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Research Article

Invasive alien weeds of Kondagattu hill forest of Telangana State, India

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Abstract

Kondagattu hill forest is known for its rich biodiversity and *Gyrocarpus* dominant forest. But in recent days, its rich diversity is worse influenced by various disturbing factors like habitat fragmentation, anthropogenic influence, occurrence and spread of invasive alien weeds etc. Against this background, an attempt has been made to record the existing invasive alien weeds and recommend some measures to stop their further spread in the Kondagattu hill forest of Telangana, India.

INTRODUCTION

The kondagattu hill forests are situated in the Jagtiyal district of undivided Karimnagar district of Telangana state, India. After formation of newly carved Telangana state. Study area is known for rich floral and faunal biodiversity. Lord Hanuman shrine is located on the top of the hill forests which attracts of lakhs of devotees in the form of piligrimage annually. In addition JNTU engineering college is located at adjacent to the hill forests. A rail and road net work are fragemented the forest ecosytem (Ramarao et al 2022). The forests are typical *Gyrocarpus americanus* forests with other associated species like *Wrightea tinctoria, Lannea coromandelica, Albizia procera, Anogeissus latifolia, Bombax ceiba, Boswellia serrata, Buchanania lanzan, Dalbergia latifolia, Haldinia cordifolia, Madhuca longifolia, Pterocarpus marsupium, Schrebera swietenioides, Sterculia urens, Buchanania angustifolia, Cleistanthus collinus, Chloroxylon swietenia, Diospyros melanoxylon, Hardiwickia binata, Mitragyna parviflora, Phyllanthus emblica, Schleichera oleosa, Bridelia hamiltonii, Carissa* spp. *Catunaregam spinosa, Dolichandrone falcata, Dodonaea viscosa, Grewia* spp. *Woodfordia fruiticosa,* etc. and Climbers like *Butea superba, Calycopteris floribunda, Combretum ovalifolium, Dalbergia volubilis, Derris indica, Ventilago maderaspatana* and *Wattakaka volubilis.*

But in recent days, its rich diversity is worse influenced by various disturbing factors like habitat fragmentation, anthropogenic influence, occurrence and spread of invasive alien weeds etc. Convention for Biological Diversity (1992) visualize “biological invasion of alien species as the second worst threat after habitat destruction”. Biological invasions may be considered as a form of biological pollution and significant component on human-caused global environmental change and one of the major causes of species extinction. The opportunity of accidental introductions will may become more with rapidly increasing global commerce (Mooney and Drake, 1987; Drake et al, 1989).

Despite the recent recognition of the impacts caused by invasive plants worldwide (Mooney and Hobbs, 2000), there are still many regions in the world where basic information on naturalized plant taxa and plant invasions is only anecdotal or completely lacking, e.g. Asia and neighboring regions (Corlett, 1988; Enmoto, 1999; Meyer, 2000). Establishment of a database of naturalized species is the first step in the development of invasion biology and will also serve as a stepping-stone for further detailed studies on the biology and impact of individual species (Wu et al, 2004). Against this background an attempt was made to record the exotic alien invasive plants of Kodagattu hill forest, Telangana, India.

MATERIALS AND METHODS

After an extensive review of literature on global invasive species (Mooney and Drake, 1987; Heywood, 1989; Cox, 1999; Cox, 2004; Cracraft and Francesca, 1999; D'Antonio and Vitousek, 1992; Drake et al, 1989; Randall et al, 1997; Huxel, 1999; Jenkins, 1999; Londsdale, 1999; Mooney, 1999; Elton, 2000; Mooney and Hobbs, 2000; Almeilla and Freitas, 2001; Cowie, 2001; McNeely et al, 2001) and of India and their spread based on history, species origin, species behavior and field observations, a list of 26 species of invasive aliens was prepared. The websites were also examined extensively for background information.The nativity of the species is provided based on Matthew, 1969; Maheswari and Paul, 1975; Naqvi 2001, Nayar, 1977; Sharma, 1984; Hajra and Das, 1982; Saxena, 1991; Pandey and Parmar, 1994; Reddy et al, 2000; Reddy & Raju, 2002; Reddy & Reddy, 2004; Murthy et al, 2007; Negi and Hajra, 2007, Pullaiah 2015, Reddy C.S & Reddy K.N 2016).

