Floristic composition of Butwal area and its surrounding hills

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Enumeration of flowering plants were carried out in the Butwal area in order to give the general picture of its floristic composition. Altogether, 155 plants species belonging to 130 genera and 54 families, were collected and identified. The family leguminosae comprised maximum number of species, i.e., 28. *Peptadenia oudhensis*, an endangered plant was reported. Similarly, *Bauhinia scandense* was reported for the first time in western region of Nepal.

Keywords: Butwal, biodibversity, floristic composition, vegetation.

Nepal, a small Himalayan kingdom of Asia represents one of the unique geography of the world which boasts the geographic diversity ranging from the low land of Terai region (60 m. altitude) to the highest peak of the world (8848m.) within the remarkably short distance. This great range of elevation accompanied by the associated climatic variations have given rise to an amaizing diversity of flora & fauna. It abodes a large biodiversity which shares a valuable part of the global biological asset. It has been believed that around 7000 species of higher plants are present in Nepal. However, only 5400 species have been enumerated by Hara *et.al.* (1978, 1979, 1982) and 5833 by Koba *et al.* (1994). Of them, about 300 species are endangered, rare or even on the verge of extinction. The flora constitute the tropical vegetation in the low land (upto 1000m.) which gradually steps up along the altitudinal gradients forming subtropical, temperate and alpine vegetation respectively before giving way to the perennial ice. Nepal represents the confluence of both eastern and western flora which in terms of its floristic composition can be divided into three regions viz. eastern, central and western. The present study area i.e., Butwal represents the western region of the country.

Nestled in the laps of foot hills of Churia range, Butwal silently sprawls over the tropical plain. It lies at 27^0 20' N to 27^0 45' N latitudes and 83^0 10' E to 83^0 30' E longitudes in Rupandehi district. Surrounded by the hills on three sides, it resides on the bank of Tinau river which traverses right through the city. It receives the crossing point of two major highways viz., Mahendra high way and Siddhartha highway, posing itself as an only gateway to western part of the country. People of various casts, religions and sects from different parts of the country such as Palpa, Syangja, Gulmo, etc. The main city is inhabited by diverse ethnic groups mainly Brahmins, Chetris, and Newars with Gurungs, Magars and others.

The climate of the area is typically tropical dominated by south west monsoon. Generally, the hot climate prevails throughout the year except in the winter, lasting for the short period. In the summer (February - June) season, the temperature soars up to 48^o C and the minimum temperature in the winter falls down to 7^oC.

The area is considered geologically weak zone. The rocks of Churia rnage that are deposited during the process of Himalaya formation, comprise fine grained sand stone with pocket of clay, shale conglolmerate and fresh water lime stone. The water easily percolates deep down the ground rendering the upper layer remain almost dry which, however, get heavily loaded with pore water during the rainly season. Furthermore, the water of Tinau river also infiltrate sideways to the fragile rocky structure and thus had caused various catastrophic land slides in the past. In addition, the alluvial soil of the area are brownish in colour, sandy loam and alkaline in nature. Irrigated by the river, fertile plains of the southern part is agriculturally important.

From the ecological point of view, Butwal area can be regarded as ecotone, reflecting the juncture of lower sub-tropical and tropical vegetation. Present investigation deals with the enumeration of flowering plants in order to figure out the general picture of the floristic composition of Butwal area.

Methodology

Plants were collected from three different sites of the study area which were selected during the reconnaisance of the sites. The collections were made periodically from September, 1997 to April, 1998. The standard herbarium specimens were made from the plants collected, following standard methodology (Womersley, 1981) for the identification and further reference. The specimens

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were identified with the help of standard literature concerning the flora of Nepal (Hara et al., 1978, 1982). Cross checking was also done with the specimens of the type deposited in Department of Plant Resources, Herbarium Section, Godavari.

Results and discussion

Butwal area lies at the jucture of plain of Terai and Churia range which encompasses both tropical as well as subtropical regions exhibiting their corresponding floristic composition. The present investigation was mainly focussed on the flowering plants found on the hill of Churia range alongside the Tinau river and that adjascent to the southern plain. In addition, the city area was also taken into account for the enumeration of the plants; especially, that of the cultivated as well as naturally growing plants along the road side, surrounding the public open places, campus, schools etc.

Altogether 154 flowering plant species were collected and identified belonging to 130 genera and 54 families (Table 1). The family Leguminosae comprised maximum plant species (28) followed by Compositae (10), Graminae (8), Euphorbiaceae (7), Verbenaceae (6) and so on.

