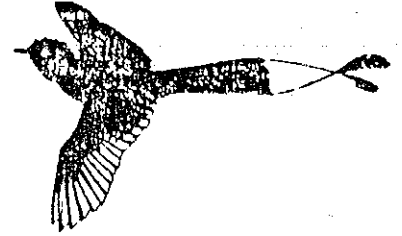




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ABOVEGROUND HERBLAYER PRODUCTIVITY
UNDER DIFFERENT LANDUSE SYSTEMS
IN UTTARA KANNADA DISTRICT OF
KARNATAKA

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INTRODUCTION

Forests contribute an inexhaustible resource provided they are allowed to renew themselves. Various factors have contributed to the destruction of our forests. Shifting cultivation, overgrazing, forest fires and diversion of forest lands for agriculture have been some of the traditional causes of loss in the extent of the forest cover. In Uttara Kannada district clearing, burning and sowing in forest is practiced in order to clear the over head cover, so as to enable the grass to grow more abundantly. The villagers maintain large number of live stock (with density of 0.49/ha) primarily cattle (77 percent) and buffaloes (19 percent) with the practice of free range grazing on the hilly tracts. The traditional horticulture and agriculture of the district heavily relies on the use of leaf manure and mulch collected from the tree clad hill areas adjacent to the cultivated valleys. Because of the over exploitation of tree cover and heavy grazing of shrub and herblayer, there is great impact upon the herb-layer productivity. So the present study aims at understanding of "above ground" herblayer productivity under different land use systems in Uttara Kannada district.

STUDY LOCALITY

The studies are conducted in Sirsi and Kumta taluks of Uttara Kannada district-(latitude 13.5°- 15-31' N; longitude 74.9° - 75.10'E) of Karnataka (fig.1). Geologically it is a transitional zone between the younger basaltic rocks of Deccan trap formation and older crystalline rocks of the Archean shield of Indian peninsula. The district of Uttara Kannada is composed of

gently undulating hills running all the way to the sea to the west and merging with Deccan plateau to the east (Technical report -2). The total annual rainfall of the district is on an average 2750mm, highest in the coastal belt and in the ghat region and decreases to the east of the ghat (Technical report -9). The natural vegetation ranges from evergreen through dry deciduous type (Technical report -2).

SAMPLING SITES

The sampling sites have been selected to estimate the above ground herb layer productivity considering different kinds of land uses, such as reserve forest (R.F.), minor forest (M.F.) and seasonal rocky habitats. All these habitats are subject to grazing and accessible to man. The representative sites from upghat and coastal areas are chosen for minor and reserve forests and seasonal habitats are selected only in coastal belt. (Table I and Fig. 2). Incidence of fire, regeneration capacity, density of shrub and tree layer are the other aspects which have been given due care while selecting the sampling sites.

SAMPLING METHOD

The study plots are visited at monthly intervals from June to February and herb layer is clipped to the ground level from twenty randomly selected quadrats of 50 cm x 50cm, which are located in one hectare. The clipped material is sorted into different species and other categories and it is oven dried to constant weight. The litter is avoided while recent dead tissues are collected and if such tissues are identifiable, they are added to the concerned species, otherwise they are considered under separate category - "standing dead".

LACUNAE IN THE DATA BASE

Clipping in some of the coastal areas are late by two months. Clipping at Mirzan is disrupted due to fire.

RESULTS

Table two give the total monthly standing biomass of various sampling sites.

Among the upghat sites they can be ranked as--

Sugavi-Bonglo ² > Phairumbo ² > Bidralli ² > Sonda ²
36.61g/m 34.31 g/m 32.70 g/m 6.02 g/m (table -3)

Among the coastal area

Nagur cross ² > Divigihat ² > Mirzan ²
134.0939 g/m 74.8673 g/m 31.9320 g/m

Chandavar ² > Santagal ² > Nagur ²
22.9560 g/m 17.8058 g/m 13.9704 g/m (table-4)

If the productivity is taken from the view point of land use patterns it can be ranked as follows.

Seasonal habitats > Minor forests > Reserve forests

(Table 2)

The peak biomass attainment of different groups varies. Table 5 gives the peak biomass of various groups and the month it is attained for various sampling sites.

DISCUSSION

The land categorization like reserve forest, minor forest has some relevance with the herb layer productivity. Reserve forest with high density (Table.1) of the trees and shrubs have fairly good canopy coverage and hence the availability of light to herb layer is mainly controlled. So under such systems tree and shrub

Samplings only constitute the major components of the herb layer (Tables 6,7,8,9). So the seasonals are limited and the damage by grazing is more to the tree shrub seedlings and the juveniles. But it is other way with the minor forests (Tables 10,11,12,13) as they have to meet the local needs like fodder, fuel, mulch and small timber, the canopy opening is quite high which facilitates the herb layer to come up. It is evidenced by all the minor forests and also the seasonal habitats (Table 14,15). But for the seasonal habitats the productivity is quite high because of seasonal herbs mainly the grasses (Table 14 and 15).

The peak biomass attainment of different groups varied plot to plot and group to group (table 5) and it is because of the canopy cover, tree and shrub densities and also because of moisture holding capacity of the habitat. In case of coastal areas as the soil is of laterite origin and with laterite floor because of greater porosity the physical conditions are unfavourable for the plants. So with the available water and the soil condition the plants/groups attain peak biomass quickly as in case of Divigihat, Nagur cross and Hirzan areas. But in up-ghat areas and other areas like Santgal and Nagur and Chanlavar, because of good soil status and fairly good canopy coverage, the attainment of peak biomass shows a postponement tendency (Table 5). As soon as the rain recedes in September the plant groups attain peak biomass and also the total month biomass is also high during that period. Receding of the rain enhances the standing dead (Table 12,14 and 15).

