of Maharashtra, namely *Juncus maritimus* Lam. and *J. prismatocarpus* R.Br. (Shimpale 2008). The present paper reports *J. bufonius* L. from Tableland, Panchgani, in Satara district of Maharashtra. Description and nomenclature of the species along with a note are given for easy identification. The voucher specimens are deposited at the Herbarium of Botany Department, Shivaji University, Kolhapur (SUK).

Juncus bufonius L., Sp. Pl. 328. 1753; Hook. *f.*, Fl. Brit. India 6: 392. 1892; Fl. Upper Gangetic Plain 3: 282. 1920; C.E.C. Fisch. in Gamble, Fl. Pres. Madras 3: 1553. 1928; Backer., Fl. Males. Ser 1. 4: 212, 1948; C.D.K. Cook, Aqua, & Wetl. Pl. India 223, f. 230, a & b. 1996; Tiagi & Aery. Fl. Rajasthan. 534-535. 2007.

Erect annual herb. Stems terete, up to 25 cm high, glabrous, striated, yellow-green. Leaves reduced to basal cataphylls, 5-12 cm long, 1-2 mm wide. Inflorescence a drepanium, 3-9 cm long; flowers small, 1-3 mm across, solitary, bracteate; bract 1, sheathing, open. Bracteoles 2. Tepals 6, free, lanceolate, straw-brown, keeled (outer tepals only) with a thickened midrib and scarious margin; outer tepals 4 mm long, exceeding inner tepals; inner tepals 3.5 mm long. Stamens 3, shorter than outer tepals; filament 0.9-1 mm long, hyaline; anthers 0.3-0.5 mm, hyaline. Ovary 1.8-2 mm long, ovoid, trigonous, hyaline; style trifid, 0.2-0.3 mm long, cylindric, brown. Capsule 3-locular, slightly shorter than tepals, ellipsoid, dark brown, shortly apiculate. Seeds 0.4-0.5 mm long, obovoid, yellowish-brown.

Flowering and Fruiting: September-March.

Distribution: INDIA: Himachal Pradesh, Delhi, Rajasthan, Sikkim, Maharashtra; temperate and warm regions of Eurasia and America; Sri Lanka; Bhutan; Nepal and Pakistan.

Specimens examined: INDIA, Maharashtra, Satara district, Panchgani, Tableland, 29.ix.2010, Lekhak-3896 (SUK).

Latitude and Longitude: 17° 55' N; 73° 48' E. Altitude: 1,413.96 m above msl.

Note: An erect herb that grows in seasonal ponds at Tableland in Panchgani. The typical associates were *Dopatrium junceum*, *Eriocaulon* spp., *Isachne* spp., *Oryza rufipogon*, *Rotala densiflora*, *Schoenoplectus* sp., and *Sopubia delphinifolia*.

ACKNOWLEDGEMENT

We are grateful to the Head of the Institution, Shivaji University, Kolhapur, for providing necessary facilities.

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10. ADDITIONS TO THE FLORA OF SIMILIPAL BIOSPHERE RESERVE, ORISSA, INDIA

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Introduction

The concept of Biosphere Reserve was initiated by the UNESCO in 1970 as a global measure to promote *in situ* conservation of biological resources with the purpose of human welfare and sustainable development. Representative areas of natural and cultural landscapes, extending over terrestrial and coastal / marine ecosystems, with appropriate zoning pattern, resource base and management mechanisms have been designated as Biosphere Reserve. This approach is an effective mean of protecting the landscape along with its biodiversity. So far, 15 Biosphere Reserves have been established in India across different biogeographical regions. Similipal in Orissa was notified as the 8th Biosphere Reserve in June 1994, as the representative ecosystem under the Mahanadian biogeographic region in the eastern end of the Central plateau and Eastern Ghats of tropical eastern India. However, Similipal shares biotic features of all the four biotic provinces – Eastern plateau, Chhotanagpur, Lower Gangetic plain and East coast line – for which Orissa is the junction. Similipal Biosphere Reserve has a unique assemblage of a