The forest type encountered in the area resembled the hill sal forest as described by Dinerstein (1979 a), Uprety (1994), Shrestha *et al.* (1997). The forest of the foot hill of Churia range was characterized by tree species like *Shorea robusta* associated with *Buchanania latifolia, Pouzolzia zeylanica* etc. while the species such as *Murrya koenigii, Pogostemon bengalensis* constituted the dominant shrub vegetation. Similarly *Bauhinia vahlii, Nyctanthus arbor-tristis* were found frequently interspersed amidst the shrubby layer. *Eragrostis japonica, Saccharum spontaneum, Imperata cylindrica, Desmodium triflorum, Evolvulus alsnoides, Ageratum conyzoides* etc. were found to dominate the ground vegetation. The western facing slope of the foot hills comprise thin canopy layer while it was densely covered by shrubs like *Pogostemon bengalensis* and *Murraya koenigii.* Similarly, tree species such as *Cassia fistula, Albizia chinensis, Dalbergia sissoo* were found frequently distributed alongside the river bank.

In the present study, a leguminous tree species *Peptadenia oudhensis* which is enlisted as an endangered species from the tropical region (Biswas and Chandra, 1997), was also reported from the bank of the Tinau river forming a patch of about 10-15 individuals. The tree is endangered throughout the region of its occurrence for its foliage and wood being indiscriminately exploited. Similarly, *Bauhinia scandense*, a woody climber was reported for the first time in the western Terai. *Dalbergia volubilis*, which was reported only from Koilabas area, Nepalgunj, was also reported during the present study in Butwal.

Tree species like, *Delonex regia, Cassia fistula, Saraca indica*, are found either lining up on the road side or circumscribing the public open places. Similarly, *Pithecellobium dulce, Tamarindus indica, Ficus benghalensis, Ficus religiosa* are found cultivated at places by local people. Shrubs like *Cassia tora, Cassia occidentalis, Ipomoea fistulosa* were found profusely growing along the road side.

Table 1: List of species present Burwal and its surrounding hills

S. No.	Species	Family	Common name
1	*Achyranthes aspera* L.	Amaranthaceae	Datiwan
2	*Adhatoda vasica Nees*	Acanthaceae	Asuro
3	*Adina cordifolia* (Willd) Benth. & Hook. F.	Rubiaceae	Haldu
4	*Aegle marmelos* (L.) Correa		Bel
5	*Ageratum conizoides* L.	Compositae	Ganamane hans
6	*Albizia chinensis* (Osbeck) Merr.	Leguminosae	
7	*Alternanthera sessilis* (L.) DC	Amaranthaceae	Bhiringe jhar
8	*Amaranthus viridis* L.	Amaranthaceae	
9	*Amaranthus spinosus* L.	Amaranthaceae	
10	*Annona squamata* L.	Annonaceae	
11	*Anogeissus latifolius* (Roxb) Bedd.	Combretaceae	Banjee
12	*Argemone mexicana* L.	papaveraceae	Thakal
13	*Asparagus racemosus* Willd.	Liliaceae	Kurilo
14	*Atylosia scarabaeoides* (L.) Benth.	Leguminosae	
15	*Azadirachta indica* A. Jees.	Meliaceae	Neem
16	*Bauhinia purpurea* L.	Leguminosae	Koiralo
17	*Bauhinia scandense*	Leguminosae	Nagbeli
18	*Bauhinia vahlii* Weight & Arn.	Leguminosae	Bhorla