CONCLUSIONS:--

1. Density of tree layer and shrub layer determines the above ground herb layer productivity in total.
2. The tendency of post-ponement of peak biomass attainment is dependent upon the physical factors like moisture holding capacity of the soil, soil status and the rainfall.
3. Accessibility of the forest to the man and animals has greater influence on the productivity of the above ground herb layer.
4. Seasonal habitats are more productive than the minor forests and reserve and reserve forests.

ACKNOWLEDGEMENTS:

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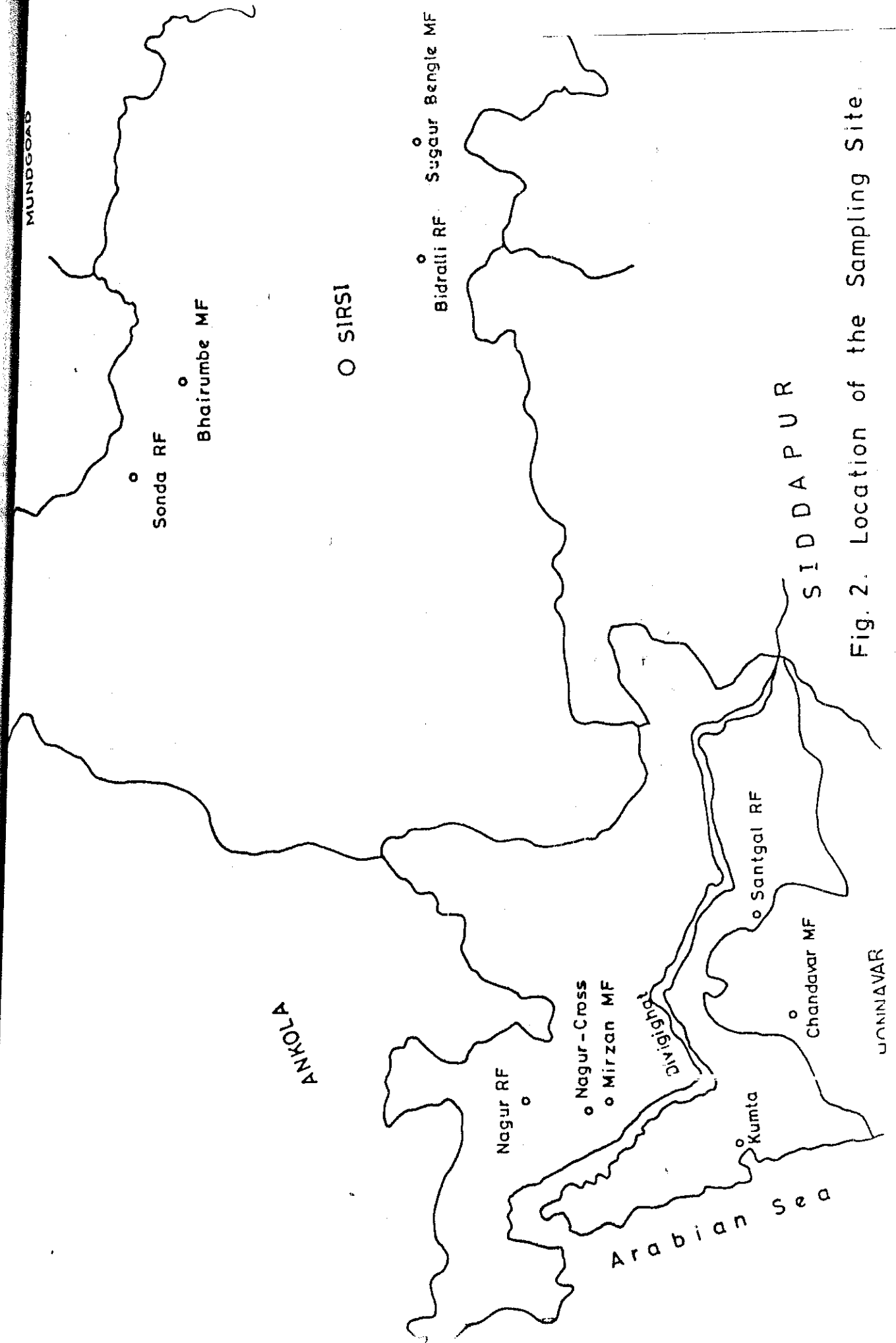
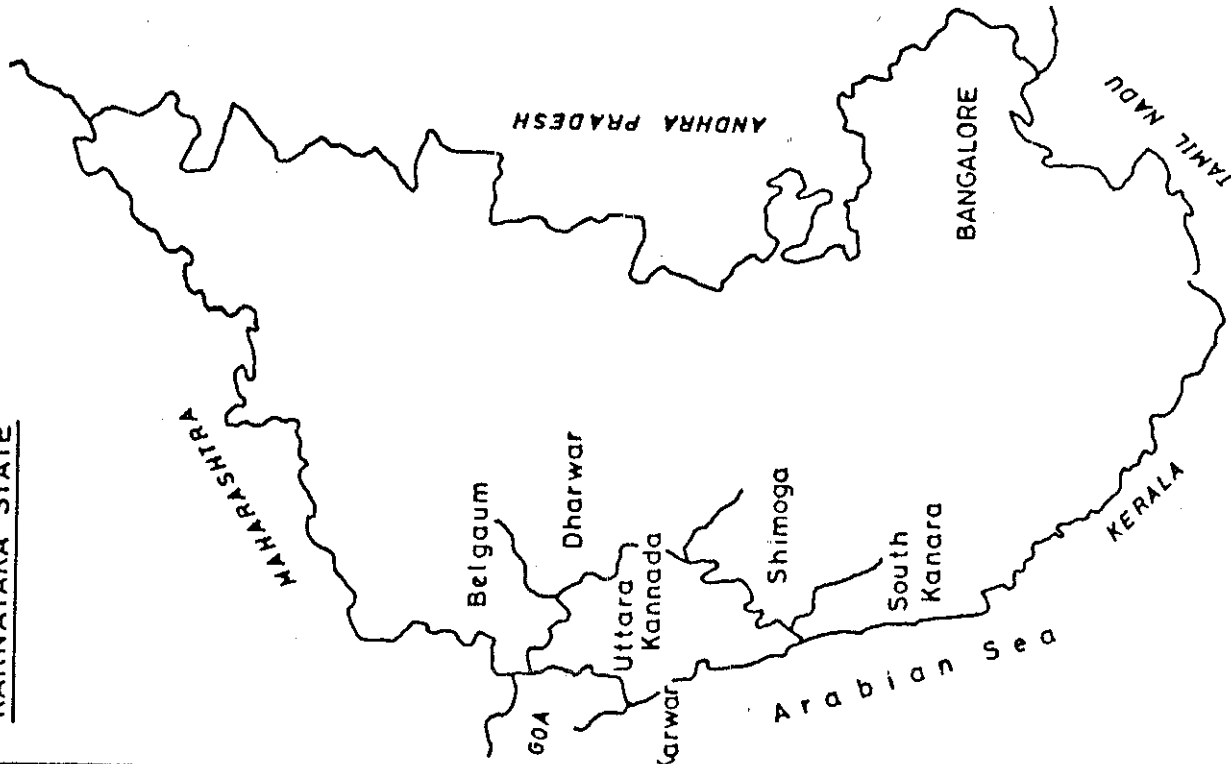


