conflicts of interest. Cite this paper Amjad, S. Journal of Geoscience and Environment Protection, 4,

2: Mangroves Forests in Pakistan - Chowrangi

*Mangrove crabs of Karachi [Nasima M Tirmizi] on www.enganchecubano.com *FREE* shipping on qualifying offers.*

Home Environment Mangroves Forests in Pakistan Mangroves Forests in Pakistan By shirazi December 6, Environment 4 Comments Mangroves are salt tolerant bush type trees which grow in inter-tidal zones of tropical and subtropical areas, river deltas and along the coasts. They are of great economic and environmental importance. Those living near Indus delta and Karachi might have seen that mangrove trees look different. They have special aerial roots which hold the trunk, leaves and foliage above the water surface. The aerial roots and tap roots can filter out the salt in the brackish water they grow in. Support roots grow directly into the mud to anchor the tree. Other roots wind up and down with the upward loops rising above the salt water level. Salt crystals taken up by the roots are stored in the leaves. The mangrove tree rids itself of the salt by shedding its leaves after sometime. Mangrove forests of Pakistan in Indus delta and along Arabian Sea coastal areas, as per estimates, are some , hectares in the Indus delta and over 3, hectares in Miani Hor, Kalamat Khor and Gwadar bay areas. Mangrove forests are teeming with life. They are natural habitat to a large number of insects, micro organisms, birds, different mammals as well as snakes. Mangrove areas act as physical breeding grounds and nurseries for fish, shrimp and crabs. During winters, many guest birds from north also come to breed here. The mangrove forests protect the coasts from dangerous cyclones and hurricanes. They also reduce sedimentation in the sea. Over time, the roots can collect enough debris and mud to extend the edge of the coastline further out. Hundreds of thousands of people directly or indirectly depend on the mangrove ecosystem for living. For centuries they have been used by human being for getting fuel wood fodder for the animals. Over the last five decades, mangrove forests in Pakistan has been subject to over exploitation and massive population pressure, and are therefore deteriorating fast in the quantity as well as quality. Without realizing the global significance, mangroves are being cut mercilessly. Near urban areas, mangroves are cleared for developmental activities. Reduced water flow in the River Indus – sixth largest river in the world – after the construction of dams and barrages upstream is also causing damage to mangrove forest and ecosystem they support. Mangroves need to be managed and conserved. Concerned agencies, government departments and non governmental organisation have already started taking steps and visible efforts are being made in this regards: New mangrove nurseries near Karachi, some other projects to grow more forests and mobilization of the local communities by enhancing awareness on the significance of mangroves for livelihood and by persuading them to take responsibility for conserving mangroves. To stop the degradation of mangrove areas, the World Bank, back in , had suggested that the mangroves forests in Pakistan be protected by declaring the Arabian Sea coastal areas a national park. This sort of sustainable solution will have important effects on the environment in the longer run.

3: The diversity of crabs in some mangrove forests of Karachi, Pakistan.

Those living near Indus delta and Karachi might have seen that mangrove trees look different. They have special aerial roots which hold the trunk, leaves and foliage above the water surface. The aerial roots and tap roots can filter out the salt in the brackish water they grow in. Support roots grow directly into the mud to anchor the tree.

