

# Chromolaena Odorata (Eupatorium Odoratum)-An Exotic Weed Used In Lalgarh, Jhargram, West Bengal For Fuel Wood Purpose

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**Abstract-** The paper represents a ecological scenario of a widespread obnoxious weed 'bhutbhairabi' (*Chromolaena odorata*) in lateritic Junglemahal area of Jhargram district with biomass production and use value used extensively by local people in and around Lalgarh of Binpur-I community development block, West Bengal, India. It describes the major distribution, growth parameters and dominance in forests and in jungles even roadside bushes of the said area with management. The forest department has no bar to collect the same for various purposes as it is a gregarious weed that spreads along with *Lantana camara* and *Parthenium hysterophorus*. Here, penetration rate of the *Parthenium* is slow though, I have recorded the availability of the same species time to time in different journals and in literature from the same. Growth of *Lantana* is slow in compare to *Chromolaena* therefore, it is envisaged that people are much more reluctant to use the species along with other non timber forest produces (NTFPs) time to time. January is the peak month for the collection of fuel wood particularly for *Chromolaena* along with other species like *Anisomeles ovata* and *Hyptis suaveolens*.

**Keywords-** *Chromolaena odorata*, growth parameters, biomass production in 100 sq.mt. quadrat, use value.

## I. INTRODUCTION

*Chromolaena odorata* (L.) King. ex Robinson is synonymously called *Eupatorium odoratum* L. which in Bengali called 'bhutbhairabi' is available everywhere i.e. from coastal part of Bay of Bengal to lateritic belt along with the foothills of Darjeeling district in West Bengal as a gregarious exotic weed. The species is a tropical and sub-tropical plant species of flowering shrub under the family Asteraceae (=Compositae). It is native to the Americas, from Florida and Texas in the United States south through Mexico and the Caribbean to South America (Wikipedia, 2018, 16:46p.m.). It is so called bitter bush, Siam Weed, Tonka Bean in English. It is used as a traditional medicine in Indonesia. The young leaves are crushed and the resulting liquid can be used to treat skin wounds. In our West Bengal, people used the plants as

anti-bleeding agent, might be used to treat mild cut and rub along the skins. The main use of the biomass of species is fuel wood purpose during late winter. In lateritic belt of Junglemahal, it is common and grows slowly from June to December though the older stock grows gregariously after the first week of monsoon. In high hills, it is abundant with old stocks but in plains it spreads very fastest in compare to other areas from new propagules. In Junglemahal area of Jhargram district, it is abundant in foothills of Belpahari hills, Laljole and in basin of Dulung, Kanswabati and Subarnarekha River areas. Not only that, it is also available in jungles, forests, degraded lands, plantation stands, shrubberies, nullah ridges, wastelands, gardens and in campus of different organizations and institutes. As it produces a large number of seeds which are dispersed by air so that the distribution is cosmopolitan. By and large, it produces large biomass within a short period of time. June is the onset of seedlings where December the peak season of flowering and the utmost biomass production ends with the complete flowering in the month of January each year. Result revealed that in Lalgarh areas, it gives us flowers from the 2<sup>nd</sup> week of November and 2<sup>nd</sup> week of December it gets maximum flowers. In the 2<sup>nd</sup> to third week of January flowering phenology completely stops in forests while in small areas where available moisture is present, there the same plant shows flowers slowly. The plants are available in bushes along with other plants like *Ziziphus oenoplea*, *Hemidesmus indicus*, *Anisomeles ovata*, *Hyptis suaveolens*, *Holarrhena antidysenterica*, *Ichnocarpus frutescens*, *Daemeia extensa*, *Cardiospermum helicacabum*, *Vanguireia spinosa*, *Randia domoerum*, *Croton oblongifolius* and many more. No data on such species in forest of Jungalmaha, degraded land and in waste places are available so the present author is presenting this idea on biomass production basis and peak collection of the same species used by local people in the said area for proper management of the forest and in general management of ecosystem to make it complete in all respect.

## II. STUDY AREA

Study area includes entire areas of Lalgarh i.e. Binpur-I community Development Block of Jhargram area

under West Bengal, India. A total 25 spots were selected randomly at 5 study sites in which jungle, wasteland, degraded forest, pasture lands and protected site (organization and institutes) were taken in to account. Studies were done in consecutive 2 years at study area under Jhargram District (Previously Paschim Medinipur District) in West Bengal state. The plant growth, flowering phenology and biomass estimation as well as use value including growth parameters were calculated on the basis of quadrat as per ecological method. As the distribution is scattered so some variations were recorded after selection of those place for study.