Fig. 2. Location of the Sampling Site.

KARNATAKA STATE



UTTARA KANNADA DISTRICT

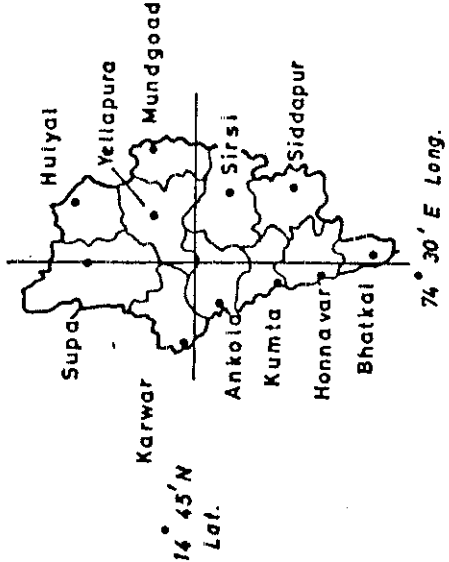


TABLE: 1.

Location	Coastal areas	Land category	Management	Species richness i.e., No. of species in tree layer shrub la- yer	Density i.e. No. of individuals in tree in shrub layer	Physiognomy vegetation	
Bidaralli	--	Reserve Forest	Forest Dept.	32	43	306	6,56,700
Sonda	-	-do-	-do-	51	61	692	3,54,400
3. Nagur		-do-	-do-	58	-63	1619	4,44,600
4. Santgal		-do-	-do-	63	39	964	1,14,900
5. Chandavar		Minor forest	Forest Dept. allowed for village community use	47	60	580	4,70,100
6. Mirzan		-do-	-do-	39	40	312	1,51,800
Bhairumbe		-do-	-do-	46	42	415	1,27,000
Sugavi- Bengle		-do-	-do-	34	68	405	6,15,900
9. Divigi Chat		Seasonal rocky habitat	Forest Dept. open area	--	--	--	--
10. Nagur cross		-do-	-do-	--	--	--	--

Evergreen 3 and 4
Degraded evergreen 5,6
Moist deciduous 1,2,7,8
Seasonal habitats 9,10.

Sampling localities with land use patterns, species, richness, density and physiognomy of sampling areas

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TABLE : 2.

