

**HABITAT EVALUATION OF THE GUINDY NATIONAL PARK  
FOR CONSERVATION STRATEGIES**

**Preliminary report for the period  
May-October 1990**

**Investigator : R. RAJARATHINAM, M.Sc.**

**MADRAS NATURALISTS' SOCIETY**

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## I INTRODUCTION

The Guindy National Park (GNP) is situated within the City of Madras. The present area of the park is only 270 hectares as compared to 504 hectares in 1959 when it was a Reserve Forest (Chaudhuri, 1990).

The park originally comprised of scrub jungle-tropical dry evergreen forest of Champion and Seth (1968) or the '*Albizia amara* community' of Meher-Homji (1973) that is characteristic of the Coromandel-Circar coastal area. In Guindy, the natural vegetation has been modified by adding various other species from time to time. The vegetation appears dry during summer but turns verdant during and immediately after good rains, especially after the north-east monsoon. Within the 270 hectares of this park, there is a surprising diversity in the physiognomy-from thickly forested areas, semi-open areas to open areas.

The park supports, besides other mammals, a natural population of the endangered Blackbuck (*Antelope cervicapra*) and a large population of the introduced Chital (*Axis axis*). There are 220 blackbuck and 1261 chital in the contiguous areas of Indian Institute of Technology (IIT), GNP and the Raj Bhavan, according to the 1989 census (Chaudhuri, 1990). In comparison, in 1982, the numbers were about 400 and 900 respectively. This is a disturbing trend.

The park, owing to its location, is surrounded by human habitation and hence is effectively isolated from similar natural habitats. With a rising population of chital, this could have disastrous consequences on the vegetation and the habitat. Besides, the endangered blackbuck, an original denizen of the park, faces the danger of local extinction as its population has been declining over the years. It is therefore imperative that the ecology of the park is studied in detail with a view to evolve conservation and management strategies.

With this objective, the present study was launched by the Madras Naturalists' Society in May 1990 and financed by the B.N.H.S, Bombay. The study will look into various aspects such as the vegetational structure, composition and dynamics, water availability, population structure and dynamics of chital and blackbuck, their habitat and food preferences. This preliminary report is a summary of the work carried out on the vegetation between May and October 1990.

## **II Methods**

### **(a) Physiognomy**

The park was divided into 4 areas for the sake of the study as shown in Fig.1.

#### **AREA I**

This area is thickly forested with good canopy.