Records of the Zoological Survey of Pakistan, 4 Materials for a carcinological fauna of India. A revision of the Cyclometopa with an account of the families Portunidae, Cancridae and Corystidae. Journal of the Asiatic Society of Bengal, Calcutta, 68, part 2 1: Taxonomy and Zoogeography of the portunid crabs Crustacea: Portunidae of the Arabian Gulf and adjacent waters. Fauna of Arabia, Die Dekapoda Brachyura von Dr. Annals of the South African Museum, Biotopes of the Western Arabian Gulf. Marine Life and Environments of Saudi Arabia: Marine Crabs of Bombay State. Taraporevala Marine Biological Station, Contribution number 1: Faune de Madagascar, Crabs of the China Seas, i-iv, , figs , pls Translation from Chinese original United States Exploring Expedition during the years , , , , , under the command of Charles Wilkes, U. United States Exploring Expedition during the years , , , , , under the command of Charles Wilkes, U. Superintendent of the Museum. Journal of the Linnean Society of London, Zoology , 22 Abhandlungen der Senckenbergischen naturforschenden Gesellschaft, 25 3: Portunid crabs of Visakhapatnam coast. Journal of the Bombay natural History Society, 90 3: Type-catalogue of the Decapod Crustacea in the collections of the Nationaal Natuurhistorisch Museum, with appendices of pre collectors and material. Zoologische Verhandelingen, Leiden, Brachyura from the coasts of China. Journal of the Linnean Society of London, Zoology, 37 Carcinological Fauna of Karachi. Agriculture Pakistan, 14 2: Relative abundance of edible crabs of family Portunidae in Karachi off-shore waters. Pakistan Journal of Science, 15 3: The crabs of Dar es Salaam. Illustrations of swimming crabs from Taiwan. Northeast Coast Scenic Area. Investigations into ecological resources and monitoring. Ministry of Transport and Tourism. Studies on the land and aquatic decapod crustacean fauna of the Kenting National Park II Communities of decapod crustaceans around the sea. Ministry of the Interior, Taipei. Fauna of the Chilka Lake. Memoirs of the Indian Museum, Calcutta, 5: On the zoogeography of southern African decapod Crustacea, with a distributional checklist of the species. Smithsonian Contribution to Zoology, A checklist of Brachyura of Karachi coasts, Pakistan. Records of the Zoological Survey of Pakistan, 7 Agriculture Pakistan, 26 3: Die Rundkrabben Cyclometopa des Roten Meeres. Abhandlungen der kaiserlich Leop. Deutschen Akademie der Naturforscher Halle, 99 2: Crab fauna of Kaohsiung Harbor, southwestern Taiwan. Annual of Taiwan Museum, On a collection of Crustaceans made at Singapore and Malacca. Proceedings of the Zoological Society of London, 48 1: On the Crustacea collected during the Skeat Expedition to the Malay Peninsula, together with a note on the genus Actaeopsis. Brachyura, Stomatopoda and Macrura. Proceedings of the Zoological Society of London, 2: Report on the Brachyura collected by Professor Herdman, at Ceylon, in Beitrag zur Crustaceenfauna von Madagascar. Abhandlungen der Senckenbergischen naturforschenden Gesellschaft, Ostafrikanische Dekapoden und Stomatopoden, gesammelt von Herrn Prof. Abhandlungen der Senckenbergischen naturforschenden Gesellschaft, 27 4: A catalogue of Brachyurous Crustacea of Taiwan. Quarterly Journal of the Taiwan Museum, 2 1: Illustrations of the Decapod Crustaceans of Formosa. Checklist of the Crustacea Brachyura Crabs recorded from Mauritius. Mauritius Institute Bulletin, 6 1: The collections from Melanesia. The collections from the Western Indian Ocean. British Museum Natural History , London, 8 1: Report on the Brachyura collected by H. Challenger during the years Challenger during the years , under the command of Captain George S. See Holthuis, , for dates of publication. Biological Magazine, Okinawa, 8: Japanese Crustacean Decapods and Stomatopods in color. Brachyura Crabs , i-viii, , pls In Japanese; second edition in Muraoka, K. Catalogue of the Brachyuran and Anomuran Crabs donated by Prof. Tane Sakai to the Kanagawa Prefectural Museum. Species of Portunid crabs Decapoda, Brachyura from Karachi. Pakistan Journal of scientific and industrial Research, 19 Food and Agriculture Organisation, Rome: Bollettino dei Musei di Zoologia e di Anatomia comparata della R. Bulletin scientifique de la France et de la Belgique, Atoll Research Bulletin, The Danish Expedition to Siam, Transactions of the Linnean Society of London, Zool. Brachyura, Albuneidae and Porcellanidae. Report on the

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4: Mangrove Ecosystem Services: Indus Delta (PQA), Sindh

Until a decade ago Karachi used to have mangrove forests on either side of Mai Kolachi. This is an ecological disaster! If there is a cyclone the forests are the only natural barrier protecting the city.