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19	*Bidens pilosa* (L.) Hook. F.	Compositae	Kuro
20	*Blumea sp.*	Compositae	Kukure
21	*Boehmeria platyphylla* D. Don	Urticaceae	
22	*Boerhaavia diffusa* L.	Nyctaginaceae	Lal punarnava
23	*Bombax ceiba* L.	Leguminosae	Simal
24	*Brachiaria distachya*	Graminae	
25	*Buchanania latifolia* Rosb.	Anacardiaceae	Piyari
26	*Butea minor* Buch. -Ham.ex Baker	Leguminosae	
27	*Catotropis gigantea* (L.) Dryander	Asclepiadaceae	Aank
28	*Cannabis sativa*	Cannabinaceae	Ganja
29	*Carex sp.*	Cyperaceae	
30	*Cassia fistula* L.	Leguminosae	Rajbriksha
31	*Cassia occidentalis* L.	Leguminosae	Thulo tapre
32	*Cassia tora* L.	Leguminosae	Tapre
33	*Centaurium ramosissmum*	Gentianaceae	
34	*Centella asiatica* (L.) Urb.	Umbelliferae	Ghod tapre
35	*Chenopodium album* L.	Chenopodiaceae	Bethe
36	*Cissamplus parai*	Leguminosae	
37	*Clausena excavata* Burm. F.	Rutaceae	
38	*Clausena heterophylla* (Roxb.) Wight & Arn.	Rutaceae	
39	*Cleome viscosa* L.	Capparidaceae	
40	*Clerodendrum indicum* (L.) Kuntze	Verbenaceae	
41	*Clerodendrum infortunatum* Gaertn.	Verbenaceae	Chitu
42	*Colebrookea oppositifolia* (Roxb.) DC.	Labiatae	Dhusero
43	*Compylotropis macrostyla* (D.Don) Lindl. Ex Miq	Leguminosae	
44	*Crassocephalum crepidioides* (Benth.) S. Moore	Compositae	
45	*Crotalaria pallida* Ait.	Leguminosae	
46	*Crotolaria albida* Heyne ex Roth.	Leguminosae	Bhindi phool
47	*Crotolaria mucronata* Desv. Inj.	Leguminosae	
48	*Cryptolepis buchanani* Roem.et. Schult.	Asclepiadaceae	
49	*Cycas sp.*	Cycadaceae	
50	*Cynodon dactylon* (L.) Pers.	Graminae	Dubo
51	*Cyperus brevifolium*	Cyperaceae	Mothe
52	*Cyperus killinga*	Cyperaceae	Mothe
53	*Dalbergia latifolia* Roxb.	*Leguminosae*	Satisal
54	*Dalbergia sissoo* Roxb.ex DC.	*Leguminosae*	Sisau
55	*Dalbergia volubilis* Roxb.	*Leguminosae*	
56	*Debregeasia longifolia*	*Leguminosae*	
57	*Delonex regia* (Bojer ex Hook.) Ratin.	*Leguminosae*	Gulmohar
58	*Dendrolobium triangulare* (Retz.) Schinde	*Leguminosae*	
59	*Desmodium pulchellum*	*Leguminosae*	
60	*Desmodium triflorum* (L.) DC.	*Leguminosae*	Bute kanike
61	*Dhatura stramonium L.*	*Solanacease*	Dhaturo
62	*Didymocarpus leucocalyx C.B. Clerke*	*Gesneriaceae*	
63	*Digitaria ciliaris*	*Graminae*	
64	*Dioscoria sp.*	*Dioscoreaceae*	Ban gittha
65	*Eclipta prostrata* L.	*Compositae*	Bhangeree
66	*Ehretia laevis* Roxb.	*Cordiaceae*	
67	*Eragrostis japonica* (Thumb) Trin.	*Graminae*	
68	*Eranthemum pulchellum* Andrew	*Acanthaceae*	
69	*Eucalyptus sp.*	*Myrtaceae*	Masala
70	*Euphorbia hirta* L.	*Euphorbiaceae*	Dudhe jhar
71	*Euphorbia parviflora*	*Euphorbiaceae*	
72	*Euphorbia pulcherima* Willd.ex Klotzsch	*Euphorbiaceae*	Lalu pate
73	*Evolvulus alsnoides* (L.) L.	*Convolvulaceae*	Sankh puspi
74	*Ficus benghalensis* L.	*Moraceae*	Bar

