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Species diversity of taxa of *Ipomoea* sp. (Convolvulaceae) in the coastal flora of east Midnapore district, West Bengal, India

Bishnupada Jana, Amal Kumar Mondal
Plant Taxonomy, Biosystematics and Molecular Taxonomy Laboratory, Department of Botany and Forestry, Vidyasagar University, Midnapur, West Bengal, India

Abstract
In this research paper the species variety of *Ipomoea* genera in coastal flora of East Midnapore district has been discussed. *Ipomoea* is a genus under convolvulaceae family. Nine types of species variety of *Ipomoea* genera have been recorded. *Ipomoea pes-caprae* is sand dune species. *Ipomoea aquatica* and *I. littoralis* are the aquatic genera. *I. carnea* & *I. batatus* grow in marshy area. *I. marginata*, *I. macrantha*, *I. quamoclit* and *I. turpenthum* are terrestrial climber.

Keywords: species variety, coastal flora, sand dune, marshy area, terrestrial climber

1. Introduction
East Midnapore is one of the 23 administrative districts in West Bengal. The East Midnapore coast (60 KM) covers 27% of the West Bengal coastal tract extending along the west bank of Hoogli estuary from New Digha at the extreme south west point of East Midnapore district and then covering arount Junput, Dadanpatrabar, Khejuri and Haldia on the east to farther northeast up to Tamluk (erstwhile Tamralipta) or even up to Kolaghat on the bank of Rupnarayan [8]. *Ipomoea* L. comprises of the largest genus in number of species under family Convolvulaceae. More than one third of the species are included in to major genera *Ipomoea* (650) and *Convolvulus* (250) under Convolvulaceae [10]. It is distributed all over the world having about 650 species [14]. In India over 60 species of *Ipomoea* are reported [15]. Eminent botanists and naturalists have done various research works on the genus *Ipomoea* L. Notable among them are Royle (1833-1839), Hooker f. (1872-1897), Coventry (1923-1930), Blatter (1927-1929), Stewart (1972) [19], Sharma and Kachroo (1981) [17] and Bhellum and Magotra (2007). Based on these works, different Floras have been compiled, the number of species *Ipomoea* in the world varies from 600 to 700 species [4]. Members of Family Convolvulaceae are distributed in tropical, subtropical and temperate regions of the state. Austin (1986) made the study of *Ipomoea nil* Complex (Convolvulaceae). The genus is almost unrepresented in the alpine zone of Kashmir Himalayas. All species propagate by seeds and some of them multiply vegetative parts. Most of the species of *Ipomoea* are climbers and trailers. This genus is exceptionally divers, containing over 600 species of vines and shrubs widely distributed throughout the tropic and sub-tropics [2, 18, 20]. *Ipomoea* species vary widely in habit, and vegetative and reproductive character [2, 18] making the genus a prime candidate for studies of character evolution. Particular species of *Ipomoea* have been the focus of a broad range of evolutionary studies including maintenance of floral polymorphisms [7, 11, 12]. 650 species through worldwide, 60 species in India and 09 species in East Midnapore district under *Ipomoea* genera have been recorded. This relative number of species have been tabulated in table-1.

Table 1

Name of the genus	Number of sp. in world	Number of sp. in India	Number of sp. in East Midnapore coastal area.
Ipomoea L.	650	60	09

The present paper highlights the species diversity of genus *Ipomoea* in the flora of East Midnapore coastal area.

2. Method & Materials
It is extremely field based research work. Extensive field study, huge literary study and critical examination of plant species of East Midnapore coastal flora have done from 2014 to 2016. Entire coastal area has been vividly and repeatedly studied in several times in a year to record the different stages of plant species. Specimens have been collect for preparation of herbarium specimen. Mainly the flowering or sexual parts have been collected. Relevant field report has been noted down at the field. Due attention has been paid each and every species of *Ipomoea* genera. Digital photos of every stage have been captured for detail study and future reference. Collected specimens have been properly preserved for further examination. The species have been critically examined with the help of books, journals and internet (Wikipedia).

3. Study Area
Total coastal area of East Midnapore (60 KM) has been studied in relevant three years. Not only the Bay of Bengal but also the bank of Haldi, Hoogli and Rupnarayan under East Midnapore have been studied. Also two islands namely Nayachar (Under Sutahata Block) and Mayachar (Under Mahisadal Block) have been studied.