Mutmainna Syed on June 17, in Geography Comments Off on Mangroves in Pakistan Mangroves are salt tolerant bush kind trees, which strengthen in, inter tidal zones of tropical and subtropical localities, stream deltas and along the coasts. There are some They are of large economic and ecological importance. Mangroves live life on the point with one end on land and one in the sea, these botanical amphibians engage a zone of drying heat, choking mud, and salt levels that would destroy a conventional plant within hours. Yet the plantations mangroves form are between the very fruitful and geologically complex ecologies on Earth. Birds nestle in the shelter, shellfish connect themselves to the roots, and snakes and crocodiles approach to hunt. Mangroves deliver nursery parklands for fish; a food source for apes, deer, tree climbing crabs, kangaroos and a liquid source for bats and honeybees. The key types discovered is *Avicennia Marina* that nurtures in low height. According to estimations, these forests cover an area of , ha. There are two supplementary classes of mangroves in Pakistan i. The Riverain Forests mature on the reservoirs and dull layer of Indus River and are commonly found in Sindh and to some level in the Punjab. The Irrigated forests were nurtured in the colonial administration in 19th century to gather need for fuel wood. Typically found in Punjab, these irrigated forests cover about , ha. Mangroves timber plantations in river mouth of river Indus and with seaboard localities of Sindh and Baluchistan, as per approximates, hectors are in river mouth of Indus and approximately ha in Karachi and Gawader embayment areas. Mangrove jungle is teeming with life. They are natural habitat to a large number of worms, micro organisms, birds, different mammals along with snakes. Throughout winters, numerous visitor birds from north furthermore migrate in these jungles. The mangrove timber plantations protect the sandy shores from dangerous cyclones and hurricanes. Hundreds of thousands of persons exactly of indistinctly count on the mangrove natural environment for living. For centuries, these bush like trees have been utilized by human being for getting fuel timber fodder for the animals. Over the last five decades, mangrove jungle in Pakistan has been subject to over exploitation and huge population force, and is thus fading very quickly in the amount with value. Throughout the world, conservationists are currently concentrating on the role of mangroves as carbon sinks likewise their environmental helpfulness, physical beauty, capability to strain pollution, house fish nurseries and safeguard coastlines in contradiction of storms. In Pakistan, Mangroves need to be organized and saved too. Related organizations, government agencies and nongovernmental association have already begun taking steps and evident efforts are being made in this regards: New mangrove nurseries beside Karachi, some other tasks to grow more timber plantations and mobilization of the local communities by enhancing awareness on the significance of mangroves for livelihood and by purposeful them to take blame for protecting mangroves. Because of the restricted fresh water furthermore accessible in salty intertidal dirt, mangroves limit in the allowance of water they misplace through their leaves. Deprived of recognizing the worldwide importance, mangroves are being cut cruelly. Adjacent urban areas, mangroves remain unoccupied for growth related actions. Reduced water drift in the River Indus the sixth biggest river in the world subsequently the building of dams and barrages in upstream is also affecting loss to mangrove forest and environment they help. The major difficulty mangroves face is nutrient uptake. Because the dirt is all floods, a little bit free oxygen is available. In these hard positions, mangroves have formatted an exceptional procedures to help their offspring endure. Mangrove kernels are buoyant and thus matched to water dispersal. Different most plants, whose seeds germinate in dirt, numerous mangroves are viviparous, whose seeds germinate while still adhered to the parent tree. Furthermore, the resolution of the ADB Financed plan is to develop costal region supervision by calming ecological deprivation, shielding coastline regions from rushed coastal destruction. To halt the humiliation of mangrove areas, the World Bank, somewhere in , had proposed that declaring the Arabian Sea coastal areas a national park safeguard the mangroves forests in Pakistan. This sort of ecological solution will have significant outcomes on the environment in the long term and it can also help Pakistan to generate revenue in terms of

tourism, as over the world Mangrove forests are being used as an key travelling point for visitors by operating hotels around them, constructing golf courses etc. Mangroves need to be performing and save, as it is important and necessary to save the environment. Our planet earth is already getting dirty and polluted because of the so called human progress and industrial improvement which is undoubtedly causing severe and ruthless harm to the nature. In these circumstances where nature is being damaged and destroyed, we need to protect it by putting some worthy efforts or at least by not letting our existing protections destroy.

5: The coast is clear: The vanishing mangrove forest of Karachi - Iris - Herald

Species of Portunid Crabs (Decapoda: Brachyura) from Karachi. () studied portunid crab species from Karachi of the Genus Octolasmis on the Gills of Mud or Mangrove Crab, Genus Scylla.

