

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/260184523>

CLIMBERS AND LIANAS DISTRIBUTION IN JHARKHAND FORESTS

Article in *Indian Forester* · January 2013

CITATIONS

6

READS

875

3 authors:



Amit Kumar

Ranchi University

4 PUBLICATIONS 13 CITATIONS

[SEE PROFILE](#)



Santosh Prasad

Ranchi University

12 PUBLICATIONS 10 CITATIONS

[SEE PROFILE](#)



Sanjay Singh

Indian Council of Forestry Research and Education (ICFRE)

36 PUBLICATIONS 290 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



jharkhand plant biodiversity [View project](#)



chemprofiling of Moringa oleifera leaves and genetic diversity analysis through molecular markers [View project](#)

CLIMBERS AND LIANAS DISTRIBUTION IN JHARKHAND FORESTS

AMIT KUMAR, SANTOSH PRASAD¹ AND SANJAY SINGH

*Botany, Silviculture and NWFP Division
Institute of Forest Productivity, NH-23 Lalgutwa, Ranchi, Jharkhand
E-mail:-sanjaysingh@lycos.com*

ABSTRACT

The present study mainly focuses on the documentation of lianas and climbers in different forest habitat of five districts of Jharkhand viz., Ranchi, East-Singhbhum, Hazaribagh, Chatra, and Latehar during the year 2009-2012. A total of 45 important climbers including 7 lianas were identified and thoroughly observed during study period in which family Fabaceae represented dominant group followed by Cucurbitaceae, Dioscoraceae and Liliaceae.

Key words: Climbers, Lianas, Jharkhand, Forest habitat, Deforestation, Biodiversity, Woody climbers

Introduction

Plants, which have special structure to climb on supports, are defined as climbers. Approximately one-half of the families of vascular plants contain climbing species. In families like Hippocrateaceae and Vitaceae nearly all the species are climbers, their axes have reduced amounts of supporting tissue and they are highly light demanding (Putz and Chai, 1987; Hegarty and Caballe, 1991; Schnitzer and Carson, 2001). Apart from the soft tissue climbers, there is another category of climbers called woody climbers or lianas with fairly considerable amount of mechanical tissue enabling them to climb over to the ultimate height of large trees. Lianas are intact structural parasites (Stevens, 1987), mostly relying on other plants for support. Variations in dispersal, climbing methods and phenological strategies help in sharing gaps and permit efficient resource partitioning between the liana species (Oldeman, 1990). Studies on lianas and climbers are lacking with regard to Indian forests, except for the recent works on the forests of Anamalais, Western Ghats (Muthuramkumar and Parthasarathy, 2000; Srinivas and Parthasarathy, 2000) and Kalrayan hills, Eastern Ghats (Kadavul and Parthasarathy, 1999). Forest locality and type appear to influence the distribution of climbers (Balfour and Bond, 1993; Grubb, 1987). Apart from contributing to biological diversity in forests (Gentry, 1991; Hegarty and Caballe, 1991; DeWalt *et al.*, 2006), climbers and lianas play an important role in forest regeneration, biodiversity and ecosystem-level processes such as whole-forest transpiration and carbon sequestration, soil erosion

control and annual leaf biomass contribution (Ogawa *et al.*, 1965; Klinge and Rodriguez, 1973; Putz, 1983). They are also important source of food for insects (Gentry, 1985) and monkeys (Emmons and Gentry, 1983). It reduces the surrounding tree damage and further reduce 50% of the post harvest canopy gaps (Fox, 1968; Appanah and Putz, 1984).

However, similar studies with regard to the forests of Jharkhand state are lacking. The present study deals with the documentation of diversity of liana and climber in five districts of Jharkhand viz., Ranchi, East Singhbhum, Hazaribhag, Chatra and Latehar, during the period 2009-2012 in various forest. The documentation of climbers and lianas are relevant in the context of increasing forest disturbance, deforestation and fragmentation of forest habitat.

Material and Methods

Study area

The state Jharkhand, experiences subtropical climate, which is characterized by hot summer from March to May and well distributed rainfall from June to October. Winter season is marked by dry and cold weather during the month of November to February. Majority of the forest of these districts belong to Dry deciduous Sal forest category.