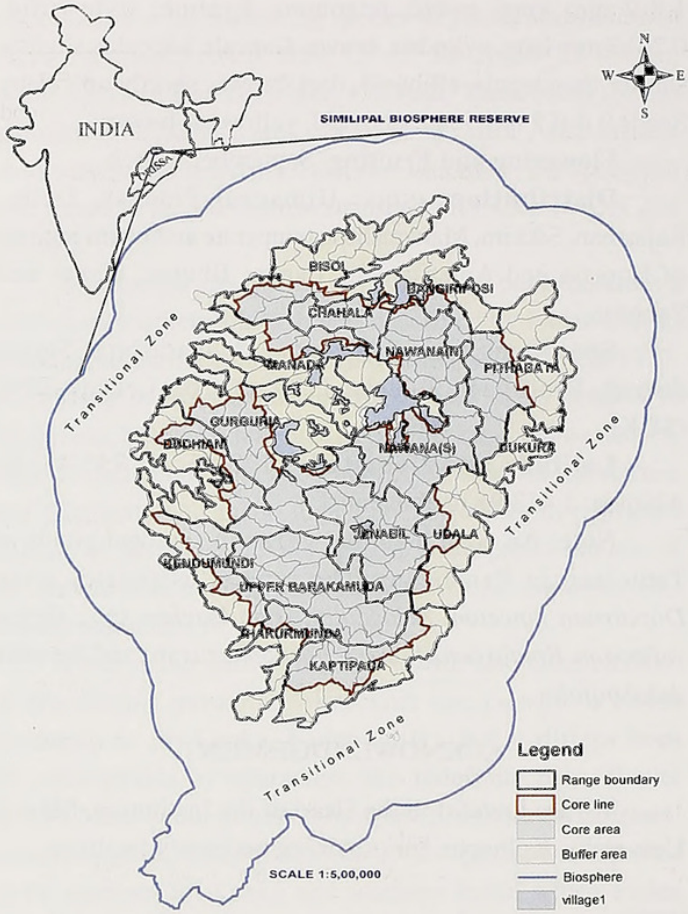

Fig. 1: Location of Similipal Biosphere Reserve, Orissa with 16 forest ranges

number of ecosystems, such as mountains, forests, grasslands and wetlands that congregate into a contiguous patch with a range of diverse vegetation types. Its rich floristic and faunal account of many indicator species makes the region a unique base for ecological studies. This biosphere reserve has varied topography, geologic formation, rich biological diversity and habitat of aboriginal / primitive tribes. It is called 'the Himalayas of Orissa' and controls the climatic regime of Orissa, part of Bihar, West Bengal, and other areas of eastern India influencing rainfall during monsoon season; it harbours the largest tropical peninsular sal zone forming a biological link between northern and southern India.

Location and spatial configuration

Similipal Biosphere Reserve is located in the central part of Mayurbhanj district of Orissa state, close to the interstate boundary with West Bengal in the north-east direction and Jharkhand in the north-west. It contains three protected habitats within its precincts, namely Similipal Tiger Reserve, Sanctuary and National Park. The Reserve is a compact mass of natural forests spread over an area of 5,569 sq. km lying between 21° 10' to 22° 12'N and 85° 58'to 86° 42' E, ranging between 300 m to 1,180 m above msl. The core area occupies 845 sq. km, which is intensively protected and absolutely undisturbed, secured legally and managed scientifically. The core zone includes Similipal Tiger Reserve and Similipal National Park. No biotic interference is permitted in the 2,129 sq. km buffer zone that surrounds the core zone. Limited activities of recreation, tourism, grazing and fishing, are permitted in the buffer zone with a view to reduce its effect on the core zone. The core and buffer zones of the Biosphere Reserve are under the administrative control of three forest divisions: Karanjia, Baripada and Rairangpur, which comprise of sixteen forest ranges, as traced in the map (Fig.1). The transitional zone extends over 2,595 sq. km, and is the outermost part of the Reserve encircling a belt of *c.* 10 km width around the buffer. This is a zone of collaboration where conservation knowledge and management skills are applied to foster alternative livelihood and reduce dependence on forest products. Most of the areas of this zone are under cultivation of field crops, such as paddy, mustard, til, and other vegetables practised by local people.