### III. MATERIALS AND METHODS

Growth of *Chromolaena odorata* is gregarious in various sites. So, study period for biomass and ecological data were taken from field since June to February, 2016-2017 and 2017-2018. Study of complete ecology was made on the basis of complete 2 years study period because of the various compositions available in field and the rate of penetration is different. A complete study includes old stock of *Chromolaena odorata* and new establishment of species from seeds and old root stock including sprouting and developmental strategies was recorded time to time in forests, degrade sites and in plantation stand. Total 5 sites were taken in which 5 sets of quadrats were analysed. List of plant species as check list was prepared (Table 1) for general consideration. Mean value was calculated from each site and from the values available in field from November to January each year. Graphical representations were established for easy discussion. The flowering period of the species starts from November and end to the month of January though moist condition extends the phonological changes in different places so, increasing or decreasing order of flowering phenology was arranged as per the value taken from field but the data was green biomass basis. As the geographical distribution of sites are small so than degree of variations might be lower that have no negetaive impact on conclusion though author is trying to make it complete later on the basis of dry biomass to make it intact for final conclusion. Photographs were taken from field for use of these species in field as well as use of other fuel wood species. Recorded species of old stock was placed in earthen pot and watered regularly to know the variations occurred in pot culture artificially. Literature used from various sources (1-29) including website of internet available time to time. Balance was used to take biomass value and tape was used to measure the size of the quadrat as well as height of the species in bush.

### IV. RESULTS AND DISCUSSION

The present study revealed that the area is *sal* dominated (*Shorea robusta*) and it is observed that a total 155 species was observed in the study sites including *Chromolaena odorata*, though some sites having no *sal* species round the year. Five study sites showed a remarkable degree of abundance for the same species. It is observed that the selected species of degraded land showed high % of availability of *C. odorata* which starts its flowering from 2<sup>nd</sup> week of November and ends in the month of January. Moisture content of soil in some shed places showed flowering up to the end of January. So, there is a degree of flowering phenomenon which may change the biomass production. Degraded stand showed highest biomass production produced by *C. odorata* followed by plantation stand, wasteland, protected land, fallow land and then natural vegetation at Lalgargh area of Junglemahal in West Bengal. During October, November, December and January, mean green biomass of *C. odorata* was 14, 27, 25, 17 kg. per 100 sq. mt. area respectively. So, November is peak season for highest green biomass production produced by the selected species in present study site. The species is highly valued for its fuel yielding value rather than medicinal use though almost all plants are medicinal (Anonymous, 2017). November is the peak period for biomass production by *C. odorata* though extraction of species ends in the month of January by local people. By and large, end of the November growth of *C. odorata* ceases and gradually fall up to January though extraction is simultaneously increased in the same area (Fig. 1). Peak season of flowering is January but it starts with November each year (Fig. 2). In the month of December, use of fuel wood species produced by *C. odorata* culminates with the other use value of biomass produced by Non-woody forest species in degraded and plantation stand in the study sites. In the month of January use value of study species increased in compare to other non-woody species available in the study area (Fig. 3).

**Table 1.**  
**Checklist of species as associates found in the Study area round the year (2016-2018)**

Sl. No.	Family Name	Species Name
1.	Acanthaceae	<i>Adhatoda zeylanica</i>
2.	Acanthaceae	<i>Andrographis echiodides</i>
3.	Acanthaceae	<i>Andrographis paniculata</i>
4.	Acanthaceae	<i>Barleria prionitis</i>
5.	Acanthaceae	<i>Dicliptera roxburgiana</i>
6.	Acanthaceae	<i>Dipterocanthus prostrates</i>
7.	Acanthaceae	<i>Hemigraphis hirta</i>

