Distribution of plant species according to growth form

Shrub

From the eight different plant species which are represented in this growth form *Palisota mannii* is the most prevalent species in the 0.5 m and the 1.0 m height classes (Figure 6.33). *Aframomum angustifolium* is the most widely distributed species occurring in four of the five represented height classes, while missing in the 0.5 m height class (Figure 6.33). The shrub growth form has no representatives in the > 6.0 m height class (Figure 6.33). The 0.5 m height class has the highest density of shrub with a mean of 241 plants per hectare. The 1.0 m and 4.0 - 5.0 m height class both have a density equal to or below 50 plants per hectare, with the latter height class having the lowest mean density with 16 plants per hectare (Figure 6.33). *Nephrolepis biserrata*, *Palisota mannii and Palisota schweinfurthii* are only represented in the shrub growth form (Figure 6.33 – 6.38).

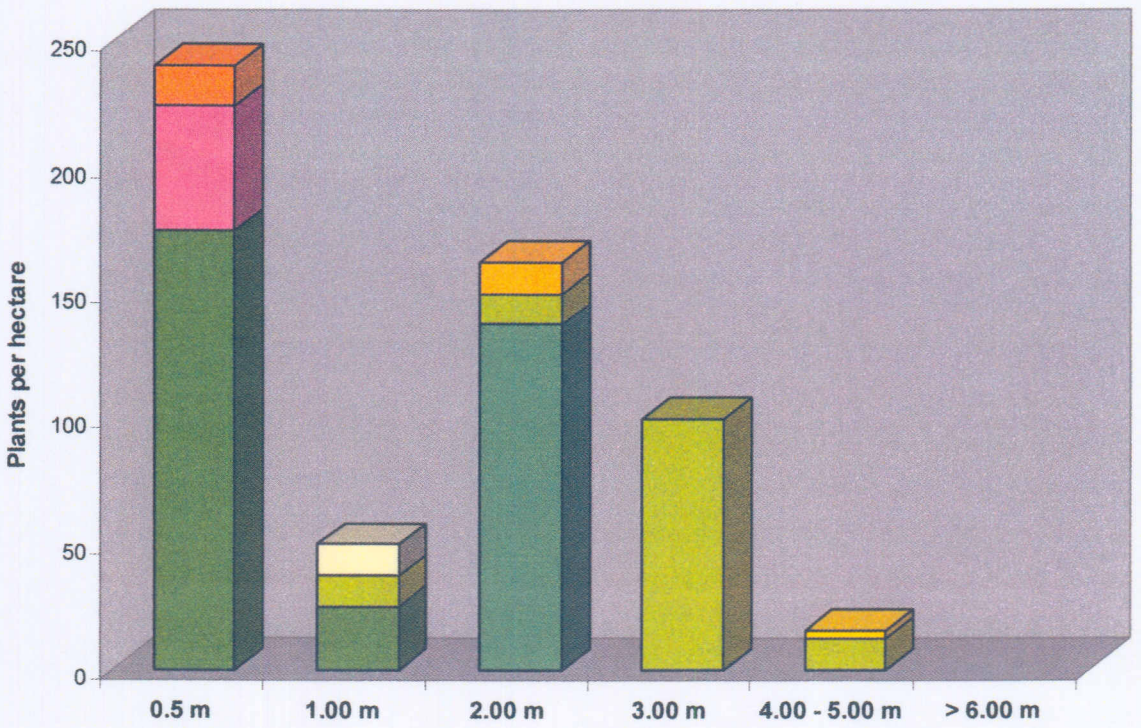

Figure 6.33: Mean density (plants per hectare) of shrub according to plant species and height class.

Key:

- *Dracaena fragrans*
- *Oxyanthus speciosus*
- *Galinera saxifraga*
- *Nephrolepis biserrata*
- *Palisota schweinfurthii*
- *Aframomum angustifolium*
- *Ouratea hiernii*
- *Palisota mannii*

Sparse shrub

This growth form is represented by 13 different plants species, while only four of the species contributing to the shrub growth form are also represented here, namely *Aframomum angustifolium*, *Dracaena fragrans*, *Ouratea hiernii* and *Oxyanthus speciosus* (Figure 6.34). *Aframomum angustifolium* is again the most widely distributed and also the most abundant species (Figure 6.34). It occurs in the first four height classes, but not in the 4.0 - 5.0 m height class. There are no representatives of this growth form in the > 6.0 m height class (Figure 6.34). The height class with the highest density of plants is the 2.0 m height class with 250 sparse shrub per hectare, while the 4.0 -5.0 m height class has the lowest density with 54 plants per hectare. Both of these height classes contain four different plant species (Figure 6.34). *Antiaris toxicara* and *Millettia dura* are the only two species which have representatives solely in the sparse shrubs growth form but in no other growth form (Figure 6.33 – 6.38).

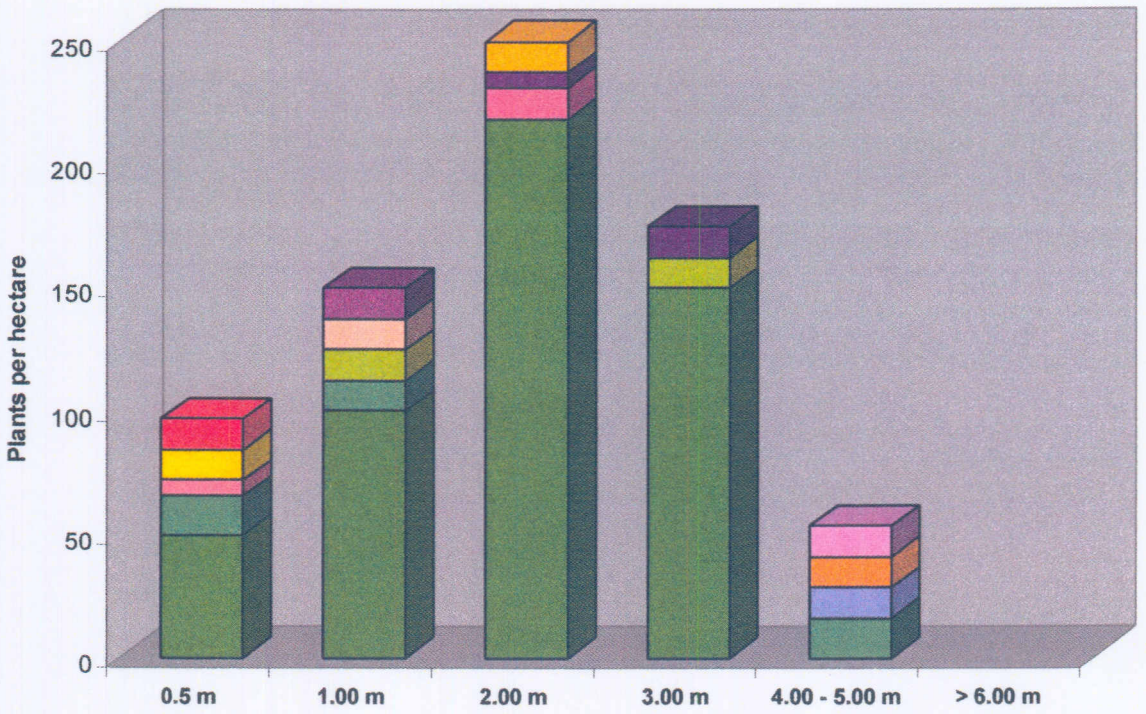

Figure 6.34: Mean density (plants per hectare) of sparse shrub according to plant species and height class.

Key:

- *Peddiea fischeri*
- *Eugenia capensis*
- *Milettia dura*
- *Guarea cedrata*
- *Albizia gumnifera*
- *Antiaris toxicara*
- *Macaranga monandra*
- *Dictyandra arborescens*
- *Dracaena fragrans*
- *Ouratea hiernii*
- *Coffea canephora*
- *Oxyanthus speciosus*
- *Aframomum angustifolium*

Tree

Trees are present in all six of the investigated height classes and 35 of the identified 41 woody species contribute to this growth form. Of those, twelve species also have representatives in either one or both of the shrub vegetation types, i.e. *Aframomum angustifolium, Albizia gumnifera, Coffea canephora, Dictyandra arborescens, Dracaena fragrans, Eugenia capensis, Galinera saxifraga, Guarea cedrata, Macaranga monandra, Ouratea hiernii, Oxyanthus speciosus* and *Peddiea fischeri*. On the basis of their density the 35 species have been assembled into four different groups (Figures 6.35 – 6.39).

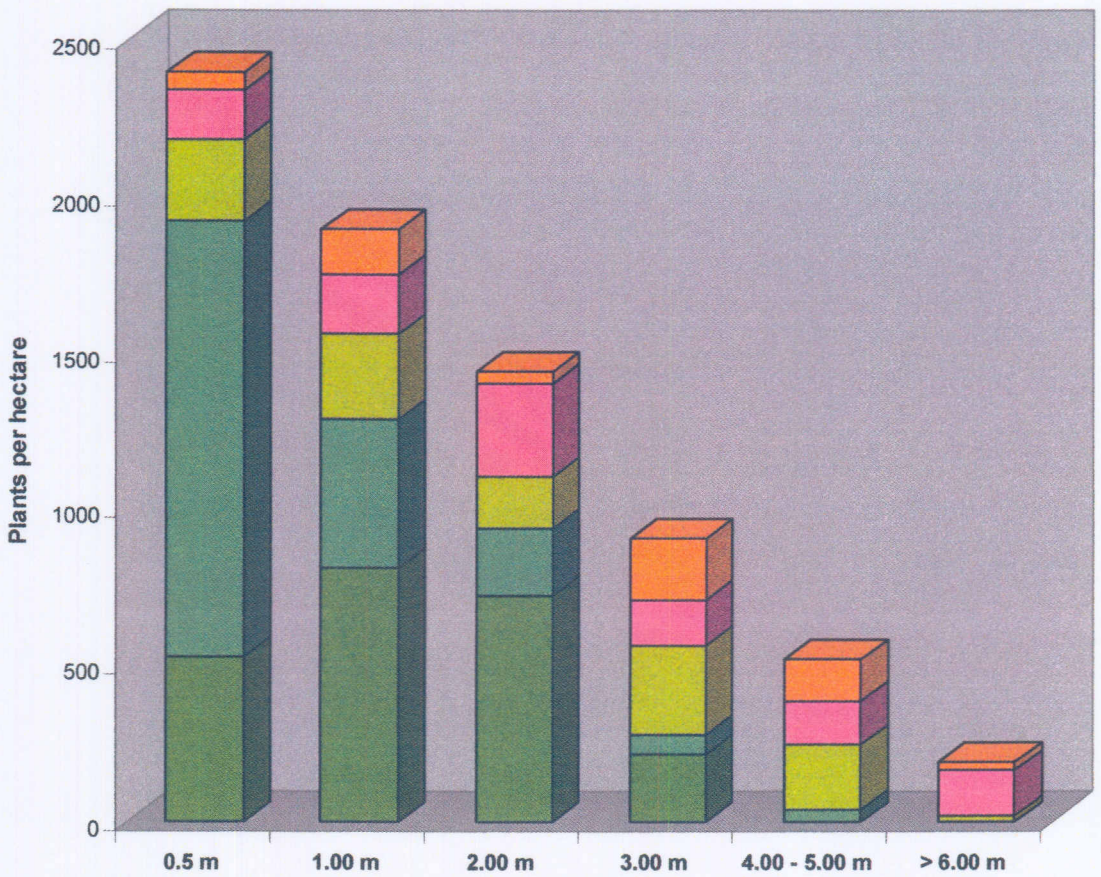

Figure 6.35: Mean density (plants per hectare) of trees of species reaching densities of > 500 plants per hectare.

Key:

- *Oxyanthus speciosus*
- *Guarea cedrata*
- *Albizia gumnifera*
- *Dracaena fragrans*
- *Aframomum angustifolium*

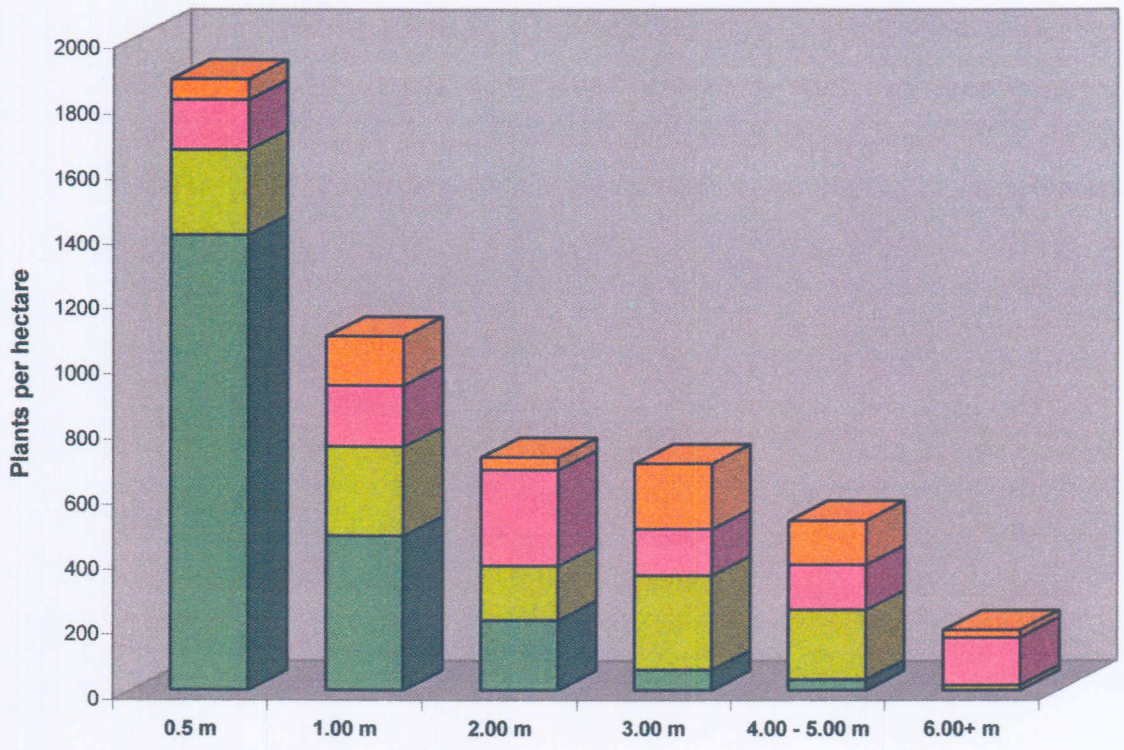

Figure 6.36: Mean density (plants per hectare) of trees of species reaching densities of > 500 plants per hectare. Contributions of *Aframomum angustifolium* are not taken into consideration.