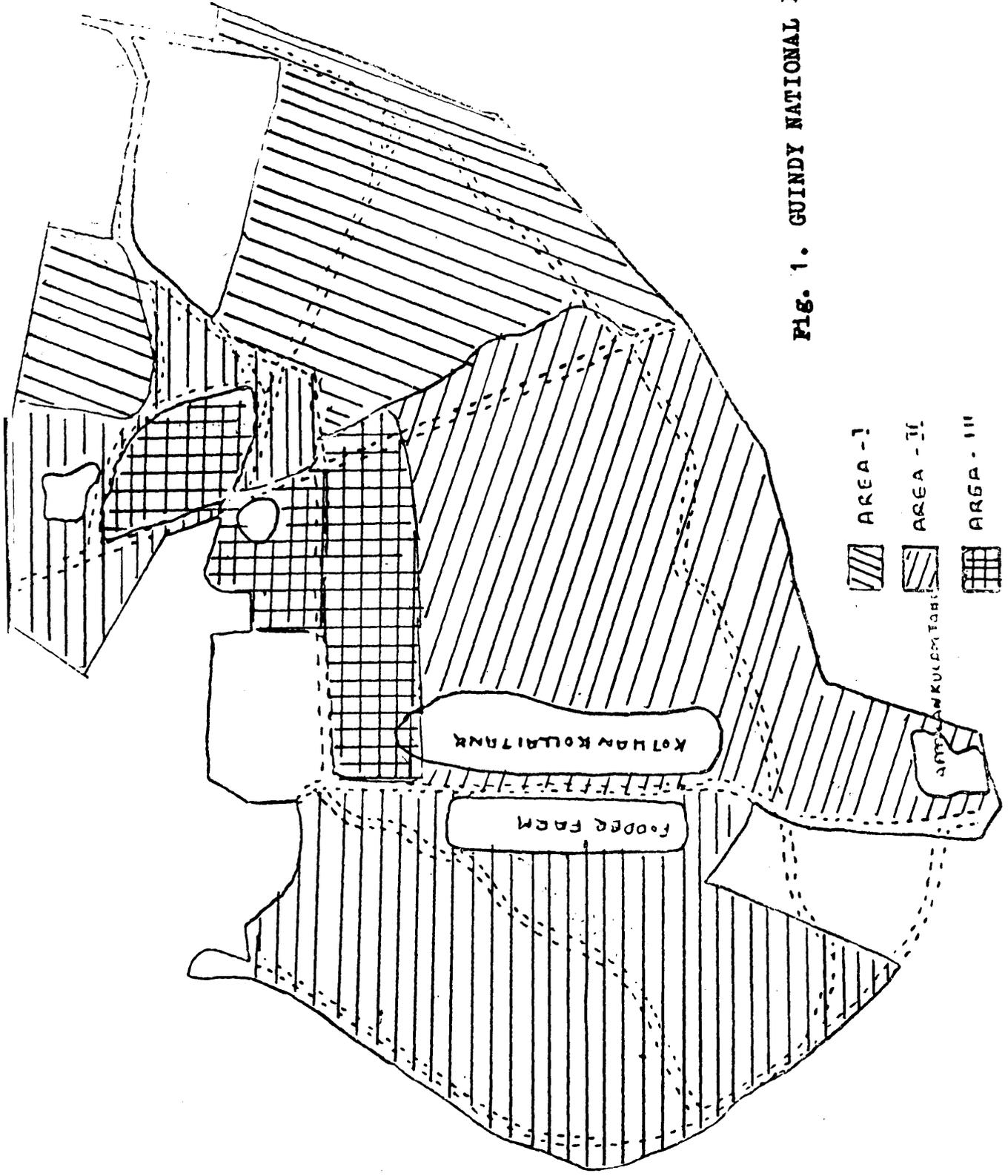


FIG. 1. GUINDY NATIONAL PARK

The dominant tree is the umbrella shaped *Acacia planifrons*. The undergrowth is dense with *Glycosmis cochinchinensis* and *Clausena dentata* shrubs.

#### AREA II

The semi-open areas where *Acacia planifrons* is almost absent and the canopy is sparse. Although no species is clearly dominant, *Borassus flabellifer* is conspicuous as also the shrub *Randia malabarica* and *Randia dumetorum*. This forms the major part of the Park.

#### AREA III

This represents the area which has been primarily cleared and in some cases have also been planted with saplings of trees like *Tamarindus indica*, *Bassia longifolia*, *Pterocarpus santalinus* and *Acacia auriculiformis*.

#### AREA IV

The extreme west of the park is perhaps the remnant of the original vegetation of this region. The vegetation here is thick though not as thick as in Area I. *Acacia leucophloea*, *Syzygium cumini*, *Dichrostachys cinerea* and *Lannea coromandelica* are the dominant tree species in this area.

**(b) Flora**

Plant specimens were collected using the methods of Santapau (1955) and Mathew (1981). They were identified with the help of standard regional Floras (Gamble, 1967; and Nair and Henry, 1983). All collections have been preserved as herbarium specimens and are available for future reference.

**(c) Phytosociology**

Systematic sampling was done, using the methods indicated in the BNHS Report (Rao, et al, 1989).

The entire area was divided into 200m x 200m quadrats. Sampling was done around criss-cross points using a 5m x 5m quadrat. A total of 80 quadrats were studied. Both trees and shrubs were recorded in the quadrats separately. The various parameters recorded were, the number of individuals of each species, and the height and circumference at breast height (cbh). A brief description of methods adopted are given below.

For the tree species, the circumference was measured at breast height ie. 1.4 meters. Whenever the trees were found to be branched below this level, the measurements were taken at the base of the first branch. In cases where branching started at the ground level, the main branches were measured. All the plants that were above 20 cm 'cbh' were considered as trees. Plants with >10 cm and <20 cm 'cbh' were listed as Shrubs. All the woody species with <10 cm 'cbh' excluding the herbs

were treated as saplings and seedlings. The number of climbers were counted in each quadrat and grouped separately. The height of the plants was measured with a marked aluminium pole.

Vegetational analysis was carried out using the following formulae, referring standard works like Krebs (1985), Curtis and McIntosh(1950) and Philips(1959).

$$1. \text{ DENSITY} = \frac{\text{Total number of individuals of the species}}{\text{Total number of quadrats studied}}$$

$$2. \text{ ABUNDANCE} = \frac{\text{Total number of individuals of species}}{\text{Total number of quadrats in which the species has occurred}}$$

$$3. \text{ PERCENTAGE FREQUENCY} = \frac{\text{Total no: of quadrats in which the species has occurred}}{\text{Total number of quadrats studied}} \times 100$$

On the basis of the percentage frequency value, all the species were grouped under frequency classes.

Frequency %	Frequency Class
0 - 20	A
21 - 40	B
41 - 60	C
61 - 80	D
81 - 100	E

$$4. \text{ REL.DENSITY} = \frac{\text{Density of individual species}}{\text{Total density of all the species}} \times 100$$

$$5. \text{ REL.FREQUENCY (RF)} = \frac{\text{Frequency of the species}}{\text{Sum of the frequencies of all the species}} \times 100$$

$$6. \text{ REL.DOMINANCE (R.Dom)} = \frac{\text{Total basal cover of the species}}{\text{Total basal cover of all the species}} \times 100$$

7. The Relative values of frequency, density and dominance are summed to represent the Importance Value Index (IVI) for tree species.

$$\text{IVI} = \text{RD} + \text{RF} + \text{RDom}$$

8. The Species Diversity was estimated by Shannon - Weinner Diversity Index formula (Shannon and Weinner, 1963).

$$\text{Diversity Index } H' = \sum_{i=1}^s P_i (\log P_i)$$

where  $s$  = the number of species,  $P_i$  = proportion of total belonging to the  $i$ th species.

### III Results and Discussion

#### (a) Flora

A total of 123 species in 105 genera belonging to 47 families were recorded (Table 1). The habit of these plants are given in Table 2. The dominant family with maximum species is Caesalpinaceae (12 species), followed by Papilionaceae, Mimosaceae and Rubiaceae (8 each).

**Table 1****Summary of plants listed at Guindy National Park**

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	Dicotyledons		Monocotyledons	
	No.	%	No.	%
Families	43	91.5	4	8.5
Genera	93	88.6	12	11.4
Species	110	89.4	13	10.6

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**Table 2****Habits of plants listed at Guindy National Park**

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Habit	Number of plants
Herbs	29
Shrubs	27
Trees	47
Climbers	20

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(a-1) Systematic enumeration of the species

The following list of plants collected from the Guindy National Park during the past five months has been arranged according to the Bentham and Hooker's System of Classification. The name of the plants in a family are arranged in alphabetical order. As far as possible, the recent names of plants are given.