MONTHS, in g/m²

LITY	Nov.83	Dec.83	July 84	Aug.84	Sept 84	Oct. 84	Nov. 84	Dec.84	Jan85	Feb.85
BHAIRUMBE M.F.	--	--	--	143.55 (28.71)	90.99 (18.20)	159.22 (31.84)	80.27 (16.05)	171.54 (34.31)	30.95 (6.19)	---
BENGLE SUGAVI M M.F.		242.04 (48.41)	41.25 (8.25)	59.47 (11.89)	93.15 (18.63)	124.51 (24.90)	163.28 (32.66)	138.04 (36.61)	136.03 (27.21)	153.86 (30.78)
BIDRALI R.F.	228.41 (45.68)	139.69 (27.93)	45.26 (9.05)	64.88 (12.98)	87.30 (17.46)	118.55 (23.71)	163.52 (32.70)	161.51 (32.30)	130.02 (26.00)	109.12 (21.82)
SONDA R.F.	42.32 (8.46)	--	--	17.46 (3.49)	24.46 (4.89)	24.87 (4.97)	28.87 (5.65)	30.11 (6.02)	20.42 (4.08)	---
MIRZAN M.F.	--	--	--	58.29 (11.66)	72.46 (14.49)	34.02 (6.80)	33.96 (6.79)	--	159.66 (31.93)	---
CHANDAVAR M.F.	--	--	--	--	67.80 (13.56)	114.78 (22.96)	86.00 (17.20)	73.62 (14.72)	39.96 (7.99)	---
NAGUR R.F.	--	--	--	--	25.73 (5.14)	19.07 (3.81)	69.85 (13.97)	45.82 (9.16)	36.77 (7.35)	---
SANTGAL R.F.	--	--	22.23 (4.45)	--	45.46 (9.09)	63.18 (12.64)	89.03 (17.81)	21.33 (4.27)	36.17 (7.23)	---
DIVIGHAT Seasonal habitats	--	--	21.80 (29.06)	46.49 (61.99)	56.15 (74.87)	48.11 (64.14)	--	--	--	---
NAGUR CROSS Seasonal habitats	--	--	24.32 (32.42)	36.54 (48.72)	24.01 (32.01)	100.57 (134.09)	73.41 (97.89)	--	--	---

Figures in paranthesis indicate estimated values.

TABLE: 3/ TOTAL MONTHLY STANDING BIOMASS IN DIFFERENT LOCALITIES OF UP GHANSA PLOTS

LOCALITY	MONTHS											
	Nov. 83	Dec. 83	Jan. 84	Feb. 84	July 84	Aug. 84	Sept. 84	Oct. 84	Nov. 84	Dec.		
AIRUMBE	--	--	30.95 (6.19)	--	--	143.55 (28.71)	90.99 (18.20)	159.22 (31.84)	80.27 (16.05)	171.5 (34.3)		
ENGLE SUGAVI	--	242.04 (48.14)	136.03 (27.21)	153.86 (30.78)	41.25 (8.25)	59.47 (11.89)	93.15 (18.63)	124.51 (24.90)	163.28 (32.66)	138.0 (36.61)		
EDRALLI	228.41 (45.68)	139.69 (27.93)	130.02 (26.00)	109.12 (2.82)	45.26 (9.05)	64.88 (12.98)	87.30 (17.46)	118.55 (23.71)	163.52 (32.70)	161.5 (32.3)		
ONDA	--	42.32 (8.46)	20.42 (4.08)	--	--	17.46 (3.49)	24.46 (4.89)	24.87 (4.97)	28.27 (5.65)	30.11 (6.02)		

Figures in paranthesis indicate estimated values.

TABLE: 4.

LOCALITY

	Jan.	Feb.	July	August	September	October	November	December
MIRZAN	159.6600 (31.9320)	--	--	58.2850 (11.6570)	72.4588 (14.4918)	34.0179 (6.8036)	33.9584 (6.7917)	--
CHANDAVAR	39.9597 (7.9919)	--	--	67.8004 (13.5600)	114.7801 (22.9560)	86.0072 (17.2014)	73.6245 (14.7249)	--
NAGDOOR	36.7683 (7.3537)	--	--	25.7308 (5.1461)	19.0711 (3.8142)	69.9519 (13.9704)	45.8270 (9.1645)	--
SANTGAL	36.1734 (7.2347)	22.2260 (4.4452)	--	45.4580 (9.0916)	63.1785 (12.6357)	89.0288 (17.8058)	21.3329 (4.2666)	--
DIVIGI-CHAT	--	21.7966 (29.0621)	--	46.4927 (61.9902)	56.1505 (74.8673)	48.1074 (64.1432)	--	--
NAGOOR-CROSS	--	24.3170 (32.4227)	--	36.5429 (48.7239)	24.0112 (32.0149)	100.5704 (134.0939)	73.4172 (97.8896)	--

Figures in parantheses indicate estimated values.

TABLE: 5.

LOCALITIES

GROUPS	LOCALITIES									
	MIRZAN MP	CHANDAVAR MP	MAGUR RF	SANTGAL RF	DIVIGIBHAT CROSS	MAGUR CROSS	EHAIRUMBE MP	SUGAVI- BENGLE MP	SOMDA RF	BIDRALL
1 Dicot Seasonal herbs	2.32 Oct.	4.19 Sept.	0.03 Sept.	4.48 Oct.	0.39 Aug.	33.71	2.27 Jan.	4.46 Feb.	0.43 Sept.	2.32 Nov.
2 Dicot Perennial herbs	5.0010 Jan.	4.7716 Oct.	0.0417 Sept.	0.9290 Oct.	13.9727 Oct.	13.41 Sept.	4.30 April	3.47 Dec.	0.45 Jan.	9.24 Nov.
3 Dicot Climbers	0.08 Nov.	1.23 Jan.	1.37 Nov.	1.95 Nov.			0.20 Oct.	2.29 Oct.	0.59 Nov.	1.63 Nov.
4 Dicot Shrubs	0.45 Oct.	7.02 Oct.	7.62 Nov.	2.30 Nov.			0.19 Jan.		0.78 Dec.	
5 Dicot Trees	0.02 Nov.	2.02 Nov.	4.41 Dec.	3.10 Nov.			0.02 Nov.		0.89 Dec.	
6 MONOCOTYLEDONS										
1 Monocot Seasonal herbs	8.61 Sept.	8.20 Nov.	0.22 Oct.	0.08 Oct.	67.02 Sept.	86.62 Oct.	35.80 Jan.	35.23 Dec.	5.31 Mar.	18.74 Nov.
2 Monocot Perennial herbs	0.30 Sept.	1.02 Oct.	0.71 Oct.	4.11 Nov.	17.23 July	7.77 July	2.66 Sept.	5.68 Oct.	1.73 Nov.	2.67 Nov.
3 Monocot Climbers		0.07 Nov.	0.400. Nov.	0.80 Nov.				0.20 Oct.	0.01 Nov.	1.59 Nov.
4 Monocot shrubs			0.40 Nov.	0.62 Nov.					1.20 Nov.	
5 Monocot Trees			0.48 Nov.	0.51 Jan.						
6 TREES	0.50 Sept.	1.07 Sept.	0.23 Sept.	1.56 Sept.			0.04 Aug.	0.40 July	0.12 Dec.	0.14 Aug.
7 STANDING DEAD	61.35 Nov.	5.13 Dec.	2.06 Sept.	1.48 Nov.	74.87 Sept.	96.84 Nov.	30.24 Dec.	20.47 Feb.	6.30 Feb.	11.56 Nov.