Method

Data collected on the basis of ocular observation during different field trips in and around forest and surrounding areas between 2009-2012. Study sites were selected on the basis of varying degree of disturbance

A total of 45 important climbers including 7 lianas were reported from five districts of Jharkhand with family Fabaceae represented dominant group.

¹Biotechnology, Genetics and Tree Improvement Division, Institute of Forest Productivity, NH-23 Lalgutwa, Ranchi, Jharkhand

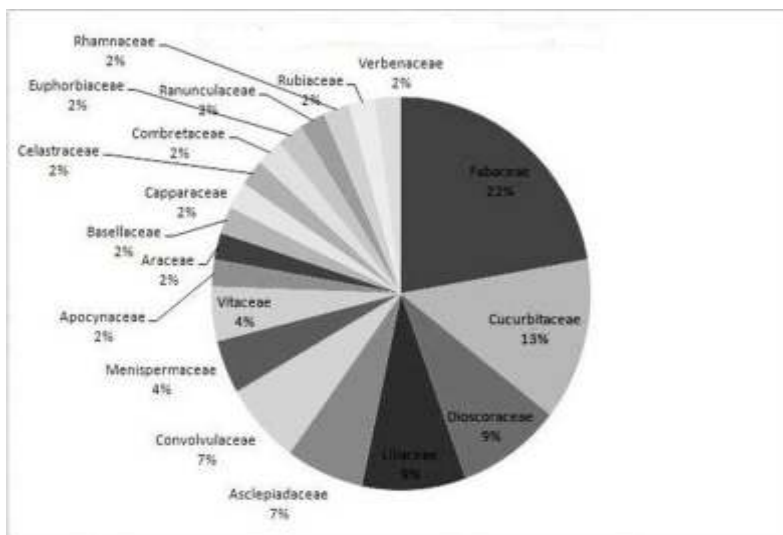


Fig. 1 : Floristic composition (Family wise) of climbers recorded in different district of Jharkhand Forest.

like forest clearing, human interference, etc. The selection of sites in increasing order of disturbance was based on the assessment of the intensity of anthropogenic activities in the forest area as it was observed that when the canopy of the forest is broken from whatever cause, the development of dense climber population is always observed in that site. Besides, forest road side climber taxa were also taken into account. The categorization of climbers and lianas were done according to their climbing habit as lianas and climbers possess various climbing modes to ascend on their host, based on which various classifications have been proposed (Darwin, 1867; Putz, 1984). Putz (1984) recognized the following climbing modes: stem twinner, branch twinner, root climbers, tendrill climbers and scramblers. He further divided scramblers into hook/thorn climbers and scramblers. The stem twinners twine around their host.

Plant specimens were collected with collection

number, place and date of collection and field descriptions. Press dried plant specimens, treated with 4% formaldehyde solution were mounted as herbarium specimens for future references. Identification was done from monographs and research paper available, local flora in the library/herbaria of University Department of Botany, Ranchi and Institute of Forest Productivity, Ranchi.

Results and Discussion

A total of 45 climbers belonging to 19 families including 7 woody climbers i.e. *Bauhinia vahlii*, *Celastrus paniculata*, *Combretum decandrum* (Fig. 3 a,d and i) *Zizyphus oenoplia*, *Acacia pennata* (Fig. 3,e), *Vitis latifolia*, *Butea superba* were recorded during the study period (Table 1). The family Fabaceae represented dominant group with 10 taxa followed by Cucurbitaceae with 6, Dioscoreaceae and Liliaceae with 4 where as Asclepiadaceae, Convolvulaceae are represented 3 taxa (Fig. 1). The genus *Dioscorea* is represented by 4 species