**ANONACEAE**

*Anona squamosa* Linn.

A large shrub, common in the Eastern part of the park.

*Polyalthia longifolia* HK. f & T.

A tall evergreen tree, occasionally noticed in eastern part of the park.

**NYMPHAEACEAE**

*Nelumbium speciosum* Willd.

A large erect herb, growing in shallow water, commonly found in Applankulam Tank.

**CAPPARIDACEAE**

*Capparis sepiaria* Linn.

A common thorny shrub with wiry branches.

*Capparis zeylanica* Linn.

A large, thorny, climbing shrub commonly found.

*Cleome viscosa* Linn.

An erect annual herb, commonly found along roadsides.

#### VIOLACEAE

*Hybanthus enneaspermus* (L) F.V. Huell.

A herb, commonly found in grassy places.

#### BIXACEAE

*Flacourtia sepiaria* Roxb.

A rigid shrub, common in the park.

#### POLYGALACEAE

*Polygala chinensis* Linn.

A herb, common in the park.

#### XANTHOPHYLLACEAE

*Xanthophyllum flavescens* Roxb.

A small tree, rare in the park.

#### CARYOPHYLLACEAE

*Polycarpaea corymbosa* Lam.

A herb found along pond banks; occasional in the park.

#### MALVACEAE

*Sida cordifolia* Linn.

A herb, commonly seen along roadsides.

#### STERCULIACEAE

*Guazuma tomentosa* Kunth.

A small tree, rare in the park.

#### RUTACEAE

*Atlantia monophylla* Correa.

A small thorny tree, common in the park.

*Aegle marmelos* Corr.

A glabrous, spiny, deciduous tree, rare in the park.

*Clausena dentata* (Willd.) R. & S.

A large herb. Common in the park.

*Glycosmis cochinchinensis* Pierre.

A small, evergreen, unarmed shrub. Common in the park.

*Limonia acidissima* L.

A medium sized, armed, deciduous, glabrous tree,  
occasional in the park

*Pamburus missionis* (Wt.) Swingle

A small tree, armed with long straight spines.

Occasional in the park.

*Toddalia asiatica* Lam.

A climbing shrub. Common in the park.

#### MELIACEAE

*Azadirachta indica* A. Juss.

A large, evergreen tree. Common in the park.

#### CELASTRACEAE

*Gymnosporia emarginata* Lawson.

A shrub with long straight thorns; rare in the park.

#### RHAMNACEAE

*Zizyphus jujuba* Lam.

A low, much branched thorny tree, rare in the park.

*Zizyphus oenoplia* Mill.

A scrambling prickly shrub, occasional in the park.

*Zizyphus xylopyrus* Willd.

A straggling tree, common in the park.

## VITACEAE

*Cissus quadrangularis* Linn.

A climbing shrub, tendrils leaf opposed, branched.

Common in the park.

## SAPINDACEAE

*Dodonaea viscosa* (Linn.) Jacq.

A gregarious evergreen shrub, rare in the park.

## ANACARDIACEAE

*Lannea coromandelica* (Houtt.) Merrill.

A large, deciduous tree, common in the park.

*Mangifera indica* L.

A large, evergreen tree occasional in the park.

## PAPILIONACEAE

*Abrus precatorius* Linn.

A perennial wiry twiner, occasional in the park.

*Butea monosperma* (Lam.) Taub.

A deciduous tree, rare in the park.

*Dalbergia sissoo* Roxb.

A fairly large tree, rare, planted in the park.

*Indigofera enneaphylla* Linn.

An undershrub with rootstock and prostrate branches,  
common in the park.

*Indigofera aspalathoides* Vahl.

A stiff silvery undershrub. Common in the park.

*Pterocarpus santalinus* L.f.

A moderate-sized deciduous tree, rare, planted in the  
park by the forest department.

*Rhynchosia aurea* D.C.

A slender trailing annual herb, occasional in the park.

*Zornia diphylla* Pers.

A diffuse wiry herb, common in the park.

#### CAESALPINIACEAE

*Bauhinia racemosa* Lam.

A small, deciduous tree, rare in the park.

*Cassia fistula* Linn.

A small sized, deciduous tree, occasional in the park.

*Cassia marginata* Roxb.

A small, deciduous tree, common in the park.

*Cassia tora* Linn.

An annual weed, almost an undershrub, occasional in the park.

*Cassia auriculata* Linn.

An evergreen gregarious, pubescent shrub, occasional in the park.

*Cassia occidentalis* Linn.

A diffuse undershrub, common in the park.

*Cassia pumila* Lam.

A small, diffuse or procumbent undershrub occasional in the park.

*Cassia siamea* Lam.

A moderate-sized tree common in eastern part of the park.

*Caesalpinia coriaria* Willd.

A small unarmed tree, occasional in the park.

*Delonix regia* (Boj.) Raf.

A gregarious, exotic, deciduous tree, planted, rare in the park.

*Pterolobium indicum* A. Rich.

A very thorny, straggling shrub, rare in the park.

*Tamarindus indica* Linn.

A large, evergreen tree, occasional, planted in the park by Forest Department.

#### MIMOSACEAE

*Acacia planifrons* W. & A.

