



NATURAL OCCURENCE OF PLANT SPEICES ON BANKOLA AREA OF RANIGANJ COALFIELD, WEST BENGAL, INDIA

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ABSTRACT

A study was undertaken to report the natural occurrence of plant species on 6 years old coal mine spoils at Bankola coal mine of Raniganj coalfield, India. Bankola site was mostly dominated by herbaceous species followed by shrub and tree species. Several vines found, but the numbers were very poor. The Fabaceae family dominate over all the natural vegetation along with Asteraceae on coal mine spoil at the site.

KEY WORDS: Coal Mine Spoil, Plant species, Raniganj Coalfields.

INTRODUCTION

Mined areas exhibit completely modified ecological system. Large spoil piles and pits are main features of a mining land (Martinez Orozco et al., 1993). Mining activity results in huge dumps of overburden material as mine spoil. In particular, open cast, that is, surface mining activities result in a drastic disturbance mining areas become an important man-made component of landscape (Toomik and Liblik, 1998; Hüttel and Bradshaw, 2000). Because of low organic matter contents and other unfavorable physico-chemical characteristics, mine spoils possess very rigorous conditions for plant growth (Singh and Jha, 1993; Banerjee et al., 2004; Singh and Singh, 2006). Nitrogen and phosphorus are the limiting nutrients in mine spoil (Singh and Singh, 2001). Mine spoil needs to be stabilized and restored to a natural self-sustaining ecosystem. Natural restoration is a slow process (Jha and Singh, 1991). However, it can be accelerated by planting tree species with ground seeding of herbaceous flora (Singh et al., 1997). This initial two tier vegetation increases the biological fertility and diversity of mine spoil subsequently paving way for the invasion of locally adapted species. Study of native vegetation is necessary for planning programmes of revegetation in any site affected by opencast coal mining with a view to maintain essential processes and life support system, preservation of genetic diversity and to ensure sustainable utilization of species and ecosystem (Soni et al., 1989; Jha and Singh, 1990; Banerjee et al., 1996; Sheoran et al., 2010). The objective of the present study is to analyze the natural occurrence of plant species assemblages on 6 years old coal mine spoils on Bankola area of Raniganj coal field, West Bengal, India.

MATERIALS AND METHODS

The study was conducted at Bankola coal mine of Raniganj coalfield, India. The geographical location of this site is at 23°39'54.7" N Latitude and 87°14'40.2" E Longitude. The study area encompasses a large stretches of old Opencast Coal Pit (OCPs) in the area of Eastern Coalfield Limited (ECL). They are located in the Raniganj Coalfield division of Burdwan district of West Bengal of India. Total area of ECL is 1,620 sq. km. Among which 1530 sq. km is under Raniganj Coalfield spreading over Burdwan, Birbhum, Bankura and Purulia Districts in West Bengal and Dhanbad District in Jharkhand.

The climate of the study area is in general dry tropical. The area experiences three prominent seasons, summer (middle of March to middle of June) monsoon rain (middle of June to middle of October) and winter (November to February). In summer average temperature ranges between 38°C to 43°C, some time it may be rises up to 48°C temperature. The area receives average annual rainfall between 1240 to 1500 mm.

A quadrat of 10m² was considered within the selected site, which was sampled for the presence of the plant species, irrespective of being trees, shrubs and herbs. The number of plants were counted and recorded for the purpose of analysis following the identification and confirmation using herbarium reference.

RESULTS AND DISCUSSION

The total number of naturally occurring species at Bankola site is given in the Table 1

Table 1: List of naturally occurring plant species on a 6 years old coal mine spoil at Bankola coal mine of Raniganj coalfield, India

Sl. No.	Plant Species	Family	Habit
1.	<i>Acacia auriculaeformis</i> Benth.	Fabaceae	Tree
2.	<i>Acacia nilotica</i> (L.) Delile	Fabaceae	Tree
3.	<i>Acalypha indica</i> L.	Euphorbiaceae	Herb
4.	<i>Ailanthus excelsa</i> Roxb.	Simaroubaceae	Tree
5.	<i>Alstonia scholaris</i> (L.) R.Br.	Apocynaceae	Tree
6.	<i>Alternanthera tenella</i> Colla	Amaranthaceae	Vine
7.	<i>Alternanthera pungens</i> Kunth	Amaranthaceae	Vine
8.	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Herb
9.	<i>Amaranthus viridis</i> L.	Amaranthaceae	Herb
10.	<i>Azadirachta indica</i> A.Juss.	Meliaceae	Tree
11.	<i>Calotropis gigantea</i> (L.) W.T.Aiton	Asclepiadaceae	Shrub
12.	<i>Calotropis procera</i> W.T.Aiton	Asclepiadaceae	Herb
13.	<i>Cassia obtusifolia</i> L.	Fabaceae	Herb
14.	<i>Cassia tora</i> L.	Fabaceae	Herb
15.	<i>Cleome viscosa</i> L.	Capparaceae	Herb
16.	<i>Clerodendrum viscosum</i> Vent.	Verbenaceae	Herb
17.	<i>Cnicus wallichii</i> Hook.f.	Asteraceae	Herb
18.	<i>Coccinia cordifolia</i> Cogn.	Cucurbitaceae	Vine
19.	<i>Croton bonplandianus</i> Baill.	Euphorbiaceae	Herb
20.	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Vine