Key:

- *Oxyanthus speciosus*
- *Guarea cedrata*
- *Albizia gumnifera*
- *Dracaena fragrans*

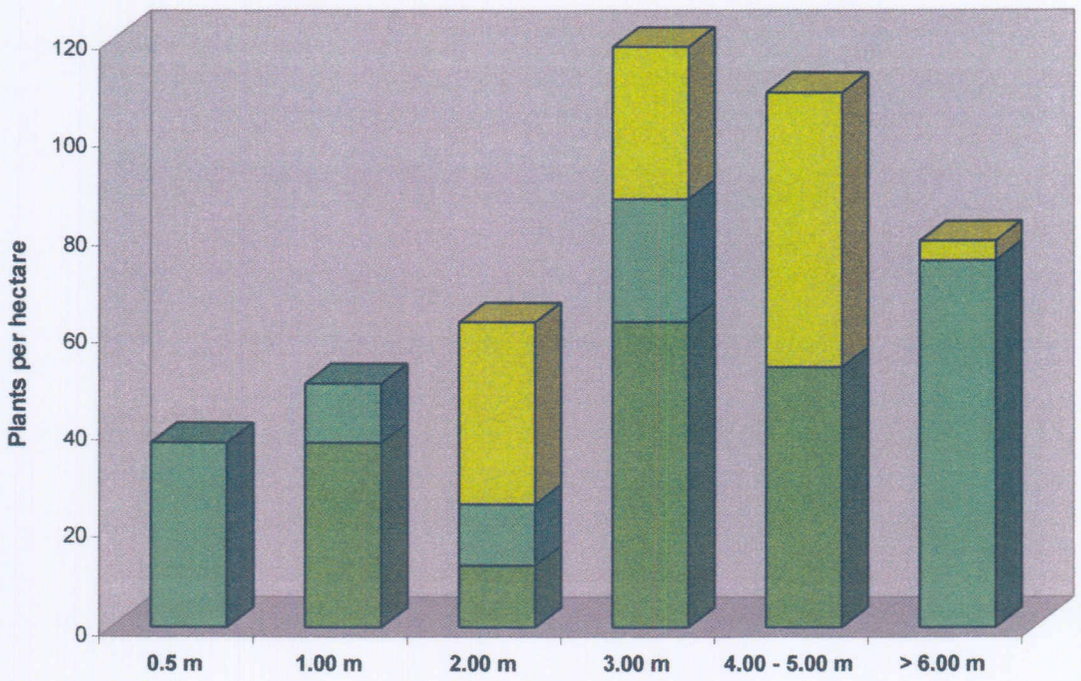

Figure 6.37: Mean density (plants per hectare) of trees of species reaching densities of > 100 to 500 plants per hectare.

Key:

- *Tetrorchidium didymostemon*
- *Pachystela brevipes*
- *Galinera saxifraga*

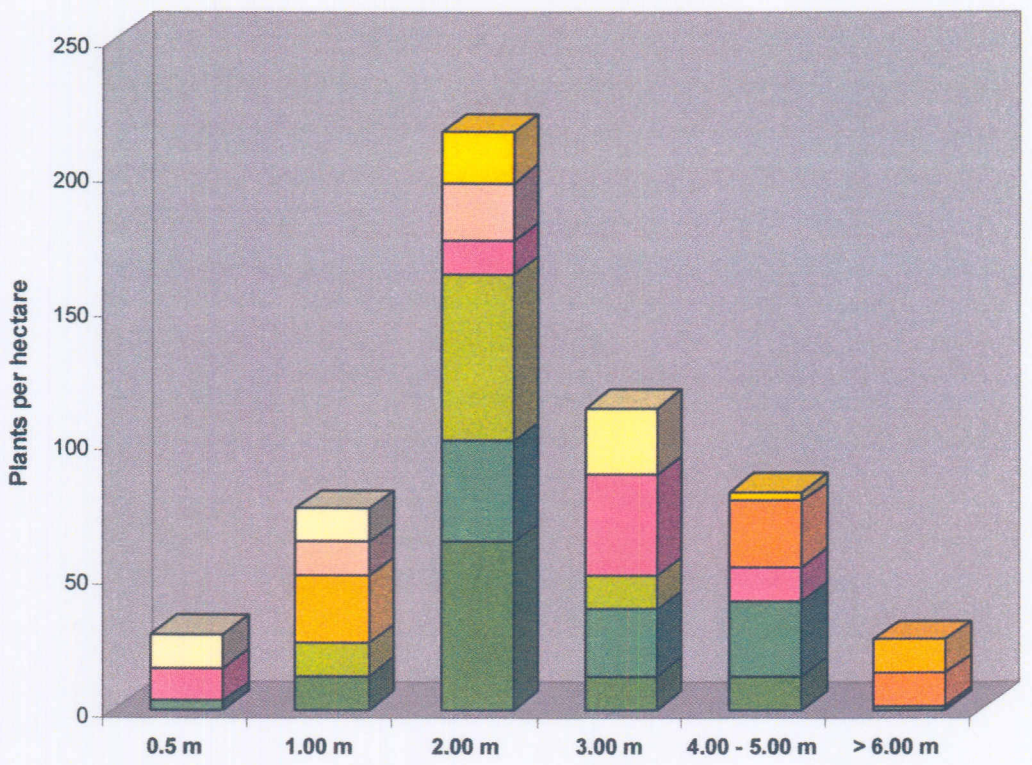

Figure 3.38: Mean density (plants per hectare) of trees of species reaching densities of > 20 to 100 plants per hectare.

Key:

- *Beilschmedia ugandensis*
- *Canthium species 1*
- *Coffea canephora*
- *Psychotria peduncularis*
- *Eugenia capensis*
- *Macaranga monandra*
- *Ficus ovata*
- *Ouratea hiernii*
- *Alchornea cordifolia*
- *Dictyandra arborescens*

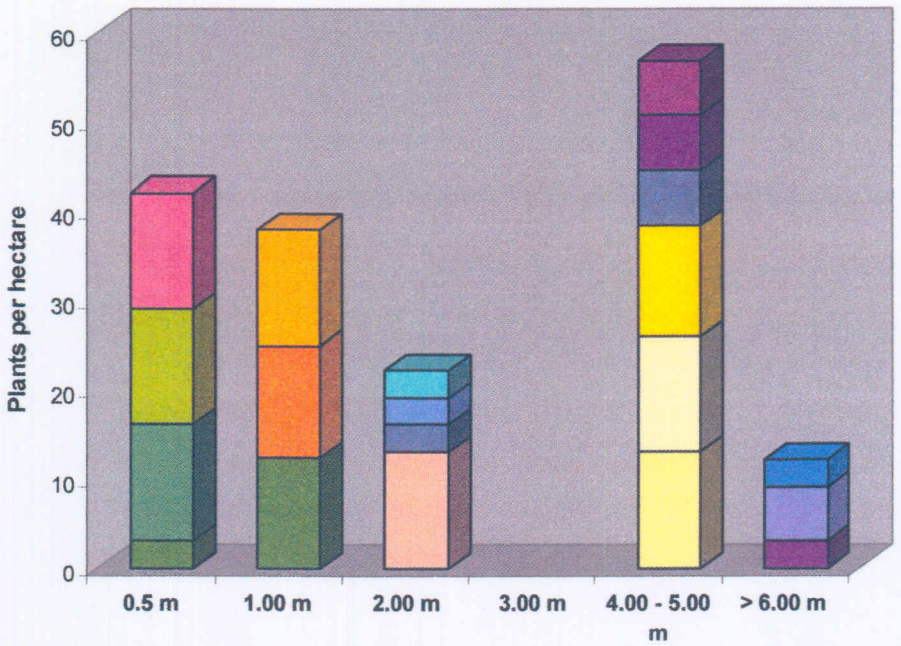

Figure 6.39: Mean density (plants per hectare) of trees of species reaching densities of >1 to 20 plants per hectare.

Key:

- *Clitandra cymulosa*
- *Trilepsium madagascariense*
- *Psychotria mannii*
- *"Unidentified species"*
- *Ficus wildemanniana*
- *Peddiea fischeri*
- *Ronorea brachipetala*
- *Oxyanthus speciosus* var. *stenocarpus*
- *Clitandra species 1*
- *Canarium schweinfurthii*
- *Oxyanthus subpunctatus*
- *Clerodendrum formicarum*
- *Entandophragma utile*
- *Psychotria species 1*
- *Trichilia species 1*
- *Ficus species 2*
- *Ficus species 1*

The first group with mean tree densities of > 500 plants per hectare comprises five different species (Figure 6.35). The tree density in this group declines stepwise from the 0.5 m (2 403 plants per hectare) to the > 6.0 m height class (186 plants per hectare) (Figure 6.35). This is mainly due to the high density of *Dracaena fragrans* and *Aframomum angustifolium* in the three lowest height classes (Figure 6.35). Without *Aframomum angustifolium* the sequence of densities remains the same (Figure 6.36). There is a ten-fold, but stepwise decrease in tree density from the 0.5 m (1 879 plants per hectare) to the > 6.0 m (186 plants per hectare) height class (Figure 6.36). The highest contribution of *Aframomum angustifolium* is to the 2.0 m height class to which it contributes 50% of plants per hectare, followed by the 1.0 m height class with 43% of plants per hectare (Figure 6.35). *Aframomum angustifolium* contributes about one-fifth of the plants per hectare in the 0.5 m (22%) and the 3.0 m (23%) height class (Figure 6.35).

The second group with mean tree densities of > 100 to 500 plants per hectare comprises only three different plant species (Figure 6.37). The highest density of trees per hectare is in the 3.0 m height class (119 plants per hectare), mainly due to a high density of *Galinera saxifraga* (63 plants per hectare) (Figure 6.37). There is a slight decline in density towards the two taller height classes and a nearly two-fold decline towards the 2.0 m height class (64 plants per hectare), with tree density further decreasing towards the 0.5 m height class (38 plants per hectare), only representing *Pachystela brevipes* (Figure 6.37).

The third group with mean tree densities of > 20 to 100 plants per hectare comprises ten different species (Figure 6.38). The highest density of trees per hectare is in the 2.0 m height class (218 plants per hectare) (Figure 6.38). The density decreases towards the three taller height classes, beginning with a more than two-fold decrease in density to the 3.0 m height class (Figure 6.38). It also decreases towards the two smaller height classes, beginning with a nearly three-fold decrease towards the 1.0 m height class. The smallest and tallest height class have nearly the same tree density, namely 27 and 29 plants per hectare, respectively (Figure 6.38). In this group *Dictyandra arborescens* is the most prominent species with 100 trees per hectare, but with no representatives in the 0.5 m height class and the > 6.0 m height class (Figure 6.38).

The final group with mean tree densities of > 1 to 20 plants per hectare contains 17 different species, but has no representatives in the 3.0 m height class (Figure 6.39). Only two species represented in the three smallest height classes also have representatives in the two tallest

height classes, namely *Oxyanthus speciosus var. stenocarpus* (1.0 m and 4.0 - 5.0 m height class) and *Rinorea brachipetala* (2.0 m and 4.0 - 5.0 m height class) (Figure 6.39). The highest tree density is in the 4.0 - 5.0 m height class with 57 plants per hectare and representing also the greatest species richness, namely six different species (Figure 6.39).

Overall, this group has the greatest species richness of all four groups, followed by the third group with ten different species (Figure 6.38 & 6.39). The first and second group, showing the highest tree densities, have the smallest species richness with four, respectively three different species each – if *Aframomum angustifolium* is not considered (Figure 6.36 & 6.37).

Density of "Dead Trees"

Tables 6.9 & 6.10 show the number of "Standing dead" and "Fallen dead" trees per hectare for each sample plot and stem diameter classes, while Figure 6.40 classifies the sample plots according to their density of the total number of dead trees per hectare and Figure 6.41 shows the percentage of dead trees in each sample plot. To calculate these percentages the number of trees per hectare in each sample plot corrected for *Aframomum angustifolium* have been used (Figure 6.32).

Table 6.9: *Number of "Fallen dead" trees per hectare in each sample plot according to stem diameter categories*

Number of "Fallen dead" trees												
Plot		1	2	3	4	5	6	7	8	Mean	Σ	%
Stem diameter [cm]	10-15	4	6	4	75	20	11	8	25	19.1	153	40.13
	> 15-20	4				8	33		6	6.4	51	13.45
	> 20-25	8	6	4	25	8		4	13	8.5	68	17.86
	> 25-30		6		25		11	8	6	7	56	14.71
	> 30-50	4	6					12	6	3.5	28	7.35
	> 75-100				25					3.1	25	6.51
Total		20	24	8	150	36	55	32	56	47.6	381	100

Table 6.10: *Number of "Standing dead" trees per hectare in each sample plot according to stem diameter categories*

Number of "Standing dead" trees												
Plot		1	2	3	4	5	6	7	8	Mean	Σ	%
Stem diameter [cm]	10-15			8				44		6.5	52	46.43
	> 15-20						4			0.5	4	3.57
	> 20-25	4		4	4				19	3.9	31	27.86
	> 25-30			4					6	1.3	10	9.29
	> 30-50			4				11		1.9	15	13.57
Total		4	0	20	4	0	4	55	25	14	112	100

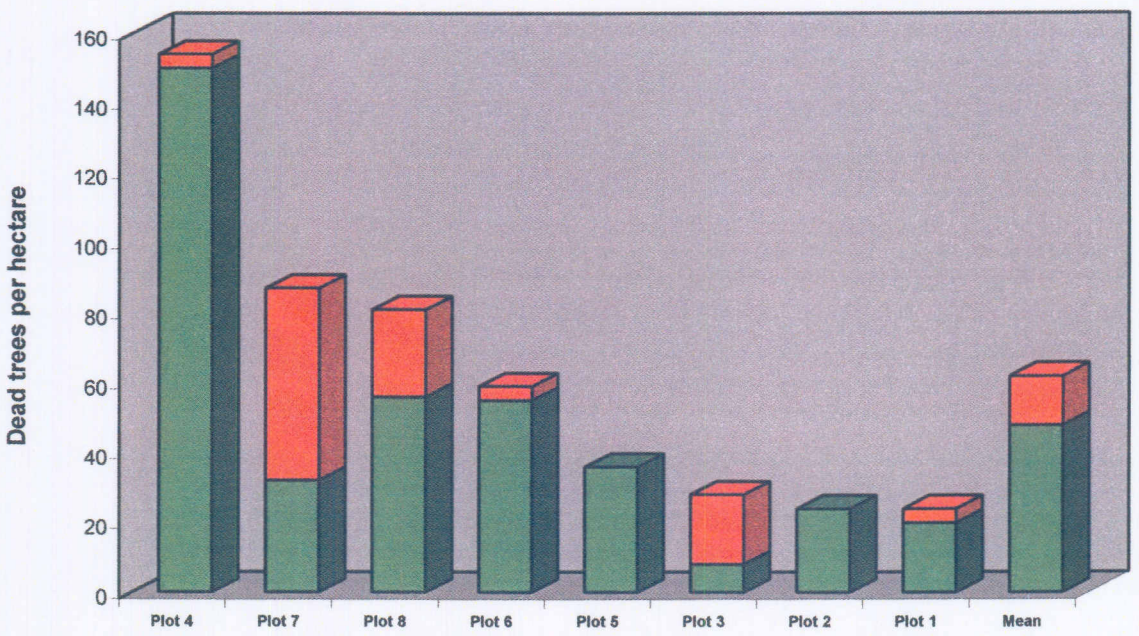

Figure 6.40: Number of dead trees per hectare.

Key:
- Number of standing dead trees
- Number of fallen dead trees

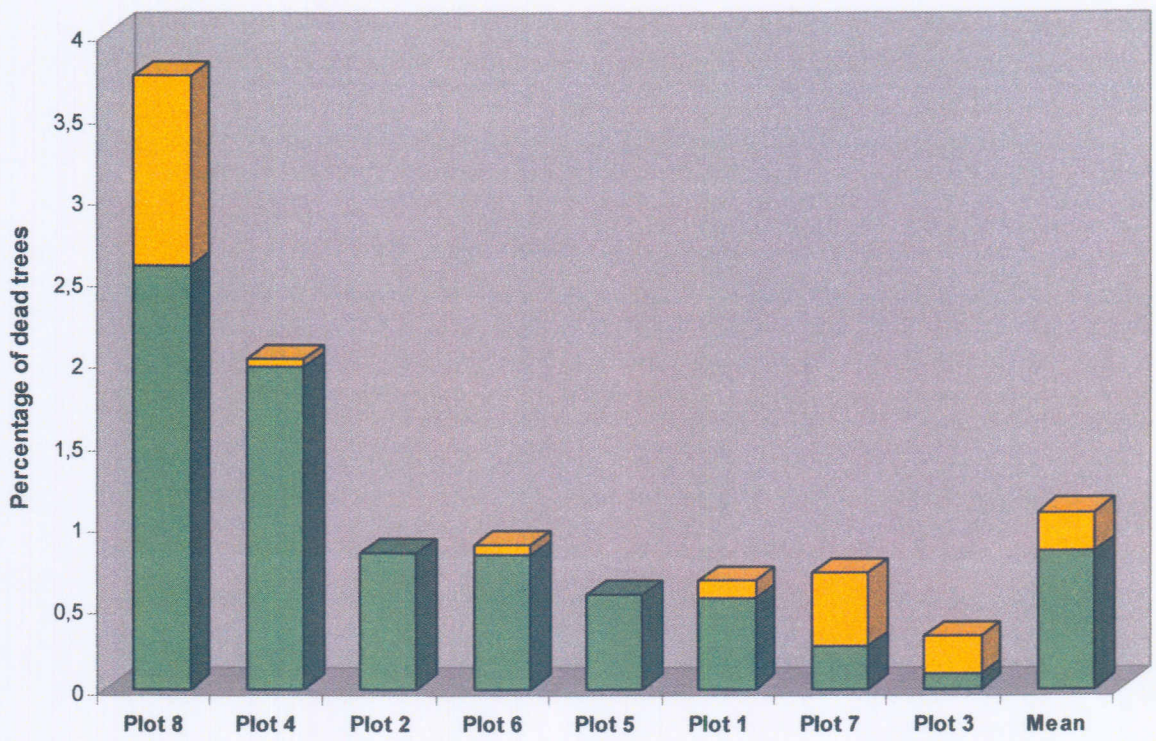

Figure 6.41: Percentage of total density made up by dead trees.