A small tree, often gregarious, crown remarkably flat, dense, spreading umbrella-like, common in eastern part of the park.

*Acacia leucophloea* Willd.

A moderate, deciduous tree, common in the park.

*Acacia ferruginea* D.C.

A large, deciduous tree, common in the park.

*Acacia auriculiformis*

A large tree, common in central part of the park.

Planted by the Forest Department.

*Albizia lebbek* Benth.

A large, deciduous tree, common in the park.

*Dichrostachys cinerea* (L.) W. & A.

A thorny small tree, common in the park.

*Prosopis juliflora* D.C.

A moderate - sized tree, common in the peripheral region

of the forest. It is abundant in the adjacent Indian Institute of Technology.

*Samanea saman* (Jecq.) Merr.

A large, deciduous tree, rare in the park.

#### MYRTACEAE

*Eugenia bracteata* Roxb.

A shrub, rare in the park.

*Psidium guajava* Linn.

A small tree, rare in the park.

*Syzygium cumini* Linn.

A large, evergreen tree, common in the park.

#### MELASTOMATACEAE

*Memecylon edule* Roxb.

A small tree, rare in the park.

#### CACTACEAE

*Opuntia dillenii* Haw.

A shrub with succulent stem, occasional in the park.

#### MOLLUGINACEAE

*Mollugo nudicaulis* Lam.

An erect annual herb common along the roadsides.

#### ALANGIACEAE

*Alangium salvifolium* Wang.

A deciduous small tree, rare in the park.

#### RUBIACEAE

*Borreria hispida* K. Sch.

A hispid procumbent herb with long branches, rare in the park.

*Canthium parviflorum* Lam.

A thorny shrub with white flowers common in the park.

*Chomelia asiatica* O.Kze.

A large evergreen shrub with shining leaves, occasional in the park.

*Ixora parviflora* Vahl.

A small evergreen tree, occasional in the park.

*Morinda tinctoria* Roxb.

A moderate-sized, deciduous tree, occasional in the park.

*Pavetta indica* Linn.

A large shrub rare in the park.

*Randia dumetorum* Lam.

A large shrub with opposite spines, common in the park.

*Randia malabarica* Lam.

An erect thorny shrub. Common in the park.

#### SAPOTACEAE

*Bassia longifolia* Linn.

A large tree, occasional in the park.

*Mimusops elengi* Linn.

A large tree, occasional in the park.

#### OLEACEAE

*Jasminum sessiliflorum* Vahl.

A much-branched climbing shrub, common in the park.

## APOCYNACEAE

*Carissa spinarum* Linn.

A large gregarious, evergreen thorny shrub, common in the park.

*Ichnocarpus frutescens* R.Br.

A much-branched, extensively twining shrub, occasional in the park.

*Rauwolfia canescens* Linn.

A small shrub. Occasional in the park.

*Wrightia tinctoria* R.Br.

A small deciduous tree. Occasional in the park.

## ASCLEPIADACEAE

*Calotropis gigantea* R.Br.

A large shrub, rare in the park.

*Gymnema sylvestre* R. Br.

A large woody climber, occasional in the park.

*Hemidesmus indicus* R.Br.

A twining or prostrate, wiry shrub. Occasional in the park.

*Leptadenia reticulata* W. & A.

A twining shrub, occasional in the park.

*Pentstemon microphylla* W. & A.

A slender glabrous twiner, rare in the park.

*Sarcostemma brevistigma* W. & A.

A trailing, leafless shrub, occasional in the park.

*Tylophora asthmatica* W. & A.

A much-branching climber, occasional in the park.

#### BORAGINACEAE

*Ehretia microphylla* Lamk.

A small shrub, occasional in the park.

*Heliotropium bracteatum* R.Br.

A slender erect herb, occasional in the park.

#### CONVOLVULACEAE

*Evolvulus alsinoides* Linn.

Prostrate herb, common in the park.

#### SCROPHULARIACEAE

*Striga lutea* Lour.

An erect scabrous herb. Occasional in grassy places.

#### ACANTHACEAE

*Justicia prostrata* Gamble. n. comb.

A small pale prostrate herb. Common in the park.

#### VERBENACEAE

*Gmelina asiatica* Linn.

A large straggling shrub. Occasional in the park.

*Lantana aculeata* Linn.

A very aromatic shrub, rare in the park.

*Vitex negundo* Linn.

A large shrub, rare in the park.

#### LAMIACEAE

*Leucas aspera* Spreng.

A large erect herb found in roadsides, occasional in the park.

### AMARANTHACEAE

*Aerva lanata* Juss.

A many-branched undershrub, rare in the park.

### POLYGONACEAE

*Antigonon leptopus* Hook & Arn.

A climbing shrub, occasional in the park.

### LAURACEAE

*Cassytha filiformis* Linn.

A wiry, leafless parasite, sending numerous haustoria by which, it adheres to the host. Common in the park.

### THYMELACEAE

*Wikstromia viridiflora* Meissn.

A low shrub. Common in the park.

### SANTALACEAE

*Santalum album* Linn.

A small evergreen tree, occasional in the park.

### EUPHORBIACEAE

*Croton bonplandianum* Baill.

An erect herb common in the Pond banks.

*Euphorbia hirta* Linn.

A straggling, scandent, hispid herb, occasional in the park

*Euphorbia prostrata* Ait.

A small, prostrate herb. Common in the park.

*Euphorbia corrigioloides* Bois.

