



Dominance of *Shorea robusta* Gaertn. f. in Similipal Wildlife Sanctuary

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ABSTRACT

Similipal Wildlife Sanctuary spreads in Mayurbhanj district with an area of 2271.78 km². The Sanctuary is having hilly terrain dominated by tree species. An analysis of tree species in four different types of forests within Sanctuary revealed that *Shorea robusta*, Gaertn f. (Sal) is the most dominant species in all forest types out of 168 tree species under 48 families. Sal is climax tree species in the forests of present study as in the case of many Sal forests of India. The frequency of individuals and number of species was maximum in the lower GBH class. The distribution of girth classes show classical negative exponential pattern which is a common feature found in the pristine forest. The present study reveals that the intensive management of forests for fodder species and grass lands are required for the wildlife management and conservation.

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1. Introduction

Similipal Wildlife Sanctuary, located at the north east corner of Odisha state in the District Mayurbhanj, has got a significant identity in view of occupying a large area of 2271.78 km². The Sanctuary lies between 21° 31' and 22° 02' North latitude and 86° 06' and 86° 36' East longitude. The topography of the area is with innumerable crests and valleys, perennial streams and rivers. Altitude of Sanctuary ranges from 40 m to 1168 m with Khairiburu, the highest peak at 1168 m, followed by Meghasini (1100 m). Rainy season lasts from middle of June till October with average annual rainfall of 185 cm and maximum being 225 cm. Storms and depressions from Bay of Bengal in the pre and post monsoon season often cause heavy rains with high velocity of winds. South of Similipal Sanctuary receives higher precipitation than north of Similipal Sanctuary and there is general decrease of rainfall from south west of the sanctuary to north east. The climate of Similipal Sanctuary is tropical warm and humid. The temperature ranges from 4 °C in winter to about 37°C in summer. In Similipal Wildlife

Sanctuary three distinct seasons namely summer, rainy season and winter are felt in the year.

The Sanctuary is aimed at conserving flora and fauna with overlapping management units by constituting Similipal National Park, Similipal Tiger Reserve, Similipal Biosphere Reserve and Mayurbhanj Elephant Reserve. The location map of Similipal Sanctuary is self explanatory (Fig. 1.).

Similipal Wildlife Sanctuary is well known for its diverse vegetation, which is dominated by tree species. Flora of Similipal Sanctuary is considerably diverse and may be considered as mini flora of Odisha except coastal mangroves. According to the revised classification of forest types of India by Champion and Seth (1968), the natural vegetation of the sanctuary can be classified into following forest types.

(i) Northern Tropical Semi-evergreen Forests. (Type: 2b/c3): The species found under this forest type depending upon the soil and micro-climatic conditions. (ii) Northern Tropical Moist Deciduous Forests (Type: 3C/C2e): This type of forest is found all over Similipal except the moist valleys

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was recorded using GPS and altimeter with a sensitivity of 20 m. Identification of plants was done using The Flora of Orissa (Saxena and Brahmam, 1994-95) and The Flora of Simlipahar (Similipal) Orissa (Saxena and Brahmam, 1989). The data gathered from various quadrates under each vegetation type were analyzed for Sal dominance in different forest types. Importance Value Index (IVI) of various tree species was also worked out (Muller-Dombois and Ellenberg, 1974) as the sum of Relative density, Relative frequency and Relative Basal area of each of them. From the quadrate data obtained from the field work viz., density, frequency, abundance, basal area, IVI (Importance Value Index), and biodiversity indices were calculated separately for different forest types using Microsoft Excel software. (Curtis and McIntosh, 1951; Misra, 1968).

3. Results and discussion

Total 138,129,100,20 tree species under 45,44,40,15 families were recorded from 139, 123, 49, 6 quadrates drawn in Northern Tropical Moist Deciduous Forests (NMDF), Dry Deciduous Hill Forests (DDHF), Northern Tropical Semi-evergreen Forests. (NSEF), and High Level Sal Forest (HLSF) respectively. Based on IVI values of all the species Sal is most dominant in all the forest types. Sal exhibited 95.28, 89.24, 86.23 and 130.34 in forests of NMDF, DDHF, NSEF and HLSF respectively. The IVI of ten Most dominant species with their important value index in the different forest types are given in table 1.