TOTAL MONTHLY STANDING BIOMASS OF DIFFERENT GROUPS g/m² AT BIDRALLE.

TABLE: 6.

MCNEHS

Nov. 83 Dec. 83 Jan. 84 Feb. 84 July 84 Aug 84 Sept. 83 Octo 84 Nov. 84 Dec. 84.

DICOTYLEDONS

Seasonal herbs	11.6110 (2.3222)	2.9000 (0.5800)	1.0300 (0.2060)	0.2400 (0.0480)	0.1058 (0.0210)	1.4845 (0.2969)	1.6244 (0.3249)	2.6013 (0.5203)	0.9187 (0.1837)	
Perennial herbs	40.6690 (8.1338)	30.7810 (6.1562)	22.1620 (4.4324)	20.1910 (4.0382)	5.4068 (1.0814)	20.2080 (4.0416)	22.5453 (4.5091)	46.2025 (9.2405)	28.1458 (5.6292)	
Climbers	8.1610 (1.6322)	7.4070 (1.4814)	3.3450 (0.6690)	1.4897 (0.2979)	3.8433 (0.7686)	3.8077 (0.7615)	2.2936 (0.4588)	3.0059 (0.6012)	1.5574 (0.3115)	5.6779 (1.1356)

Sh rubs
Trees

I MONOCOTYLEDONS

Seasonal herbs	88.3150 (17.6630)	57.6780 (11.5356)	70.8220 (14.1644)	71.6147 (14.3229)	18.3241 (3.6648)	26.5336 (5.3067)	40.7112 (8.1422)	74.1425 (14.8255)	53.6910 (18.7382)	92.5191 (12.5038)
Perennial herbs	13.3730 (2.6746)	1.4500 (0.2900)			7.4654 (1.4931)	8.3967 (1.6793)	10.5737 (2.1147)	11.6362 (2.3272)	5.7442 (1.1488)	0.7989 (0.1598)
Climbers	7.9510 (1.5902)				3.8423 (0.7685)	4.1737 (0.8347)	4.6860 (0.9372)	0.1082 (0.0216)	3.8067 (0.7613)	

4. Shrubs
5. Trees
III FERNS

IV STANDING DEAD

	0.5170 (0.1034)				0.7041 (0.1408)					
Total	57.8140 (11.5628)	39.4740 (7.8948)	32.6600 (6.5320)	15.8257 (3.1651)	6.1538 (1.2308)	5.6073 (1.1215)	71.0433 (1.4687)	5.4763 (1.0952)	9.9130 (1.9826)	33.4461 (6.6392)
	228.4110 (45.6822)	139.6900 (27.9380)	130.0190 (26.0038)	109.1211 (21.8242)	45.2557 (9.0511)	87.3003 (12.9756)	118.5488 (17.4601)	103.5161 (23.7099)	161.5065 (32.7032)	32.3013 (6.6392)

Figures in paranthes indicate estimated values.

TOP/L MONTHLY STANDING BIOMASS OF DIFFERENT GROUPS g/m² AT SONDA

TABLE: 7.

MONTHS

Dec. 83 Jan. 84 March 84 August 84 Sept. 84 Oct. 84 Nov. 84 Dec. 84

DICOTYLEDONS

1. Seasonal herbs	1.0044 (0.2009)	0.4885 (0.0977)	1.5070 (0.3014)	0.0020 (0.0004)	2.1690 (0.4338)	1.2000 (0.2400)	0.5050 (0.1010)	1.2087 (0.2417)
2. Perennial herbs	1.2590 (0.2518)	2.4020 (0.4496)	1.9280 (0.3856)	0.2468 (0.0494)	1.7425 (0.3485)	1.2300 (0.2460)	2.0150 (0.4030)	1.7447 (0.3489)
3. Climbers	0.4375 (0.0875)	0.4980 (0.0996)		1.6297 (0.3259)	0.1500 (0.0300)		2.9650 (0.5930)	0.8274 (0.1655)
4. Shrubs	0.7715 (0.1543)		0.8500 (0.1700)				2.4440 (0.4888)	3.8944 (0.7729)
5. Trees				0.0390 (0.0078)			0.2000 (0.0400)	0.8944 (0.1789)