A stiff herb, common in the park.

*Embllica officinalis* Gatertn.

A medium - sized deciduous tree, rare in the park.

*Fluggea leucopyrus* (Koen) Willd.

A large stiff, thorny, stragglng shrub, occasional in the park.

*Jatropha glandulifera* Roxb.

An erect shrub, occasional in the park.

#### MORACEAE

*Ficus bengalensis* Linn.

A large evergreen tree with numerous aerial roots on branches, occasional in the park.

*Ficus religiosa* Linn.

A large tree without aerial roots, rare in the park.

*Streblus asper* Lour.

A small tree, evergreen, rare in the park.

#### LILIACEAE

*Asparagus racemosus* Willd.

A tall, rambling, spinous climber, rare in the park.

*Gloriosa superba* Linn.

A handsome climber, rare in the park.

#### ARECACEAE

*Borassus flabellifer* Linn.

A tall deciduous palm. Common in the park.

*Phoenix sylvestris* Roxb.

A tall deciduous tree, occasional in the park.

*Phoenix humilis* Royle

A shrubby very spinuous dwarf palm. Common in the park.

## CYPERACEAE

*Mariscus paniceus* Vanl.

An erect herb, perennial, occasional in the park.

*Scleria lithosperma* Sw.

An erect herb with fibrous roots, rare in the park.

## POACEAE

*Aristida adscencionis* Linn.

A slender, tufted grass, common in the park.

*Apluda mutica* Linn.

A herb, common in the park.

*Bambusa arundinacea* Willd.

A tall, thorny, gregarious bamboo. Occasionally found near Duck Pond.

*Cymbopogon flexuosus* Wats.

A densely tufted, aromatic grass occasional in the park

*Eragrostis viscosa* Trin.

An erect and slender herb, common in the park.

*Perotis indica* O.Ktz.

An erect, tufted herb. Common in the park.

### (b) Phytosociology :

In the present study, 31 species were recorded under tree category; 36 species under shrub category and 13 species under climbers category. Seedlings and saplings of 26 species were encountered. Out of the 31

species of trees, 17 species formed the topmost stratum and the remaining species (14) formed the second stratum. Shrubs constituted a major portion of forest vegetation. Many of them are multi-stemmed, thorny and form thickets. The climbers are mostly found on the canopy trees: they flourish immediately after rains and become deciduous during summer.

Seedlings of 26 species (trees, shrubs and climbers) were recorded during the course of study. Seedlings of trees form 30.8%, shrubs form 50% and climbers form 19.2%.

In the present study, herbs and grasses were not taken into account and they will be studied in more detail in the coming months. So far 15 grass species have been collected and 6 of them identified.

#### **(b-1) TREES**

The tree canopy height ranged from 5 to 15 metres.

In the present study, *Borassus flabellifer* had the highest density (0.39) (Table 3) followed by *Cassia marginata* (0.24). *Atlantia monophylla* (0.10), *Syzygium cumini* (0.087) and *Acacia planifrons* (0.087). There were 7 species with low density values (0.013) *Prosopis juliflora*, *Santalum album*, *Polyalthia longifolia*,

Table 3

## Vegetation analysis of trees

Species	D	A	F%	C	RD	RF	RDom.	IVI
<i>Borassus flabellifer</i>	0.387	1.48	26.25	B	22.8	17.13	26.95	66.87
<i>Bassia longifolia</i>	0.027	1.00	2.5	A	1.47	1.63	0.45	3.1
<i>Phoenix sylvestris</i>	0.05	1.00	5.0	A	2.94	3.26	1.48	7.69
<i>Cassia marginata</i>	0.24	1.05	22.5	B	13.97	14.68	8.91	37.56
<i>Prosopis juliflora</i>	0.125	1.00	1.25	A	0.73	0.81	0.89	2.44
<i>Ficus bengalensis</i>	0.025	1.00	2.5	A	1.47	1.63	8.01	11.11
<i>Morinda tinctoria</i>	0.037	1.00	3.75	A	2.20	3.45	1.02	6.67
<i>Caesalpinia coriara</i>	0.037	1.00	3.75	A	2.20	3.45	0.71	6.36
<i>Tamarindus indica</i>	0.05	1.00	5.0	A	2.94	3.26	3.01	9.22
<i>Syzygium cumini</i>	0.087	1.17	7.5	A	5.15	4.89	8.71	10.74
<i>Santalum album</i>	0.012	1.00	1.25	A	0.73	0.81	0.07	1.62
<i>Zizyphus jujuba</i>	0.025	1.00	2.5	A	0.86	1.63	1.34	3.84
<i>Atlantia monophylla</i>	0.1	1.00	10.0	A	5.88	6.25	1.47	13.88
<i>Acacia leucophloea</i>	0.05	1.00	5.0	A	2.94	3.26	1.09	7.93
<i>Lannea coromandelica</i>	0.05	1.00	5.0	A	2.94	3.26	4.54	10.75
<i>Acacia ferruginea</i>	0.037	1.00	3.75	A	2.20	3.45	2.45	8.1
<i>Pamburus missionis</i>	0.05	1.25	5.0	A	2.94	3.26	3.64	9.64
<i>Acacia planifrons</i>	0.087	1.33	7.5	A	5.15	4.89	4.14	14.18
<i>Wrightia tinctoria</i>	0.037	1.00	3.75	A	2.20	3.45	2.47	8.12
<i>Limonia acidissima</i>	0.05	1.5	5.0	A	2.94	3.26	3.7	9.9
<i>Cassia fistula</i>	0.025	1.00	2.5	A	1.47	1.63	1.45	4.55
<i>Albizia lebeck</i>	0.025	1.00	2.5	A	1.47	1.63	1.8	4.91
<i>Cassia siamea</i>	0.037	1.67	3.75	A	2.2	2.45	1.53	6.18
<i>Polyalthia longifolia</i>	0.012	1.00	1.25	A	0.73	0.81	0.17	1.72
<i>Azadirachta indica</i>	0.012	1.00	1.25	A	0.73	0.81	1.38	2.19
<i>Streblus asper</i>	0.025	1.00	2.5	A	1.47	1.63	0.71	3.81
<i>Alangium salvifolium</i>	0.012	1.00	1.25	A	0.73	0.81	0.15	1.7
<i>Guazuma tomentosa</i>	0.012	1.00	1.25	A	0.73	0.81	0.24	1.79
<i>Zizyphus xylopyrus</i>	0.05	1.00	5.00	A	2.94	3.26	0.76	6.96
<i>Acacia auriculiformis</i>	0.025	1.00	2.5	A	1.47	1.63	4.86	7.96
<i>Pterocarpus santalinus</i>	0.012	1.00	1.25	A	0.73	0.81	0.57	2.12

