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Floristic Diversity and Conservation Status of Non-Reserve Forest Area of Kachchh District, Gujarat

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Abstract

Kachchh, the largest district of western Indian in Gujarat state that depicts thorn scrub forest, grassland, marine and mangrove ecosystem. The study aimed at documenting the floral diversity of the Khambhla forest, located between 23°23'42.0"N 69°14'14.5"E to 23°26'11.9"N 69°15'07.0"E in the western block of Nakhatrana in Kachchh. This particular forest has an undulating terrain with small hillocks, classified under tropical thorn forest. In the present study, a total of 107 species belonging to 86 genera from 31 families are recorded. Prosopis juliflora (Sw.) DC., an invasive species that has taken over the native vegetation of Kachchh and has altered the community structure of an ecosystem. A participatory approach of the present study revealed that the land expansion of P. juliflora, composition of nutritive grasses used for pastoralism has changed. Dense invasion causes migration of the wildlife. The study concludes with recommendations for effective management of P. juliflora to restore the native biodiversity of Kachchh.

Keywords: Invasive plant; Participatory approach; Phytodiversity; Prosopis juliflora; Floristic diversity; Biological diversity rule; Habitat degradation; Climate change; Convention on biological diversity; Biological diversity act

Introduction

India as a nation wished to conserve, manage and share the benefits of biological resources and associated knowledge in a fair and equitable manner to safeguard the interest of the common man. Besides using the legal provisions to fulfil its obligations as a signatory to the Convention on Biological Diversity (CBD) [1-2] heralded a significant era for biodiversity conservation at local and regional level. In any ecosystem for its functioning vast diversity is needed and it always play an important role in human civilization since ages in addition to its functioning and stability. Biodiversity loss all around globe is witnessed due various anthropogenic activities including development and climate change. Biodiversity especially phytodiversity forms a support system for human survival and economic well-being over thousands of years and which has been used by each civilization for its growth and development.

Floristic diversity

Kachchh is the largest district of Gujarat, covering 45674 km^2 area and depicts Thorn Scrub Forest, Grassland, Marine and Mangrove ecosystem. Katchchh district falls under arid to semiarid climate which is demarcated by the xerophytes or majority of annual plant species. [3] classified the forest area of the district under "Northern Tropical Thorn Forest. [4] recorded total of 988 species under the flora of Kachchh district. The study also revealed that Kachchh depict the presence of 21 species of rare, endemic and threatened category. *Prosopis juliflora* (Swartz) D.C. is an alien woody and commonly known as mesquite tree). It was introduced to the Indian subcontinent at Sind province (now Pakistan) in 1877 [5]. It is classified under the invasive category and has a negative impact on native phytodiversity in the district [6]. We are trying to generate the information on diversity and distribution on tree and shrub species is of primary importance for developing the conservation and management strategies [7-8].

Methodology

Extensive surveys of the Khambala reserved forest in central area of kachchh were conducted at the interval of two months for 2020-2021 to prepare a list of plant species occurring in different seasons registering plants with different habits. We have collected the information of habitat degradation from the pastoralists by participatory approach.

Results and Discussion

In the present study, a total of 107 species belonging to 86 genera from 31 families are recorded which includes 85 species of dicot (79%), 25 species of monocot (20%) and 1 species of gymnosperm (1%) i.e. *Ephedra foliata* Boiss. ex C. A. Mey. Moreover, the area is dominated by Poaceae (19); Fabaceae (15), Malvaceae (10), Asteraceae (9) and Acanthaceae (6) plant taxa. We could record six habits of floral species specifically Tree, Shrub, Herb, Climber, Grass and Sedge with 8 (7.5%), 12 (11.21%), 60 (56.07%), 7 (6.54%), 19 (17.75%), and 1 (0.93%) species respectively. The area is ecologically significant due to the presence of five plant taxa belonging to the category of threatened and endemic taxa namely *Campylanthus ramosissimus* Wight (a), *Commiphora wightii* (Arn.) Bhandari (b), *Ephedra foliata* Boiss. ex C.A.Mey. (c), *Helichrysum cutchicum* (C.B.Clarke) R.S.Rao & Deshp. (d) and *Ipomoea kotschyana Hochst.* ex Choisy .(e) *Fagonia schweinfurthii* (Hadidi) M.Hall (f), *Ipomoea kotschyana Hochs.* Ex Choisy (g). *Ziziphus jujuba* Mill. (BSI 2020, IUCN 2022) (Figure 1).