The flora of Similipal Biosphere Reserve exhibits a rich assemblage of species owing to its diversified hilly topography with lofty mountain crests and innumerable deep valleys, abundant springs, and specialized group of geological formation. The terrain and topography offer a congenial environment for the growth of plants including the rare / endangered ones restricted to this phyto-geographic region. The Reserve is located at the junction of four biotic provinces, and therefore shares multifarious floristic features of different geographic regions, such as Eastern Ghats, Deccan plateau, Lower Gangetic Plain and East Coastal zone. Thus, it has a unique biodiversity; it is of significance as it harbours a number of endemic, medicinal, economic and rare plants. The floral composition shows affinities towards northern and southern India, and Central table land due to a transitional bridge for migration of species from north to south or vice-versa. Diverse vegetation types prevailing in different landscapes and microclimates are found in Similipal, these include semi-evergreen forests along stream banks, damp valleys and deep gorges of high moisture content; moist and dry deciduous forests of high table lands along hill slopes and ridges; peninsular sal in ferruginous loams, loamy clays and red soils; and grasslands of exposed lofty plateau.

Past floristic work

The first attempt to identify the flora of Similipal hills is credited to Forester H.H. Haines (1921-25) who conducted an exploration trip to Similipal area of Mayurbhanj state, including Meghasini hills. On the contrary, none of the species mentioned by Mooney (1950) in his treatise is appended with Similipal hill ranges as locality of collection though he

Table1: Enumeration of additional taxa

Sl. No.	Family	Name of Species	Occurrence	Distribution	Fl. & Fr./ fertile period
1	Ophioglossaceae	*Ophioglossum reticulatum* L.	Munibasa, Rajapal, Saharpat	Common on forest floor during monsoon	Sep-Nov
2	Marsileaceae	*Marsilea quadrifolia* L.	Purunapani	Occasional in marshy places in forest edges	Nov-Feb
3	Thelypteridaceae	*Cyclosorus gongylodes* (Schkuhr) Link	Bakua nala	Occasional near water course	Nov-Dec
4	Aspidiaceae	*Tectaria cicutaria* (L.) Copel.	Solamundi	Occasional on foothills	Nov-Jan
5	Nephrolepidaceae	*Nephrolepis delicatula* (Decne) Pichi-Sermolli	Meghaseni	Occasional on foothills in shady places	Nov-Dec
6	Ranunculaceae	*Naravelia zeylanica* (L.) DC.	Sargil nala, Kasipani, Rajapala	Rare along streams in shady places	Oct-Apr
7	Annonaceae	*Alphonsea lutea* (Roxb.) Hook.f. & Thoms.	Ghatkumari, Misin nala	Occasional in dense moist habitat	Apr-May
8		*Polyalthia simiarum* Buch.-Ham. ex Hook.f. & Thoms.	Joronda	Rare near streams in damp valleys	Mar-Apr
9	Menispermaceae	*Tinospora cordifolia* (Willd.) Hook. f. & Thoms.	Barehipani	Occasional on foot hills	Feb-May
10	Malvaceae	*Abelmoschus crinitus* Wall.	Kolha, Nala near Ransa	Occasional on foothills near habitations	Sep-Oct
11		*Abelmoschus moschatus* Medic.	Kasipani, Kolha	Common on foothills near habitations	Aug-Oct
12		*Hibiscus platanifolius* (Willd.) Sweet	Kasipani, Munibasa	Occasional in dense and moist habitats	Feb- Apr
13	Sterculiaceae	*Guazuma ulmifolia* Lam.	Pithabata	Common on hill slopes in mixed forest	May- Feb
14		*Melochia corchorifolia* L.	Kukurbhuka	Common in forest edges during monsoon	Jul-Dec
15	Tiliaceae	*Triumfetta pentandra* A. Rich.	Kasipani	Common on foothills near habitations	Aug-Sep
16	Rutaceae	*Aegle marmelos* (L.) Corr.	Gurguria, Kasipani, Astakumar	Occasional in dry and moist deciduous forest	Mar-Apr
17		*Atalantia monophylla* (L.) Corr.	Ghatkumari, Kasipani	Occasional in forest periphery	Feb-Jun
18		*Chloroxylon swietenia* DC.	Ghatkumari, Kasipani, Bangiriposi	Occasional on hill slopes in dry forests	Mar-Jun
19		*Naringi crenulata* (Roxb.) Nicol.	Dantiakocha, Ghatkumari	Occasional on dry hill slopes	Apr-Nov
20	Opiliaceae	*Opilia amentacea* Roxb.	Barehipani,Chakundakocha, Misin nala	Occasional near stream course in dense forest	Apr-July
21	Celastraceae	*Cassine glauca* (Rotth.) Kuntze	Barehipani	Occasional in moist habitat	Sep-Dec
22	Rhamnaceae	*Ventilago maderaspatana* Gaertn.	Pithabata	Common on foothills in degraded habitat	Sep-Mar
23		*Ziziphus funiculosa* Buch.-Ham ex Lawson	Nigirdha, Kaduchapal	Common in moist habitats	Apr-Jun
24	Vitaceae	*Cayratia auriculata* (Wall.) Gamble	Kasipani, Ghatkumari	Common in shady and moist forest	July-Nov
25		*Cayratia pedata* (Lour.) Juss. ex Gagnep.	Kasipani, Kukurbhuka	Common in open scrublands	Aug-Dec
26		*Tetrastigma lanceolarium* (Roxb.) Planch.	Sargil nala	Occasional near streams under shade	Jan-Jul
27	Caesalpiniaceae	*Bauhinia acuminata* L.	Rajapal	Occasional in foothills of open forest	Jun-Aug
28	Mimosaceae	*Albizia odoratissima* (L.f.) Benth.	Pithabata	Common in moist valleys	Jun-Dec