D = Density; A = Abundance; F = Frequency;  
 C = Frequency class; RD = Relative density;  
 RF = Relative frequency; R Dom = Relative Dominance;  
 IVI = Importance Value Index

*Azadirachta indica*, *Alangium salvifolium*, *Guazuma tomentosa* and *Pterocarpus santalinus*.

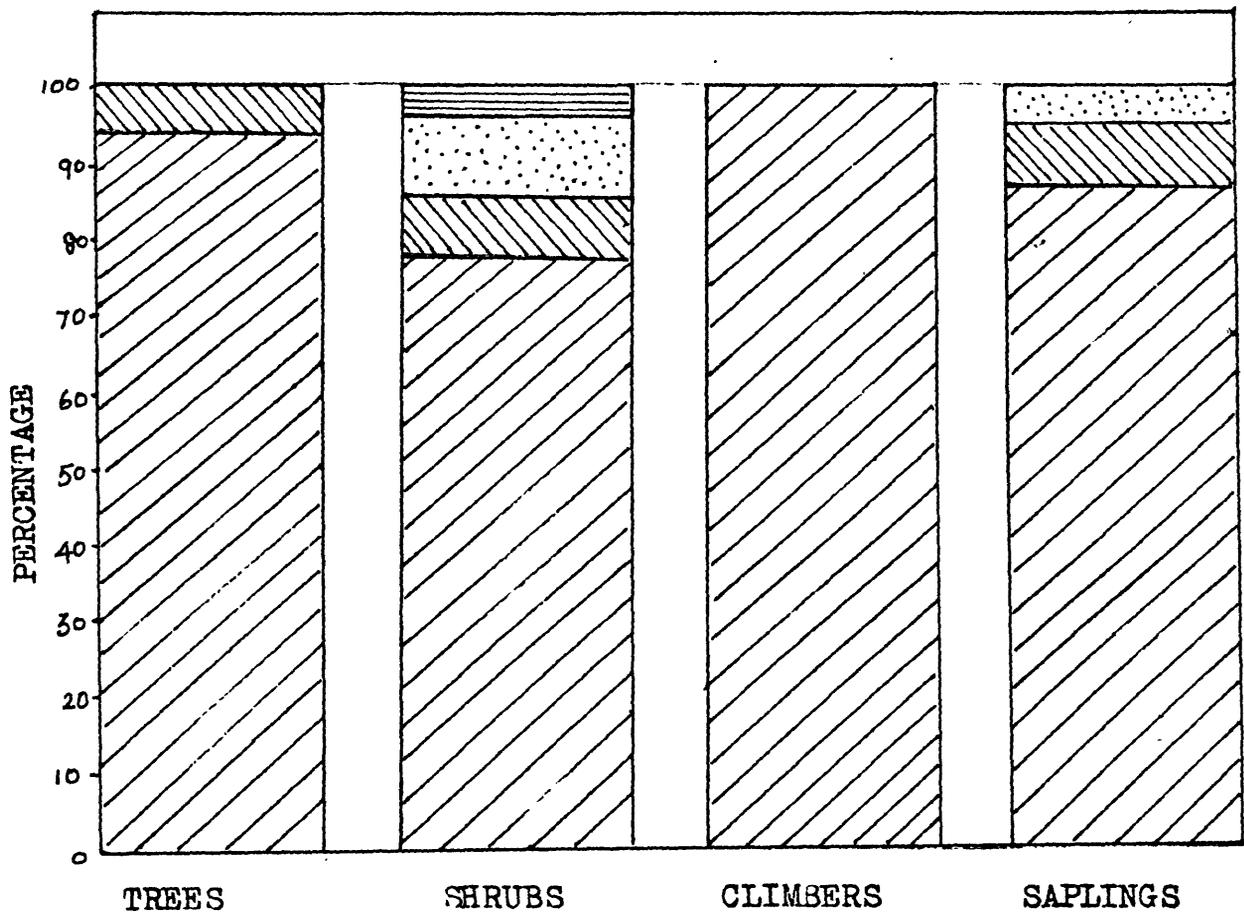
*Cassia siamea* is the most abundant tree species (1.67) followed by *Limonia acidissima* (1.5), *Borassus flabellifer* (1.48) and *Acacia planifrons* (1.33), whereas most of the tree species (25) had almost equal abundance value (1.00).

