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A check list of exotic plants in the Bornadai Wildlife Sanctuary in Assam, India

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Abstract

Preliminary study on the flora of Barnadi Wildlife Sanctuary [is located in between 91°42′E to 91°47′E and 26°52′ N to 26°52′N] of Udalguri District of Assam has recorded the occurrence of 56 exotic species covering 50 genera belonging to 27 families. The species of American origin are dominating the recorded exotic flora. This list of exotic plants will be of much help for the conserving the local species in the sanctuary. Local uses of the exotic plants by the local inhabitants were also recorded during the study area.

Key words: Exotic Flora, Assam, Barnadi Wildlife Sanctuary, local uses

INTRODUCTION

Migration of species to an area where it was not previously distributed is a regular phenomenon. But, the long distance migration sometimes causes concern in health, agriculture and conservation. These plants in their new habitat are generally referred as 'exotic' or 'alien' plants. Exotics are either introduced either intentionally or accidentally. Several studies have been conducted to explore the exotic floristic composition of a particular region in India (Das 2002; Nagar *et al* 2004; Buragohain 2007; Tomar *et al* 2008; McDougall *et al* 2011; Khuroo *et al* 2012).

Assam is the Gateway of North East of India having rich vegetation dominated by evergreen and deciduous trees and a large number of epiphytes and bamboos. The vegetation of Assam in general bears a close similarity with that of Myanmar and Malaysia (Lakhanpal 1970). People of many communities like Boro, Garo, Nepalese, Tea tribes and Assamese are residing in the fringe area of the Barnadi Wildlife Sanctuary (BWS). These local people extract many plant resources from the sanctuary as their daily livelihood. However, the main objective of the present investigation was to record the exotic flora of the BWS in the Udalguri district of Assam as well as their uses by the local inhabitants.

Study area

Barnadi Wildlife Sanctuary (Udalguri district) is located in the Northern part of Bramhaputra Valley under the Dhansiri forest division of Assam. The Santuary is located in between 91°42'E to 91°47' E longitude and 26°52' N to 26°52' N latitude and bounded by Indo-Myanmar border in the north. The soil is of alluvial type, fertile and sandy loam in texture. The climate

is sub-tropical type with four distinct seasons, the Winter (December to February), the Pre-monsoon (March to May), the Monsoon (June to August) and the Retreating Monsoon (September to November). The average diurnal temperature ranges between 15° C and 32º C in the cold and hot months, respectively. The highest monthly temperature is recorded in July, varying between 32º C and 36º C. The annual rainfall is around 500 – 600 cm [*Source:* Forest Department, Udalguri district].

MATERIALS AND METHODS

Field survey and documentation

Intensive field studies were conducted in BWS to record the maximum number of exotic species during 2009 – 2010. The collected plant specimens were processed, dried and herbarium specimens were prepared (Jain & Rao 1977). The identity of the plant species were confirmed through matching herbarium specimens of Botany department, Gauhati University and consulting various published literatures [Kanjilal *et al* 1934 - 1940; Hooker 1872 – 1897; Hara 1966, 1971; Ohashi 1975; Chowdhury 2005]. The nativity of the exotic plants was recorded from the published literatures [Das 2002; Buragohain 2007; Sekar 2012] and from different websites. After concluding the work, the voucher specimens will be deposited in the Herbarium of the Department of Botany, Gauhati University. The local uses were recorded consulting elderly people of different local communities. The plants are enumerated alphabetically as per their botanical name along with family, life forms and nativity. The habit groups of plants were categorized as herb, shrub, liana and tree.