Table1: Enumeration of additional taxa (*contd.*)

Sl. No.	Family	Name of Species	Occurrence	Distribution	Fl. & Fr./ fertile period
29	Fabaceae	*Crotalaria pallida* Ait.	Pithabata, Ghatkumari	Common in forest periphery near villages	Aug-Feb
30		*Crotalaria retusa* L.	Kasipani, Ghatkumari	Abundant along periphery near villages	Oct-Mar
31		*Desmodium pulchellum* (L.) Benth.	Sanuski, Chakundakocha	Frequent in moist forest	Oct-Feb
32		*Flemingia bracteata* (Roxb.) Wt.	Ghatkumari, Chakundakocha	Common on foothills and slopes	Nov-Feb
33		*Millettia racemosa* (Roxb.) Benth.	Munibasa, Bilapagha	Common on foothills and slopes	Feb-Jun
34		*Pseudarthria viscida* (L.) W. & A.	Ghatkumari, Kasipani	Occasional in shady areas	Nov-Feb
35	Myrtaceae	*Syzygium heyneanum* (Duthie) Wall. ex Gamble	Along Khairi river, Gudugudia	Common along river/nala	Apr-Jul
36	Lythraceae	*Ammannia multiflora* Roxb.	Phuljhari	Common in wet and muddy places	Oct-Feb
37	Passifloraceae	*Passiflora foetida* L.	Ghatkumari	Common in waste places	Nov-May
38	Cucurbitaceae	*Cucumis callosus* (Roettler) Cogn.	Bangriposi	Occasional in degraded forest near habitation	Oct-Mar
39	Molluginaceae	*Glinus oppositifolius* (L.) DC.	Pithabata	Common along river bank	Jan-Apr
40	Aizoaceae	*Trianthema portulacastrum* L.	Charabandh, Ghatkumari, Kasipani	Common on fallow fields near villages	Jun-Jul
41	Rubiaceae	*Benkara malabarica* (Lam.) Tirveng,	Bangiriposi, Kasipani	Common on foothills in open forest	Dec-May
42		*Canthium glabrum* Bl.	Sargil nala	Rare in moist valleys	Jul-Jan
43		*Canthium parviflorum* Lam.	Kasipani, way to Munibasa	Occasional along forest periphery	Apr-Dec
44		*Mitracarpus villosus* (Sw.) DC.	Kukurbhuka, Alapani	Common in moist places	Sep-Mar
45		*Spermacoce ramanii* Sivar. & Nayar	Gurguria, Kasipani	Common along forest edges	Sep-Jan
46		*Spermadictyon suaveolens* Roxb.	Astakumar	Common on moist hill slopes	Nov-Feb
47		*Tarenna asiatica* (L.) Kuntze & Schum.	Pithabata	Common on foothills in open forest	Dec-Apr
48	Asteraceae	*Chromolaena odorata* (L.) King & Robins.	Kasipani	Naturalized in open valleys	Nov-Mar
49		*Enydra fluctuans* Lour.	Pithabata, Sitakund	Occasional along river beds and on wet places	Dec-Mar
50		*Synedrella nodiflora* (L.) Gaertn.	Bangriposi, Kukurbhuka	Occasional in wet places	Sep-Feb
51	Ebenaceae	*Diospyros ferrea* (Willd.) Bakh.	Pithabata	Occasional in open valley	Mar-Jul
52	Apocynaceae	*Wrightia arborea* (Dennst.) Mabb.	Darbarmela pahad	Common in mixed deciduous forest	May-Dec
53		*Wrightia tinctoria* (Roxb.) R. Br.	Munibasa, Ghatkumari with scanty soil	Occasional in mixed deciduous forest	Apr-Dec
54	Asclepiadaceae	*Caralluma umbellata* Haw.	Darbarmela pahad	Occasional on fractured rocks	Jul-Dec
55		*Ceropegia hirsuta* Wt. & Arn.	Kaliani	Rare in moist forest	Jul-Dec
56		*Heterostemma tanjorense* Wt. & Arn.	Kasipani	Occasional in mixed deciduous forest	Nov-Feb
57		*Holostemma annulare* (Roxb.) Schum.	Ghatkumari	Occasional in moist valleys	Aug-Jan
58		*Wattakaka volubilis* (L. f.) Stapf.	Kairaburu, Dantiakocha	Common in open and mixed deciduous forest	May-Jan
59	Boraginaceae	*Coldenia procumbens* L.	Ghatkumari	Common in cultivated lands near villages	Nov-Feb
60		*Trichodesma zeylanicum* (Burm. f.) R. Br.	Kasipani	Occasional on foothills in degraded forest	Dec-May
61	Convolvulaceae	*Evolvulus alsinoides* (L.) L.	Char bandh	Common on degraded forest floor	Sep-Feb