From the values of percentage frequency, it can be inferred that 93.5% of the trees (Fig.2) occur in 'A' class and this shows that most of the trees are unevenly distributed in the forest. Only 6.5% of the tree species occurred in 'B' class.

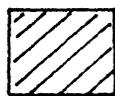
From the Importance Value Index, it is evident that *Borassus flabellifer* is the dominant tree species (66.9), followed by *Cassia marginata* (37.6), *Acacia planifrons* (14.2), *Atlantia monophylla* (13.9), *Ficus bengalensis* (11.1) and *Syzygium cumini* (10.7). Low IVI was recorded for the species like *Santalum album* (1.6), *Alangium salvifolium* (1.7) and *Guazuma tomentosa* (1.8). The higher IVI for *Borassus flabellifer* is mainly due to the very high relative dominance of this species.

Shannon - Weinner diversity index for the tree stratum was 2.94.

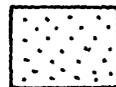
FIG. 2 FREQUENCY CLASS DISTRIBUTION



FREQUENCY CLASSES



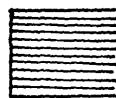
A



C



B



D

## (b-2) SHRUBS

Among the shrubs, *Glycosmis cochinchinensis* has the highest density of 2.86 (Table 4) followed by *Clausena dentata* (2.7) and *Carissa spinarum* (1.77). The higher values for abundance than density recorded for all the shrub species indicate an uneven distribution pattern for shrub layer also (Table 4). *Clausena dentata* has recorded the highest value of abundance (4.5).

In the present investigation, of the 36 species recorded under shrub category, 77, 8.3, 11.1, and 2.8% occurred in percentage frequency classes A, B, C and D respectively. (Fig.2). The higher frequency value for *Glycosmis cochinchinensis* (66.25%) and *Clausena dentata* (60%) clearly shows their relatively uniform distribution.

Shannon - Weinner diversity index for the shrub species was 2.34.

## (b-3) CLIMBERS

Among the climbers *Cissus quadrangularis* showed the highest density value of 0.28 (Table 5) followed by *Capparis zeylanica* (0.18). *Sarcostemma brevistigma* and *Antigonon leptopus* have the highest abundance value (2.00). The higher values for abundance for all the species recorded, establishes the fact that even the climbers are distributed in an uneven fashion.

Table 4

## Vegetation analysis of shrubs

Species	D	A	F%	C	RD	RF
<i>Glycosmis cochinchinensis</i>	2.862	4.32	66.25	D	21.44	15.63
<i>Clausena dentata</i>	2.7	4.5	60.00	C	20.22	14.16
<i>Wikstromia viridiflora</i>	1.2	3.0	40.00	B	8.99	9.44
<i>Phoenix humilis</i>	0.225	1.06	21.00	B	0.02	5.01
<i>Randia malabarica</i>	1.375	2.89	47.5	C	10.3	11.21
<i>Phoenix sylvestris</i>	0.49	2.5	3.75	A	0.22	0.87
<i>Carissa spinarum</i>	1.775	3.74	47.5	C	13.3	11.21
<i>Toddalia asiatica</i>	0.1	1.6	6.25	A	0.75	1.47
<i>Opuntia dillenii</i>	0.012	1.0	1.25	A	0.09	0.29
<i>Randia dumetorum</i>	1.362	3.2	42.5	C	10.21	10.03
<i>Rauwolfia canescens</i>	0.05	1.33	3.75	A	0.37	0.77
<i>Dodonea viscosa</i>	0.025	1.0	2.5	A	0.19	0.59
<i>Gmelina asiatica</i>	0.125	1.67	7.5	A	0.94	1.77
<i>Dichrostachys cinerea</i>	0.025	1.0	2.5	A	0.19	0.59
<i>Cassia auriculata</i>	0.062	2.5	2.5	A	0.47	0.59
<i>Flacourtia sepiaria</i>	0.387	2.07	18.75	B	2.9	4.42
<i>Jatropha glandulifera</i>	0.037	1.5	2.5	A	0.28	0.59
<i>Eugenia bracteata</i>	0.012	1.0	1.25	A	0.09	0.29
<i>Fluggea leucopyrus</i>	0.162	3.25	5.00	A	1.22	1.18
<i>Canthium parviflorum</i>	0.05	2.0	2.5	A	0.37	0.59
<i>Ehretia microphylla</i>	0.02	2.0	1.25	A	0.19	0.29
<i>Memecylon edule</i>	0.012	1.0	1.25	A	0.09	0.29
<i>Atlantia monophylla</i>	0.075	2.0	3.75	A	0.56	0.88
<i>Cassia marginata</i>	0.037	1.0	3.75	A	0.28	0.88
<i>Capparis zeylanica</i>	0.037	1.5	2.5	A	0.84	0.59
<i>Acacia auriculiformis</i>	0.112	4.5	2.5	A	0.84	0.59
<i>Tamarindus indica</i>	0.012	1.0	1.25	A	0.09	0.29
<i>Zizyphus oenoplia</i>	0.062	1.67	3.75	A	0.47	0.88
<i>Syzygium cumini</i>	0.212	3.4	6.25	A	1.59	1.47
<i>Pamburus missionis</i>	0.012	1.0	1.25	A	0.09	0.29
<i>Borassus flabellifer</i>	0.02	1.0	2.5	A	0.19	0.59
<i>Ixora parviflora</i>	0.012	1.0	1.25	A	0.09	0.29
<i>Pavetta indica</i>	0.02	2.0	1.25	A	0.19	0.29
<i>Annona squamosa</i>	0.075	1.5	5.00	A	0.56	1.18

D = Density; A = Abundance; F = Frequency percentage;  
 C = Frequency class; R.D = Relative Density;  
 RF = Relative Frequency.