Etymology[edit] The term " mangrove " comes to English from Spanish perhaps by way of Portuguese , and is likely to originate from Guarani. It was earlier "mangrow" from Portuguese mangue or Spanish mangle , but this word was corrupted via folk etymology influence of the word " grove ". Areas where mangals occur include estuaries and marine shorelines. High tide brings in salt water, and when the tide recedes, solar evaporation of the seawater in the soil leads to further increases in salinity. The return of tide can flush out these soils, bringing them back to salinity levels comparable to that of seawater. At low tide, organisms are also exposed to increases in temperature and desiccation, and are then cooled and flooded by the tide. Thus, for a plant to survive in this environment, it must tolerate broad ranges of salinity, temperature, and moisture, as well as a number of other key environmental factors—thus only a select few species make up the mangrove tree community. About species are considered "mangroves", in the sense of being a tree that grows in such a saline swamp, [4] though only a few are from the mangrove plant genus, Rhizophora. However, a given mangrove swamp typically features only a small number of tree species. It is not uncommon for a mangrove forest in the Caribbean to feature only three or four tree species. For comparison, the tropical rainforest biome contains thousands of tree species, but this is not to say mangrove forests lack diversity. Though the trees themselves are few in species, the ecosystem that these trees create provides a home habitat for a great variety of other species. Mangrove plants require a number of physiological adaptations to overcome the problems of anoxia , high salinity and frequent tidal inundation. Each species has its own solutions to these problems; this may be the primary reason why, on some shorelines, mangrove tree species show distinct zonation. Small environmental variations within a mangal may lead to greatly differing methods for coping with the environment. Therefore, the mix of species is partly determined by the tolerances of individual species to physical conditions, such as tidal inundation and salinity, but may also be influenced by other factors, such as predation of plant seedlings by crabs. Once established, mangrove roots provide an oyster habitat and slow water flow, thereby enhancing sediment deposition in areas where it is already occurring. The fine, anoxic sediments under mangroves act as sinks for a variety of heavy trace metals which colloidal particles in the sediments have scavenged from the water. Mangrove removal disturbs these underlying sediments, often creating problems of trace metal contamination of seawater and biota. Mangrove swamps protect coastal areas from erosion, storm surge especially during hurricanes , and tsunamis. Wave energy is typically low in areas where mangroves grow, [10] so their effect on erosion is measured over long periods. Shrimps and mud lobsters use the muddy bottoms as their home. Mangrove plantations in Vietnam , Thailand , Philippines and India host several commercially important species of fishes and crustaceans. Mangrove forests can decay into peat deposits because of fungal and bacterial processes as well as by the action of termites. It becomes peat in good geochemical, sedimentary and tectonic conditions. In Puerto Rico the red Rhizophora mangle , white Laguncularia racemosa and black Avicennia germinans mangroves occupy different ecological niches and have slightly different chemical compositions so the carbon content varies between the species as well between the different tissues of the plant e. Termites are an important part of this decay, and so an understanding of their action on the organic matter is crucial to the chemical stabilization of mangrove peats. Globally, mangroves stored 4. Plant biodiversity is generally low in a given mangrove. Above and below water view at the edge of the mangal. Red mangroves , which can survive in the most inundated areas, prop themselves above the water level with stilt roots and can then absorb air through pores in their bark lenticels. Black mangroves live on higher ground and make many pneumatophores specialised root-like structures which stick up out of the soil like straws for breathing which are also covered in lenticels. The four types of pneumatophores are stilt or prop type, snorkel or peg type, knee type, and ribbon or plank type. Knee and ribbon types may be combined with buttress roots at the base of the tree. The roots also contain wide aerenchyma to facilitate transport within the plants. Limiting salt intake[edit] Salt crystals formed on