Table1: Enumeration of additional taxa (*contd.*)

Sl. No.	Family	Name of Species	Occurrence	Distribution	Fl. & Fr./ fertile period
62		*Hewittia sublobata* (L.f.) Kuntze	Kasipani	Occasional in moist habitat in dense forest	Nov-Mar
63	Cuscutaceae	*Cuscuta reflexa* Roxb.	Kasipani	Occasional, climbing on shrubs in open areas	Nov-Feb
64	Solanaceae	*Physalis minima* L.	Kasipani	Common on foothills	Sep-Feb
65		*Solanum violaceum* Orteg.	Nigirdha	Common in open areas near habitation	Jan-May
66	Scrophulariaceae	*Bacopa monnieri* (L.) Pennell	Lulung	Occasional near water courses	May-Nov
67		*Lindernbergia muraria* (Roxb. ex D. Don) Bruhl.	Barehipani	Occasional on moist shady slopes	Oct-Feb
68		*Torenia cordifolia* Roxb.	Darbarmela pahad	Rare in damp shady places	Sep-Jan
69	Gesneriaceae	*Chirita hamosa* R. Br.	Kanthipani, Sleeping Kocha	Rare on moist moss-clad rock surface	Sep-Dec
70	Bignoniaceae	*Radermachera xylocarpa* (Roxb.) K. Schum.	Kairaburu, Ghatkumari	Rare in moist forest near stream	Mar-May
71	Martyniaceae	*Martynia annua* L.	Kasipani	Occasional in waste places near villages	Sep-Jan
72	Acanthaceae	*Blepharis maderaspatensis* B. Heyne ex Roth	Kasipani	Frequent on dry hill slopes in dry forests	Oct-Mar
73		*Eranthemum purpurascens* Nees in Wall.	Barehipani	Common in moist valleys	Sep-Jan
74		*Indoneesiella echioides* (L.) Sreemadh.	Kasipani	Common in open scrub forest	Sep-Jan
75	Verbenaceae	*Premna latifolia* Roxb.	Pithabata	Common in mixed deciduous forest	Apr-Jun
76		*Vitex negundo* L.	Nawana, Sanuski, Gurguria	Frequent on waste ground and pathways	Jul-Nov
77	Lamiaceae	*Leonotis nepetifolia* (L.) R. Br.	Pithabata	Common in forest periphery	Sep-Feb
78		*Leucas aspera* (Wild.)Link.	Kasipani	Frequent in open forest during monsoon	Jul-Jan
79		*Ocimum basilicum* L.	Sanakasira	Common in waste grounds near villages	Nov-Apr
80		*Orthosiphon pallidus* Benth.	Pithabata	Common on foothills in dry forests	Sep-Jan
81	Amaranthaceae	*Allmania nodiflora* (L.) R. Br. ex Wt.	Kasipani, Ghatkumari	Common near habitations in monsoon	Sep-Jan
82		*Amaranthus viridis* L.	Kukurbhuka, Basilakocha	Common in waste grounds and fallow lands	Aug-Dec
83		*Gomphrena celosioides* Mart.	Ghatkumari	Common in fallow lands	Oct-Jan
84		*Pupalia lappacea* (L.) Juss.	Kasipani, Barehipani	Frequent in open forests during monsoon	Sep-Dec
85	Lauraceae	*Cassytha filliformis* L.	Pithabata	Occasional in open scrub forests	Nov-Mar
86	Euphorbiaceae	*Acalypha indica* L.	Pithabata	Common in wastelands towards periphery	Sep-Jan
87		*Pachystylidium hirsutum* (Bl.) Pax & Hoffm.	Sargil nala, Nala near Ransa	Vulnerable in damp valleys along nala	Mar-May
88		*Phyllanthus amarus* Schum. & Thonn.	Kasipani	Common along forest edges	Aug-Dec
89		*Tragia involucrata* L.	Kasipani	Occasional in mixed dry deciduous forest	Dec-May
90	Moraceae	*Ficus heterophylla* L. f.	Kolha	Common along stream course in dense forest	Jan-May
91		*Ficus hispida* L. f.	Astakumar	Frequent in moist areas along forest periphery	Nov-Jun