RESULTS AND DISCUSSION

Based on history, species origin, species behavior and field observations, a list of 26 species of invasive aliens was prepared and presented in tabular form (Table 1). Of these Asteracae is dominant with 5 species while Caesalpiniaceae with 3 followed by Amaranthaceae, Cleomaceae, Malvaceae and Poaceae with 2 species each and remaining families i.e., Ascleipiadaceae, Convolvulaceae, Lamiaceae, Oxalidaceae. Papaveraceae, Pontederiaceae, Solanaceae, Tiliaceae, Verbenaceae are with each species.

All these species reported here, were reported as weeds in other countries or invasive alien plants in most of the regions. Almost 80% of the invasive alien plant species were introduced from Neotropics. The predominance of Asteraceae species in invasive category shows the high impact of neotropical flora on Indian region. While a number of lists of invasive plant species are in worldwide circulation, criteria used in these listings often are not documented clearly. Surveys have shown that more than half of exotic plant species currently spreading naturally were intentionally introduced, and that most of the exotic species that endanger India's native ecosystems were first introduced for horticultural purposes. Thus reducing the intentional use of high risk exotic plants could reduce the spread and impact of invasive plants in the country.

Of the reported invasive weeds *Hyptis suaveolens* (L.) Poit. and *Lantana camara* L. are very obnoxious and harmful to native plant species. *Hyptis suaveolens* (L.) Poit. (Bush mint, Pig nut) of Lamiaceae, is soft, suffrutescent herb native to tropical america (Figure 2). Being introduced and naturalized througout India, it has become obnoxious weed and potential threat to grazing grounds. The phenomenon of its entry, establishment, colonization and luxuriant growth in forest openings, arears of podu cultivation and pastures in wildlife sanctuaries is alarming. It stands pure dense stands over waste areas, threatening the native plant vegetation. (Murthy et al 2007). *H. suaveolnes* (L.) Poit. does not allow the native ground flora to surface by physically occupying the land and outgrowing. It is known to proudce allelochmicals which inhbit seed germination of other species. Invasion by this invasive species is leading to the loss of important palatable, medicnal and other important indigenous plants. Besides it enhances forest fires during the dry seasons. Damage done by *Lantana* to native flora is well known in India.

Table 1. Invasive alien weeds of Kondagattu hill forest, Telangana, India

S. No.	Botanical Name	Family	Origin
1	*Ageratum conyzoides* L.	Asteraceae	Tropical America
2	*Alternanthera pungens* Kunth	Amaranthaceae	Tropical America
3	*Argemone mexicana* L.	Papaveraceae	Tropical America
4	*Blumea lacera* (Burm.f.) DC.	Asteraceae	Tropical America
5	*Celosia argentea* L.	Amaranthaceae	Tropical Africa
6	*Chloris barbata* Sw.	Poaceae	Tropical America
7	*Chromolaena odorata* (L.) King & Robinson	Asteraceae	Tropical America
8	*Cleome gynandra* L.	Cleomaceae	Tropical America
9	*Cleome viscosa* L.	Cleomaceae	Tropical America
10	*Corchorus aestuans* L.	Tiliaceae	Tropical America
11	*Cryptostegia grandiflora* R.Br	Asclepiadaceae	Madagascar
12	*Datura metel* L.	Solanaceae	Tropical America
13	*Echinochloa colona* (L.) Link	Poaceae	Tropical South America
14	*Eichhornia crassipes* Solms- Loub.	Pontederiaceae	Tropical America
15	*Evolvulus nummularius* (L.) L	Convolvulaceae	Tropical America
16	*Glossocardia bosvallea* (L.f.) DC.	Asteraceae	Tropical America
17	*Gnaphalium coarctatum* Willd	Asteraceae	Tropical America
18	*Hyptis suaveolens*(L.) Poit.	Lamiaceae	Tropical America
19	*Lantana camara* L.	Verbenaceae	Tropical America
20	*Malachra capitata* (L.) L.	Malvaceae	Tropical America
21	*Malvastrum coromandelianum* (L.) Garcke	Malvaceae	Tropical America
22	*Indigofera linnaei* Ali	Papilionaceae	Tropical Africa
23	*Oxalis corniculata* L.	Oxalidaceae	Europe
24	*Senna occidentalis* L	Caesalpiniaceae	Tropical South America
25	*Senna tora* L.	Caesalpiniaceae	Tropical South America
26	*Senna uniflora* Mill.	Caesalpiniaceae	Tropical South America