Dominance of *Shorea robusta Gaertn. f.* with Important Value Index (IVI) in all the forest types of shows

that Sal appears to have achieved a steady state over and time in the Sanctuary through the process of ecological succession. The dominance of Sal may also ascribed to ban on green felling in the forests imposed during 1988 by the Honorable Supreme Court of India combined with the declaration of Sanctuary and management of forests of Similipal wildlife Sanctuary for conservation of Wildlife. The high Important Value in case of High level Sal Forests (130.34) of Sanctuary, probably due to withstanding of Sal species for high wind velocity and other vagaries of weather.

The density of stems of diameter ≥ 20 cm above in the study area was 1187 ha⁻¹ in NMDF, 1034 ha⁻¹ in DDHF, 1164 ha⁻¹ in NSEF and 608 in HLSF ha⁻¹. The range of 1187 to 608 stems ha⁻¹ in the sanctuary is higher than reported range of 276-905 stems Ha-1 in the forests of tropics (Ghate *et al.*, 1998; Sundarpandian and Swamy, 1997), as in the instant case for calculation purpose the trees above 20 cm has been taken in to account instead 30 cm.

Girth class distribution when graphically plotted is represented as an inverted 'J' shaped curve. Any distortion in the curve is an indication of disturbance. Population density of tree species across girth class interval showed that around 56% of individuals belonged to 20-50 cm GBH. The highest number of species (159) was also observed in the same category, (Table 2). The study area represents typical mature stands with good regeneration.

Percentage of individuals of trees plotted against Girth class for all the forest types in the entire study area of

Table 1.

IVI of ten most dominant species in different forest types of Similipal Wildlife Sanctuary.

Species	D/ha	RD	RF	RBA	IVI
I. Northern Tropical Moist Deciduous Forests (Type: 3C/C2e)					
<i>Shorea robusta Gaerten.f.</i>	512.41	43.17	0.08	52.03	95.28
<i>Terminalia alata Heyne ex Roth.</i>	72.66	6.12	0.06	7.81	13.99
<i>Syzygium cumini (L.) Skeels.</i>	51.26	4.32	0.05	4.15	8.52
<i>Protium serratum (Wall.ex Colebr.) Engl.</i>	33.45	2.82	0.04	3.75	6.61
<i>Xylia xylocarpa (Roxb.) Taub.</i>	34.53	2.91	0.02	3.46	6.39
<i>Anogeissus latifolia (Roxb.ex DC) Wall.ex Guill.&Perr.</i>	39.39	3.32	0.04	3.00	6.36
<i>Schleichera oleosa (Lour.) Oken.</i>	20.68	1.74	0.03	1.63	3.41
<i>Croton roxburghii Balak.</i>	25.36	2.14	0.02	1.15	3.31
<i>Dillenia pentagyna Roxb.</i>	16.91	1.42	0.03	1.53	2.98
<i>Cleistanthus collinus (Roxb.) Benth.ex Hook.f.</i>	19.42	1.64	0.02	0.61	2.27

