

Checklist of pasture species at Biratnagar, Eastern Nepal

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Abstract

Pasture species of Biratnagar area were seasonally observed during 2018. A total of 77 species including monocot grasses (27) nonlegumes forbs (43), and legumes (7) were recorded. Seasonally, summer had maximum number of species (73), followed by rainy (64 species) and winter (53 species). Occasional and scarce native grasses were replaced by unpalatable and invasive species. *Desmostachya bipinnata* (graminoid) and *Indigofera linifolia* (legume) were the scarcely found species.

Keywords: Grasses, invasive species, legumes, scarce, unpalatable

Introduction

Pasture is a herbaceous community of graminoids and forbs dominated by graminoid herbs. It is a naturally occurring community of grasses established as a result of climate, soil type and biota. Increased grazing, drought or altitude tends to increase the percentage of forbs (Jha, 2006). Pastures are rich in biodiversity which provides ecosystem goods and services to local people and forms important genetic resources for future use. The present study was undertaken to document the year-round species composition of the pastures occurring adjacent to PG Campus Biratnagar.

Materials and Methods

Study area

Biratnagar (Lat. 26°23'10''- 26°30'49''N; Long. 87°23'10''-87°18'29''E; alt. 72 m) lies in Morang district of eastern Nepal. The pastures are under stress due to haphazard urbanization and invasion by alien species. The sites have alluvial soil, tropical monsoonic climate with three distinct seasons, viz., winter (November-February); summer (March-June) and rainy (July-October) in a year. The average rainfall is 1312 mm, and average annual minimum and maximum temperatures are 14.2 and 30.6°C, respectively.

Plants were observed and collected monthly throughout the year 2018 and they were identified using herbaria and standard literature (Siwakoti & Verma, 1999; Press *et al.*, 2000, Jha *et al.*, 2011; Rajbhandary & Rai, 2017). Occurrence was determined as abundant (++++), frequent (+++), occasional (++) and scarce (+) based on observation. Specimens were deposited in the regional herbarium, Department of Botany, T.U., Biratnagar, Nepal.

Results and Discussion

A total of 77 species including monocot grasses (27) dicot nonlegumes forbs (43), and legumes (7) were recorded in pasture of Biratnagar (Table 1). In the present study number

of species was highest in summer (73 species), followed by rainy (64 species) and winter (53 species) (Table 2). *Axonopus compressus* and *Chrysopogon aciculatus* were abundant; *Alternanthera sessilis*, *Blumea lacera*, *Croton bonplandianus*, *Cynodon dactylon*, *Cyperus rotundus*, *Desmodium triflorum*, *Evolvulus numularious*, *Imperata cylindrica*, *Kyllinga brevifolia*, *Mikania micrantha*, and *Paspalum scrobiculatum* were frequent species. Occasional (*Alysicarpus vaginalis*, *Paspalum distichum*, *Hemarthria compressa*, *Sporobolus diander* *Vetiveria zizanioides*) and scarce (*Desmostachya bipinnata*, *Indigofera linifolia*). Palatable grasses and legumes for cattle were observed to be replaced by unpalatable and invasive species. *Ageratum conyzoides*, *Cassia occidentalis*, *C. sophera*, *C. tora*, *Croton bonplandianum*, *Mikania micrantha*, *Mimosa pudica*, *Oxalis latifolia*, *Parthenium hysterophorus* and *Xanthium strumarium* were invasive species. *Blumea lacera*, *Clerodendron infortunatum*, *Euphorbia hirta*, *E. parviflora* and *Hemigraphis hirta* were unpalatable.