Table 5

Vegetation analysis of Climbers

Species	D	A	F%	C	RD	RF
<i>Capparis zeylanica</i>	0.187	1.5	12.5	A	17.04	16.13
<i>Pterolobium indicum</i>	0.012	1.0	1.25	A	1.14	1.61
<i>Cissus quadrangularis</i>	0.28	1.38	20.00	A	25.00	25.8
<i>Ichnocarpus frutescens</i>	0.1	1.6	6.25	A	9.09	8.06
<i>Sarcostemma brevistigma</i>	0.025	2.0	25.00	A	2.27	1.61
<i>Gymnema sylvestre</i>	0.025	1.0	2.5	A	2.27	3.22
<i>Jasminum sessiliflorum</i>	0.125	1.43	8.75	A	11.36	11.29
<i>Leptadenia reticulata</i>	0.1	1.0	10.00	A	9.09	12.90
<i>Abrus precatorius</i>	0.0125	1.0	1.25	A	1.14	1.61
<i>Cassytha filiformis</i>	0.087	1.75	1.25	A	5.00	5.15
<i>Hemidesmus indicus</i>	0.012	1.0	1.25	A	1.14	1.61
<i>Tylophora asthmatica</i>	0.088	1.75	5.00	A	7.95	6.45
<i>Antigonon leptopus</i>	0.05	2.00	2.5	A	4.54	3.22

D = Density; A = Abundance; F = Frequency percentage;  
 C = Frequency class; R.D = Relative Density;  
 RF = Relative Frequency.

All the 13 species come under frequency class A (Fig.2). When compared with other climbers *Cissus quadrangularis*, *Leptodenia reticulata* and *Ichnocarpus frutescens* are more common.

Shannon-Weinner diversity index for the climber species was 2.2.

#### (b-4) SAPLINGS

The seedlings and saplings of most of the trees, shrubs and climber species were recorded in the lower strata of the forest. *Glycosmis cochinchinensis* has the highest density of 1.11, followed by *Clausena dentata* (0.9) and *Carissa spinarum* (0.8). *Glycosmis cochinchinensis* is a gregarious shrub and its seedlings occur in large numbers. Of the total 26 species of saplings recorded 88.5%, 7.7% and 3.85% were distributed in percentage frequency classes A, B and C respectively.

#### IV FUTURE PLAN OF WORK ON THE PROJECT

Studies on the habitat preferences and utilization by chital and blackbuck is to be carried out. A matter of great concern is the carrying capacity of the area. Chitals have multiplied while blackbucks have registered a decrease. As it is, the animals are being given fodder and water regularly during the lean period. It is necessary to understand the requirements

of feed for the ungulate population of the national park. For this, the dynamics of growth of existing grasses and shrubs consumed by the blackbuck and chital have to be estimated. This is an important part of the work which has now to be taken up. The chital are found in large numbers in the IIT campus rather than in G.N.P. In the former area, a number of them scavenge around human habitations. Diseased animals are also found in the IIT Campus. Comparison of GNP with a much more disturbed area i.e the IIT campus will be very interesting.

Species richness of birds is to be carried out in the different habitats of G.N.P. Counts are being taken by MNS members regularly.

Water availability to animals during the different seasons of the year is to be monitored since there is no information on this important parameter.

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## APPENDIX - 1

### CLIMATOLOGY

In Guindy National Park, Air Temperature, Humidity and Rainfall were recorded from May 1990 to October 1990. The results are given as mean monthly values for Air temperature and humidity. Rainfall is given in monthly total values (Table 6, Fig.3).

#### AIR TEMPERATURE

The mean monthly minimum temperature ranged between 22.1°C recorded in August and 26.7°C recorded in October. The mean monthly maximum temperature was lowest (30.9°C) in October and the highest (36.2°C) in May (Fig.3). The highest temperature was recorded on 17th June 1990 i.e 39°C.

#### RELATIVE HUMIDITY

The mean monthly percentage of relative humidity ranged between 78% (August, 1990) and 83% in October (Table 6).

#### RAINFALL

All the six months received rain. The total precipitation recorded was 840 mm spread over 65 rainy days. Maximum rainfall was recorded (463 mm) during

October, 1990 and minimum rain of 9 mm was recorded during June, 1990 (Fig.3). The number of rainy days varied from seven to thirteen during the period of study. The rainfall in May was unusually high this year.

**Table 6**

Mean monthly maximum and minimum Temperatures, Humidity and Total monthly rainfall at Guindy National Park, During the period of study (May-Oct, 1990)

Months	Temperature °C		Humidity	Ave.rain
	Maximum	Minimum	%	monthly (mm)
May	36.2	24.1	83.6	215.2
June	36.0	23.8	80.7	9.3
July	33.5	23.0	82.4	42.5
Aug	34.4	22.1	78.2	51.7
Sep	34.7	22.9	80.7	58.2
Oct	30.8	24.7	83.8	463.1

FIG. 3 MONTHLY TOTAL RAINFALL