8.	Acanthaceae	<i>Justicia diffusa</i>
9.	Acanthaceae	<i>Justicia simplex</i>
10.	Acanthaceae	<i>Peristrophe bicalyculata</i>
11.	Acanthaceae	<i>Rungia pectinata</i>
12.	Amaranthaceae	<i>Digera muricata</i>
13.	Amaranthaceae	<i>Achyranthes aspera</i>
14.	Amaranthaceae	<i>Aerva lanata</i>
15.	Amaranthaceae	<i>Alternanthera sessilis</i>
16.	Amaranthaceae	<i>Amaranthus spinosus</i>
17.	Amaranthaceae	<i>Amaranthus viridis</i>
18.	Amaranthaceae	<i>Celosia argentia</i>
19.	Anacardiaceae	<i>Mangifera indica</i>
20.	Anacardiaceae	<i>Semecarpus anacardium</i>
21.	Apiaceae	<i>Centella asiatica</i>
22.	Apiaceae	<i>Coridandrum sativum</i>
23.	Apocynaceae	<i>Alstonia scholaris</i>
24.	Apocynaceae	<i>Catharanthus roseus</i>
25.	Asclepiadaceae	<i>Calotropis gigantean</i>
26.	Asclepiadaceae	<i>Pergularia daemia</i>
27.	Asclepiadaceae	<i>Tylophora indica</i>
28.	Asteraceae	<i>Ageratum conyzoides</i>
29.	Asteraceae	<i>Blumea laciniata</i> DC.
30.	Asteraceae	<i>Chromolaena odorata</i>
31.	Asteraceae	<i>Eclipta alba</i>
32.	Asteraceae	<i>Emilia sochifolia</i>
33.	Asteraceae	<i>Grangea madaraspata</i>
34.	Asteraceae	<i>Launea asplanifolia</i>
35.	Asteraceae	<i>Sonchus arvensis</i>
36.	Asteraceae	<i>Tagetes patula</i>
37.	Asteraceae	<i>Tridax procumbens</i>
38.	Asteraceae	<i>Vernonia cinerea</i>
39.	Asteraceae	<i>Xanthium indicum</i>
40.	Boraginaceae	<i>Heliotropium indicum</i>
41.	Brassicaceae	<i>Brassica nigra</i>
42.	Brassicaceae	<i>Rorippa indica</i>
43.	Brassicaceae	<i>Brassica juncea</i>
44.	Caesalpiniaceae	<i>Cassia fistula</i>
45.	Caesalpiniaceae	<i>Cassia sophera</i>
46.	Caesalpiniaceae	<i>Cassia tora</i>
47.	Capparaceae	<i>Capparis zeylanica.</i>
48.	Capparidaceae	<i>Cleome gynandra</i>
49.	Capparidaceae	<i>Cleome viscosa</i>
50.	Convolvulaceae	<i>Evolvulus nummularius</i>
51.	Cucurbitaceae	<i>Coccinia grandis</i>
52.	Cucurbitaceae	<i>Cucurbita maxima</i>
53.	Cucurbitaceae	<i>Momordia charantia</i>
54.	Cucurbitaceae	<i>Mukea scabrella</i>
55.	Cucurbitaceae	<i>Mukia maderaspatana</i>
56.	Euphorbiaceae	<i>Acalypha indica</i>
57.	Euphorbiaceae	<i>Chrozophora rottleri</i>

58.	Euphorbiaceae	<i>Croton bonplandianum</i>
59.	Euphorbiaceae	<i>Euphorbia hirta</i> .
60.	Euphorbiaceae	<i>Euphorbia microphylla</i>
61.	Euphorbiaceae	<i>Euphorbia thymifolia</i>
62.	Euphorbiaceae	<i>Jatropha curcas</i>
63.	Euphorbiaceae	<i>Jatropha gossypifolia</i>
64.	Euphorbiaceae	<i>Micrococca mercurialis</i>
65.	Euphorbiaceae	<i>Phyllanthus fraternus</i>
66.	Euphorbiaceae	<i>Phyllanthus reticulatus</i>
67.	Euphorbiaceae	<i>Phyllanthus urinaria</i>
68.	Euphorbiaceae	<i>Pilea microphylla</i>
69.	Euphorbiaceae	<i>Pouzolzia hirta</i>
70.	Euphorbiaceae	<i>Pouzolzia zeylanica</i>
71.	Euphorbiaceae	<i>Ricinus communis</i>
72.	Euphorbiaceae	<i>Tragia involucrate</i>
73.	Fabaceae	<i>Abrus precatorius</i>
74.	Fabaceae	<i>Alysicarpus monilifer</i>
75.	Fabaceae	<i>Atylosia platycarpa</i>
76.	Fabaceae	<i>Cajanus cajan</i>
77.	Fabaceae	<i>Clitoria ternatea</i>
78.	Fabaceae	<i>Desmodium gangeticum</i>
79.	Fabaceae	<i>Desmodium triflorum</i>
80.	Fabaceae	<i>Phaseolus trilobatus</i>
81.	Fabaceae	<i>Tephrosia purpurea</i>
82.	Fabaceae	<i>Teramnus labialis</i>
83.	Fabaceae	<i>Zornia diphylla</i>
84.	Gentianaceae	<i>Canscora decussata</i>
85.	Gentianaceae	<i>Canscora diffusa</i>
86.	Lamiaceae	<i>Anisomeles indica</i>
87.	Lamiaceae	<i>Hyptis suaveolens</i>
88.	Lamiaceae	<i>Leonurus sibiricus</i>
89.	Lamiaceae	<i>Leucas linifolia</i>
90.	Lamiaceae	<i>Ocimum americanum</i>
91.	Lamiaceae	<i>Ocimum sanctum</i>
92.	Lamiaceae	<i>Ocimum basilicum</i>
93.	Lythraceae	<i>Ammania baccifera</i>
94.	Malvaceae	<i>Abutilon indicum</i>
95.	Malvaceae	<i>Gossypium herbaceum</i>
96.	Malvaceae	<i>Sida acuta</i>
97.	Malvaceae	<i>Sida cordata</i>
98.	Malvaceae	<i>Sida rhombifolia</i>
99.	Malvaceae	<i>Urena lobata</i>
10.	Meliaceae	<i>Melia azadirachta</i>
10.	Menispermaceae	<i>Cocculus hirsutus</i>
10.	Menispermaceae	<i>Stephania japonica</i>
10.	Molluginaceae	<i>Glenus oppositifolius</i>
10.	Molluginaceae	<i>Mollugo pentaphylla</i>
10.	Moraceae	<i>Ficus bengalensis</i>
10.	Moraceae	<i>Ficus benamina</i>
10.	Moraceae	<i>Ficus hispida</i>