grey mangrove leaf. Red mangroves exclude salt by having significantly impermeable roots which are highly suberised impregnated with suberin, acting as an ultra-filtration mechanism to exclude sodium salts from the rest of the plant. In a frequently cited concept that has become known as the "sacrificial leaf", salt which does accumulate in the shoot sprout then concentrates in old leaves, which the plant then sheds. However, recent research suggests the older, yellowing leaves have no more measurable salt content than the other, greener leaves. As seen in the photograph on the right, white or grey mangroves can secrete salts directly; they have two salt glands at each leaf base correlating with their name—they are covered in white salt crystals. Limiting water loss [edit] Because of the limited fresh water available in salty intertidal soils, mangroves limit the amount of water they lose through their leaves. They can restrict the opening of their stomata pores on the leaf surfaces, which exchange carbon dioxide gas and water vapour during photosynthesis. They also vary the orientation of their leaves to avoid the harsh midday sun and so reduce evaporation from the leaves. Anthony Calfo, a noted aquarium author, observed anecdotally a red mangrove in captivity only grows if its leaves are misted with fresh water several times a week, simulating frequent tropical rainstorms. Anaerobic bacteria liberate nitrogen gas, soluble ferrum iron, inorganic phosphates, sulfides and methane, which make the soil much less nutritious. Mangroves store gases directly inside the roots, processing them even when the roots are submerged during high tide. Increasing survival of offspring [edit] Red mangrove seeds germinate while still on the parent tree. In this harsh environment, mangroves have evolved a special mechanism to help their offspring survive. Mangrove seeds are buoyant and are therefore suited to water dispersal. Unlike most plants, whose seeds germinate in soil, many mangroves e. Once germinated, the seedling grows either within the fruit e. *Aegialitis*, *Avicennia* and *Aegiceras*, or out through the fruit e. *Rhizophora*, *Ceriops*, *Bruguiera* and *Nypa* to form a propagule a ready-to-go seedling which can produce its own food via photosynthesis. The mature propagule then drops into the water, which can transport it great distances. Propagules can survive desiccation and remain dormant for over a year before arriving in a suitable environment. Once a propagule is ready to root, its density changes so the elongated shape now floats vertically rather than horizontally. In this position, it is more likely to lodge in the mud and root. If it does not root, it can alter its density and drift again in search of more favorable conditions. Taxonomy and evolution [edit] The following listing modified from Tomlinson, gives the number of species of mangroves in each listed plant genus and family. Mangrove environments in the Eastern Hemisphere harbor six times as many species of trees and shrubs as do mangroves in the New World. Genetic divergence of mangrove lineages from terrestrial relatives, in combination with fossil evidence, suggests mangrove diversity is limited by evolutionary transition into the stressful marine environment, and the number of mangrove lineages has increased steadily over the Tertiary with little global extinction.

6: Marine Species Identification Portal : Mangrove swimming crab - *Thalamita crenata*

Mangrove crabs of Karachi. Nasima M. Tirmizi, Naseem Ghani and Khalid Khan. Pakistan Agricultural Research Council, pbk.

News Mangroves Mangrove forests of Indus delta, covering an area of about , hectares, constitute an important ecosystem in the coastal deltaic region formed by the River Indus. Indus delta mangroves are perhaps unique in being the largest arid climate mangroves in the world. They are almost entirely dependent upon freshwater discharges from the River Indus and a small quantity of freshwater from domestic and industrial effluents of Karachi. The Indus delta mangroves are under the management control of three different organizations, which are as follows: The area under the control of Board of Revenue is classified as "Government wasteland". At present, there are four mangrove species found in the Indus delta: The Indus Delta, provides subsistence to approximately , people throughout the year. About half of this population is located in Korangi area located on the southern outskirts of Karachi. While the remaining population is spread over the rest coastal belt to the Indian border. The Indus delta mangroves are only found in estuaries between mean sea level and mean high water spring tides. At high tides, their roots and lower stems may be inundated, while at low tides the mangroves may be exposed for several hours. However, the extent of their inundation varies according to the tidal cycle. During neap high tides usually only the lower reaches of the mangrove swamp are inundated. While during spring tides, water may even reach the outer fringes on higher ground. The tidal rise and fall create a continuous changing environment. At high tides the roots are submerged with high saline water. During the monsoon, fresh water laden with silt and rain, reduces water salinity to great extent. Water movements also affect temperature, nutrients and oxygen levels in the soil and water. If the mangroves are degraded then as much as , tons of fish caught off the Sindh Coast will be at risk IUCN in The Indus delta mangrove ecosystem provides habitat for fish, plants, crustaceans, birds, mammals, reptiles and amphibians. According to a Zoological Survey of Pakistan, 98 species of fish have so far been recorded in the Indus delta mangroves. Most of the fish are attracted towards mangrove swamps during high tide periods due to nutrient-rich food sources present in these areas. The presence of three species of lizards and 14 species of snakes exhibit a very good example of overlapping of terrestrial and aquatic fauna. The evergreen forests of Indus delta mangroves provide a habitat for many of the waterfowls. Migratory birds, such as flamingos, pelicans, cranes, cormorants, in flocks of thousands visit the Indus delta for feeding, roosting and breeding from November to February every year. It has been observed that the population of migratory birds has declined due to degradation of habitat during the last decade. Similarly, the number of sea dolphins has also reduced in mangroves due to marine pollution. Mangroves ecosystem in the Indus delta has been adversely affected in the recent years because of over exploitation of coastal resources due to coastal population increase, pollution and acute scarcity of freshwater from river Indus due to diversion of water for inland agriculture, coastal urbanization and industrialization. The situation is exacerbated by a general lack of education and awareness of sustainable use, on the part of communities, policy makers and implementers. Indus delta mangroves are dependent on freshwater discharge for their survival. Historically, abundant freshwater discharge and nutrient rich sediment load was conducive to a highly productive ecosystem including mangroves stands. With gradual and continuing reduction of discharge from the Indus, not only the transport of sediments to Indus delta mangrove has decreased, but also with the average annual rainfall being extremely low mm , and in some years, virtually no rain at all; availability of freshwater to Indus delta mangroves has been extremely curtailed. This combined phenomenon has put most severe environmental stress on the mangroves. Indus Delta at present receives the least amount of freshwater, leading to high levels of salinity and disruption to the ecological balance and loss of biodiversity. Today, Indus delta mangroves forests have become monoculture. According to Flora of Pakistan, eight species of plants have been reported along the coast of Pakistan, out of which four species have completely disappeared, three species are at the verge of extinction and only one species, *Avicennia marina* is surviving in Indus delta. As a result these shrinking forests are not playing their full role as a shelterbelt against cyclones. The A-2 cyclone caused a very serious loss of life and property of