Key:
- Percentage of standing dead trees
- Percentage of fallen dead trees

The mean density of dead trees for the whole island is 62 plants per hectare, composed of a mean of 14 "Standing dead" and 48 "Fallen dead" (Figure 6.40). The mean percentage contribution to the mean total density made by dead trees is 1.08% for the whole island with 0.24% "Standing dead" and 0.84% "Fallen dead" trees (Figure 6.41).

The highest density of "Fallen dead" trees occurs in plot 4 (150 plants per hectare), followed by plot 8 (56 plants per hectare) and plot 6 (55 plants per hectare) (Table 6.9 & Figure 6.40). The highest percentage of "Fallen dead" trees though occurs in plot 8 (2.59%), followed by plot 4 (1.97%) and plot 2 (0.83%) (Figure 6.41). Considering the stem diameter a mean of 40.13%, i.e. 19.1 plants per hectare of "Fallen dead" trees occurs in the lowest diameter class of 10-15 cm (Table 6.9), followed by the third diameter class of > 20-25 cm, with a mean of 8.5 plants per hectare or 17.86% (Table 6.9).

The highest density of "Standing dead" trees occurs in plot 7 (55 plants per hectare), followed by plot 8 (25 plants per hectare) and plot 3 (20 plants per hectare) (Table 6.10 & Figure 6.40). The highest percentage of "Standing dead" trees though occurs in plot 8 (1.16%), followed by plot 7 (0.45%) and plot 3 (0.23%) (Figure 6.41). Considering the stem diameter a mean of nearly 50% (46.43%), i.e. 6.5 plants per hectare of "Standing dead" trees occurs in the lowest diameter class of 10-15 cm (Table 6.10), followed by the third diameter class of > 20-25 cm with a mean of 3.9 plants per hectare or 27.86% (Table 6.10).

The highest percentage of "Fallen dead" and "Standing dead" hence occurs in plot 8, while the stem diameter classes with the highest mean percentages of "Dead trees" per hectare are the lowest (10-15 cm) and third (> 20-25 cm) class for both "Dead tree" categories (Table 6.9 & 6.10 & Figure 6.40 & 6.41).

Ngamba Island chimpanzees' plant food species

When comparing Marshall's (2000) list of known Ngamba Island chimpanzees' plant food species (see Annex - Table 2) with the distribution and densities of these species throughout the eight sample plots, the following picture emerges:

The plot with the highest density of food plants is plot 7 (17 375 plants per hectare), followed by plot 5 (13 975 plants per hectare), plot 3 (12 725 plants per hectare) and plot 6 (11 900 plants per hectare). Three of these plots (5, 6 & 7) are part of the *Dracaena fragrans-*

Psychotria peduncularis moist evergreen forest community in the eastern part of the island, while plot 3 represents the highest density of *Aframomum angustifolium* (5 700 plants per hectare) (Table 6.3 & 6.4). All four plots are concentrated in the central and eastern part of the island (Figure 6.1). The plant species with the highest mean density is *Aframomum angustifolium* (2 991 plants per hectare), followed by *Dracaena fragrans* (2 209 plants per hectare), *Commelina capitata* (1 863 plants per hecatre), *Albizia gumnifera* (1 185 plants per hectare) and *Guarea cedrata* (1 078 plants per hectare). Apart from *Oxyanthus speciosus* (679 plants per hectare) all remaining food plant species have a mean density below 200 plants per hectare (Table 6.4).

Distribution and density of* Ficus *species

Only four of the eight sample plots comprise any *Ficus* spp. (Figure 6.42). The highest density of fig trees is represented in plot 4 (600 plants per hectare) which is also the plot with its centre point at the highest altitude (1 176 ± 5 m) (Table 6.1). Three of the four plots (2, 4, & 8) are part of the *Tetrorchidium didymostemon-Macaranga monandra moist evergreen forest community* and all plots are concentrated more in the south-western part of Ngamba Island (Table 6.3 & Figure 6.1 & 6.2).

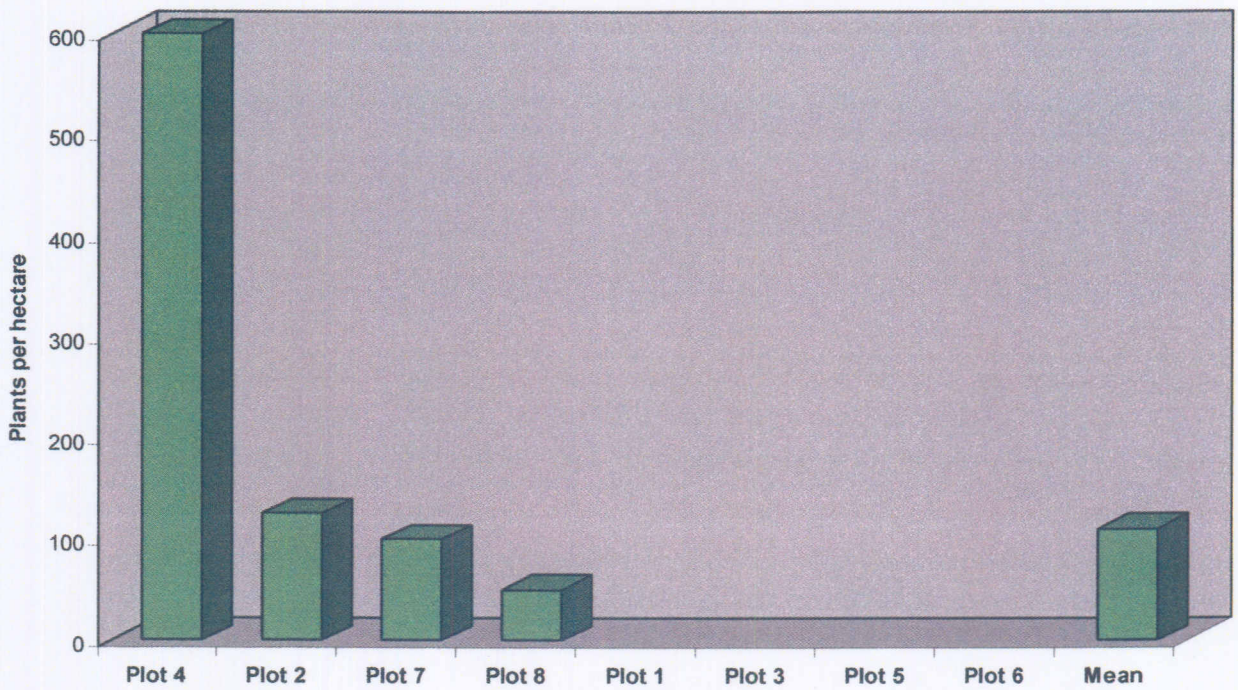

Figure 6.42: Number of individual Fig trees (*Ficus* species) per hectare.

Key: Number of *Ficus* trees

Total projected canopy cover

Total projected canopy cover at different height classes

The projected canopy cover was calculated using the method as described by Coetzee and Gertenbach (1977). In the > 6.0 m height class plot 2 has the highest percentage of total projected canopy cover (363.59%), followed by plot 5 (304.27%) and plot 6 (233.59%). In all these plots the> 6.0 m height class contributes the highest percentage of all height classes to the total projected canopy cover (Figures 6.43 – 6.47). For the remaining five plots this is not the case and the total projected canopy cover for all these is below 75% in the > 6.00 m height class (Figure 6.43 – 6.47). Considering the density of plants plot 2 has the lowest number of trees (2 900) as well as plants (3 100) per hectare of all plots (Figure 6.5). While plot 5 represents the third lowest density of trees (6 200) and plants (7 300), respecftively, plot 6 possesses the third highest density of trees (9 500) and plants (11 000) per hectare (Figure 6.5).

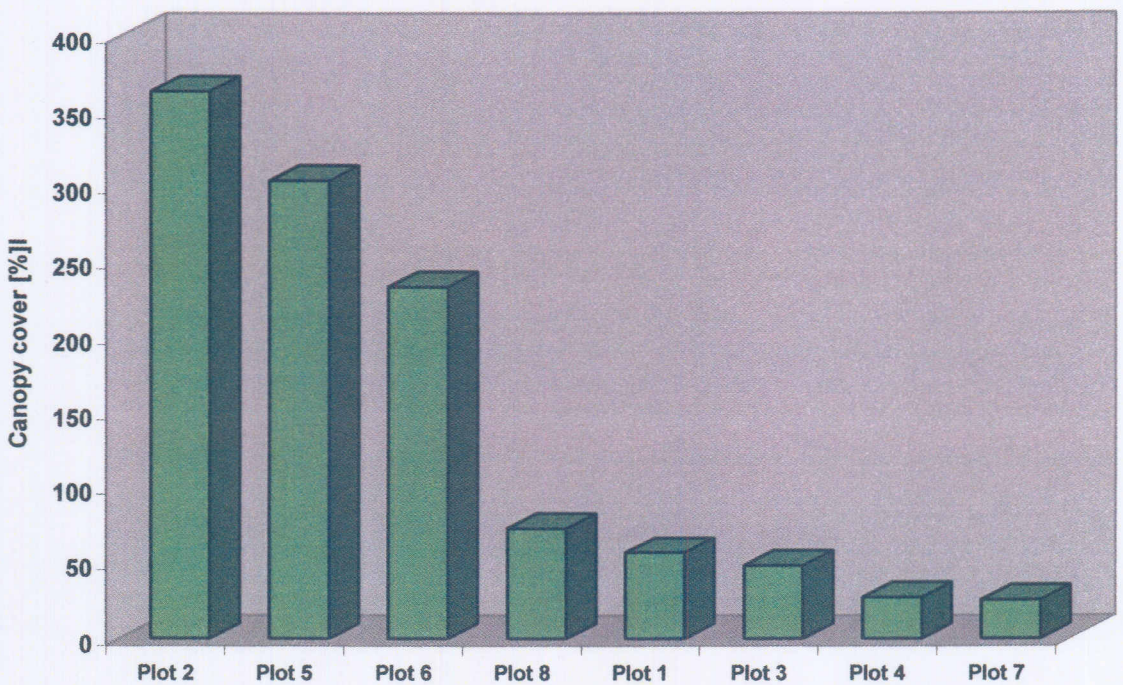

Figure 6.43: Total projected canopy cover of the > 6.0 m height class for all sample plots.

Key: Percentage canopy cover

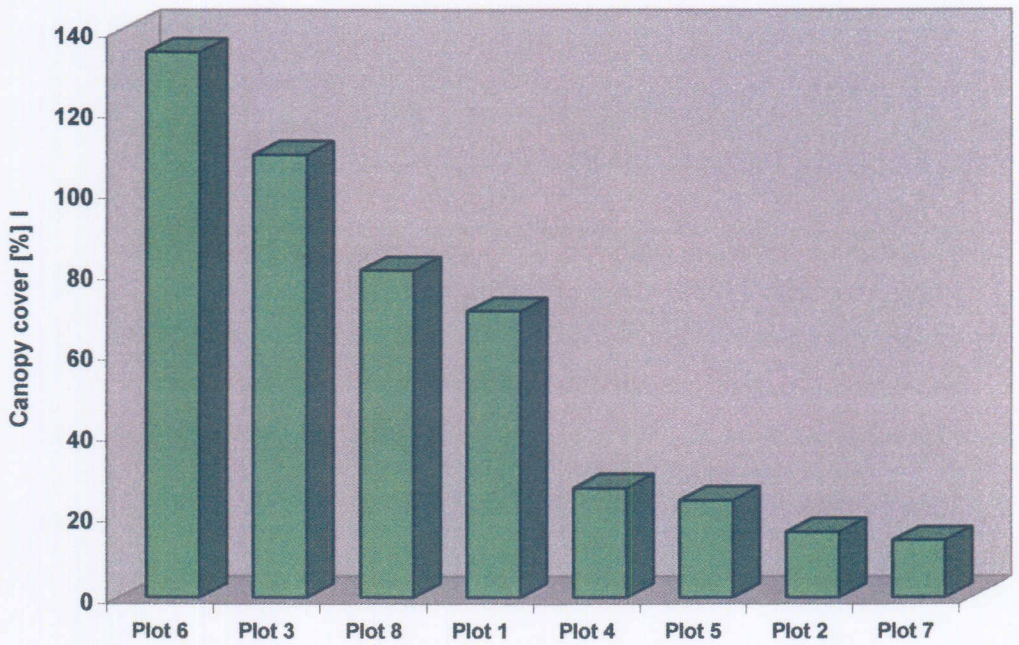

Figure 6.44: Total projected canopy cover of the 4.0 - 5.0 m height class for all sample plots.

Key: Percentage canopy cover

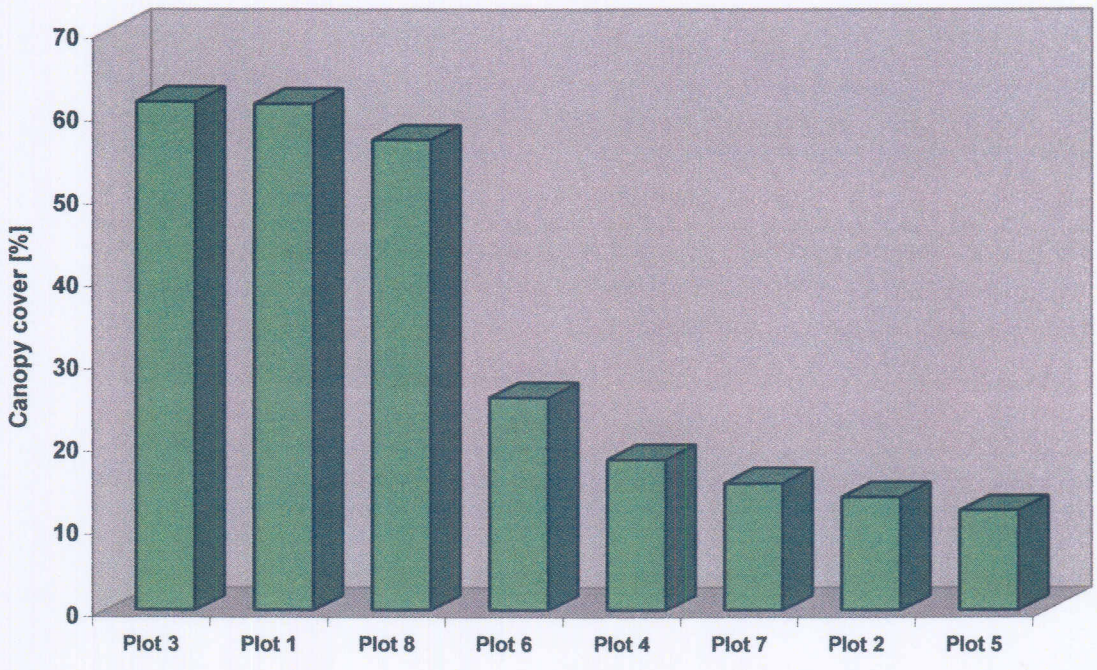

Figure 6.45: Total projected canopy cover of the 3.0 m height class for all sample plots.