Table 1. Enumeration of pasture species at Biratnagar (* invasive weeds)

S.N.	Plant species	Local name	Family
Dicots			
A. Non legume forbs			
1.	<i>Achyranthes aspera</i> L.	Apamarga	Amaranthaceae
2.	<i>Aerva sanguinolenta</i> (L.) Blume	-	Asteraceae
3.	* <i>Ageratum conyzoides</i> L.	Ilamejhaar/Gandhaki	Asteraceae
4.	<i>Alternanthera sessilis</i> (L.) DC.	Saraunchi	Amaranthaceae
5.	* <i>Amaranthus tricolor</i> L.	Lunde jhaar	Amaranthaceae
6.	<i>Blumea lacera</i> (Brum. f.) DC.	Gande jhaar	Asteraceae
7.	<i>Breea arvensis</i> (L.) Less	Gaidakande	Asteraceae
8.	<i>Centella asiatica</i> (L.) Urb.	Ghodtapre	Apiaceae
9.	<i>Centipeda minima</i> (L.) A. Braun & Asch.	Chiunka jhaar	Asteraceae
10.	<i>Clerodendron infortunatum</i> L.	Bhaanti	Verbenaceae
11.	<i>Crepis japonica</i> (L.) Benth	-	Asteraceae
12.	* <i>Croton bonplandianus</i> Baill	Khorsane jhaar	Euphorbiaceae
13.	<i>Eclipta prostrata</i> (L.) L.	Bhringaraj	Asteraceae
14.	<i>Euphorbia hirta</i> L.	Dudhe jhaar	Euphorbiaceae
15.	<i>Euphorbia parviflora</i> L.	Dudhe jhaar	Euphorbiaceae
16.	<i>Evolvulus numularious</i> (L.)	Kodejhaar	Convolvulaceae
17.	<i>Gnaphalium affine</i> D.DON	Bukijhaar	Asteraceae
18.	<i>Hedyotis corymbosa</i> (L.) Lam	-	Rubiaceae
19.	<i>Hemigraphis hirta</i> (Vahl) T. Anders	Jhusejhaar	Acanthaceae
20.	<i>Hygrophila polysperma</i> (Roxb.) T. Anders	-	Acanthaceae
21.	<i>Ixis polycephala</i> Cass.	Dudhejhaar	Asteraceae
22.	<i>Justicia procumbens</i> L., var. <i>simplex</i> (D. Don)	-	Acanthaceae
23.	<i>Leucas indica</i> (L.) R.Br. ex. Vatke	Dronapushpi	Lamiaceae
24.	<i>Lindernia oppositifolia</i> (L.) Mukurjee	-	Scrophulariaceae
25.	<i>Lippia nodiflora</i> (L.) Rich.	-	Verbenaceae
26.	<i>Majus pumilus</i> (Brum. f.) Van Steenis	Malatijhaar	Scrophulariaceae

27. <i>Mecardonia procumbens</i> (Mill.) small	-	Scrophulariaceae
28. * <i>Mikania micrantha</i> Kunth	Laharebanmara	Asteraceae
29. <i>Nicotiana plumbaginifolia</i> Viv.	Bansurti	Solanaceae
30. <i>Oxalis corniculatan</i> L.	Chariamilo	Oxalidaceae
31. * <i>Oxalis latifolia</i> L.	Chariamile	Oxalidaceae
32. * <i>Parthenium hysterophorus</i> L.	Kanike ghaans	Asteraceae
33. <i>Physalis peruviana</i> L.	Musakojaand	Solanaceae
34. <i>Polygonum pleibium</i> R.Br.	Sukuljhaar	Polygonaceae
35. <i>Salvia plebia</i> R. Br.	Ban tulsi	Lamiaceae
36. <i>Scuparia dulcis</i> (L.)	Baghejhaar	Caryophyllaceae
37. <i>Senecio ramosus</i> Wall. ex. DC.	-	Asteraceae
38. <i>Sida rhombifolia</i> L.	Khareto	Malvaceae
39. <i>Solanum nigrum</i> L.	Bhutka	Solanaceae
40. <i>Sonchus asper</i> (L.) Hill	Dudhe	Asteraceae
41. <i>Tridax procumbens</i> L.	Susumu jhaar	Asteraceae
42. <i>Veronia cinerea</i> (L.)	-	Asteraceae
43. * <i>Xanthium strumarium</i> L.	Bhede kurro	Asteraceae
B. Legumes		
44. <i>Alysicarpus vaginalis</i> (L.) DC.	Chandre ghans	Fabaceae
45. * <i>Cassia occidentalis</i> (L.)	Tapre	Fabaceae
46. * <i>C. sophera</i> L.	Tapre	Fabaceae
47. * <i>C. tora</i> L.	Tapre	Fabaceae
48. <i>Desmodium triflorum</i> (L.) DC	Bam methi	Fabaceae
49. <i>Indigofera linifolia</i> (L. f.) Retz.	-	Fabaceae
50. * <i>Mimosa pudica</i> L.	Lajawati	Fabaceae
Monocots		
Grasses		
51. <i>Axonopus compressus</i> (Swartz.) Beauvois	Hade dubo	Poaceae
52. <i>Brachiaria villosa</i> (Lam.)	-	Poaceae
53. <i>Chrysopogon aciculatus</i> (Retz.) Trin	Kuro	Poaceae
54. <i>C. zizanioides</i> (L.) Nash	Khus-Khus	Poaceae
55. <i>Commelina benghalensis</i> L.	Kaanejhaar	Commelinaceae
56. <i>Cynodon dactylon</i> (L.) Pers	Dubo	Poaceae
57. <i>Cyperus rotundus</i> L.	Mothe	Cyperaceae
58. <i>Desmostachya bipinnata</i> (L.) Stapf	Kush	Poaceae
59. <i>Dicanthium annulatum</i> (Forsk.) Stapf	-	Poaceae
60. <i>D. caricosum</i> (L.) A. Camus	-	Poaceae
61. <i>Digitaria setigera</i> Roth ex R and S	Banso	Poaceae
62. <i>Echinochloa colona</i> (L.) Link	Samo	Poaceae
63. <i>Eleusine indica</i> (L.) Gaertn.	Ban kodo	Poaceae
64. <i>Eragrostis unioides</i> (Retz.) Nees ex Steud	Banso	Poaceae
65. <i>Eriocaulon virede</i> Korn	Buche jhaar	Eriocaulaceae
66. <i>Fimbristylis mileacea</i> (L.) Vahl	Mothe	Cyperaceae