Table1: Enumeration of additional taxa (*contd.*)

Sl. No.	Family	Name of Species	Occurrence	Distribution	Fl. & Fr./ fertile period
92		*Ficus lanceolata* (Miq.) Buch.-Ham.	Kadchapal	Occasional along streams in dense forest	Feb-Jun
93		*Ficus microcarpa* L. f.	Sarbil nala	Common in damp valleys	Nov-Apr
94		*Ficus nervosa* Heyne ex Roth.	Kadchapal	Occasional along streams in valleys	Feb-Jun
95	Urticaceae	*Elatostemma cuneatum* Wight	Nagpur pahad, Kasipani	Occasional on damp steep slopes and rocks	Nov-Dec
96		*Laportea interrrupta* (L.) Chew	San Uski	Occasional in moist shady places	Sep-Dec
97		*Pouzolzia auriculata* Wight	Kasipani, Barehipani	Occasional on moist fractured rocks/slopes	Aug-Nov
98	Zingiberaceae	*Amomum maximum* Roxb.	Dulmi pahad	Occasional near stream	Aug-Dec
99		*Curcuma zedoaria* (Christm.) Rosc.	Nigidha	Occasional on steep slopes in moist forest	Mar-Sep
100	Marantaceae	*Phrynium placentarium* (Lour.) Merr.	Sarbil nala	Occasional in damp valleys near streams	Dec-Apr
101		*Schumannianthus dichotomus* (Roxb.) Gognep.	Nala near Ransa	Occasional in marshy places along streams	Apr-Aug
102	Dioscoreaceae	*Dioscorea alata* L.	Gurguria	Occasional near settlements	Nov-Feb
103		*Dioscorea bulbifera* L.	Basilakocha, Kasipani, Nuniagada	Frequent in open moist forest	Aug-Jan
104		*Dioscorea belophylla* Voigt. ex Haines	Barehipani	Frequent in moist dense forest	Nov-Apr
105		*Dioscorea tomentosa* Koenig. ex Spreng.	Sanagandu	Occasional in moist slopes	Sep-Jan
106	Liliaceae	*Gloriosa superba* L.	Kasipani	Occasional in open scrub forest	Oct-Jan
107		*Drimia indica* (Roxb.) Jessop	Dulmi pahad, Kairaburu	Frequent on moist slopes	Mar-Jun
108	Commelinaceae	*Commelina benghalensis* L.	Kukurbhuka	Frequent in disturbed areas/ fallow lands	Oct-Dec
109		*Commelina diffusa* Burm. f.	Barehipani	Common in damp places	Sep-Dec
110		*Cyanotis fasciculata* (Roth.) Scult. & Scult.f.	Kasipani	Common on rock crevices with soil	Sep-Dec
111	Arecaceae	*Calamus viminalis* Willd. var *fasciculatus* Becc.	Chahala	Rare in damp places along stream course	Oct-Apr
112		*Caryota urens* L.	Sarbil nala	Rare in secluded damp valleys	Apr-Aug
113	Araceae	*Alocasia macrorrhizos* (L.) G. Don	Munibasa, Kanthipani	Common in damp wet places	Nov-Apr
114		*Amorphophalus paeoniifolius* var *campanulatus* (Dec.) Siv.	Kasipani	Common in forest periphery near villages	Mar-Nov
115		*Remusatia vivipara* (Roxb.)Schott	Nala near Ransa	Rare on rock crevices along dry stream	Apr
116		*Rhapidophora decursiva* (Roxb.) Schott	Misin nala near Chakundakocha	Rare, climbing on trees in damp valleys	Jun-Nov
117		*Theriophonum minutum* (Willd.) Baillon	Mayurpani, Ghatkumari	Rare in moist shady places near stream	May-Jun
118	Poaceae	*Saccharum narenga* (Nees ex Stud.) Hack.	Sargil nala	Occasional along moist valleys	Aug-Dec