coastal communities in Keti Bunder and Shah Bunder area of Indus delta. Keti Bunder and Shah Bunder are located in the southeastern part of the Indus delta close to the Indian border. Loss of mangrove forests has environmental and socio-economic consequences including: Reduced reproduction and procurement of commercially important fish. Loss of livelihood, impoverishment and declining health of communities, particularly women, children and elders dependent on fish and fish based products as a primary source of sustenance. Increased coastal erosion, resulting in damage to coastal villages and agricultural land through salt-water intrusion and contamination of ground water. Reduced availability of wood for use by local communities. Loss of faunal and floral biodiversity. Silting up the navigational channels and ports and harbours and Deprivation of local communities of the traditional use. Mangroves are important for ecology, environment and livelihood of communities dependant upon resources produced and sustained by these vital ecosystems. They are known as sites of high biological productivity and as a natural nursery grounds for a variety of marine organisms. In terms of environmental security, mangroves reduce erosion by trapping sediments, stabilizing the coastal zone and thus protecting the coast from storm surges and cyclones. In terms of livelihood, mangroves provide edible fish and other utilizable resources e.

7: Traveler Guide | Hotels In Karachi

Sampling site: The sampling site "mangrove backwater area" at Sandspit is the largest on the coast of Karachi and is located between latitudes 24° 50' N and longitudes 66° 53' E.