67.	<i>Hemarthria compressa</i> (L. f.) R.Br.	Ghode dubo	Poaceae
68.	<i>Imperata cylindrica</i> (L.) Beauvois	Siru	Poaceae
69.	<i>Kyllinga brevifolia</i> Rottb.	Mothe	Cyperaceae
70.	<i>Leptochloa chinensis</i> (L.) Nees	-	Poaceae
71.	<i>Murdannia nudiflora</i> (L.) Brenan	Masino kande	Commelinaceae
72.	<i>Oplismenus burmanii</i> (Retz.) P. Beauv.	-	Poaceae
73.	<i>Paspalum scrobiculatum</i> L.	Banso	Poaceae
74.	<i>P. distichum</i> L.	Banso	Poaceae
75.	<i>Saccharum spontaneum</i> L.	Kansh	Poaceae
76.	<i>Setaria pallidifusca</i> (Schmach)	Ghoge banso	Poaceae
77.	<i>Sporobolus diander</i> (Retz.) Beauvois	-	Poaceae

Table 2. Seasonal occurrence and availability of pasture species at Biratnagar (W = winter, S = summer, R = rainy; +++++ = abundant, +++ = frequent, ++ = occasional, + = scarce)

S.N.	Plant species	W	S	R	Availability
1.	<i>Achyranthes aspera</i>	+	+	+	++
2.	<i>Aerva sanguinolenta</i>	+	+	-	++
3.	<i>Ageratum conyzoides</i>	+	+	+	++
4.	<i>Alternanthera sessilis</i>	+	+	+	+++
5.	<i>Alysicarpus vaginalis</i>	+	+	+	++
6.	<i>Amaranthus tricolor</i>	+	-	+	++
7.	<i>Axonopus compressus</i>	+	+	+	+++++
8.	<i>Blumea lacera</i>	+	+	-	+++
9.	<i>Brachiaria villosa</i>	+	+	+	++
10.	<i>Breea arvensis</i>	+	+	-	++
11.	<i>Cassia occidentalis</i>	-	+	+	++
12.	<i>C. sophera</i>	+	+	+	++
13.	<i>C. tora</i>	+	+	+	++
14.	<i>Centella asiatica</i>	+	+	+	++
15.	<i>Centipeda minima</i>	-	+	+	+
16.	<i>Chrysopogon aciculatus</i>	+	+	+	+++++
17.	<i>C. zizanioides</i>	+	+	+	++
18.	<i>Clerodendron infortunatum</i>	+	+	+	++
19.	<i>Commelina benghalensis</i>	+	+	+	++
20.	<i>Crepis japonica</i>	+	+	-	++
21.	<i>Croton bonplandianus</i>	+	+	+	+++
22.	<i>Cynodon dactylon</i>	+	+	+	+++
23.	<i>Cyperus rotundus</i>	-	+	+	+++
24.	<i>Desmodium triflorum</i>	+	+	+	+++
25.	<i>Desmostachya bipinnata</i>	+	+	+	+
26.	<i>Dicanthium annulatum</i>	+	+	+	++
27.	<i>D. caricosum</i>	+	+	+	++
28.	<i>Digitaria setigera</i>	-	+	+	++
29.	<i>Echinochloa colona</i>	-	-	+	++
30.	<i>Eclipta prostrata</i>	+	+	+	++
31.	<i>Eleusine indica</i>	+	+	+	++