10	Moraceae	<i>Ficus racemosa</i>
10	Moraceae	<i>Ficus religiosa</i>
11	Moraceae	<i>Fleureya interrupta</i>
11	Moraceae	<i>Streblus asper</i>
11	Myrtaceae	<i>Psidium guajava</i>
11	Myrtaceae	<i>Syzygium cumini</i>
11	Nyctaginaceae	<i>Boerhaavia repens</i>
11	Nyctaginaceae	<i>Mirabilis jalapa</i>
11	Oxalidaceae	<i>Biophytum sensitivum</i>
11	Oxalidaceae	<i>Oxalis corniculata</i>
11	Papaveraceae	<i>Argemone Mexicana</i>
11	Pedaliaceae	<i>Sesamum indicum</i>
12	Piperaceae	<i>Piperomia pellucid</i>
12	Poaceae	<i>Aristida adenseoides</i>
12	Poaceae	<i>Alloteropsis cimicina</i>
12	Poaceae	<i>Apluda mutica L.</i>
12	Poaceae	<i>Brachiaria reptens</i>
12	Poaceae	<i>Chloris barbata</i>
12	Poaceae	<i>Cynodon dactylon</i>
12	Poaceae	<i>Dactyloctenium aegyptiacum</i>
12	Poaceae	<i>Digitaria adscendens</i>
12	Poaceae	<i>Eleusine indica</i>
13	Poaceae	<i>Eragrostis tenella</i>
13	Poaceae	<i>Panicum repens</i>
13	Poaceae	<i>Paspalum flavidum</i>
13	Poaceae	<i>Paspalum scrobiculatum</i>
13	Polygalaceae	<i>Polygala chinensis</i>
13	Polygonaceae	<i>Antigonon leptopus</i>
13	Polygonaceae	<i>Rumex dentatus</i>
13	Portulacaceae	<i>Portulaca oleracea</i>
13	Portulacaceae	<i>Portulaca quadrifida</i>
13	Rhamnaceae	<i>Zizyphus mauritiana</i>
14	Rubiaceae	<i>Borreria articularis</i>
14	Rubiaceae	<i>Dentella repens</i>
14	Rubiaceae	<i>Oldenlandia corymbosa</i>
14	Rubiaceae	<i>Oldenlandia paniculata</i>
14	Rutaceae	<i>Glycosmis mauritiana</i>
14	Rutaceae	<i>Glycosmis pentaphylla</i>
14	Scrophulariaceae	<i>Lindenbergia indica</i>
14	Scrophulariaceae	<i>Lindernia crustacea</i>
14	Scrophulariaceae	<i>Scoparia dulcis</i>
14	Urticaceae	<i>Laportea interrupta</i>
15	Verbenaceae	<i>Lantana camara</i>
15	Verbenaceae	<i>Clerodendrum viscosum</i>
15	Verbenaceae	<i>Phylla nodiflora</i>
15	Violaceae	<i>Hybanthus enneaspermus</i>
15	Vitaceae	<i>Cayratia trifolia</i>
15	Zygophyllaceae	<i>Tribulus terrestris</i>