Key: Percentage canopy cover

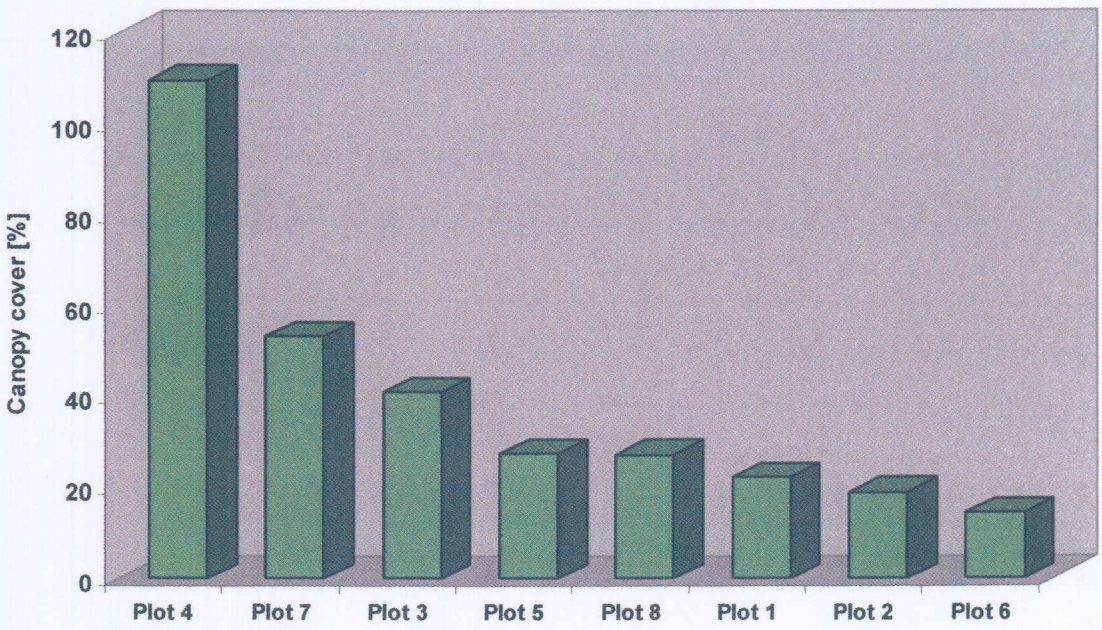

Figure 6.46: Total projected canopy cover of the 2.0 m height class for all sample plots.

Key: Percentage canopy cover

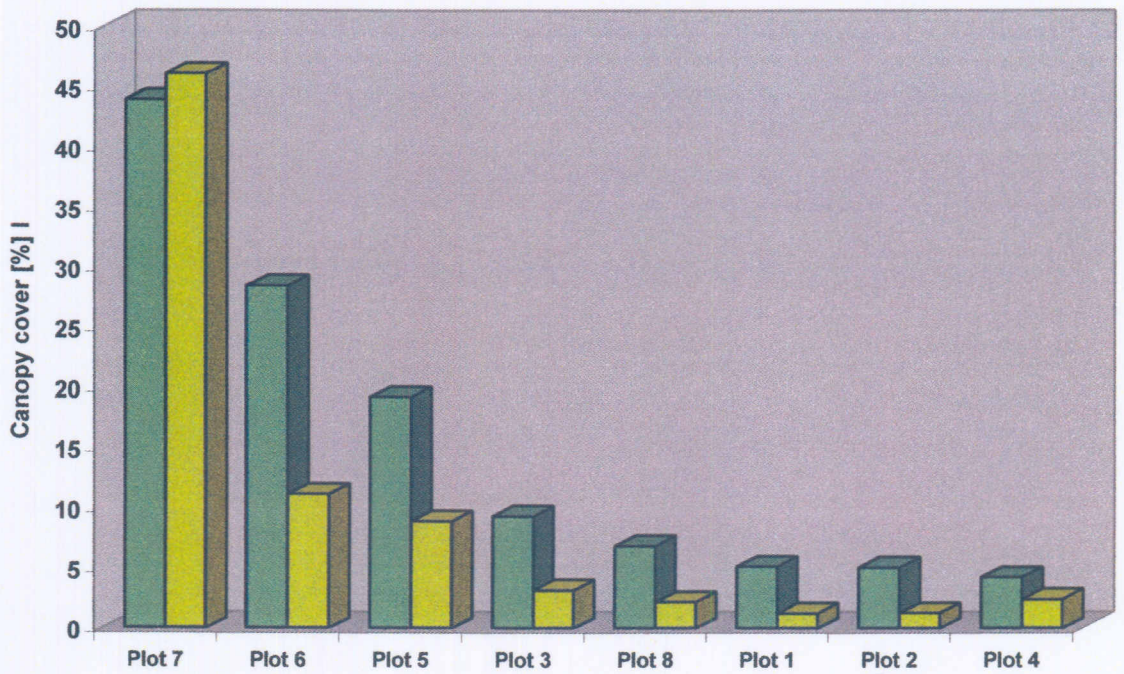

Figure 6.47: Total projected canopy cover of the 1.0 m and 0.5 m height classes for all sample plots.

Key:
- Percentage canopy cover of the 0.5 m height class
- Percentage canopy cover of the 1.0 m height class

In the 4.0 – 5.0 m height class plot 6 has the highest percentage of total projected canopy cover (134.81%), followed by plot 3 (109.39%) and plot 8 (80.73%). While plot 1 still contributes a high percentage in this height class (70.72%), the total projected canopy cover for all the remaining plots is below 30% (Figure 6.44). Considering the density of plants plot 3 possesses the second highest density of trees (13 700) as well as of plants (14 700) per hectare, while plot 8, though only representing the second lowest density of trees per hectare (6 061), ranges fifth with its overall density of plants per hectare (9 386) (Figure 6.5).

In the 3.0 m height class the percentages of total projected canopy cover are below 65% for all plots, with plot 3 (61.59%), plot 1 (61.35%) and plot 8 (56.94%) being the most prominent plots and contributing nearly the same percentage of total projected canopy cover in this height class (Figure 6.45). Considering the density of plants plot 1 ranges fifth in the density of trees (6 222) and seventh in the density of plants (6 922) per hectare (Figure 6.5).

In the 2.0 m height class plot 4 has the highest percentage of total projected canopy cover (104.66%), followed by plot 7 (53.16%) and plot 3 (40.95%). In plot 4 the 2.00 m height class contributes the highest percentage of all height classes to the total projected canopy cover (Figure 6.46). Considering the density of plants plot 4 ranges fourth in the density of trees (7 625) as well as in the density of plants (9 125) per hectare. While plot 7 has the highest density of trees (16 025) and plants (18 050) per hectare of all plots (Figure 6.5).

The 1.0 m and 0.5 m height classes are of minor importance in their contributions to the total projected canopy cover. In the 1.00 m height class all contributions are below 30% (plot 5 & 6) or 10% (plot 3, 1, 2, & 4), respectively. In the 0.5 m height class all contributions are below 12% of total projected canopy cover (Figure 6.47). The exception in both height classes is plot 7 which represents 43.95% of total projected canopy cover in the 1.0 m height class and 46.12% in the 0.5 m height class. It is therefore far above the contributions of the other plots to the total projected canopy cover in these height classes (Figure 6.47).

Considering the overall percentage of total projected canopy cover for each sample plot the three most prominent plots are plot 6 (448.30%), plot 2 (418.69%) and plot 5 (369.05%) (Table 6.10). The remaining plots represent an overal total canopy cover of below 300% (plot 3, 8, & 1) and 200% (plot 7 & 4), respectively (Table 6.10). Tree density and percent canopy cover do not seem to correlate with each other since e.g. plot 7 with the highest plant

density represents with 198.15% the second lowest overall percentage of total projected canopy cover (Table 6.11 & Figure 6.3).

Table 6.11: *Total projected canopy cover over all height classes for all sample plots*

Total projected canopy cover over all height classes [%] for all sample plot							
6	2	5	3	8	1	7	4
448.30	418.69	396.05	272.52	247.36	217.63	198.15	188.67

Mean total projected canopy cover at different height classes

The > 6.0 m height class contributes overall by far the highest percentage to the total projected canopy cover (141.57%) with the contribution by the > 6.0 m height level nearly four times higher (105.17%) than that of the second prominent 4.0 – 5.0 m height level (27.26%). It is the only height class which does not contribute at the 0.5 m height level (Figure 6.48). All other height classes contribute on average only one quarter or less of the percentage of the > 6.0 m height class to the total projected canopy cover. Every height class contributes the largest percentage of total projected canopy cover in its highest height level (Figure 6.48).

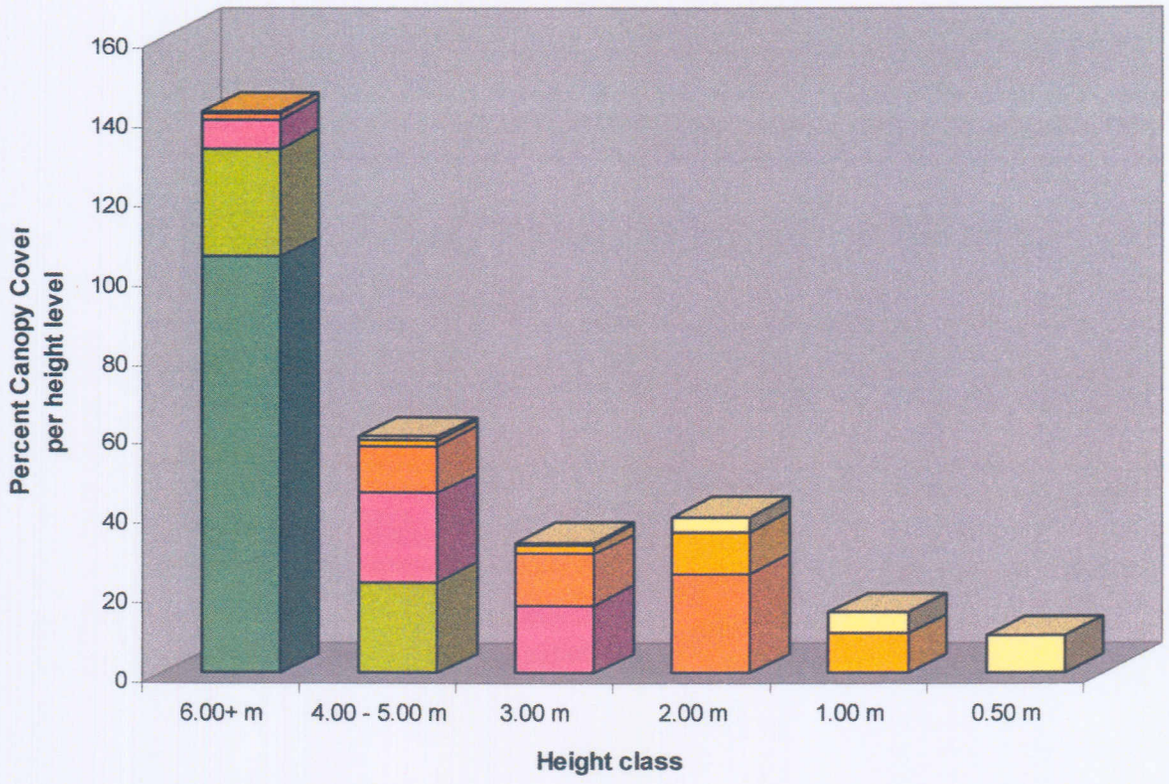

Figure 6.48: Mean total projected canopy cover at different height classes.

Key:

- 0.5 m height class
- 1.0 m height class
- 2.0 m height class
- 3.0 m height class
- 4.0 – 5.0 m height class
- > 6.0 m height class

Total projected canopy cover at different height levels

There are three plots where the > 6.0 m height level contributes the highest percentage of total projected canopy cover (Figure 6.49 – 6.56). In plot 2 all the other height levels contribute less than 20% each to the total projected canopy cover, with the 361.04% of the > 6.0 m height level therefore being much more prominent. In contrast in plot 5 and plot 6 the 4.0 – 5.0 m height level (115.59% and 74.62%) and the 3.0 m height level (53.34% and 97.02%) also contribute a high percentage to the total projected canopy cover compared to the respective covers at the > 6. 0 m height level (150.86% and 146.34%). Overall, the > 6.0 m height level in plot 2 contributes a more than two-fold higher percentage to the total projected canopy cover than in plot 5 and 6 (Figure 6.50, 6.53 & 6.54).

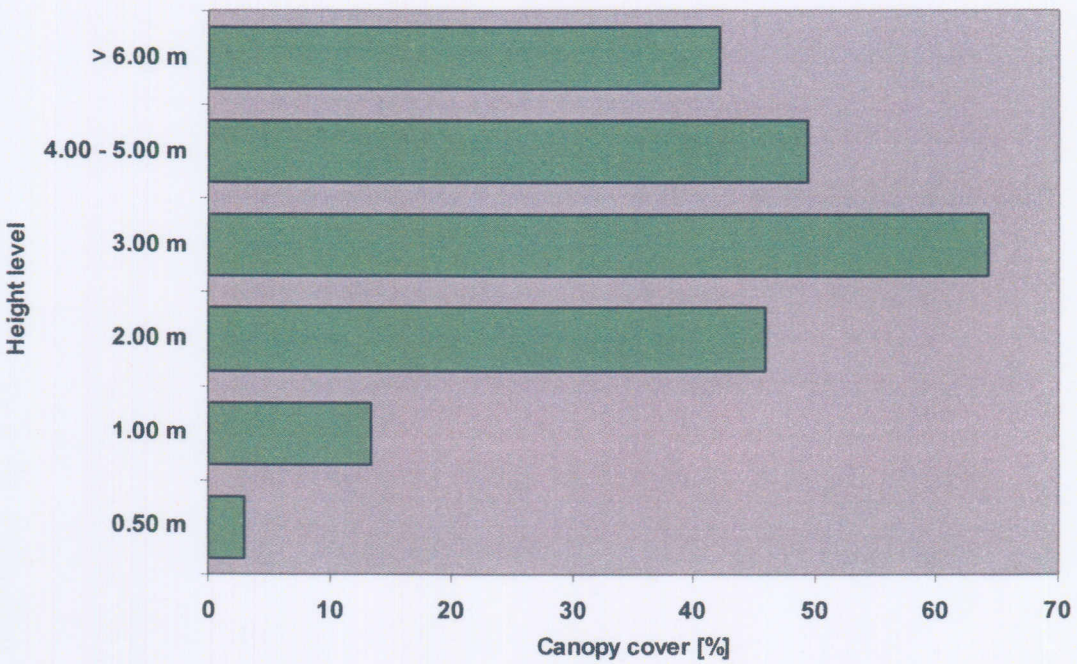

Figure 6.49: Total projected canopy cover at all height levels for plot 1.