RESULTS AND DISCUSSION

A total of 54 exotic species covering 48 genera and belonging to 26 families were reported from the BWS (Table 1). The Asteraceae (11), Euphorbiaceae (06), Caesalpiniaceae (05) and Poaceae (04) were the dominant families of the recorded exotic flora of BWS. The study reveals 10 geographic regions in terms of Nativity and the floras of American origin (Tropical America, Central America and South America) have dominated the exotic floristic composition of the sanctuary accounting 31 species followed by Africa (07) and China (04). A good proportion of the flora of BWS is also represented by those which have their original distribution in Brazil, Europe and Mexico. A large number of exotic flora of the reserve is represented by herbs (29 species), followed by shrubs (16 species), tree (05 species) and liana (3 species). The most common flora of American origin were represented by *Sida cordata, Senna alata, S. occidentalis, S. obtusifolia, Tamarindus indica, Ageratum conyzoides, Chromolaena odorata, Crassocephalum crepidioides, Eclipta prostrata, Mikania micrantha, Parthenium hysterophorus, Synedrella nodiflora, Emilia sonchifolia, Datura metel, Lantana camara,* etc. The flora of African origin were represented by *Ocimum americanum, Ricinus communis, Canna indica, Eragrostis tenella, Calotropis gigantea, Urena lobata, Abelmoschus esculentus* and Chinese flora were represented by *Ziziphus mauritiana, Bauhinia variegata, Justicia gendarussa, Morus alba* and *Panicum miliaceum.*

Among the recorded exotic plants, sixteen species are used as herbal medicines by the rural folks living in the vicinity of BWS. The important ones include *Ageratum conyzoides, Argemone mexicana, Senna occidentalis, S. alata, Cynodon dactylon, Cyperus rotundus, Datura metel, Jatropha curcus, Alternanthera philoxeroides, Eclipta prostrata, Ipomoea fistulosa, Ocimum americanum, Ricinus communis, Calotropis gigantea, Tamarindus indica* and *Ziziphus mauritiana*.

Table 1. Exotic plants recorded from the BWS along with their habit and nativity

Name of plants [Family]; Voucher specimen	Habit	Nativity
Abelmoschus esculentus Moench [Malvaceae]; *Boro- 450*	Shrub	Africa
Ageratum conyzoides Linnaeus [Asteraceae]; *Boro - 231*	Herb	Central America
Alternanthera philoxeroides (Martius) Grisebach [Amaranthaceae]; *Boro – 30*	Herb	Brazil
Alternanthera sessilis (Linnaeus) DC. [Amaranthaceae]; *Boro – 192*	Herb	Tropical America
Amaranthus spinosus Linnaeus [Amaranthaceae]; *Boro - 43*	Herb	America
Argemone mexicana Linnaeus [Papaveraceae]; *Boro-445*	Herb	Ethiopia
Calotropis gigantea (Linnaeus) R. Brown [Asclepiadaceae]; *Boro- 451*	Shrub	Tropical Africa
Chenopodium album (Linnaeus) G. Don [Chenopodiaceae]; *Boro-458*	Herb	Mexico
Chromolaena odorata (Linnaeus) King & Robinson [Asteraceae]; *Boro-256*	Shrub	Tropical America
Crassocephalum crepidioides (Benthum) Moore [Asteraceae]; *Boro - 226*	Herb	America
Croton bonplandianum Baillon [Euphorbiaceae]; *Boro- 457*	Herb	South America
Cynodon dactylon (Linnaeus) Person [Poaceae]; *Boro-447*	Herb	Tropical America
Cyperus rotundus Linnaeus [Cyperaceae]; *Boro-436*	Herb	Eurasia
Datura metel Linnaeus [Solanaceae]; *Boro- 459*	Undershrub	Tropical America
Eclipta prostrata Linnaeus [Asteraceae]; *Boro – 428*	Herb	South America
Eichhornia crassipes Solms [Pontederiaceae]; *Boro-273*	Herb	Brazil
Emilia sonchifolia (Linnaeus) DC. [Asteraceae]; *Boro-448*	Herb	Tropical America
Eragrostis tenella (Linnaeus) P. Beauvois *ex* Roemer & Schultes [Poaceae]; *Boro-437*	Herb	Africa
Euphorbia hirta Linnaeus [Euphorbiaceae]; *Boro-460*	Herb	Tropical America
Euphorbia thymifolia Linnaeus [Euphorbiaceae]; *Boro- 438*	Herb	Tropical America
Ipomoea fistulosa Martius [Convolvulaceae]; *Boro- 449*	Shrub	South America
Ipomoea quamoclit Linnaeus [Convolvulaceae]; *Boro- 465*	Climbing Herb	Tropical America
Jatropha curcus Linnaeus [Euphorbiaceae]; *Boro-463*	Shrub	Tropical America
Jatropha gossypifolia Linnaeus [Euphorbiaceae]; *Boro- 470*	Shrub	Brazil