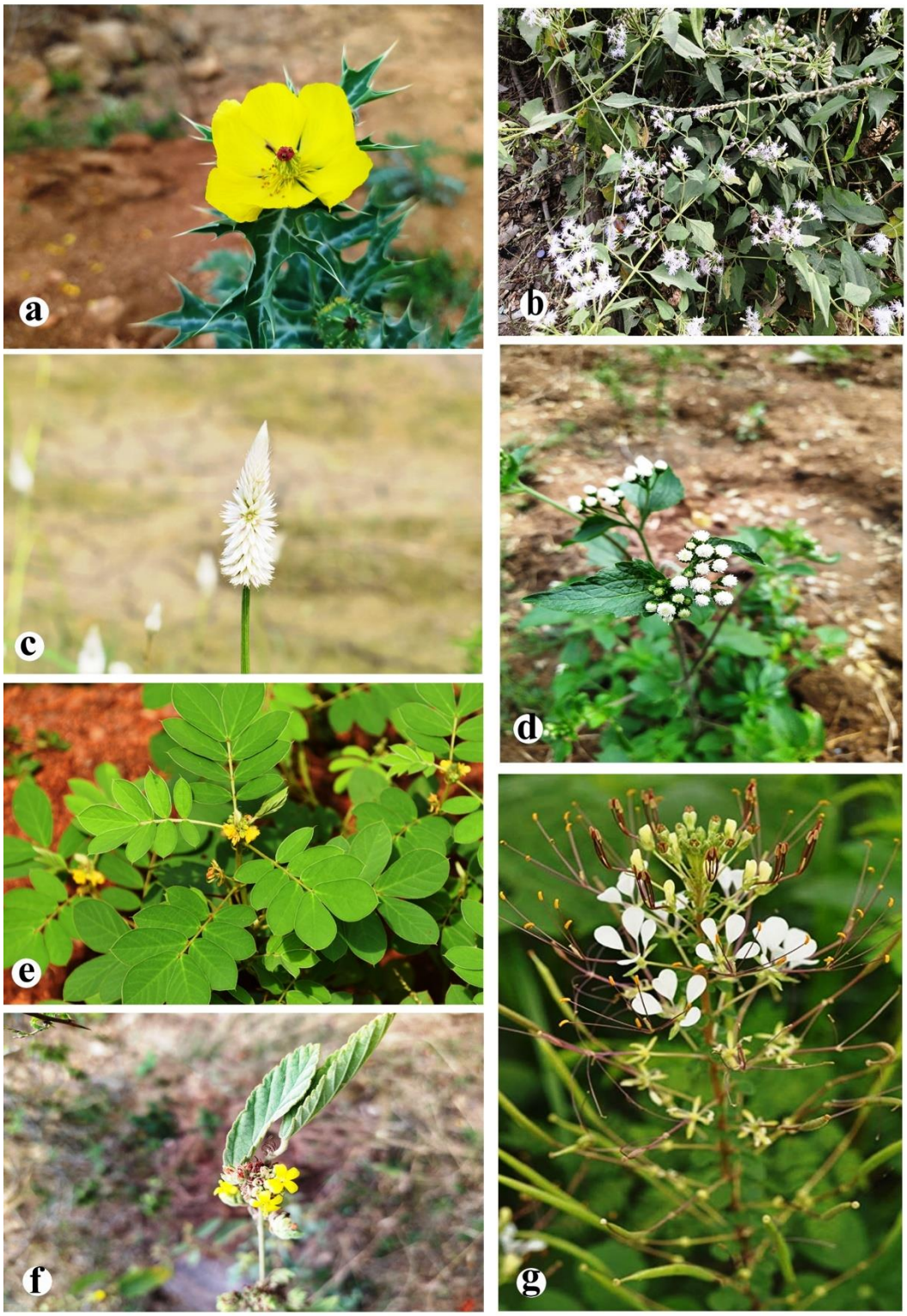

Figure 1. a) *Argemone mexicana* L.; b) *Chromolaena odorata* (L.) King & Robinson.; c) *Celosia argentea* L.; d) Ageratum conyzoides L.; e) *Senna uniflora* Mill.; f) *Waltheria indica* L. ; g) *Cleome gynandra* L.