recognized the region as one of the interesting spots rich in rare specimens, floristically. Panigrahi *et al.* (1964) undertook an exploration tour to Similipal during February 1958 and reported collection of 613 field numbers, belonging to 347 species. Misra (1989, 1997a, b) enumerated 94 species of orchids, of which 10 species were new record to the flora of Orissa, two were new additions for India and *Eria meghasaniensis* S. Mishra was new to science. Saxena and Brahmam (1989) made an exhaustive study on the flora of Similipal, which included findings of earlier workers and

Table 2: Comparative analysis of taxa of different plant groups

Plant groups	Earlier studies (Haines 1925; Panigrahi *et al.* 1964; Saxena and Brahmam 1989, 1994-96; Mishra 1997a,b)			Present study			Additional taxa incorporated		
	Family	Genera	Species	Family	Genera	Species	Family	Genera	Species
Pteridophytes	28	42	60	31	46	65	3	4	5
Gymnosperms	3	4	4	3	4	4	-	-	-
Dicotyledons	114	446	747	119	496	839	5	50	92
Monocotyledons	24	159	325	25	169	346	1	10	21
Total	169	651	1,136	178	715	1,254	9	64	118

observation of their field survey and recorded 1,012 species of vascular plants besides 64 species of cultivated taxa. Bal (1942) and Yoganarsimhan and Dutta (1972) have published an account of the useful plants and medicinal plants of Mayurbhanj district and Similipal forest, respectively. Later, Misra (1997a) provided an account of 52 species of rare and endangered plants of Similipal Biosphere Reserve based on field observation and reference of literature. Very little has been added thereafter regarding ethnobotany, flora of lower plants and other floristic aspects of the region.

Two decades have elapsed since Saxena and Brahmam (1989) published the floristic account of Similipal. This treatise, however, did not cover many plant species found in the core and buffer zones. Several floristically rich and economically potential localities were partly explored and a number of unreported plant species are expected to occur in such a diversified floristic region. Besides, there has been a considerable change in vegetation pattern during the last two decades, which is more likely due to biotic interferences and habitat loss/conversion of forest to agricultural lands and introduction of exotic species / aliens into the nearby valleys, which necessitated a further exploration.

Methodology

The present work is based on the results of intensive floristic survey done during 2007-2009 in different seasons, for which eight field trips were undertaken to explore the area and to observe the changes in the floristic biodiversity. The core and buffer areas have been surveyed on foot across various eco-zones and vegetation types on a tentatively trimonthly basis with increasing frequencies of visit during the monsoon to record the ground flora. Effort was made to record the species not documented earlier. Plant specimens were collected in flowering or / and fruiting stages. The specimens were brought to the centre for morphological observations and identified with the help of Saxena and Brahmam (1994-96) and other relevant literature. During the field studies, detailed notes on habit, habitat, botanical description, colour of the flower and other prominent features were recorded. The specimens were processed and a herbarium of voucher specimens prepared, checked with authenticated herbarium sheets, and deposited in the herbarium of Regional Plant Resource Centre, Bhubaneswar. In addition, photographs of many plants were taken in the field for record and thorough observation.

Results and Discussion

The aim of the present study was to record occurrence of species to supplement the flora of Similipal Biosphere Reserve and undertake a comparative analysis of existing plant species in Similipal with taxa documented earlier (Haines 1921-25; Mooney 1950; Panigrahi *et al.* 1964; Saxena and Brahmam 1989, 1994-96; Misra 1997a, b). All such additional plant species are enumerated in Table 1.