32.	<i>Eragrostis unioides</i>	+	+	+	++
33.	<i>Eriocalon viride</i>	-	-	+	++
34.	<i>Euphorbia hirta</i> L.	+	+	-	++
35.	<i>E. parviflora</i>	+	+	-	++
36.	<i>Evolvulus numularious</i>	+	+	+	+++
37.	<i>Fimbristylis mileacea</i>	-	+	+	++
38.	<i>Gnaphalium affine</i>	-	+	+	++
39.	<i>Hedyotis corymbosa</i>	-	+	+	++
40.	<i>Hemarthria compressa</i>	+	+	+	++
41.	<i>Hemigraphis hirta</i>	+	+	+	++
42.	<i>Hygrophila polysperma</i>	-	+	+	++
43.	<i>Imperata cylindrica</i>	+	+	+	+++
44.	<i>Indigofera linifolia</i>	+	+	-	+
45.	<i>Ixeris polycephala</i>	+	+	-	++
46.	<i>Justicia procumbens</i>	+	+	+	++
47.	<i>Kyllinga brevifolia</i>	+	+	+	+++
48.	<i>Leptochloa chinensis</i>	-	+	+	+
49.	<i>Leucas indica</i>	+	+	-	++
50.	<i>Lindernia parviflora</i>	-	+	+	++
51.	<i>Lippia nodiflora</i>	+	+	-	++
52.	<i>Majus pumilus</i>	-	+	+	++
53.	<i>Mecardonia procumbens</i>	+	+	+	++
54.	<i>Mikania micrantha</i>	+	+	+	+++
55.	<i>Mimosa pudica</i>	+	+	+	++
56.	<i>Murdania nudiflora</i>	-	-	+	++
57.	<i>Nicotinia plumbaginifolia</i>	-	+	-	++
58.	<i>Oplismenus burmanii</i>	-	+	+	++
59.	<i>Oxalis corniculatus</i>	+	+	+	++
60.	<i>O. latifolia</i>	+	+	-	+
61.	<i>Parthenium hysterophorus</i>	+	+	+	++
62.	<i>Paspalum scrobiculatum</i>	+	+	+	+++
63.	<i>Paspalum distichum</i>	-	+	+	++
64.	<i>Physalis peruviana</i>	-	+	+	+
65.	<i>Polygonum pleibium</i>	+	+	-	++
66.	<i>Saccharum spontaneum</i>	+	+	+	++
67.	<i>Salvia plebia</i>	-	+	+	+
68.	<i>Scuparia dulcis</i>	+	+	+	++
69.	<i>Senecio ramosus</i>	-	+	+	++
70.	<i>Setaria pallidefusca</i>	-	+	+	++
71.	<i>Sida rhombifolia</i>	+	+	+	++
72.	<i>Solanum nigrum</i>	+	+	+	++
73.	<i>Sonchus asper</i>	-	+	+	++
74.	<i>Sporobolus diander</i>	+	+	+	++
75.	<i>Tridax procumbens</i>	-	+	+	++
76.	<i>Veronia cinerea</i>	+	+	+	++
77.	* <i>Xanthium strumarium</i>	-	+	+	+

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