II NONCOTYLEDONS

1. Seasonal herbs	6.7542 (1.3508)	16.8710 (3.3742)	26.5665 (5.3133)	11.1854 (2.2371)	13.7815 (2.7563)	13.5200 (2.7040)	5.2985 (1.0597)	6.7542 (1.3508)
2. Perennial herbs	0.5885 (0.1177)	0.0830 (0.0166)	2.2070 (0.4414)	1.1376 (0.3075)	4.7660 (0.9572)	7.5500 (1.5100)	8.6670 (1.7334)	0.3271 (0.0654)
3. Climbers							0.0500 (0.0100)	
4. Shrubs							5.9930 (1.1986)	5.3883 (1.0777)
5. Trees					0.2003 (0.0400)			0.6160 (0.1232)

IV STANDING DEAD

	31.5025 (6.3005)	8.1146 (1.6220)	2.2109 (0.5633)	1.6300 (0.3230)	1.3700 (0.2740)	0.1370 (0.0274)	8.4574 (1.6915)	
Total	42.3176 (9.4635)	20.4225 (4.0845)	41.1731 (8.2346)	27.4574 (5.3115)	24.4530 (4.8918)	24.8700 (4.9700)	29.2745 (5.6549)	30.1126 (6.0225)

GROUPS

MONTHS

September 84 October 84 November 84 December 84 January 85

I DICOTYLEDONS

1. Seasonal herbs	0.1416 (0.0283)	--	--	--	--
2. Perennial herbs	0.2086 (0.0417)	--	--	--	--
3. Climbers	1.5768 (0.3151)	5.0550 (1.0110)	6.8393 (1.3679)	2.9188 (0.5838)	2.5007 (0.5001)
4. Shrubs	2.5832 (0.5166)	2.7457 (0.5491)	38.0778 (7.6156)	20.4586 (4.0917)	22.7095 (4.5419)
5. Trees	6.8632 (1.3726)	5.1438 (1.0288)	20.4556 (4.0911)	22.0.594 (4.4119)	11.2718 (2.2544)

II MONOCOTYLEDONS

1. Seasonal herbs	--	1.0930	--	--	--
2. Perennial herbs	2.6708 (0.5341)	(0.2186) 3.5486 (0.7097)	0.1319 (0.0264)	--	--
3. Climbers	0.0353 (0.0071)	0.3075 (0.7615)	0.6838 (0.1368)	--	--
4. Shrubs	--	0.1178 (0.0236)	1.3036 (0.2607)	0.2127 (0.0425)	0.1654 (0.0331)
5. Trees	0.3384 (0.07677)	0.4965 (0.0993)	2.3599 (0.4720)	0.1775 (0.0355)	0.1209 (0.0242)
III FERNS	1.1682 (0.2336)	0.2481 (0.0496)	--	--	--
IV STANDING DEAD	10.2863 (2.0573)	0.3151 (0.0630)	--	--	--

TOTAL

(5.1461)	(3.8142)	(13.9704)	(9.1654)	(7.3537)
25.7308	19.0711	69.8519	45.8270	36.7683

Figures in paranthesis indicate estimated values.

July 84 September 84 October 84 November 84 December 84 January 85

I DICOTYLEDONS

1. Seasonal herbs	4.9250 (0.9850)	10.8415 (2.1683)	22.4048 (4.4810)	14.2501 (2.8500)	8.6502 (1.7300)	2.2638 (0.4528)
2. Perennial herbs	0.4180 (0.0836)	0.4935 (0.0987)	4.6447 (0.9289)	--	--	--
3. Climbers	3.4940 (0.6988)	7.5484 (1.5097)	7.7994 (1.5599)	9.7307 (1.9461)	3.4615 (0.6923)	20.9697 (4.1939)
4. Shrubs	--	0.1118 (0.0224)	2.7931 (0.5586)	11.4689 (2.2938)	0.5825 (0.1165)	3.2237 (0.6447)
5. Trees	0.1720 (0.0344)	6.6015 (1.3203)	12.0872 (2.4174)	15.5131 (3.1026)	3.1518 (0.6303)	1.6542 (0.3308)

II MONOCOTYLEDONS

1. Seasonal herbs	--	--	0.4176 (0.0835)	--	--	--
2. Perennial herbs	4.7780 (0.9556)	7.9681 (1.5936)	8.1524 (1.6309)	20.5403 (4.1081)	0.2405 (0.0481)	--
3. Climbers	0.4100 (0.0820)	1.6177 (0.3235)	0.5271 (0.1054)	4.0213 (0.8043)	--	--
4. Shrubs	--	--	--	3.1155 (0.6231)	0.5279 (0.1056)	0.5555 (0.1111)
5. Trees	0.2410 (0.0482)	1.1144 (0.2229)	2.4901 (0.4980)	2.5293 (0.5059)	1.1077 (0.2215)	2.5643 (0.5129)
III FERNS	7.7880 (1.2576)	2.3195 (0.4639)	1.8621 (0.3724)	0.5007 (0.1001)	0.4655 (0.0931)	0.6247 (0.1250)
IV STANDING DEAD	--	6.8416 (1.3683)	--	7.3589 (1.4718)	3.1453 (0.6291)	4.3175 (0.8635)

Total:

22.2260 (4.4452)	45.4580 (9.9016)	63.1785 (12.6357)	89.0288 (17.8058)	21.3329 (4.2666)	36.1734 (7.82347)
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Figures in paranthesis indicate estimated values.

GROUPS

MONTHS

Aug 84. September 84 October 84 November 84. December 84 January 85.