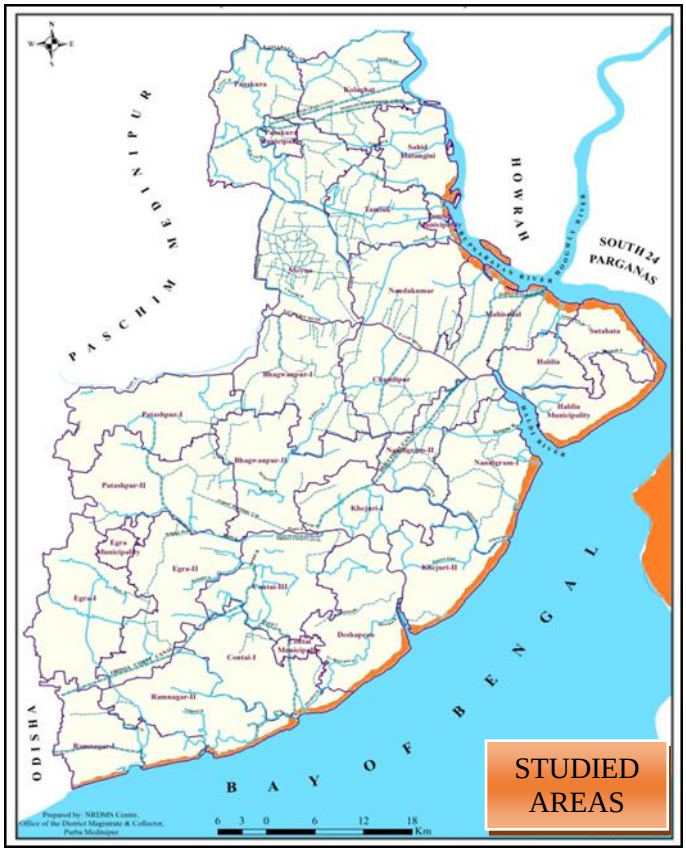

Fig 1: Map collected from district official website of East Midnapore.

4. Result and Discussion

In the flora East Midnapore coastal area eight species of *Ipomoea* genera have been identified. These have been tabulated in table-2.

Table 2

S. No	Name of the species
01	*Ipomoea aquatic* Forssk.
02	*I. batatas* (L.)Lam.
03	*I. cairica* Sweet
04	*I. carnea* Jace.
05	*I. macrantha* (Kunth.) G.Don
06	*I. marginata* (Desr.) Verdc.
07	*I. per-caprae* L. R.Br.
08	*I. quamoclit* L.
09	*I. turpethum* L. Silva Manso

5. Description

1) ***Ipomoea aquatic*:** It is aquatic in nature but sometimes it can grow in marshy areas. It grows all over East Midnapore district abundantly. Throughout coastal area it grows in low salt contain marshy area and any shallow fresh water bodies. In winter season it produces white-violate colour flowers. It shows vegetative and sexual reproduction. It is an economic plant in East Midnapore because of a good vegetable.
2) ***I. batatas*:** It can grow in sandy terrestrial field and semi-aquatic field. It can store the food materials in the adventitious root. So, storage roots are used as vegetable. Mainly this species of *Ipomoea* is cultivated but some cases it can grow naturally. In low salt containing soil it can grow but in high salt containing soil it cannot survive.
3) ***I. cairica*:** This species is found in Haldia on the way of Durgachak – Patikhali. The GPS coordinate is 22.05701191E (latitude) & 88.14048458N (longitude). Flower is produced in winter season and the colour of flower is bluish. Five leaflets are found (palmatisect) in a leaf and one leaflet is slightly unequally bifurcated at base portion of leaflet. They are terrestrial climber.
4) ***I. carnea*:** It is common in whole coastal area of East Midnapore district and also found canal side and shallow marshy areas. It is shrub in nature. It produces light bluish colour flower. It reproduces through vegetative and sexual processes. People use this plant as fuel and for boundary making.
5) ***I. macrantha*:** This species found in Digha Mohana to Sankarpur coast line. It is terrestrial climber. It produces white colour flower with long tubular corolla. Leaves are cordate.
6) ***I. marginata*:** It is a predominant weed and found in everywhere of East Midnapore district. It produces light violate colour flower in winter season. Its leaf may be cordate or sagitate.
7) ***I. per-caprae*:** It is sand dune vegetation but also found by the bank of Hoolgi near Patikhali under Sutahata Block. It is good sand dune stabilizer. In plant succession on sand dune it has a great role. It produces violate colour flower. Now it is destroying due to anthropogenic activities. Bi-lobbed leaves are prominent character of this species.
8) ***I. quamoclit*:** This species can grow throughout East Midnapore. It is twining vine growing and it can flower in rainy season. Flower is red in colour and leaves are deeply lobed.
9) ***I. turpethum*:** This species is found Mayachar (Under Mahisadal Block) and Horkhali (Under Sutahata Block). It produces white colour flower. Leaves are cordate.