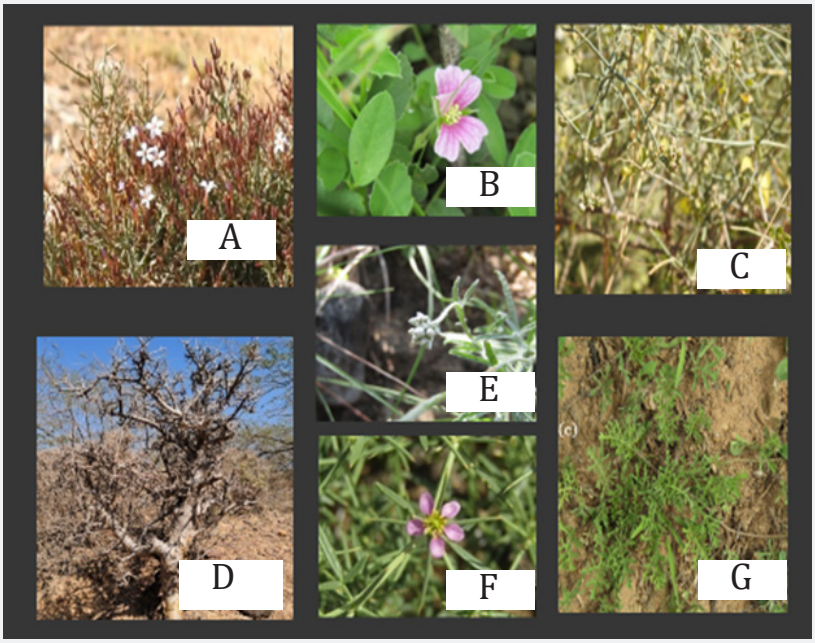

Figure 1 (A) *Campylanthus ramosissimus Wight,* B) *Monsonia senegalensis Guill. & Perr.* (C) *Ephedra foliata Boiss.* ex C.A.Mey (D) *Commiphora wightii* (Arn.) Bhandari, (E) *Helichrysum cutchicum* (C.B.Clarke) R.S.Rao & Deshp. (F) *Fagonia schweinfurthii* (Hadidi) M.Hall (G) *Ipomoea kotschyana Hochs.* Ex Choisy

Prosopis juliflora (Sw.) DC., is an invasive species has taken over the native vegetation of Kachchh and has altered the community structure of an ecosystem. The selected area is also dominated by this invasive species. A participatory approach of the present study revealed that land expansion of *P. juliflora* decreased the composition of nutritive grasses used for pastoralism and also resulted into injuries and disease of the cattle. Dense invasion causes migration of the wildlife especially of Chinkara and Spiny Tailed Lizard of threatened category. To reduce the migration of animals we have proposed and planted the local native plant taxa in the area especially *Commiphora wightii* (Arn.) Bhandari; *Acacia nilotica (L.)* Willd. ex Delile; *Salvadora Oleoides* Decne.etc.

Restoring native plant habitat is vital for preserving biodiversity. Native plants are those that occur naturally in a region in which they evolved. By plantation of native species, each patch of habitat becomes part of a collective effort to nurture and sustain the living landscape for birds and other animals. This forms the ecological basis upon which life depends, without them and the birds, animals and insects co-evolved with them cannot survive. Seeds of native plants which are major part of that ecosystem and playing important role in sustaining local ecosystem. seeds of native plants *Acacia senegal, Acacia nilotica , Salvadora oleoides, Ziziphus nummularia* and *Ziziphus jujuba* Mill. were collected and sown in the area before rain. As these species are also major associate species of RET plants recorded in restored area like *Ephedra foliata*, *Commiphora wightii* etc.

While considering the agro diversity of traditional crops we were able to gather a surprising information from the local farmers and pastoralists. In recent time, most of the farmers are practicing hybrid farming which is ultimately harmful for the native biodiversity. So after discussing with locals we were able to convince them to use the traditional crops instead of hybrids. At the same time, we could ab able to convince them about the conservation of native seeds and sow in some parts of their land to support natural ecological cycle. It will also have helped to us get the traditional knowledge of native plant taxa which can be used for conserving the biodiversity of the area.

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Conclusion

On the basis of our observation and documented diversity prevailing in the area can be enhanced if we restore the habitat by removing the invasive species periodically. By and large, by developing the microecosystem for RET taxa within existing vegetation the landscape. We proposed for further ecological restoration with mapping of major contour and macro-habitats. In addition, habitat improvement on the large scale will be very beneficial for the conservation of threatened species of the area since the faunal species are using the entire landscape instead of restricted to the small habitat. The Grazing land is an undulating area with small hills so soil moisture conservation work can be very effective in this area and will be support existing biodiversity. Several meetings will also be proposed with BMCs, pastoralists and farmers group on promoting the participatory conservation of native ecosystem including thorn forests, grasslands, wetlands and rain-fed agriculture.

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