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75	*Ficus benjamina* L.	*Moraceae*	Sami
76	*Ficus religiosa* L.	*Moraceae*	Pipal
77	*Ficus semicordata*	*Moraceae*	Khanayao
78	*Flemingia macrophylla* (Willd.) Merr.	*Leguminosae*	Bhatwasi
79	*Galinsoga parviflora* Cav.CC.Descr. Pl.	*Compositae*	Gandhe jhar
80	*Gnaphalium polycaulon*	*Compositae*	Buke jhar
81	*Grewia asiatica* Auct. Non L. Wall.	*Tiliaceae*	Syal fusre
82	*Gynura crepidiodes* Benth.	*Compositae*	
83	*Heliotropiumm indicum* L.	*Boraginaceae*	Mriga raj
84	*Hemigraphis hirta* (Vahl.) Nees	*Acanthaceae*	
85	*Holeptila sp.*	*?*	
86	*Holmskioldia sanguinea*	*Verbenaceae*	
87	*Hydrocotyle nepalensis* Hook.	*Umbelliferae*	Ghod tapre
88	*Hyptis suaveolens* (L.) Poit	*Compositae*	
89	*Imperata cylindrica*	*Cyperaceae*	Siru
90	*Ipomoea fistulosa*	*Convolvulaceae*	Besharma
91	*Jasminum dispermum* Wallich	*Oleaceae*	
92	*Kirganellia reticulata* (Poir) Baill	*Euphorbiaceae*	
93	*Leea robusta* auct.non Roxb.	*Leeaceae*	
94	*Lindenbergia indica* (L.)	*Scrophulariaceae*	Bagh mukhe ghans
95	*Lippia nudiflora* (L.) Rich	*Verbenaceae*	
96	*Majus pumilus* (Burm. F.) Van Steenis	*Scrophulariaceae*	Malati jhar
97	*Mallotus philippinensis* Muell.-Arg.	*Euphorbiaceae*	Sindure
98	*Maytenus ovata* (Walp.) Loesen	*Celastraceae*	
99	*Melotheria heterophyla*	*Cucurbitaceae*	
100	*Miliusa relutina* (Dunal) Hook. F. & Thoms.	*Annonaceae*	
101	*Mimosa pudica*	*Leguminosae*	Buhari jhar
102	*Mirabilis jalapa* L.	*Nyctaginaceae*	
103	*Murrya koenigii* (L.) Spreng.	*Rutaceae*	Kari patta
104	*Nerium indicum* Miller	*Apocynaceae*	Pahenlo karbir
105	*Nyctanthus arbor-tristis* L.	*Oleaceae*	Parijat phool
106	*Orthosiphon incurvus* Benth.in Wall.	*Labiatae*	
107	*Oxalis corniculata* L.	*Oxalidaceae*	Chari amilo
108	*Panicum distachyon.* L.	*Graminae*	
109	*Paspalidium flavidum* (Retz.) A.	*Graminae*	
110	*Pavetta tomentosa* Roxb.ex Smith	*Rubiaceae*	
111	*Peptadenia oudhensis* Brandis	*Leguminosae*	
112	*Persicaria barbata* (L.) Hara	*Polygonaceae*	Pire jhar
113	*Persicaria capitata* (Buch.-Ham.ex D.Don) H. Grass		
114	*Persicaria hydropiper* (L.) Spuch	*Polygonaceae*	Roto pire jhar
115	*Phoenix sp.*	*Palmaceae*	
116	*Phyllanthus niruri* L.	*Euphorbiaceae*	
117	*Pinus roxburghii* Sarg.	*Pinaceae*	Khote sallo
118	*Pithecellobium dulce* (Roxb.) Benth.	*Leguminosae*	Julebi
119	*Pogostemon bengalensis* (Burm.F.) Kuntze	*Libiatae*	Rudilo
120	*Polygonum plebejum* R. Br. Prodr.FL.	*Polygonaceae*	Masino pirhe
121	*Pouzolzia zeylanica* (L.) J. Bennett & Brown		
122	*Ranunculus sceleratus* L.	*Ranunculaceae*	Nakkore jhar
123	*Ricinus communis* L.	*Euphorbiaceae*	Adir
124	*Rorippa dubia* (Persoon) Hera	*Cruciferae*	
125	*Rubus ellipticus* Smith	*Rosaceae*	Ainselu
126	*Rungia himalyensis*	*Acanthaceae*	Pindee
127	*Saccharum spontaneum* L.	*Graminae*	Dhaddi
128	*Saraca indica* auct. Non L. Beddome	*Leguminosae*	Ashok

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129	*Sauraria nepaulensis* DC.	*Saurariacease*	
130	*Schleichera oleosa* (Lour.) Oken	*Sapindaceae*	Kusum
131	*Scoparia duleis* L.	*Scrophulariaceae*	
132	*Semicarpus anacardium* L.	*Anacardiaceae*	Bhalayo
133	*Shorea robusta* Gaertn.	*Dipteracarpaceae*	Sal
134	*Sida cordata* (Burm f.) Borss.	*Malvaceae*	
135	*Sizyzium cumini* (L.) Skeels	*Myrtaceae*	Jamun
136	*Smilax ovalifolia*	*Liliaceae*	
137	*Solanum nigrum* L.	*Solanaceae*	Bihin
138	*Solanum surattense* Burm. F.	*Solanaceae*	Kantakari
139	*Stellaria media* (L.) Vill	*Caryophyllaceae*	Boksi jhar
140	*Swertia chiraita* (Roxb.) Karsten	*Gentianaceae*	Chiraito
141	*Tamarindus indica* L.	*Leguminosae*	Imli
142	*Tectona grandis*	*Verbenaceae*	
143	*Terminalia alata* Heyne.ex Roth	*Combretaceae*	Asna
144	*Terminalia belerica* (Gaertn.) Roxb.	*Combretaceae*	Barro
145	*Thespesia lampas* (Cav.) Dalz & Gibs	*Malvaceae*	Ban kapas
146	*Thysanolaena maxima* (Roxb.) Kuntze	*Graminae*	Amriso
147	*Torenia diffusa*	*Scrophulariaceae*	
148	*Tridax procumbens* L.	*Compositae*	Husure jhar
149	*Urena lobata.* L.	*Malvaceae*	Nalu kuro
150	*Urtica dioica* L.	*Urticaceae*	Sisnu
151	*Vernonia cinerea* (L.) Less	*Compositae*	
152	*Veronica cana* Wall ex Benth	*Scrophulariaceae*	
153	*Vitex negundo* L.	*Verbenaceae*	Simali
154	*Wendlandia exserta* (Roxb.) DC.	*Rubiaceae*	
155	*Zizyphus sp.*	*Rhamnaceae*	Bayar

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