I DICOTYLEDONS

1. Seasonal herbs	9.4733 (1.9895)	5.2050 (1.0410)	6.6175 (1.3235)	5.4185 (1.0837)	3.6950 (0.7390)	11.3429 (2.2686)
2. Perennial herbs	21.5007 (4.3001)	11.0595 (2.2119)	12.8905 (2.5781)	16.0785 (3.81757)	9.8540 (1.9708)	15.2373 (3.0475)
3. Climbers	0.1369 (0.0274)		1.0210 (0.2042)	--	--	--
4. Shrubs	0.6600 (0.1320)	--	0.1020 (0.2040)	0.7870 (0.1574)	0.7890 (0.1578)	0.9600 (0.1920)
5. Trees	0.0500 (0.0100)	--	--	0.0990 (0.0198)	--	--

II MONOCOTYLEDONS

1. Seasonal herbs	96.5903 (1993181)	61.3577 (12.2715)	132.2275 (26.4455)	57.2020 (11.4404)	5.8890 (1.1778)	179.0236 (35.8047)
2. Perennial herbs	12.1048 (2.4210)	13.2865 (2.6573)	5.8615 (1.1723)	0.6880 (0.1376)	0.1100 (0.0220)	1.5788 (0.3158)
3. Climbers	--	--	--	--	--	--
4. Shrubs	--	--	--	--	--	--
5. Trees	--	--	--	--	--	--
III FERNS	0.1750 (0.0350)	0.8000 (0.0160)	--	--	--	--

IV STANDING DEAD

	2.8588 (0.5718)	--	9.4950 (0.0990)	--	151.2064 (30.2413)	97.8029 (19.5660)
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Total

	143.5498 (28.7100)	90.1987 (18.1977)	159.2150 (31.8430)	80.2730 (16.0546)	171.5434 (34.3087)	30.9455 (6.1891)
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figures in paranthesis indicate estimated values.

TOTAL MONTHLY STANDING BIOMASS OF DIFFERENT GROUPS - g/m² AT BENGLE SUGRAVI

TABLE: 11.

MONTHS

Dec. 83 Jan. 84 Feb. 84 July 84 August 84 Sept. 84 Oct. 84 Nov. 84 Dec. 84

	Dec. 83	Jan. 84	Feb. 84	July 84	August 84	Sept. 84	Oct. 84	Nov. 84	Dec. 84
I DICOTYLEDONS									
1. Seasonal herbs	12.9290 (2.5858)	9.5550 (1.9110)	22.3050 (4.4610)	1.3002 (0.2600)	2.9872 (0.5974)	2.5531 (0.5106)	3.4837 (0.6967)	21.8777 (4.3755)	2.7901 (1.7560)
2. Perennial herbs	14.4720 (2.8944)	11.6570 (2.3314)	7.1900 (1.4380)	0.7215 (0.1443)	0.7177 (0.1435)	3.9902 (0.7990)	13.1008 (2.6202)	16.3062 (3.2612)	17.3295 (3.4659)
3. Climbers	9.3800 (1.8760)	1.6000 (0.3200)	2.5000 (0.5000)	6.4079 (1.2816)	3.5968 (0.7194)	1.9223 (0.3857)	11.4421 (2.2224)	3.8303 (0.7661)	1.5612 (0.3122)
4. Shrubs.									
5. Trees.									
II MONCOTYLEDONS									
1. Seasonal herbs	176.1360 (35.2272)	45.6350 (9.1270)	19.5300 (3.9060)	8.1373 (1.6275)	26.0465 (5.2093)	50.1553 (10.0310)	56.8730 (11.3752)	75.8885 (15.1777)	54.5575 (10.9915)
2. Perennial herbs	1.3720 (0.2744)	0.1350 (0.0270)		19.3227 (3.8645)	23.3313 (4.6663)	24.5497 (4.9099)	28.3930 (5.6786)	5.5576 (1.1152)	1.4772 (0.2954)
3. Climbers	0.4000 (0.0800)	0.4700 (0.0940)		0.6350 (0.1270)	0.3007 (0.0601)		0.9868 (0.1974)	0.5274 (0.1055)	
4. Shrubs									
5. Trees									
III FERNS									
IV STANDING DEAD	27.3470 (5.4694)	61.9760 (13.3952)	102.3360 (20.4672)	2.7172 (0.5434)	2.4866 (0.4973)	9.9712 (1.9942)	10.2342 (2.0468)	39.2919 (7.8584)	92.9361 (19.7672)
TOTAL	242.0360 (48.41)	116.0280 (27.21)	153.8610 (30.78)	41.2542 (8.25)	59.4668 (11.89)	93.1473 (18.63)	124.5166 (24.90)	163.2796 (32.66)	193.0416 (36.61)

Figures in paranthes indicate estimated values.

GROUPS

MONTH

August 84 September 84. October 84. Nov. 84 January 85.

I. DICOTYLEDONS

1. Seasonal herbs	3.3250 (0.6650)	10.2629 (2.0526)	11.6227 (2.3245)	9.5750 (1.9150)	3.9600 (0.7920)
2. Perennial herbs	10.4010 (2.0802)	14.7931 (2.9586)	4.5097 (0.9019)	14.6960 (2.9392)	25.0050 (5.0010)
3. Climbers	0.3720 (0.0744)	--	--	0.4021 (0.0804)	--
4. Shrubs	0.1850 (0.0370)	--	2.2730 (0.4546)	1.0804 (0.2161)	--
5. Trees	0.0600 (0.012)	--	--	0.0892 (0.0178)	--

II MONOCOTYLEDONS

1. Seasonal herbs	41.8020 (8.3604)	43.0480 (8.6096)	13.5892 (2.7178)	1.3836 (0.2767)	--
2. Perennial herbs	0.7860 (0.1572)	1.4798 (0.2960)	0.6509 (0.1301)	--	--
3. Climbers	--	--	--	--	--
4. Shrubs	--	--	--	--	--
5. Trees	--	--	--	--	--
III FERNS	1.3540 (0.2708)	2.8750 (0.5750)	0.7209 (0.1442)	--	--
IV STANDING DEAD	--	--	0.6515 (0.1303)	306.7321 (61.3646)	--

Total:

58.2850 (11.6570)	72.4588 (14.4918)	34.0179 (6.8036)	333.9584 (66.7117)	159.6600 (31.9320)
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Figures in paranthesis indicate estimated values.