The revised assessment led to new records of 118 species from the Similipal Biosphere Reserve. These constitute 92 species of dicotyledons and 21 species of monocotyledons. Besides, new records of 5 species, 4 genera and 3 families of pteridophytes were made. The genus and species within the family follow in alphabetical sequence. A brief citation on the occurrence of species, their general distribution within the Biosphere Reserve, and flowering and fruiting time has also been provided. All the species recorded in this present enumeration are wild or naturalized. Some of the species excluded from the earlier account were collected and recorded in the present study.

A total of 9 families were added to the recorded taxa, namely Ophioglossaceae, Aspidiaceae and Nephrolepidaceae to pteridophytes; and Opiliaceae, Passifloraceae, Aizoaceae, Cuscutaceae, Martyniaceae and Marantaceae to dicotyledons and monocotyledons.

A comparative analysis of taxa of different plant groups

Table 3: Comparative list of ten dominant angiosperm families in Similipal Biosphere Reserve, Flora of Orissa, Bihar-Orissa and British-India

Order of dominance	Similipal Biosphere Reserve (Present study)	Flora of Orissa, Saxena & Brahmam, 1994-96	Bihar & Orissa Haines,1921-25 & Mooney,1950	British India J.D. Hooker,1872-97
1.	Poaceae	Poaceae	Leguminosae	Orchidaceae
2.	Orchidaceae	Fabaceae	Graminae	Leguminosae
3.	Fabaceae	Cyperaceae	Cyperaceae	Graminae
4.	Asteraceae	Orchidaceae	Asteraceae	Rubiaceae
5.	Rubiaceae	Asteraceae	Euphorbiaceae	Euphorbiaceae
6.	Euphorbiaceae	Euphorbiaceae	Acanthaceae	Acanthaceae
7.	Cyperaceae	Rubiaceae	Rubiaceae	Compositae
8.	Acanthaceae	Acanthaceae	Orchidaceae	Cyperaceae
9.	Lamiaceae	Scrophulariaceae	Labiatae	Labiatae
10.	Scrophulariaceae	Lamiaceae	Scrophulariaceae	Urticaceae

recorded from earlier studies and found in the present study is given in Table 2. The present estimate reveals that there is an increase in composition of taxa of each plant group increasing the number of species from 1,136 to 1,254, genus from 651 to 715 and family from 169 to 178. There is an overall increase of 10.4% species, 9.83% genera, and 5.32% families.

A comparative account of ten dominant angiosperm families with respect to number of species in the flora of Similipal Biosphere Reserve (present study), Orissa, Bihar and Orissa and British India is presented in Table 3. In terms of species content, Poaceae, Orchidaceae and Fabaceae occupy the first, second, and third position respectively consisting of 108, 94 and 82 species followed by Asteraceae (58 species), Rubiaceae (52), Euphorbiaceae (47), Cyperaceae (43), Acanthaceae (40), Lamiaceae (28) and Scrophulariaceae (23). The present analysis records the ratio of monocots to dicots as 1:4.76 for families, 1:2.93 for genera and 1:2.42 for species against previously recorded 1:4.75 for families, 1:2.80 for genera and 1:2.29 for species, respectively. The present ratio of family to genera to species is 1:4.02:7.04 against 1:3.85:6.72 in the previous assessment. Thus, the total species assessed in the present floristic estimate for Similipal is 1,254, which represent 46% of the flora of Orissa against previously recorded 39.45% (Saxena and Brahmam 1989).

ACKNOWLEDGEMENTS

The authors are grateful to the Ministry of Environment and Forests, Govt. of India, New Delhi, and Director, Similipal Biosphere Reserve, Baripada, for providing financial support to undertake the project. Special thanks are due to the Director, Similipal Biosphere Reserve for providing entry permission to the Reserve and logistic support during the field survey.

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Printed by Bro. Leo at St. Francis Industrial Training Institute, Borivli, Mumbai 400 103 and published on November 30, 2011 by Dr. Ashok Kothari for Bombay Natural History Society, Hornbill House, Dr. Sálim Ali Chowk, Shaheed Bhagat Singh Road, Mumbai 400 001, Maharashtra, India.

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