II. Dry Deciduous Hill Forests (Type: 5B/C1c)					
<i>Shorea robusta</i> Gaerten.f.	380.69	36.78	0.08	52.37	89.24
<i>Terminalia alata</i> Heyne ex Roth.	52.85	5.11	0.06	6.62	11.78
<i>Buchanania lanzan</i> Spreng.	72.36	6.99	0.05	2.44	9.48
<i>Anogeissus latifolia</i> (Roxb.ex DC) Wall.ex Guill.&Perr.	31.10	3.00	0.04	4.77	7.82
<i>Protium serratum</i> (Wall.ex Colebr.) Engl.	18.70	1.81	0.02	2.86	4.69
<i>Schleichera oleosa</i> (Lour.) Oken.	22.56	2.18	0.04	2.18	4.40
<i>Syzygium cumini</i> (L.) Skeels.	20.33	1.96	0.03	2.03	4.03
<i>Pterocarpus marsupium</i> Roxb.	21.95	2.12	0.03	1.70	3.85
<i>Cleistanthus collinus</i> (Roxb.) Benth.ex Hook.f.	28.66	2.77	0.02	0.94	3.74
<i>Xylia xylocarpa</i> (Roxb.) Taub.	19.92	1.92	0.01	1.27	3.21
III. Northern Tropical Semi-evergreen Forests. (Type: 2b/c3)					
<i>Shorea robusta</i> Gaerten.f.	464.80	39.99	0.08	46.16	86.23
<i>Syzygium cumini</i> (L.) Skeels.	75.51	6.50	0.06	6.41	12.97
<i>Dillenia pentagyna</i> Roxb.	35.71	3.07	0.05	3.84	6.97
<i>Terminalia alata</i> Heyne ex Roth.	38.78	3.34	0.03	3.33	6.70
<i>Protium serratum</i> (Wall.ex Colebr.) Engl.	45.92	3.95	0.04	2.38	6.37
<i>Mangifera indica</i> L.	10.20	0.88	0.02	4.23	5.12
<i>Michelia champaca</i> L.	9.69	0.83	0.01	4.03	4.87
<i>Schleichera oleosa</i> (Lour.) Oken.	12.76	1.10	0.03	3.10	4.23
<i>Terminalia chebula</i> Retz.	22.45	1.93	0.02	1.78	3.74
<i>Sterospermum Chelonoides</i> (L. f.) DC.	21.43	1.84	0.03	1.21	3.08
IV. High Level Sal Forest. (Type: 3C/C 2e(i))					
<i>Shorea robusta</i> Gaerten.f.	366.67	60.27	0.18	69.88	130.34
<i>Schleichera oleosa</i> (Lour.) Oken.	41.67	6.85	0.06	5.82	12.73
<i>Garuga pinnata</i> Roxb.	33.33	5.48	0.06	4.49	10.03
<i>Cassia fistula</i> L.	25.00	4.11	0.06	0.96	5.13
<i>Protium serratum</i> (Wall.ex Colebr.) Engl.	16.67	2.74	0.03	0.89	3.66
<i>Terminalia alata</i> Heyne ex Roth.	16.67	2.74	0.06	5.25	8.05
<i>Anogeissus latifolia</i> (Roxb.ex DC) Wall.ex Guill.&Perr.	12.50	2.05	0.09	4.64	6.78
<i>Dillenia pentagyna</i> Roxb.	12.50	2.05	0.03	0.27	2.35
<i>Milium velutina</i> (Dunal) Hook.f. & Thoms.	12.50	2.05	0.03	0.60	2.69
<i>Bridelia pubescens</i> Kurz.	8.33	1.37	0.06	1.63	3.06

D/ ha- Density per hectare RD- Relative density, Relative Frequency, RBA – Relative basal area, IVI – Important value index

Sanctuary together provided a graph which almost represents a negative exponential or 'inverse J' curve (Fig. 2). The frequency of individuals was maximum in the lower GBH class i.e. the higher number of individuals (56%) was represented in 20-50 cm GBH class. The number of species was also higher in the lower size classes. The distribution

of girth classes show classical negative exponential pattern which is a common feature found in the pristine forest.

Dominance of Sal and further presence of higher percentage (56%) of individuals in 20-50 cm girth at breast height in the forests of the sanctuary shows the poor availability of fodder (grass) species and grass lands for the wildlife for which the Sanctuary is earmarked.

Table 2

Population structure of tree species along girth class frequencies in Similipal Wildlife Sanctuary

Girth class	No of individuals	No of species	% of individuals
20-50	7864	159	55.71
51-80	2721	111	19.28
81-110	1664	80	11.79
111-140	978	54	6.93
141-170	524	43	3.71
171-200	238	27	1.69
>200	127	21	0.90
Total	14116		100.00

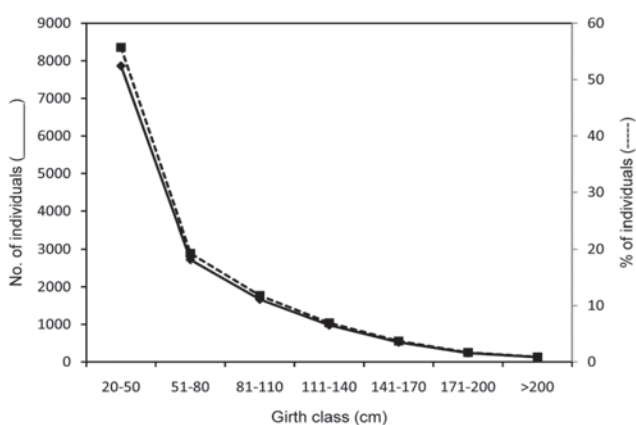


Fig. 2 Girth class distribution of trees plotted against the percentage of individuals

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