Eighty-five percent of the crabs, for the size group 50 to mm carapace width, were found infested with stalked barnacles. In all crabs, the barnacles were found attached to the inner hypobranchial surface of the gill with the exception of a single crab in which the barnacles were also found attached to the outer epibranchial surface of the gill. The stalked barnacles were identified as *Octolasmis* cor *Aurivillius*, and *O.* Their distribution on various parts of the gills, i. Most of the barnacles were found attached to the medial part of the gill *O.* Gill number 7 bore the maximum number of *O.* La branchie 7 porte le nombre maximum de *O.* However, Keenan et al. The present specimens were only tentatively identified as *Scylla tranque-barica*, as some of them show intermediate or overlapping characters a paper on the taxonomy of Pakistan mud crabs is under preparation by the authors. In this paper, we identify the species and describe the distribution and abundance of these *Octolasmis* species on the gills of *Scylla* cf. These crabs were cultured in the earthen pond for a period of about four months, from January to May, on an experimental basis. The size of the pond was about m² and the stocking density was 1. The crabs were killed, measured to the nearest mm, and sexed, all before dissection and examination for the presence of stalked barnacles on the gills. The gills were examined under a stereomicroscope and the number and position of the *Octolasmis* present were recorded. All barnacles were found attached to the inner hypobranchial surface of the gills except for one female crab, which had barnacles attached to both gill surfaces. This female crab measured 99 mm in CW and had 14 *Octolasmis* 9 *O.* The maximum number of *Octolasmis* found was attached to the gills of a male crab of 91 mm CW: There were three crabs, all male, that had only one stalked barnacle on their gills. The first, 50 mm CW, had one *O.* Distribution of *Octolasmis* cor A total of specimens of *Octolasmis* cor was found. The medial part of the gill was found the most frequently infested, followed by the proximal and the distal parts. The highest number of *O.* The lowest numbers of *O.* Distribution of *Octolasmis* *angulata* One hundred and twenty-nine specimens of this species were found inhabiting the gills of the mud crabs. Gill number 4 harboured the maximum number of *O.* The lowest numbers of barnacles were found on gill number 8 1. The relationship between the number of stalked barnacles attached to the gills and the size of the mud crab is shown in fig. The smallest-sized crab that was found infested by *Octolasmis* had 50 mm CW and the rate of infestation was found to increase with the increase in size of the host crab. Size-frequency distributions of *Octolasmis* cor and *O.* The size ranges from mm to mm total length. The modal size group was mm for both the species, followed by the mm size-group in the case of *O.* All specimens, including the small-sized, could be identified on the basis of the scutum as shown in fig. Percentage distribution of the stalked barnacles, *Octolasmis* cor *Aurivillius*, white bars and *O.* Relationship between number of the stalked barnacles, *Octolasmis* and the size of the mud crab, *Scylla* cf. Prior to Jeffries et al. Monod, ; Newman, While ecotypic plasticity cannot yet be ruled out, the size-frequency data fig. Yet, even though the two forms may appear to be exposed to identical conditions when on the same gill, this may not be the case, and so it will likely take molecular genetics to conclusively demonstrate phenotypic plasticity is not responsible for the differences here observed. They identified these barnacles as *Lepas* sp. During the present study, a total of *Octolasmis* was found attached to the gills of the crabs but not a single specimen of *Lepas* was encountered. *Octolasmis* cor was found more than thrice as abundant as *O.* Milne Edwards, , another portunid crab, from Karachi. They did not find *O.* A, small *Octolasmis* cor *Aurivillius*, ; and B, small *O.* Instead, they found *O.* In another study, Jeffries et al. It is well known that small-sized crabs, which moult more frequently do not harbour *Octolasmis*, and the low infestation rate reported by Jeffries et al. Only two species of *Octolasmis* were found on the gills of the mud crab herein, whereas Jeffries et al. In addition to these, two more species, *O.* Hence, six species are now known to occur in the waters of the Gulf of Thailand, and on this basis Jeffries et al. Hence, it would appear that the coastal waters of Karachi harbour more *Octolasmis* species than the Gulf of Thailand. Financial assistance provided by ALP is gratefully acknowledged. Material for a carcinological fauna of India, no. A revision of the

Cyclometopa with an account of the families Portunidae, Cancridae and Corystidae. The Cirripedia of the Madras coast. Physiological effects of an ectocommensal gill barnacle, *Octolasmis muelleri*, on gas exchange in the blue crab *Callinectes sapidus*. Physiological effects of a gill barnacle on host blue crabs during short-term exercise and recovery. *Marine Behaviour and Physiology*, Carcinological fauna of Karachi. A subject-indexed bibliography of the symbiotic barnacles of the genus *Octolasmis* Gray, Crustacea: Pedunculate barnacles of the symbiotic genus *Octolasmis* Cirripedia: Poecilasmatidae from the northern Gulf of Thailand. Chulalongkorn University, 5 1: Age of the mangrove crab *Scylla serrata* at colonization by stalked barnacles of the genus *Octolasmis*. Diversity and distribution of the pedunculate barnacle *Octolasmis* in the seas adjacent to Singapore. Species recognition among the pedunculate barnacles Cirripedia: Thoracica on the mangrove crab, *Scylla serrata*. A revision of the genus *Scylla* De Haan, Crustacea: Pedunculate cirripedes from Pakistan coast. Addition to the pedunculate cirriped fauna of Pakistan coast. Species of portunid crabs Decapoda: Five pedunculate cirripedes from the western Pacific, including two new forms. *Marine fauna of Pakistan*, 4, Crustacea: Brachyura Dromiacea, Archaeobrachyura, Oxystomata, Oxyrhyncha. *Marine fauna of Pakistan*, 7. First received 1 November Final version accepted 28 May

8: Noor Us Saher | University of Karachi - www.enganchecubano.com

The boat ride captured below in pictures is 35 minutes long and it takes you through the swirling wonderland of Karachi mangroves. You can book it here. The boat ride starts from a village in Sandspit.