21.	<i>Dalbergia sissoo</i> Roxb.	Papilionaceae	Tree
22.	<i>Datura metel</i> L.	Solanaceae	Herb
23.	<i>Desmodium gangeticum</i> (L.) DC.	Fabaceae	Herb
24.	<i>Eclipta alba</i> (L.) Hassk.	Asteraceae	Herb
25.	<i>Eupatorium odoratum</i> L.	Asteraceae	Shrub
26.	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Herb
27.	<i>Ficus benghalensis</i> L.	Moraceae	Tree
28.	<i>Ficus cunea</i> Steud.	Moraceae	Tree
29.	<i>Gomphrena celosioides</i> Mart.	Amaranthaceae	Vine
30.	<i>Hyptis suaveolens</i> (L.) Poit.	Lamiaceae	Herb
31.	<i>Jatropha gossypifolia</i> L.	Euphorbiaceae	Herb
32.	<i>Lantana camara</i> L.	Verbenaceae	Shrub
33.	<i>Leonurus sibiricus</i> L.	Lamiaceae	Shrub
34.	<i>Leucas aspera</i> (Willd.) Link	Lamiaceae	Herb
35.	<i>Mikania scandens</i> (L.) Willd.	Asteraceae	Vine
36.	<i>Ocimum canescens</i> A.J. Paton	Lamiaceae	Herb
37.	<i>Pedaliium murex</i> L.	Pedaliaceae	Herb
38.	<i>Pergularia daemia</i> (Forssk.) Chiov.	Asclepiadaceae	Herb
39.	<i>Phoenix sylvestris</i> (L.) Roxb.	Areaceae	Tree
40.	<i>Phyllanthus amarus</i> Schumach. & Thonn.	Euphorbiaceae	Herb
41.	<i>Saccharum munja</i> Roxb.	Poaceae	Shrub
42.	<i>Saccharum spontaneum</i> L.	Poaceae	Shrub
43.	<i>Scoparia dulcis</i> L.	Scrophulariaceae	Herb
44.	<i>Sida acuta</i> Burm.f.	Malvaceae	Herb
45.	<i>Solanum nigrum</i> L.	Solanaceae	Herb
46.	<i>Solanum sisymbriifolium</i> Lam.	Solanaceae	Herb
47.	<i>Tephrosia purpurea</i> (L.) Pers.	Fabaceae	Herb
48.	<i>Tephrosia villosa</i> (L.) Pers.	Fabaceae	Herb
49.	<i>Tribulus terrestris</i> L.	Zygophyllaceae	Herb
50.	<i>Tridax procumbens</i> L.	Asteraceae	Herb
51.	<i>Triumfetta rhomboidea</i> Jacq.	Tiliaceae	Herb
52.	<i>Vernonia cinerea</i> (L.) Less.	Asteraceae	Shrub
53.	<i>Vitex negundo</i> L.	Verbenaceae	Shrub
54.	<i>Xanthium strumarium</i> L.	Asteraceae	Herb

At Bankola site, of the total 54 plant species reported, 31 were represented by herbs, 8 were represented by shrubs, 9 were trees and rest of 6 were represented by vines. Thus the study reveals that naturally occurring plant species at the site was dominated by herbs. Among the all herbaceous species *Cnicus wallichii*, *Hyptis suaveolens* and *Solanum sisymbriifolium* are most dominant species. It was noticed that *Calotropis gigantea* and *Saccharum spontaneum* are the most commonly occurring shrubs. It was also observed that *Acacia auriculiformis*, *Dalbergia sissoo*, *Azadirachta indica* and *Ficus cuneata* were the most frequent naturally colonizing tree species on mine spoils. The most dominant vines *Cynodon dactylon* and *Alternanthera tenella* were found in coal mine site.

Of the total plant species reported at the sites, maximum number of species was represented by those belonging to the Asteraceae and Fabaceae family. Das et al. (2013) reported the similar findings with greater abundance for naturally occurring leguminous than non-leguminous species on the coal mine spoil of Raniganj coalfield.

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