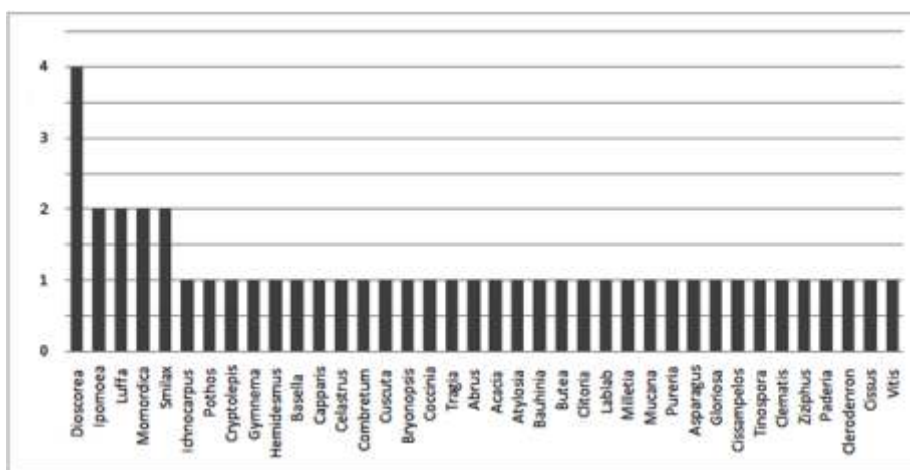


Fig. 2 : Genus wise total number of recorded taxa.

Table 1 : Different climbers recorded in Jharkhand Forests.

Family	Plant Species	Local/Vernacular Name	Climbing Mode
Apocynaceae	<i>Ichnocarpus frutescens</i> Br.	Dudhi	T
Araceae	<i>Pothos scandens</i> L.	NA	R
Asclepiadaceae	<i>Cryptolepis buchanani</i> Schult.	Bada dudhi	T
	<i>Gymnema sylvestre</i> (Retz.) Schult.	Madhunasini	T
	<i>Hemidesmus indicus</i> R. Br.	Dudhlar	T
Basellaceae	<i>Basella rubra</i> L.	Poi	T
Capparaceae	<i>Capparis zeylanica</i> L.	Bagnahi kanta	T
Celastraceae	<i>Celastrus paniculata</i> Willd.	Kujari	WC
Combrataceae	<i>Combretum decandrum</i> Roxb.	Burhi lata	WC
Convolvulaceae	<i>Cuscuta reflexa</i> Roxb.	Amarbel	HK
	<i>Ipomoea batatas</i> (L.) Lam.	Shakarkanda	HK
	<i>Ipomoea quamoclit</i> L.	Kamini	HK
Cucurbitaceae	<i>Bryonopsis laciniosa</i> L.	Shivlingi	T
	<i>Coccinea indica</i> W&A	Bon kundri	T
	<i>Luffa acutangula</i> L.	Gongra	TN
	<i>Luffa cylindrica</i> (L.) Roem.	Turiya	T
	<i>Momordica charantia</i> L.	Karela	TN
	<i>Momordica dioica</i> Roxb.	Kheksha	TN
Dioscoreaceae	<i>Dioscorea bulbifera</i> L.	Vanaloo	T
	<i>Dioscorea oppositifolia</i> L.	Vanaloo	T
	<i>Dioscorea anguina</i> Roxb.	Vanaloo	T
	<i>Dioscorea belophylla</i> Voigt.	Vanaloo	T
Euphorbiaceae	<i>Tragia involucrata</i> L.	Bichuti	T
Fabaceae	<i>Abrus precatorius</i> L.	Gunja	T
	<i>Acacia pennata</i> Willd.	Kundri kanta	WC
	<i>Atylosia scarabaeoides</i> (L.) Benth.	Van kurthi	TN
	<i>Bauhinia vahlii</i> W. and A.	Mahul /Chihor	WC
	<i>Butea superba</i> Roxb.	Palasbel /Latpalas	WC
	<i>Clitoria ternatea</i> L.	Aprajita	T
	<i>Lablab purpureus</i> (L.) Sweet.	Sembi	T
	<i>Milletia auriculata</i> Baker.	Palandu	T
	<i>Mucuna pruriens</i> Hook.f.	Alkusi	T
	<i>Pueraria tuberosa</i> DC.	Patal kohda	T
	Liliaceae	<i>Smilax macrophylla</i> Roxb.	Ramdaton
<i>Smilax zeylanica</i> L.		Ramdatwan	T
<i>Asparagus racemosus</i> Willd.		Satavari	T
<i>Gloriosa superba</i> L.		Kankasani/Jaghrahi khoon/kalihari	T
Menispermaceae	<i>Cissampelos pareira</i> L.	Kharia lata	T
	<i>Tinospora cordifolia</i> (Willd.) Hook.&.Thoms	Amrita	T
Ranunculaceae	<i>Clematis gouriana</i> Roxb.	NA	T
Rhamnaceae	<i>Zizyphus oenoplia</i> Mill.	Makor	WC
Rubiaceae	<i>Paederia foetida</i> L.	Gandhuli	T
Verbenaceae	<i>Clerodendron inerme</i> Gaertn.	NA	T
Vitaceae	<i>Cissus quadrangulris</i> L.	Harjor	T
	<i>Vitis latifolia</i> Roxb.	Khapri	WC