Key: Canopy cover [%]

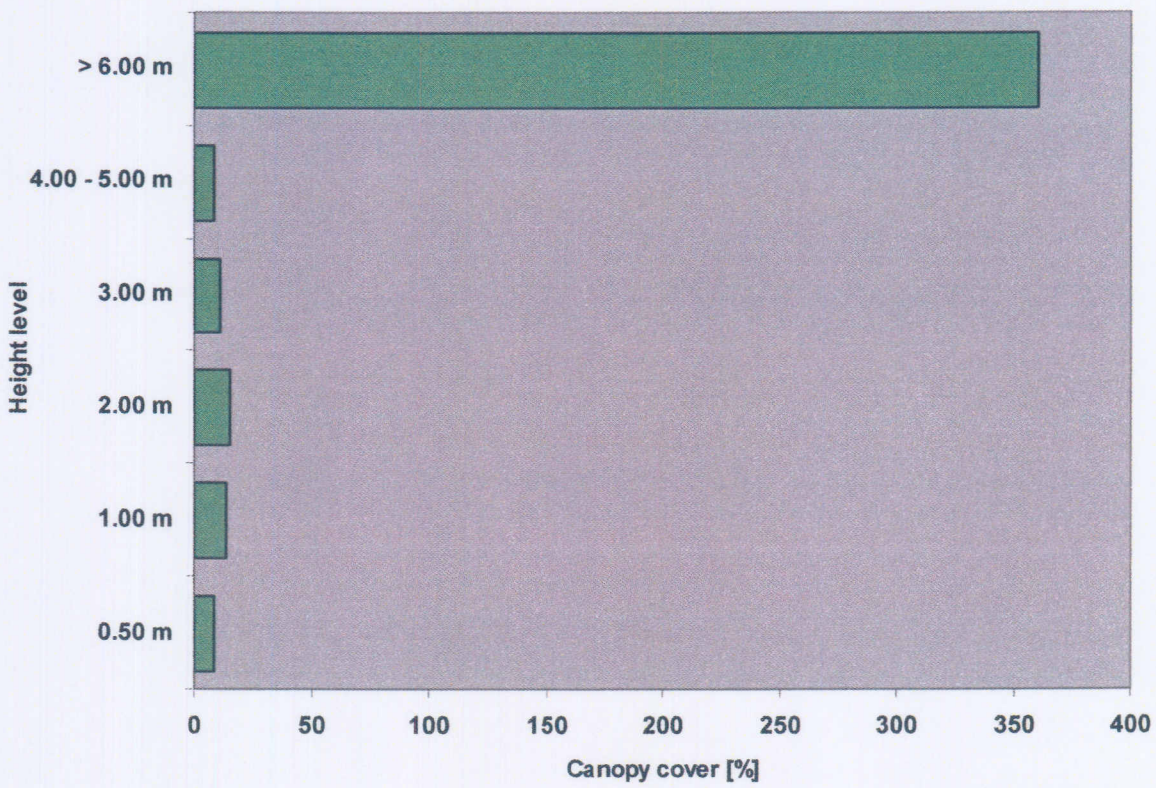

Figure 6.50: Total projected canopy cover at all height levels for plot 2.

Key: Canopy cover [%]

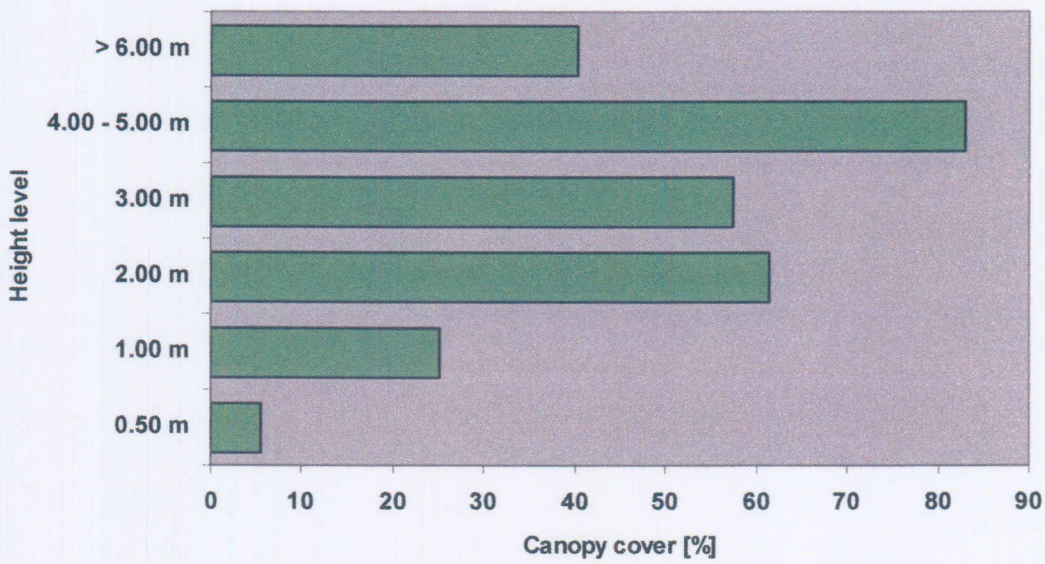

Figure 6.51: Total projected canopy cover at all height levels for plot 3.

Key: Canopy cover [%]

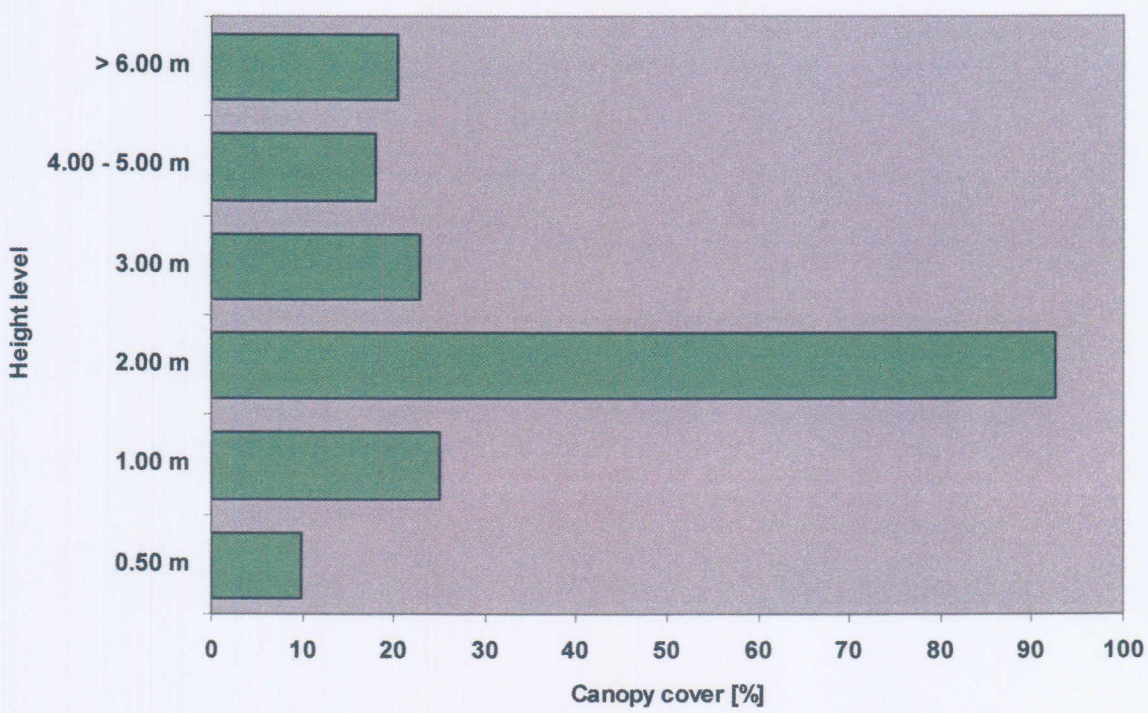

Figure 6.52: Total projected canopy cover at all height levels for plot 4.

Key: Canopy cover [%]

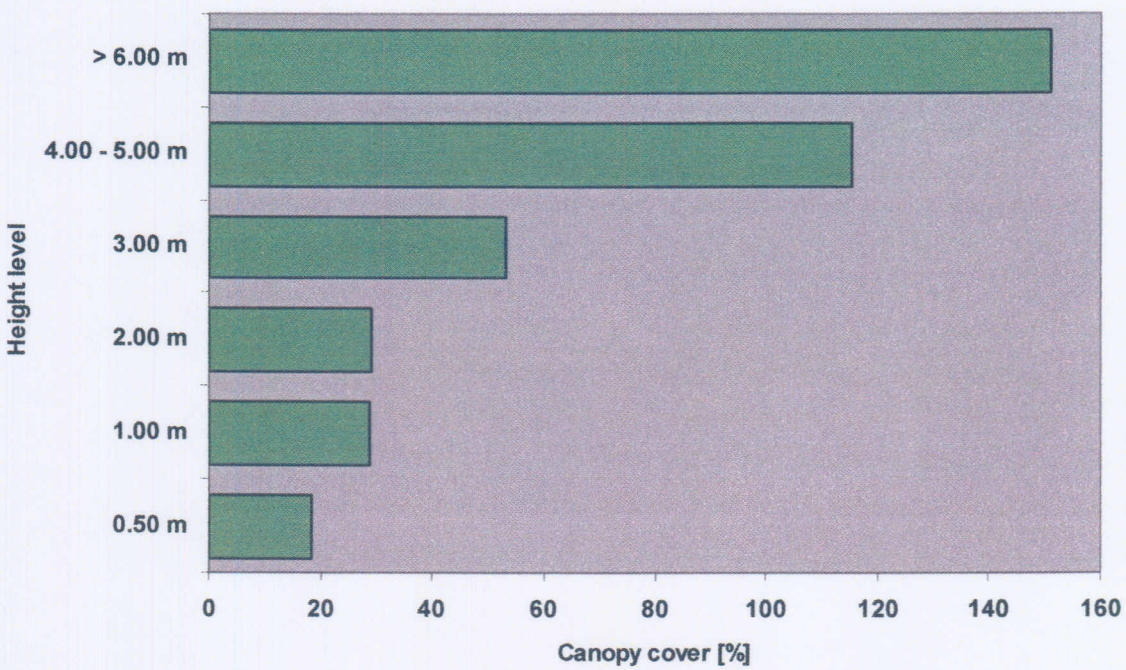

Figure 6.53: Total projected canopy cover at all height levels for plot 5.

Key: Canopy cover [%]

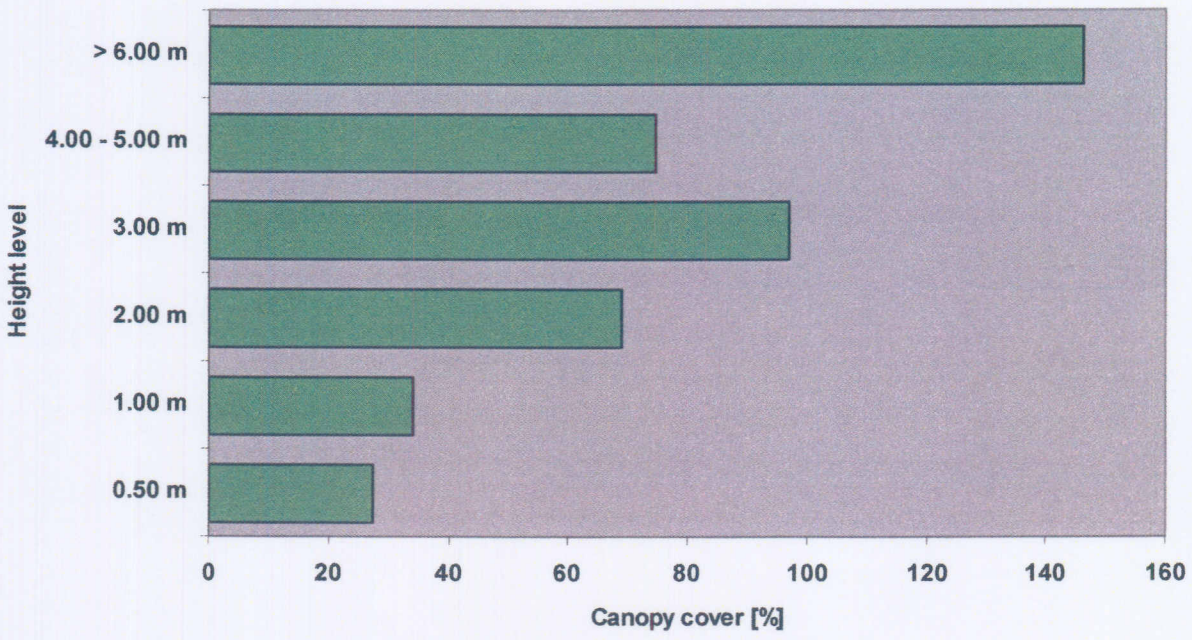

Figure 6.54: Total projected canopy cover at all height levels for plot 6.

Key: Canopy cover [%]

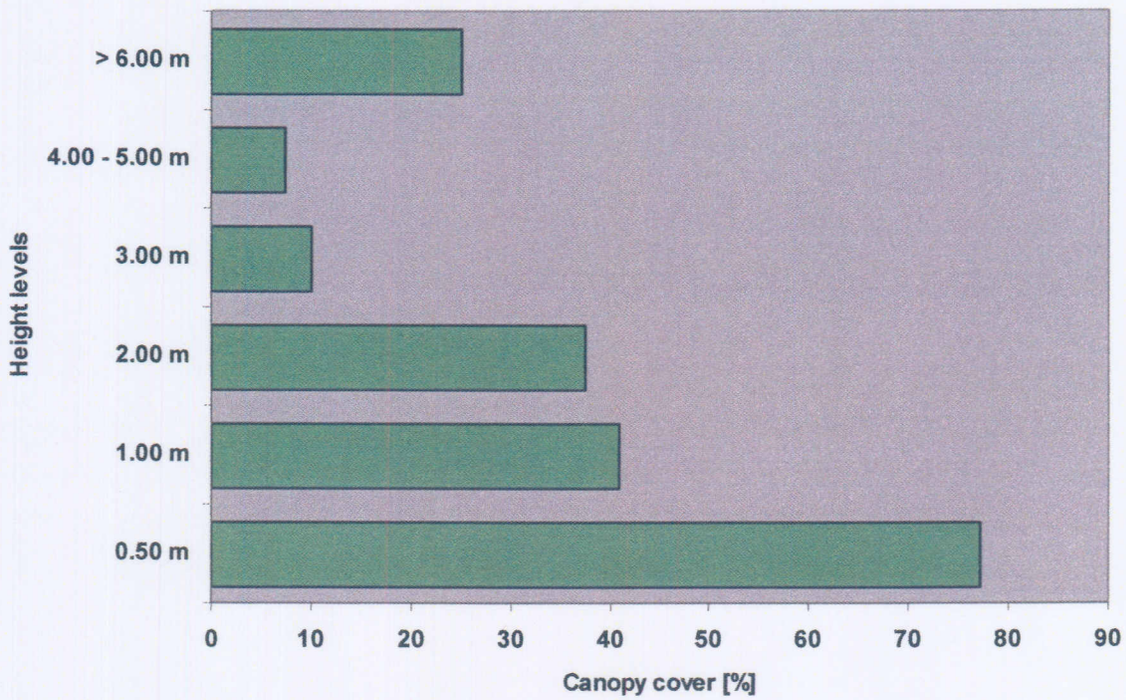

Figure 6.55: Total projected canopy cover at all height levels for plot 7.

Key: Canopy cover [%]

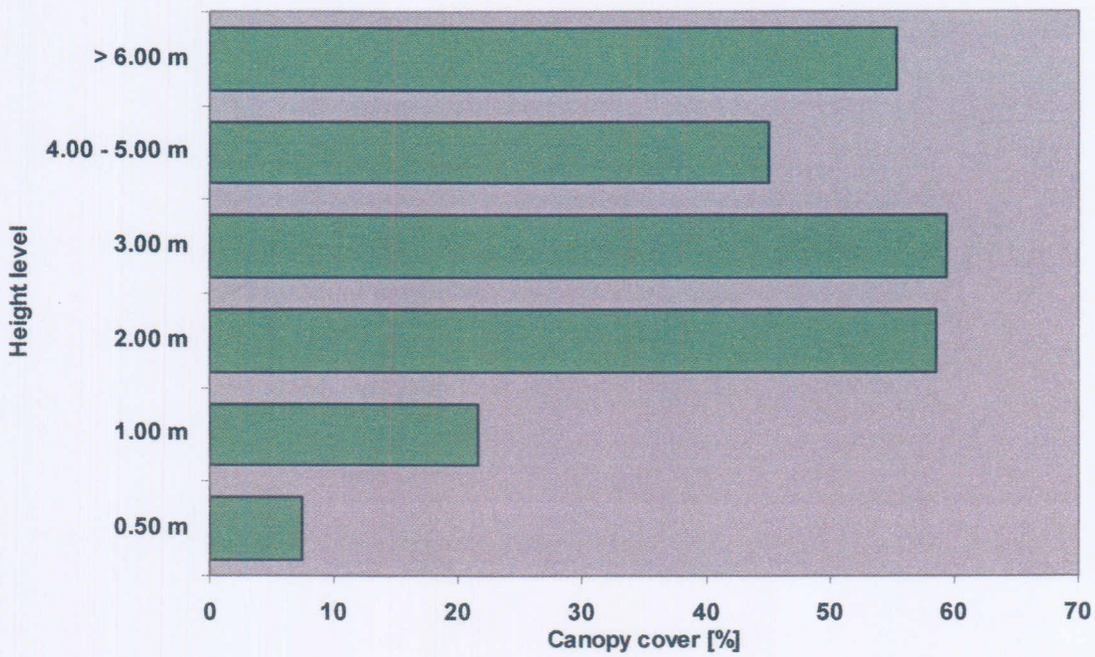

Figure 6.56: Total projected canopy cover at all height levels for plot 8.