6. Conclusion

In East Midnapore coastal flora eight types of *Ipomoea* species have been identified. Some morphological characters have been discussed to identify these species. On this topic it is the pioneer research article. Some species are restricted in some particular areas i.e. *I. macrantha* is restricted at Digha Mohana to Shankarpur area, *I. cairica* is restricted at Patikhali, Haldia, *I. pes-caprae* is restricted on sand dune area and *I.turpethum* is restricted at Mayachar island and river side of Sutahata Block due to favourable micro-climate. But some species are distributed throughout whole coastal area i.e. *Ipomoea aquatic*, *I. batatas I. carnea & I. marginata*. The adaptation capacity of these four species is better than other four spcies. But more research is needed on the ecological and economical aspect of view. The palynological study and DNA barcoding study may be done to construct the phylogenetic relationship among these species and their origin may be studied.

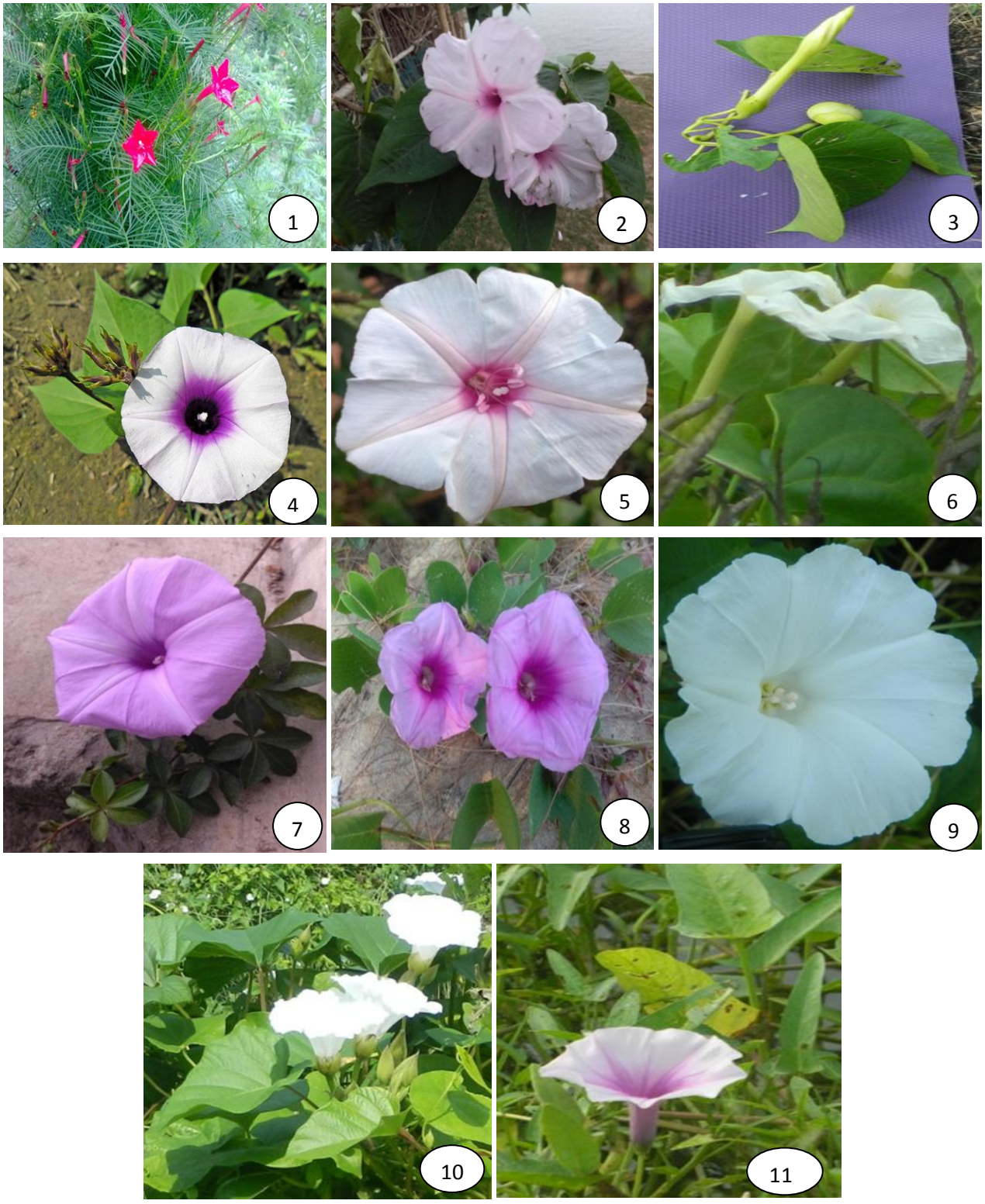

Fig 2: 1. *Ipomoea quamoclit*, **2.** *I. carnea*, **3 & 6.** *I. macrantha*, **4.** *I. batatas*, **5.** *I. marginata*, **7.** *I. cairica*, **8.** *I. per-caprae*, **9 & 10.** *I. turpethum* & **11.** *I. aquatic*.

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