(T=Twinner; HK=Hook climber; TN=Tendrill; R=Root climber; WC=Woody climber).

followed by *Ipomoea*, *Luffa*, *Smilax* and *Momordica* with 2 species each and rest of the genera with one species each (Fig. 2). Tendril and hook climbers were of rare occurrence. Total 36 species belonged to Dicotyledon and 9 species to Monocotyledon.

Many ecological attributes of climbers and lianas have been noticed in this study. For example *Combretum decandrum*, *Bauhinia vahlii*, *Porana paniculata* were observed to facilitate the structural continuity of the

forest over large distances as noticed in several sites of Dalma wild life sanctuary (East Singhbhum). These species were also observed to support the functioning of other life forms by providing arboreal pathways for canopy vertebrates like *Ratufa indica* (Common Indian giant squirrel). Such phenomenon with different climber and liana species has also been reported by Parren and Bongers (2001) and Charles- Dominique *et al.* (1981).

Many species of climbers like *Capparis zeylanica*,



Fig. 3: Photoplate of some climbers and lianas species recorded during study period; (a- *Bauhinia vahlii*, b- *Pueraria tuberosa*, c- *Asparagus racemosus*, d- *Celastrus paniculata*, e- *Acacia pennata*, f- *Smilax macrophylla*, g- *Capparis zeylanica*, h- *Milletia auriculata*, i- *Combratum decandrum*, j- *Dioscorea anguina*)

Dioscorea anguina (Fig. 3g & j), *Cryptolepis buchananii*, *Luffa acutangula* (observed wild), *Mucuna pruriens* showed good regenerating capacity in majority of the locations of present study indicating their tolerance to pollution load and high degree of human disturbance. Similar observations were also reported earlier where most lianas are light demanding and are abundant in natural or anthropogenically disturbed areas (Putz and Chai, 1987; Hegarty and Caballe, 1991; Schnitzer and Carson, 2001). These studies reveal conspicuous feature and significant floristic structural and functional components of climbers in Jharkhand forests which are mainly sal dominated dry deciduous in composition. It may conclude that the lianas and climbers contribute an ecologically important plant group which should be

included in forest management planning.

Urbanization processes, road constructions and forest clearance caused serious threats to survival of lianas and climbers. Overexploitation is another concern as these are used by local people to fulfill their various needs including hut roof making, binding of fuel wood collected from forest area, making rope for home fencing, etc. Conservation of climber and lianas has also become significant as these group of plants not only provide valuable germplasm as medicinal plant for the benefit of humankind but also play an important role in forest regeneration as they keep many pollinators throughout the year by flowering at different seasons as in many other flowering species.

झारखंड के वनों में आरोही तथा लायनास का वितरण

अमित कुमार, संतोष प्रसाद तथा संजय सिंह

सारांश

वर्तमान अध्ययन वर्ष 2009 से 2012 तक मुख्यतः झारखंड के पांच जिलों यथा: रांची, पूर्वी-सिंहभूमि, हजारीबाग, छतरा तथा लेटीहार के विभिन्न वन प्राकृतिक वासों में लायनास और आरोही पादपों के प्रलेखीकरण पर केंद्रित है। अध्ययन अवधि में 45 मुख्य आरोहियों सहित 7 लायनास

की पहचान की गई और अवलोकन किया गया। जिसमें फेबासाई मुख्य वर्ग का प्रतिनिधित्व करता है, जिसके बाद कुकरविटासाई, डायरकोरासाई तथा लाइलियासाई का स्थान है।