Key: Canopy cover [%]

Only in plot 3 does the 4.0 – 5.0 m height level represent the highest percentage of total projected canopy cover (82.95%) (Figure 6.49 – 6.56) with all remaining but the 1.0 m and 0.5 m height levels also contributing over 40% of total projected canopy cover (Figure 6.51).

There are two plots where the 3.0 m height level contributes the highest percentage of total projected canopy cover (Figure 6.49 – 6.56). In plot 1 and plot 8 also all remaining but the 1.0 m and 0.5 m height levels contribute a high percentage of total projected canopy cover. In plot 1 the 3.0 m height level (64.14%) contributes a slightly higher percentage than in plot 8 (59.37%). The former height level is also more prominent compared to the > 6.0 m (42.07%), 4.0 – 5.0 m (49.29%) and 2.00 m (45.94%) height level, while in plot 8 the contributed percentage is nearly equal for these three (55.35%, 45.02% and 58.65%) and the 3.0 m height level (Figure 6.49 & 6.56).

The only plot in which the 2.0 m height level represents the highest percentage of total projected canopy cover (92.61%) is in plot 4 (Figure 6.49 – 6.56), while all remaining but the 0.50 m height level (9.95%) contribute only around 20% of total projected canopy cover per hectare (Figure 6.52).

Only in plot 7 does the 0.5 m height level represent the highest percentage of total projected canopy cover (77.21%), with the 1.0 m height level following second (40.84%) but contributing only about half as much (Figure 6.55). In all other plots the 0.5 m height level contributes the lowest percentage of total projected canopy cover (Figure 6.49 – 6.56). In plot 7 the three lowest height levels contribute the highest percentages while the three highest height levels contribute the lowest percentages of total projected canopy cover per hectare. This trend is reversed in all other seven sample plots (Figure 6.49 - 6.56).

Mean total projected canopy cover at different height levels

The > 6.0 m height level with 105.17% contributes the highest mean percentage of total projected canopy cover. The three following height levels all contribute about half that percentage. While the two lowest height levels contribute about one-fifth of this percentage of mean total projected canopy cover (Figure 6.57).

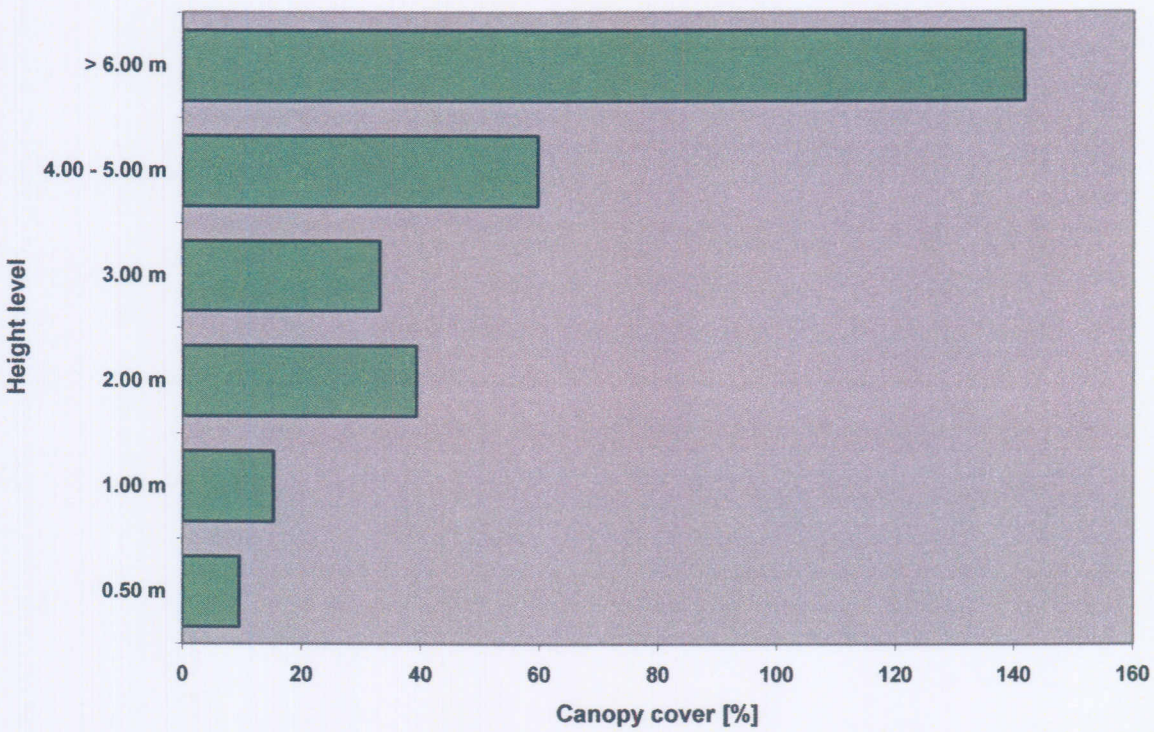

Figure 6.57: Mean total projected canopy cover at different height levels.

Key: Canopy cover [%]

Total projected canopy cover according to growth form

In seven of the eight plots the tree growth form is the most prominent one. Only in plot 4 is this place taken over by the shrub growth form (Figure 6.58). The sparse shrub growth form contributes below 30% of total projected canopy cover in plot 1 and 8, below 20% in plot 7 and 6, and below 5% in plot 4, 3, 5, and 2 (Figure 6.58). Apart from plot 4 (93.73%) the shrub growth form is even less prominent, contributing 23.61% of total projected canopy cover in plot 7, 12.78% in plot 8 and below 6% (plot 5, 6, & 3), respectively below 1% (plot 1 & 2) in the remaining plots (Figure 6.58).

Plot 4 has its centre point at the highest altitude of all sample plots (Table 6.1) and has by far the highest number, though not the highest percentage, of fallen dead trees per hectare (Figure 6.40 & 6.41).

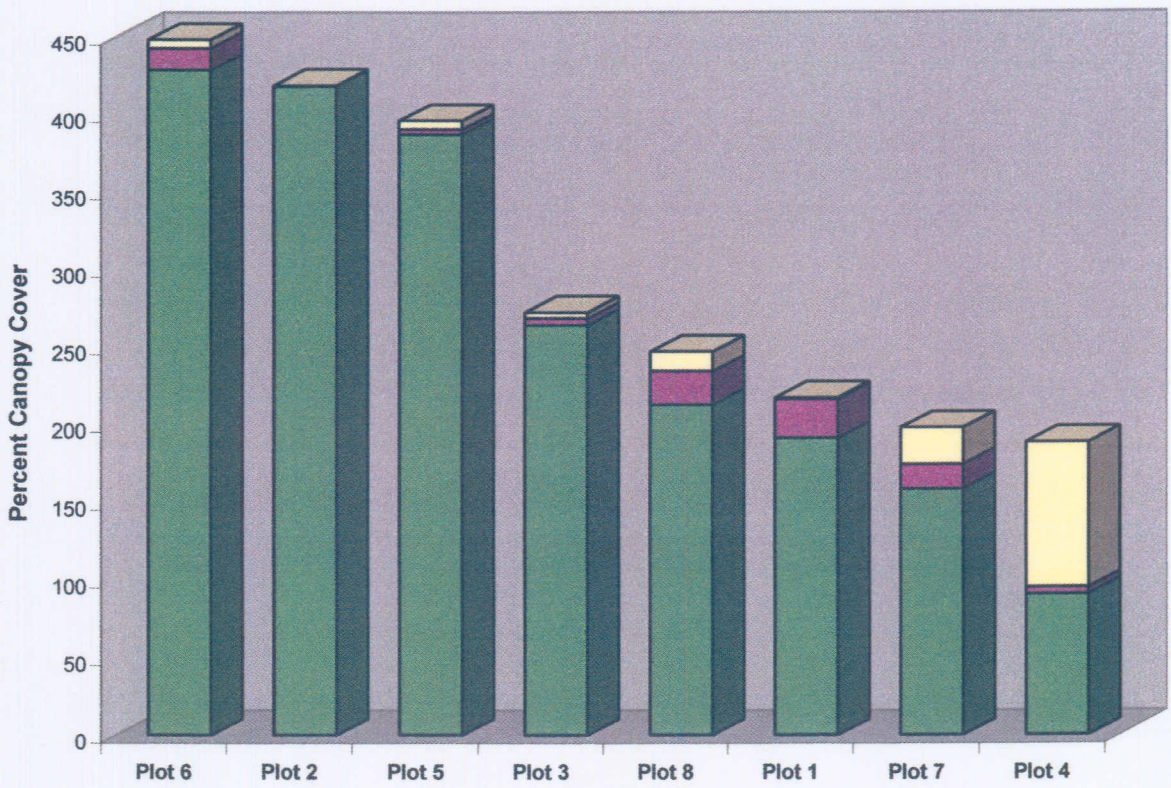

Figure 6.58: Total projected canopy cover for all sample plots according to growth form.

Key:
- Shrub
- Sparse shrub
- Tree

Mean total projected canopy cover at different height levels according to growth form

The total projected canopy cover at the > 6.0 m height level is solely represented by the tree growth form, which is also overall the most prominent growth form in the percentage contribution of total projected canopy cover (Figure 6.59). At the three following height levels trees contribute about half of the percentage total projected canopy cover compared to the > 6.0 m height level; at the two lowest height levels less than a fifth of that (Figure 6.59). The shrub growth form becomes more prominent at the three lowest height levels, showing its highest contribution of total projected canopy cover at the 2.0 m height level (10.24%). The sparse shrub growth form has the lowest overall contribution of total projected canopy cover. Only at the 3.0 m and 4.0 – 5.0 m height level does it show a greater contribution than the shrub growth form (1.00%) (Figure 6.59).

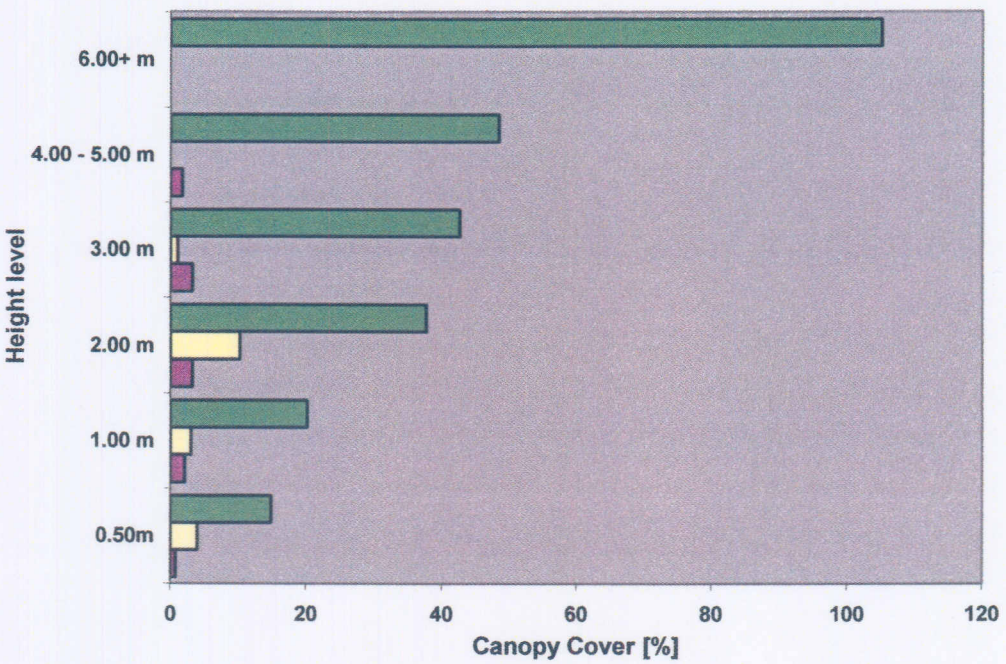

Figure 6.59: Mean total projected canopy cover at different height levels according to growth form.

Key:
- Shrub
- Sparse shrub
- Tree

Canopy regime at different height levels

Mean percentage canopy cover of selected plant species

Figures 6.60 to 6.66 show the canopy regime at different height levels for seven selected plant species on Ngamba and Nsadzi Island. The selected plant species are those species which occur on both of the islands in the determined sample plots. Three of those seven species are known Ngamba Island chimpanzees' food plant species, namely *Dictyandra arborescens*, *Oxyanthus speciosus*, and *Tetrorchidium didymostemon* (Figure 6.60, 6.63 & 6.65). The remaining four species, i.e. *Eugenia capensis*, *Ouratea hiernii*, *Peddiea fischeri*, and *Trichilia species 1*, do not fall under this category (Figure 6.61, 6.62, 6.64 & 6.66). Four of the seven species do not show many similarities in their mean percentage canopy cover at different height levels. While *Dictyandra arborescens*, *Eugenia capensis*, *Peddiea fischeri*, and *Tetrorchidium didymostemon* show the highest mean percentage canopy cover in the three to four higher height levels of woody vegetation on Ngamba Island, the same woody vegetation on Nsadzi Island only shows any canopy cover at the two to three lowest height levels (Figure 6.60, 6.62, 6.63 & 6.65). *Oxyanthus speciosus* and *Trichilia species 1* show a similar pattern in their mean percentage canopy cover at different height levels for woody vegetation on either island (Figure 6.63 & 6.66). In general though the woody vegetation on Ngamba Island possesses a higher mean percentage canopy cover at each of the height levels compared to the one on Nsadzi Island. *Ouratea hiernii* shows a different pattern again in so far that its woody vegetation on Ngamba Island shows a low mean percentage canopy cover and only at the three lowest height levels while its woody vegetation on Nsadzi Island shows a high mean percentage canopy cover over all height levels (Figure 6.62).

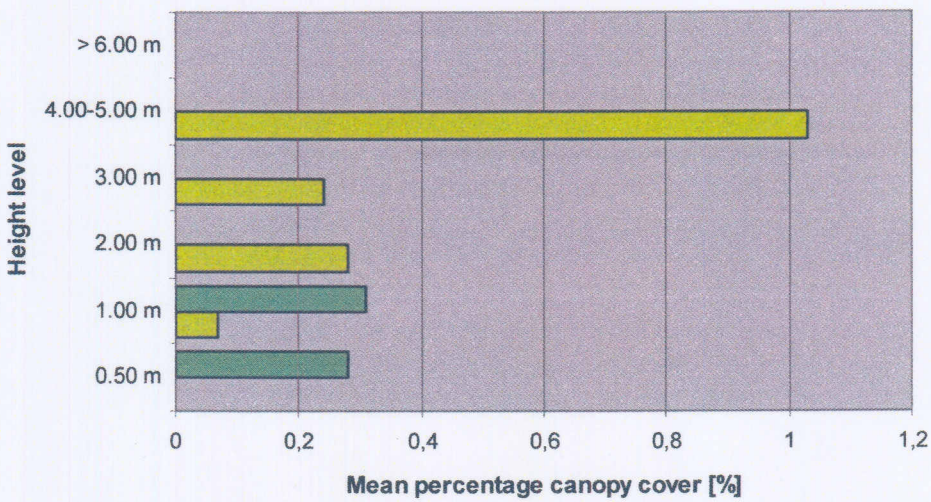

Figure 6.60: Mean percentage canopy cover of *Dictyandra arborescens* at different height levels on Ngamba and Nsadzi Island.