TOTAL MONTHLY STANDING BIOMASS OF DIFFERENT GROUPS AT CHANDAVAR

TABLE: 13.

MONTH

GROUPS

September 84 October 84 November 84 December 84 January 85

I DICOTYLEDONS

1. Seasonal herbs	20. 9408 (4.1882)	11.5851 (2.3170)	6.3868 (1.2774)	15.8543 (3.7086)	3.3644 (0.6229)
2. Perennial herbs	6.2174 (1.2435)	23.8481 (4.7716)	4.2970 (0.8594)	4.4738 (0.8948)	3.5463 (0.7093)
3. Climbers	1.9266 (0.3853)	0.4318 (0.0864)	0.8080 (0.1617)	0.7743 (0.1549)	6.1532 (1.2306)
4. Shrubs	8.0085 (1.6005)	35.0794 (7.1588)	22.0129 (4.2026)	14.3971 (2.8794)	15.8981 (3.1796)
5. Trees	--	0.9053 (0.1812)	10.0946 (2.0189)	---	7.7380 (1.5476)

II MONCOCOTYLEDONS

1. Seasonal herbs	21.3759 (4.2752)	35.3260 (7.0652)	40.9958 (8.1992)	12.0582 (2.4116)	2.7652 (0.5530)
2. Perennial herbs	3.9871 (0.7974)	5.1043 (1.0209)	0.2710 (0.0542)	0.4237 (0.0.47)	--
3. Climbers	--	--	0.3250 (0.0650)	--	--
4. Shrubs	--	--	--	--	--
5. Trees	--	--	--	--	--

III FERNS

	5.3501 (1.0700)	2.4901 (0.4980)	--	--	--
--	--------------------	--------------------	----	----	----

IV STANDING DEAD

	--	--	0.8158 (0.1632)	25.6431 (5.1286)	0.4945 (0.0989)
--	----	----	--------------------	---------------------	--------------------

Total:

	67.8004 (13.5600)	114.7801 (22.9560)	86.0072 (17.2014)	73.6245 (14.7249)	39.9597 (7.9919)
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Figures in paranthesis indicate estimated values.

TABLE: 14.

MONTHS

	July 84	August 84	September 84	October 84	November 84
DICOTYLEDONS					
1. Seasonal herbs	4.4737 (5.9649)	12.5205 (16.6940)	1.2120 11.1111 (1.6160)	17.7859 (23.7145)	0.7586 (1.0115)
2. Perennial herbs	2.4141 (3.2188)	7.0369 (9.3825)	10.0544 (13.4059)	6.0441 (8.0588)	0.0250 (0.0333)
3. Climbers					
4. Shrubs					
5. Trees					
II MONOCOTYLEDONS					
1. Seasonal herbs	9.0570 (12.0760)	12.4998 (16.6664)	11.1641 (14.8855)	64.9612 (86.6149)	
2. Perennial herbs	5.8328 (7.7771)	4.4857 (5.9809)	1.5807 (2.1076)		
3. Climbers					
4. Shrubs					
5. Trees					
III FERNS					
IV STANDING DEAD	2.5394 (3.3959)			11.7762 (15.7016)	72.6336 (96.8448)
Total	24.3170 (32.4227)	36.5429 (48.7239)	24.0112 (32.0149)	100.5704 (134.0939)	73.4172 (97.8896)

Figures in paranthes indicate estimated values.

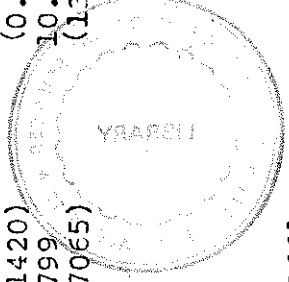
TOTAL MONTHLY STANDING BIOMASS OF DIFFERENT GROUPS g/m² AT DIVIGIGHAT

TABLE: 15.

MONTHS

July 84 August 84 September 84 October 84

GROUPS	July 84	August 84	September 84	October 84
I DICOTYLEDONS				
1. Seasonal herbs	0.5741 (0.7655)	1.9573 (2.6097)	0.1065 (0.1420)	0.2264 (0.3019)
2. Perennial herbs	0.5333 (0.7111)	5.5614 (7.4152)	5.7799 (7.7065)	10.4795 (12.9727)
3. Climbers				
4. Shrubs				
5. Trees				
II MONOCOTYLEDONS				
1. Seasonal herbs	6.7738 (9.0317)	37.1264 (49.5019)	50.2661 (67.0215)	
2. Perennial herbs	12.9193 (17.2257)	1.8476 (2.4635)		
3. Climbers				
4. Shrubs				
5. Trees				
III FERNS				
IV STANDING DEAD	0.9961 (1.3281)			37.4015 (49.8687)
Total	21.7966 (29.0621)	46.4927 (61.9902)	56.7505 (74.8673)	48.1074 (64.1432)



Figures in paranthes indicate estimated values.