References

- Appanah, S. and Putz, F.E. (1984). Climber abundance in virgin dipterocarp forest and the effect of pre-felling climber cutting on logging damage. *Malaysian Forester*, 47:335–342.
- Balfour, D.A. and Bond, W.J. (1993). Factors limiting climber distribution and abundance in a southern African forest. *Journal of Ecology*, 11: 93-99.
- Charles-Dominique, P., Atramentowicz, M., Charles-Dominique, M. Gérard, H. Hladik, C.M. and Prévost, M.F. (1981) Les mammifères frugivores arboricoles nocturnes d'une forêt Guyanaise: Inter-relations plantes-animaux. *Rev. Ecol. (Terre Vie)*, 35: 341 - 435.
- Darwin, C. (1867). On the movements and habits of climbing plants. *Journal of the Linnean Society of Botany*, 9: 1-118.
- DeWalt, S., Ickes, K., Nilus, R., Harms, K. and Burslem, D. (2006) Liana habitat associations and community structure in a Bornean lowland tropical forest. *Vegetatio*, 186(2): 203 - 216.
- Emmons, L.H., and Gentry, A.H. (1983). Tropical forest structure and the distribution of gliding and prehensile-tailed vertebrates. *American Naturalist*, 121: 513-524.
- Fox, J.E.D.(1968) . Logging damage and the influence of climbing cutting prior to logging in the lowland dipterocarp forest of Sabah. *Malaysian Forester*, 31, 326–347.
- Gentry, A.H. (1985). An ecotaxonomic survey of Panamanian lianas, In: *Historia natural de panama. Monograph of Systematic Botany* (D'Arcy, W. and Correa, M. Eds.), Missouri Botanical Garden, Saint Louis, pp. 29-42.
- Gentry, A.H. (1991). The distribution and evolution of climbing plants. In: *The Biology of Vines* (F.E. Putz and H.A. Mooney eds.) pp. 3-49 Cambridge University Press, Cambridge.
- Grubb, P.J. (1987). Global trends in species-richness in terrestrial vegetation: a view from the northern hemisphere. pp. 24-27. In: *Organization of Communities - Past and Present* (J.H.R. Gee and P.S. Giller eds.). Blackwell Scientific Publications, Oxford.
- Hegarty, E.E. and Caballé, G. (1991) Distribution and abundance of vines in forest communities. In: *The Biology of Vines* (Putz, F.E., Mooney, H.A. Eds.). Cambridge University Press, pp. 313-335.
- Kadavul, K. and Parthasarathy, N. (1999). Lianas in two tropical semi-evergreen forest sites on the Kalrayan hills, Eastern Ghats, South India. *Tropical Biodiversity*, 6: 197-208.
- Klinge, H., Rodriguez, W. (1973). Biomass estimation in central Amazonian rain forest. *Acta Cient. Venez*, 24, 225–237.
- Muthuramkumar, S. and Parthasarathy, N. (2000). Alpha diversity of lianas in a tropical evergreen forest in the Anamalais, Western Ghats, India. *Diversity and Distributions*, 6: 1-14.
- Ogawa, H., Yoda, K., Ogino, K. and Kira, T. (1965) Comparative ecological studies on three main types of forest vegetation in Thailand. II. Plant biomass, *Nature and Life in Southeast Asia*, 4 : 49–80.
- Oldeman, R.A.A. (1990): *Forests: elements of silvology*. Springer Verlag, Heidelberg, 624 pp.
- Parren, M.P.E. and Bongers, F. (2001) Does climber cutting reduce felling damage in Southern Cameroon *Forest Ecology and Management*, 141: 175 - 188.
- Putz, F.E. (1983) Liana biomass and leaf area of a "tierra firme" forest in the Rio Negro Basin, Venezuela. *Biotropica*, 15:185- 189.
- Putz, F.E. (1984). The natural history of lianas on Barro Colorado Island, Panama. *Ecology*, 65: 1713-1724.
- Putz, F.E. and Chai, P. (1987). Ecological studies of lianas in Lambir National Park, Sarawak. *Journal of Ecology*, 75: 523-531.
- Schnitzer, S.A. and Carson, W.P. (2001). Tree fall gaps and the maintenance of species diversity in a tropical forest. *Ecology*, 82: 913-919.
- Srinivas, V. and Parthasarathy, N. (2000). Comparative analysis of tree diversity and dispersion in the tropical lowland evergreen forest of Agumbe, Central Western Ghats, India. *Tropical Biodiversity*, 7: 45-60.
- Stevens, G.C. (1987). Lianas as structural parasites: the *Bursera simaruba* example. *Ecology*, 68:77–81.