Key:
Ngamba Island
Nsadzi Island

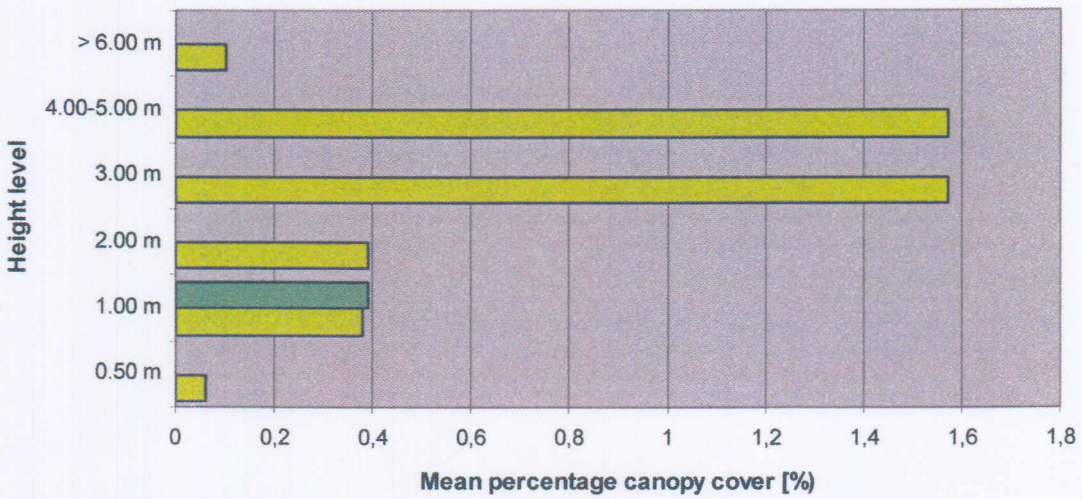

Figure 6.61: Mean percentage canopy cover of *Eugenia capensis* at different height levels on Ngamba and Nsadzi Island.

Key:
- Ngamba Island
- Nsadzi Island

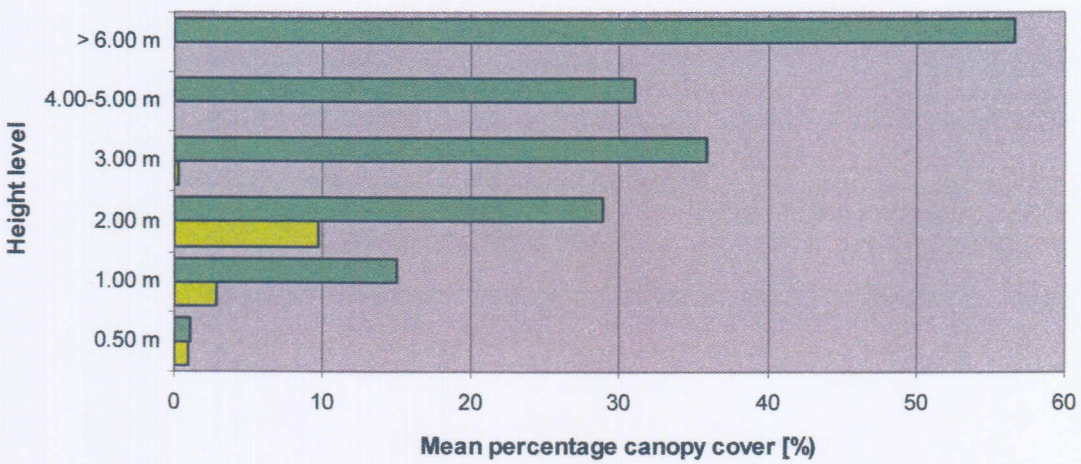

Figure 6.62: Mean percentage canopy cover of *Ouratea hiernii* at different height levels on Ngamba and Nsadzi Island.

Key:
- Ngamba Island
- Nsadzi Island

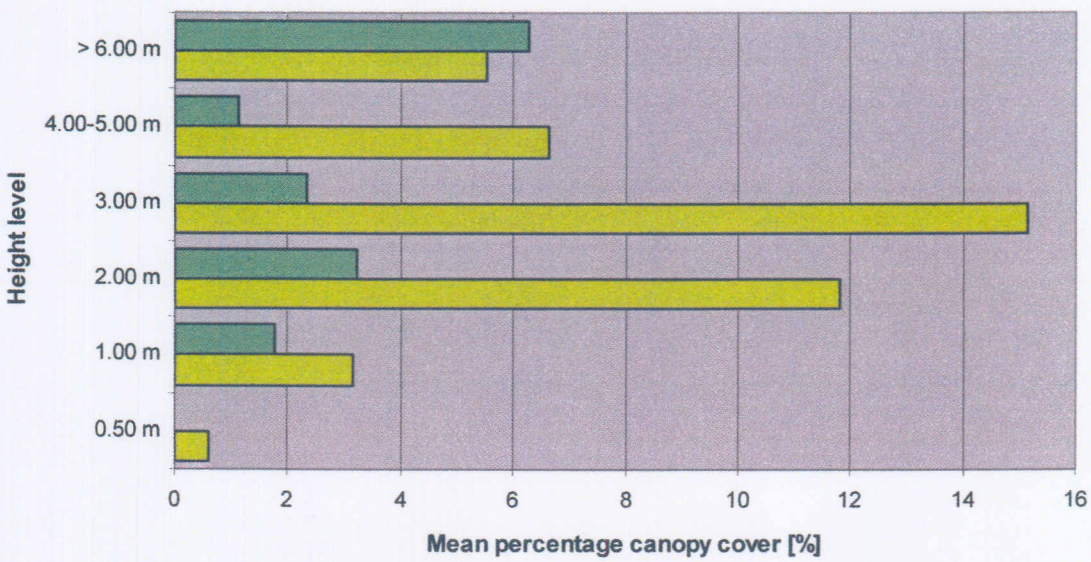

Figure 6.63: Mean percentage canopy cover of *Oxyanthus speciosus* at different height levels on Ngamba and Nsadzi Island.

Key:
- Ngamba Island
- Nsadzi Island

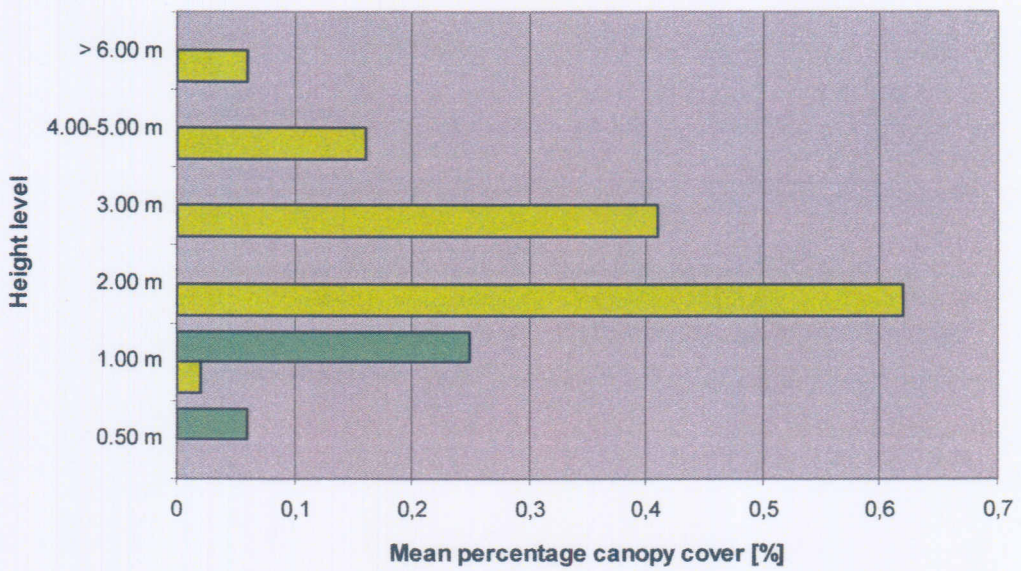

Figure 6.64 Mean percentage canopy cover of *Peddiea fischeri* at different height levels on Ngamba and Nsadzi Island.

Key:
Ngamba Island
Nsadzi Island

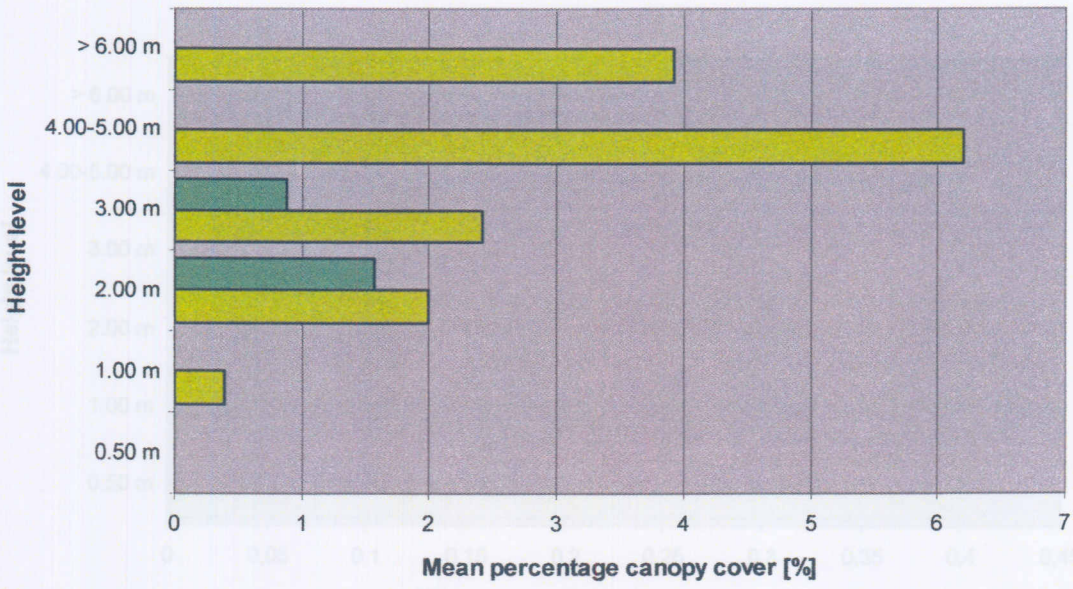

Figure 6.65: Mean percentage canopy cover of *Tetrorchidium didymostemon* at different height levels on Ngamba and Nsadzi Island.

Key:
- Ngamba Island
- Nsadzi Island

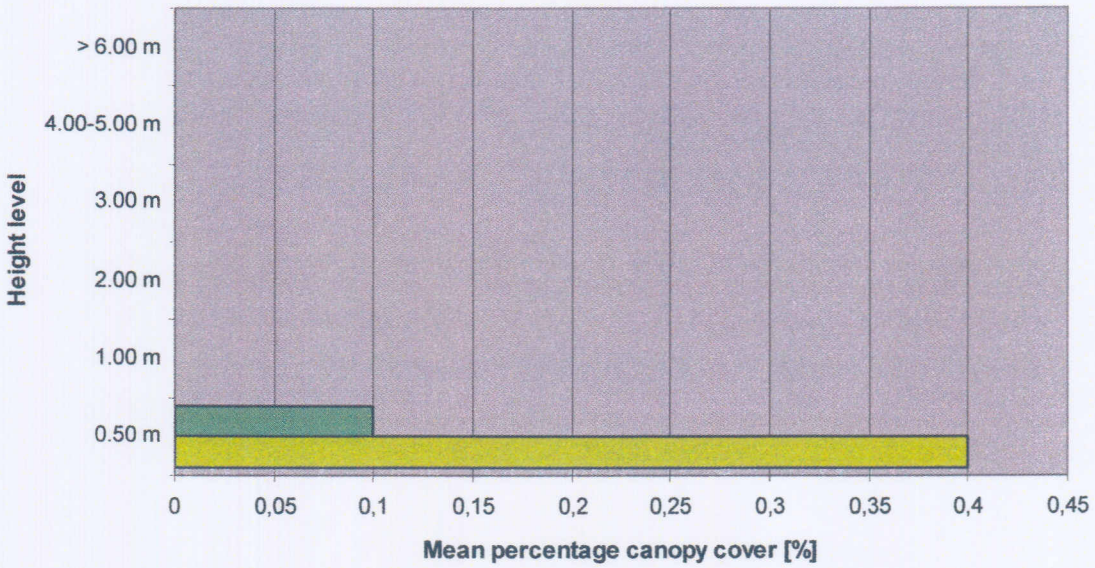

Figure 6.66: Mean percentage canopy cover of Trichilia species 1 at different height levels on Ngamba and Nsadzi Island.

Key:
Ngamba Island
Nsadzi Island

Mean total projected canopy cover of Ngamba Island chimpanzees' food plant species

From the four food plant species with the highest mean percentage canopy cover (*Guarea cedrata* = 94.52%, *Oxyanthus speciosus* = 42.85%, *Pachystela brevipes* = 35.33 %, *Dracaena fragrans* = 22.18%) it is *Guarea cedrata* which has by far the highest mean percentage canopy cover in the > 6.0 m height level (64.27%, i.e. 67.38% of all food plant species contributing to the > 6.0 m height level) (Figure 6.67). The 4.0 - 5.0 m height level is dominated by *Pachystela brevipes* (12.28%, i.e. 30.98%), while the 3.0 m and 2.0 m height levels are dominated by *Oxyanthus speciosus* (15.15%, i.e. 49.94% & 11.81%, i.e. 35.03) (Figure 6.67). The representative with the highest mean percentage canopy cover in the 1.0 m and 0.5 m height level is *Dracaena fragrans* (6.13%, i.e. 31.66% & 10.89%, i.e.74.69%) (Figure 6.67).

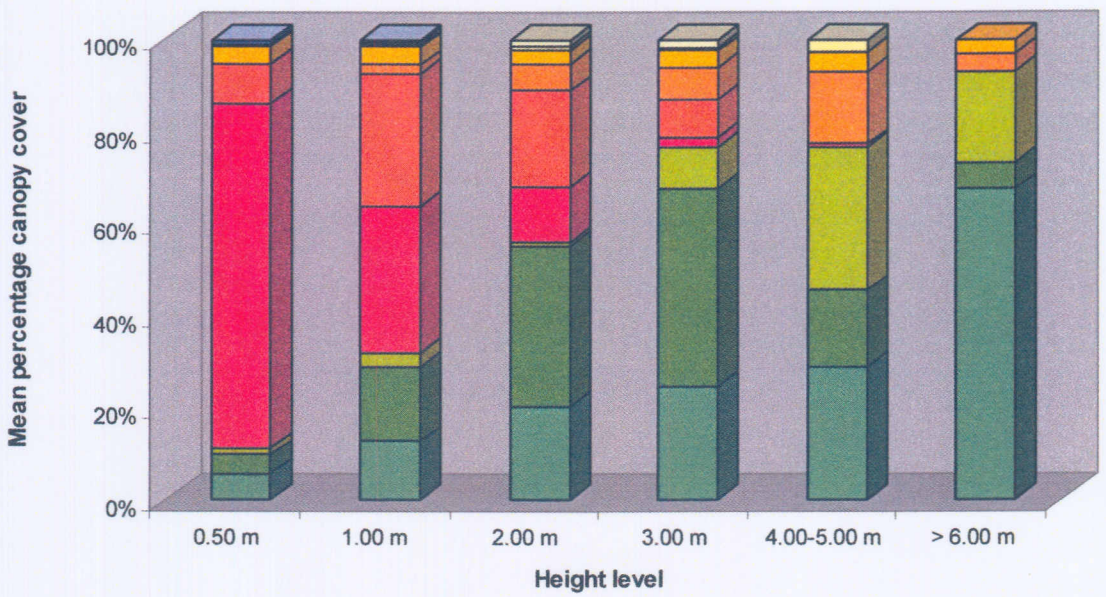

Figure 6.67: Mean percentage canopy cover of known Ngamba Island chimpanzees' food plant species.