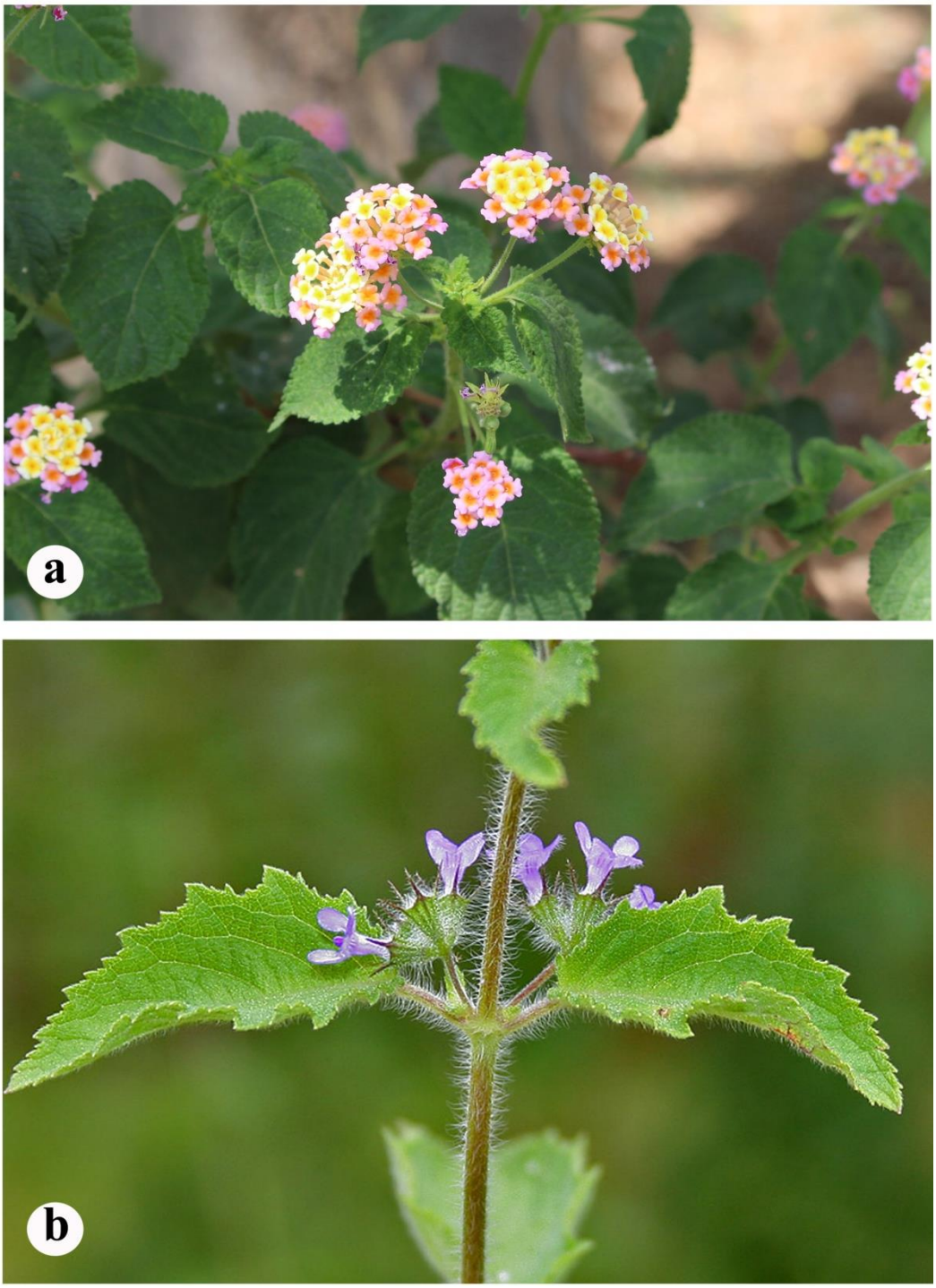

Figure 2. Problematic obnoxious invasive weeds of Kondagattu Hill forest; a) *Lantana camara* L.; b) *Hyptis suaveolens* (L.) Poit.

CONCLUSION

According to the available information, there are about 26 alien species of invasive nature are found in Kondagattu hill forest. Monitoring of invasion can be done through qualitative approach like species inventory (seasonally) and quantitative approach using phytosociological methods and mapping using ground based methods (via map overlays or GPS), remotely sensed images (aerial photos, high resolution multispectral digital data).

A better planning is needed for early detection and reporting of infestations of spread of new and naturalized weeds by creation of plant detection network by establishing communication links between taxonomists, ecologists and land managers to monitor and control. Forest should take measures to remove these weeds regularly under the guidance of botany experts to stop further spreading of these weeds and to protect native wild species.

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