GRAPHS

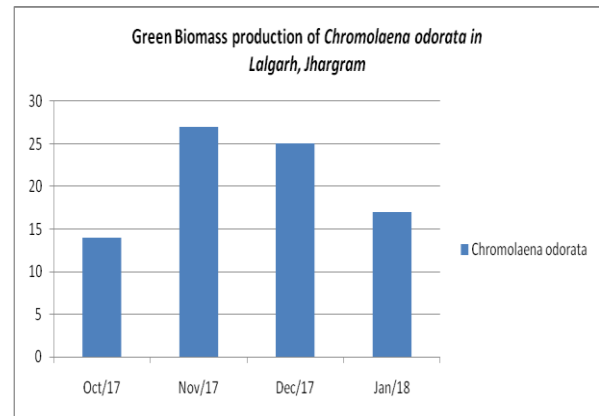


Fig. 1 Green Biomass produced by *Chromolaena odorata* from October to Jan, 2018

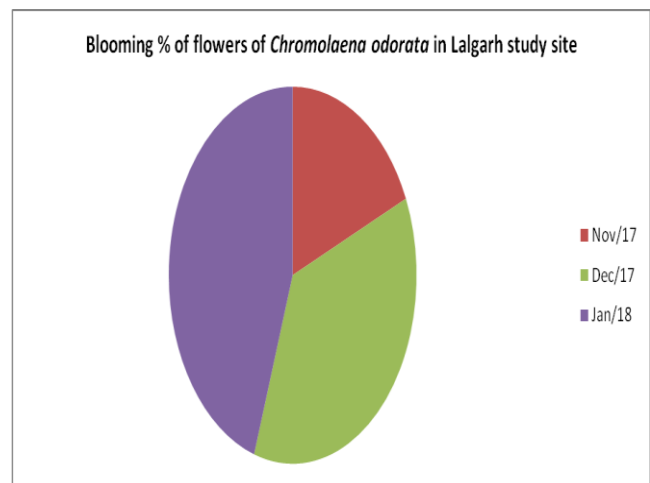


Fig. 2 Flower blooming spectrum of *Chromolaena odorata* in Lalgarh, Jhargram (October no flowering)

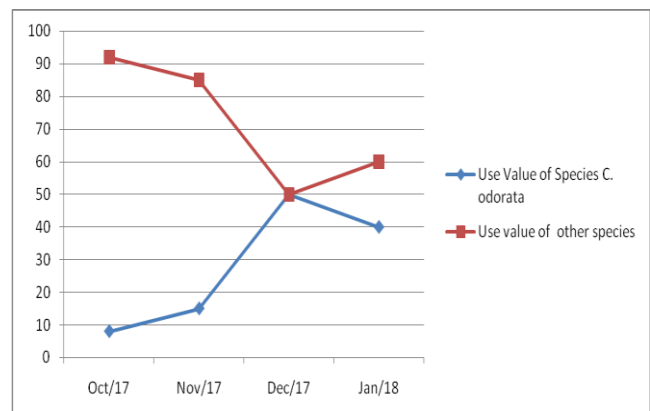


Fig. 3 Use value of *Chromolaena odorata* versus other Non-woody fuel species in 4 months study



Fig. 4 Sal dominated forest (natural) at Lalgarh during January, 2018



Fig. 7. *Chromolaena odorata* cut down for use



Fig. 5 Senescence of leaves started since end of the January



Fig. 8 Lady collected the fuel wood species from wasteland



Fig. 6 Extraction of biomass from degraded land nearer the forest of Lalgarh



Fig. 9 Use of other species rather than *C. odorata* from Institutional campus



Fig. 10 Lady processing the non-woody species for fuel in field



Fig. 11 *Calotropis procera* is used as fuel wood species

## V. CONCLUSION

The present study showed a picture of *Chromolaena odorata* used by local people of Lalgargh, Jhargram, India which is fantastic during the last two months of a year but the collection period is January each year. In the month of January, biomass use value of *C. odorata* by local people for fuel purpose is 1:1 i.e. the biomass use value culminates with the biomass of other non-timber forest produces grow in degraded as well as in wasteland and pasture land including campus of the institutes. The flowering of *C. odorata* starts from November and ends in the month of January though some pockets where sufficient moisture prevails show flowering by *C. odorata*. Experimental condition made for the study of flowering in an earthen pot shows negative result as the container have a minimum moisture and the condition is non-shady. It showed a general consequence of phenology of *C. odorata* in forest and other land in Lalgargh area of Jhargram District. Penetration rate of the same species in the forest is slow but in degraded stand the percentage of penetration is higher in compare to other stands. Biomass production and use values are higher for the same species in

the study site is January each year though it tends up to the February.

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