Mahera Omar Updated Jun 07, A boy collects mangrove wood in Mai Kolachi And so we started planning a trip to explore a natural wonderland right on the eastern edge of Karachi. Many have never even seen mangroves. Karachi has very little green cover, but it does have , hectares of lush mangrove forests on its coast. Mangroves are trees that grow in a mixture of saline and fresh water. They are a nursery for shrimp and fish and are an important part of the ecological food chain. They provide shelter to migratory birds, species of which arrive between October and January along the Indus Flyway from Siberia. A few years ago I made a documentary called City by the Sea: The biggest one was in Seawater entered the city crossing Manora breakwaters and Sandspit beach. Untreated domestic and industrial waste eating into mangrove forest near Mai Kolachi A resident of Rehri Goth takes back mangrove branches to his village One day while filming we took a boat ride into the mangroves next to Baba Island, just off Keamari and came across a few men busy cutting a tall mangrove tree. It must have taken at least 20 years to grow that big. It came crashing down as we were filming – just one of many casualties of human footprints on nature. Venturing further into the channels we saw dozens of stumps of large mangrove trees ruthlessly cut down by the timber mafia. Such destruction continues unchecked to this day. When the Mai Kolachi bypass was built in , it cut through a lush mangrove forest in Chinna Creek, also called Boat Basin. The forest was a safe refuge and feeding ground for thousands of migratory birds. Over the years, the birds have stopped coming to the area. The bypass has been an ecological disaster. Built on a natural rain drain, the Mai Kolachi bypass hinders the rainwater from going straight into the sea, reducing the width of the drain by half. This is why the old city floods during rains. The mangroves, too, have vanished completely on one side of the road. Why just for the cars? Fish also need to cross to the other side. I remember going to Gizri Creek in the early s. When Marina Club was built in , there was no road beyond the club. It was all wetlands and there were lots of mangroves. What was once precious wetlands and a haven for migratory birds is now a barren wasteland ripe for construction of mega towers. Who benefits from such development? This is not development. Imagine the wonderful birdwatching opportunities! To read more subscribe to the Herald in print. All photographs are by the author. Mahera Omer is a documentary film-maker based in Karachi.

9: Mangrove - Wikipedia

The most visible and delicate ecosystem of Karachi, a city with a profound coastal environment, is that of the mangrove forests that thrive in the mingled salt and freshwater where the Indus River.

Dreamworld is a family resort in Karachi that provides attractions for all ages and offer guests with amenities of their choice including loads of family entertainment, artificial beach access, water recreation, dining, golf and a lot more. The boat ride captured below in pictures is 35 minutes long and it takes you through the swirling wonderland, Mangroves Tour The boat ride captured below in pictures is 35 minutes long and it takes you through the swirling wonderland of Karachi mangroves. You can book it here. The boat ride starts from a village in Sandspit. The venture has been put up with the help of WWF. A tour of WWF wetland center is also recommended. Snorkeling is the practice of swimming in water while equipped with a diving mask, a shaped breathing tube, Snorkeling Snorkeling is the practice of swimming in water while equipped with a diving mask, a shaped breathing tube called a snorkel. In cooler waters, a wet-suit may also be worn. Use of this equipment allows the snorkeler to observe underwater attractions for extended periods with relatively little effort and to breathe while face-down at the surface. Crabbing Tour features a memorable voyage in the mighty blue Arabian Sea. Crabbing Freshly caught crabs will be prepared and served onboard. Enjoy a unique seafood lunch or dinner with cool sea breeze and one of the most magnificent view mother nature has to offer! Where the diver uses a self-contained underwater breathing apparatus scuba which is completely independent of surface supply, to breathe underwater. Thanks to its innovative design, the Paraglider is the most compact and easily transportable aircraft available, and once dismantled can be placed into a large travel case or trunk of your car, allowing you to take it wherever your adventure leads. Imagine floating above crystal blue waters. You feel the warm sun, the gentle breeze, and see views only seabirds Parasailing Imagine floating above crystal blue waters. You feel the warm sun, the gentle breeze, and see views only seabirds see. It combines the thrills of acceleration and altitude with the scenic views. You will find many species of fish, crabs and lobsters around it. Tourists take boats to go to the island from Mubarak Goth. It is famous for water sports such as scuba diving, underwater photography, hiking, speed boating, jet skiing, cliff diving and snorkeling. Deep sea fishing in the Arabian Sea is a specialized tour for tourists. Deep Sea Fishing The trip begins early in the morning. You will be steered in a boat to good fishing spots where you will be provided with fishing gear to fish. After fishing, we will fry your catch and serve lunch with potatoes, bread and soft drinks on board. You will still get to eat freshly caught fish!

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