Name of plants [Family]; Voucher specimen	Habit	Nativity
Justicia gendarussa N.L. Burman [Acanthaceae]; *Boro-466*	Shrub	China
Lantana camara Linnaeus [Verbenaceae]; *Boro-193*	Shrub	America
Melia azedarach Linnaeus [Meliaceae]; *Boro-169*	Tree	Iran
Mikania micrantha Kunth [Asteraceae]; *Boro - 247*	Climbing herb	Tropical America
Mimosa pudica Linnaeus [Mimosaceae]; *Boro-472*	Herb	Brazil
Morus alba Linnaeus [Moraceae]; *Boro - 181*	Small tree	China
Nicotiana plumbaginifolia Viviani [Solanaceae]; *Boro- 490*	Herb	Tropical America
Ocimum americanum Linnaeus [Lamiaceae]; *Boro- 483*	Herb	Africa
Oxalis corniculata Linnaeus [Oxalidaceae]; *Boro - 90*	Herb	Southern Europe and North America
Panicum miliaceum Linnaeus [Poaceae]; *Boro-474*	Herb	China
Parthenium hysterophorus Linnaeus [Asteraceae]; *Boro- 492*	Herb	Tropical America
Passiflora foetida Linnaeus [Passifloraceae]; *Boro - 96*	Climbing Herb	South America
Phoenix sylvestris Roxburgh [Arecaceae]; *Boro-485*	Tree	West Asia
Physalis minima Linnaeus [Solanaceae]; *Boro - 127*	Herb	South America
Portulaca oleracea Linnaeus [Portulacaceae]; *Boro- 476*	Herb	North America and Europe
Ricinus communis Linnaeus [Euphorbiaceae]; *Boro- 496*	Shrub	Africa
Senna alata (Linnaeus) Roxburgh [Caesalpiniaceae]; *Boro- 499*	Shrub	Tropical America
Senna occidentalis (Linnaeus) Link [Caesalpiniaceae]; *Boro-456*	Shrub	South America
Senna obtusifolia (Linnaeus) H.S. Irwin & R.C. Bameby [Caesalpiniaceae]; *Boro- 486*	Shrub	South America
Senna sophera (Linnaeus) Roxburgh [Caesalpiniaceae]; *Boro- 497*	Shrub	Tropical America
Sida cordata (N.L. Burman) Borssum [Malvaceae]; *Boro- 478*	Shrub	Tropical America
Sonchus oleraceus Linnaeus [Asteraceae]; *Boro-487*	Herb	Europe
Sporobolus diander (Retzius) P. Beauvois [Poaceae]; *Boro- 498*	Herb	Australia
Synedrella nodiflora (Linnaeus) Gaertner [Asteraceae]; *Boro- 512*	Herb	America
Tamarindus indica Linnaeus [Caesalpiniaceae]; *Boro- 505*	Tree	Tropical America

Name of plants [Family]; Voucher specimen	Habit	Nativity
Tridax procumbens Linnaeus [Asteraceae]; *Boro-509*	Herb	Mexico
Urena lobata Linnaeus [Malvaceae]; *Boro- 479*	Shrub	Africa
Xanthium strumarium Linnaeus [Asteraceae]; *Boro- 489*	Herb	Europe and South America
Ziziphus mauritiana Lamark [Rhamnaceae]; *Boro-502*	Tree	China

A large number of exotic plants recorded in the reserve are used as conventional vegetables by local folks. The important ones include *Oxalis corniculata, Bauhinia variegata, Passiflora foetida, Physalis minima, Alternanthera philoxeroides, Amaranthus spinosus, Chenopodium album* and *Morus alba.*

It can be concluded from the study that BWS in the Udalguri district of Assam is rich in exotic flora. Some well known invasive species viz., *Lantana camera, Eichhornia crassipes, Parthenium hysterophorus*, *Chromolaena odorata* etc are observed in the reserve forest which may create threats to near future by changing hydrology and ecosystem function of the area. In fact loss of biodiversity will occur including species extinction. The present study also reveals 14.2 % (8 species) and 28.5% (16 species) exotic species are being used by local peoples for Vegetables and Medicinal purposes respectively. The well known Biodiesel plants *Jatropha curcus, Jatropha gossypifolia* and *Ricinus communis* that recorded from the study area have a good future prospect regarding economic development to the local people in the area. The exotic flora recorded from the BWS has many positive aspect which are to be conserve except few invasive species.

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