Key:

- Canthium species
- Commelina capitata
- Ficus species
- Dictyandra arborescens
- Albizia gumnifera
- Tetrorchidium didymostemon
- Aframomum angustifolium
- Dracaena fragrans
- Pachystela brevipes
- Oxyanthus speciosus
- Guarea cedrata

HERBACEOUS VEGETATION ON NGAMBA ISLAND

TWINSPAN and DECORANA classification

Analysis of the herbaceous vegetation using TWINSPAN and DECORANA did not show any definite pattern. It was decided that the area of herbaceous vegetation on Ngamba Island was with a size of 1.89 hectare too small and its physical condition too uniform to show distinctive features using these two methods of vegetation analysis. The herbaceous vegetation is not expected to be affected by the chimpanzees in the way the woody vegetation may be. Furthermore, no control plot for herbaceous vegetation had been established on Nsadzi Island. It was therefore decided to subjectively name the prevalent herbaceous community on Ngamba Island using the Braun-Blanquet principles, as the ***Asystasia gangetica – Justicia flava – Sporobolus agrostoides post-cultivation grassland*** (Annex - Table 6 & Figure 6.2) (Langdale-Brown *et al.* 1964).

Transect surveys

Altogether, three transects with a total of 65 different 1 m x 1 m sample plots have been evaluated (Annex - Table 6).

A total of 47.7% (31) of all sample plots show patches of bare soil ranging from 10% to 60% cover per plot. The median percentage of bare soil is 20% (10 times) (Annex - Table 6). Patches of volcanic soil appear in 6.2% (4) of the sample plots; while gravel occurs in only 4.7% (3) of the plots (Annex -Table 6). Dead branches are part of the vegetation cover in 15.4% (10) of the sample plots representing a maximum of 40% of the total area covered (Annex - Table 6).

The herbaceous vegetation covers a total area of 1.89 hectare. This area consists of one small patch of herbaceous vegetation the size of 0.17 hectare and with a perimeter of 240.54 m inside the eastern edge of the secondary rain forest cover (Figure 6.2 & 3.34). The remaining area of 1.72 hectares and a perimeter of 834.27 m is situated between the fence and the fringe of the secondary rain forest cover and can be overlooked from the visitors' platform (Figure 6.2 & 3.27 – 3.30).

SOIL SAMPLES FROM NGAMBA AND NSADZI ISLAND

A total of 19 soil samples in triplets were collected. The samples were taken from the centre of each woody vegetation plot, i.e. eight times three samples from Ngamba Island and two times three samples from Nsadzi Island (Table 6.12). Three times three samples were taken from each herbaceous vegetation transect, one at the beginning, one in the middle and one at the end of each transect (Table 6.12). Table 6.12 lists the samples taken, their location, their X,Y-coordinates and their pH value.

Table 6.12: *Location, S/E-coordinates and pH values of collected soil samples from Ngamba and Nsadzi Island*

Sample Plot	S/E-coordinates	Location	Vegetation type	pH
1	00°06 242 / 32°39 005	Ngamba Island	woody	2.78
2	00°06 313/32°39 014	Ngamba Island	woody	2.61
3	00°06 152/32°39 169	Ngamba Island	woody	2.74
4	00°06 240/32°39 150	Ngamba Island	woody	2.81
5	00°06 194/32°39 325	Ngamba Island	woody	3.51
6	00°06 206/32°39 269	Ngamba Island	woody	2.78
7	00°06 338/32°39 285	Ngamba Island	woody	2.50
8	00°06 355/32°39 203	Ngamba Island	woody	2.45
1	00°05 731/32°37 252	Nsadzi Island	woody	3.15
2	00°05 759/32°37 311	Nsadzi Island	woody	2.99
T1/S1*	00°06 056/32°39 152	Ngamba Island	herbaceous	4.69
T1/S2	00°06 049/32°39 182	Ngamba Island	herbaceous	4.97
T1/S3	00°06 029/32°39 234	Ngamba Island	herbaceous	4.21
T2/S1	00°06 076/32°39 163	Ngamba Island	herbaceous	4.20
T2/S2	00°06 065/32°39 195	Ngamba Island	herbaceous	3.60
T2/S3	00°06 036/32°39 242	Ngamba Island	herbaceous	4.09
T3/S1	00°06 050/32°39 237	Ngamba Island	herbaceous	4.37
T3/S2	00°06 056/32°39 249	Ngamba Island	herbaceous	4.10
T3/S3	00°06 077/32°39 275	Ngamba Island	herbaceous	3.56

* T = Transect S = Sample

pH of collected soil samples

The mean pH of collected soil samples is lowest in the woody vegetation plots on Ngamba Island (pH 2.77 ± 0.33) compared to that on Nsadzi Island (pH 3.07 ± 0.11) and that for the samples of herbaceous vegetation on Ngamba Island (pH 4.2 ± 0.46) (Table 6.12). The pH for soil samples of woody vegetation sample plots ranges from between pH 2.45 (plot 8) to pH 3.51 (plot 7) on Ngamba Island, and from pH 2.99 to pH 3.15 on Nsadzi Island. The pH for the samples of herbaceous vegetation ranges from pH 3.56 (T3/S3) to pH 4.97 (T2/S2) (Table 6.12).

SLOPE AND ASPECT OF SAMPLE PLOTS ON NGAMBA AND NSADZI ISLAND

Table 6.1 lists slope and aspect of the woody vegetation sample plots on Ngamba and Nsadzi Island. Since the dense vegetation on Nsadzi Island did not allow reliable altitude measurements the degree of slope was estimated subjectively by comparison with the classification of slopes on Ngamba Island (Table 6.1). The majority of slopes on Ngamba Island show moderate steepness while the two sample plots on Nsadzi Island possess marked slopes (Table 6.1).

DESCRIPTION OF SAMPLE PLOTS ON NSADZI ISLAND

Figure 6.68 shows a map of Nsadzi Island based on a topographic map of the British aerial survey from 1952. Nsadzi Island covers an area of about 574.1 hectare (5.74 km²) with a perimeter of 15 100.70 m. It is partly inhabited and is to a large extent covered by herbaceous vegetation and cultivated fields. The sample area was selected according to 1. continuous vegetation cover with moist evergreen secondary rain forest and 2. closest proximity to Ngamba Island.

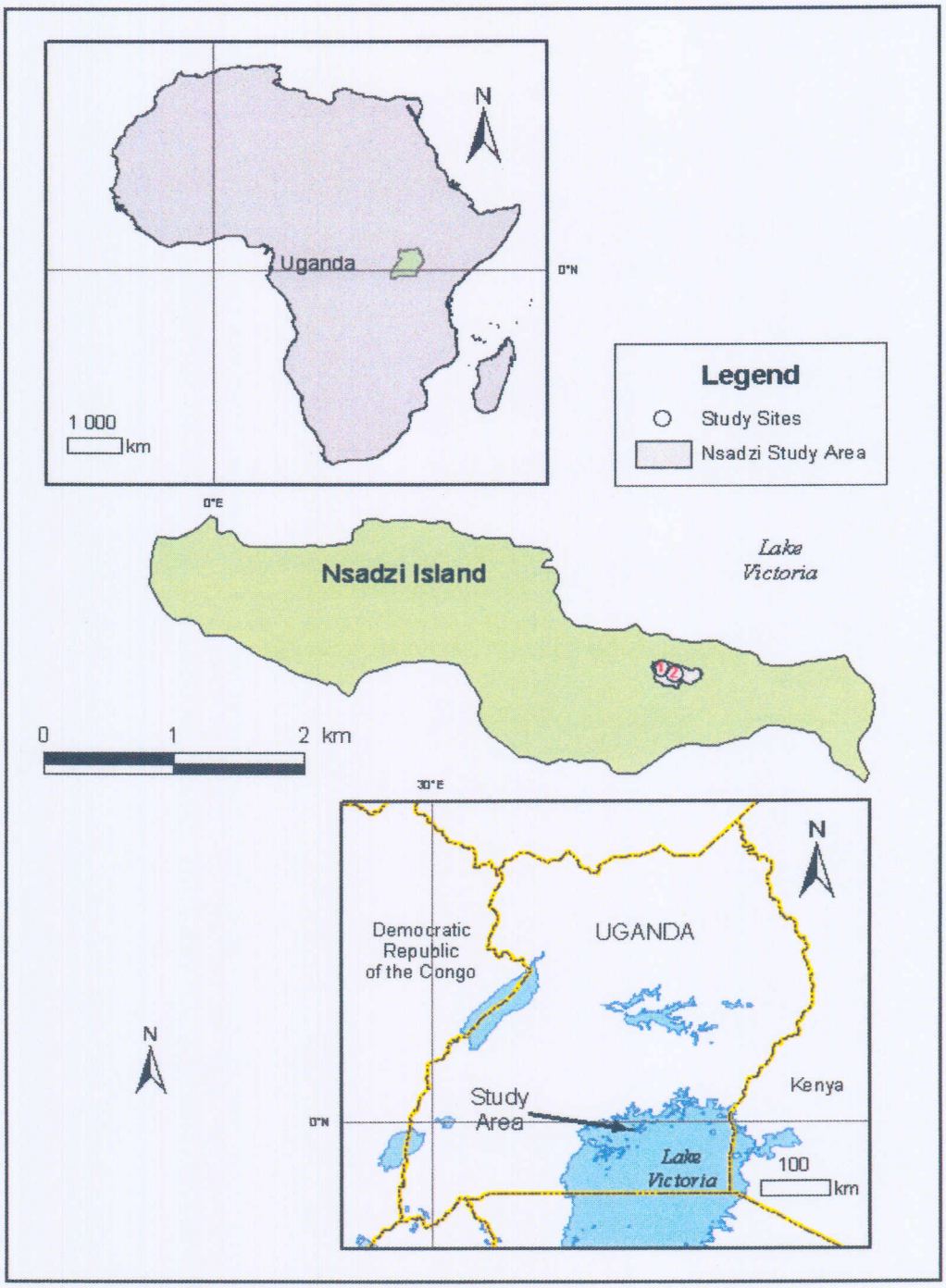

Figure 6.68: Nsadzi Island and location of study area and sample plots.

SAMPLE PLOTS ON NSADZI ISLAND

Figure 6.68 shows the sample area on Nsadzi Island based on GPS measurements. The size of the sample area is 5.27 hectare with a perimeter of 1 233.76 m. The location of the two sample plots was determined by random number selection of south / east coordinates.

Plot 1 - S 00°05 731 / E 32°37 252; 1214 ± 32 m (Table 6.1)

The forest in this plot is quite dense. The vegetation differs from that on Ngamba Island. There is widespread thorny undergrowth. A number of termite mounds and extensive termite activity can be noticed.

Plot 2 – S 00°05 759 / E 32°37 311; > 1 212 m (Table 6.1)

Here, the forest is even denser than in plot 1. Accurate GPS measurements of the coordinates for the four endpoints of the sample rectangle are not possible due to too dense vegetation. Attempts to determine altitude and slope via GPS measurements are futile on several occasions.

DIMENSIONS OF SAMPLE SQUARES ON NSADZI ISLAND

The dimensions of the respective sample areas for each height class in the two sample plots are given in Table 6.13. The majority has the smallest possible size of 5 x 5 m, like on Ngamba Island. Just as on the latter island the sample squares of the two "dead tree" categories tend to be of the largest possible size (Table 6.2 & 6.13). On Nsadzi Island therefore the density of dead trees is also on average much lower than that of the other growth form categories.

Table 6.13: *Size of sample squares for each height class in the two sample plots on Nsadzi Island*

Height class [m]	Plot 1		Plot 2	
	Size [m] of largest square	Area [m^2]	Size [m] of largest square	Area [m^2]
> 6	5 x 5	100	5 x 5	100
4 – 5	5 x 5	100	5 x 5	100
3	5 x 5	100	5 x 5	100
2	5 x 5	100	5 x 5	100
1	5 x 5	100	5 x 5	100
0.5	5 x 5	100	5 x 5	100
Standing dead	25 x 25	2500	25 x 25	2500
Fallen dead	10 x 10	400	25 x 25	2500

WOODY VEGETATION ON NSADZI ISLAND

Density

Mean density of plants over all height classes and growth forms

The mean density of plants per hectare over all height classes and vegetation types is 7 800 plants per hectare for the two sample plots on Nsadzi Island (Figure 6.69).

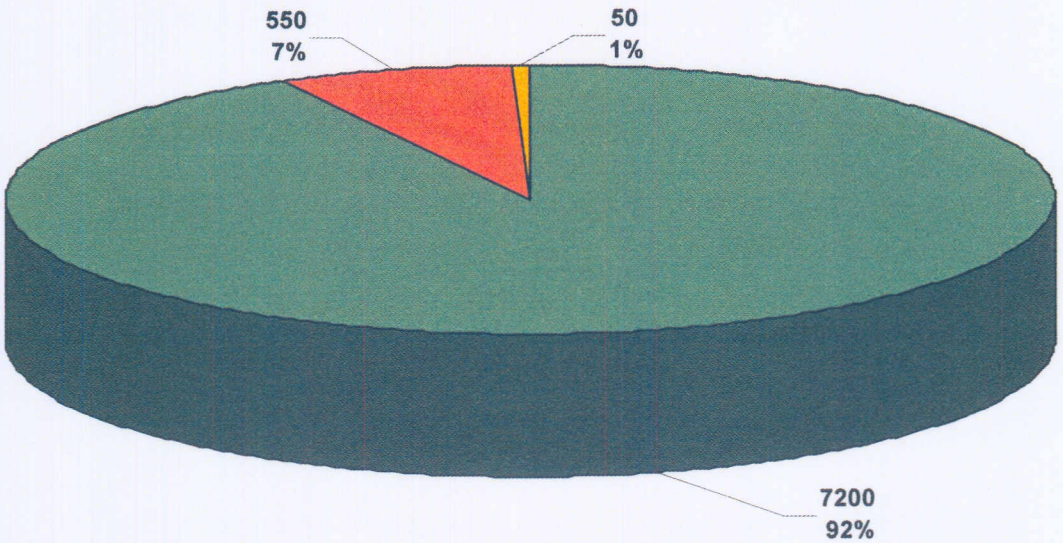

Figure 6.69: Mean number of plants per hectare and percentage per growth form.

Key:
- Shrub
- Sparse shrub
- Tree

Mean density of different growth forms

Figure 6.69 compares the mean density of different growth forms on Nsadzi Island. Trees are by far the most prominent growth form with 92% (7 200 plants per hectare), while sparse shrubs follow with 7% (550 plants per hectare). Shrubs contribute with only 1% (50 plants per hectare) the smallest number of plants per hectare (Figure 6.69).

Mean number of plant species

The mean number of different plants species per sample plot is 16 (Table 6.14). There are a total of 24 different plant species in the two sample plots on Nsadzi Island (Annex – Table 7). Only seven of those species (*Dictyandra arborescens*, *Eugenia capensis*, *Ouratea hiernii*, *Oxyanthus speciosus var. stenocarpus*, *Peddiea fischeri*, *Tetrorchidium didymostemon* and *Trichilia species 1*) are also present in the sample plot areas on Ngamba Island (Annex – Table 1). Three of the seven plant species present in sample plots on both islands are also Ngamba island chimpanzees' food plant species, namely *Dictyandra arborescens*, *Oxyanthus speciosus var. stenocarpus* and *Tetrorchidium didymostemon* (Table 6.4).

Table 6.14: *Braun-Blanquet cover abundance classes of Nsadzi Island woody vegetation*

Species	Plot 1	Plot 2
	Braun-Blanquet classification	
*Ouratea hiernii**	4	5
Rhytigynia species 1	2A	4
Uvaria angolensis	5	+
Turrea vogellioides	1	3
*Oxyanthus speciosus***	1	2B
Calycosiphonia spathicalyx	2A	+
Coffea eugenioides	+	+
Menisorus pauciflorus	+	+
Funtumia africana	5	
Olinea rochetiana		5
Argomuellera macrophylla		2A
*Dictyandra arborescens***	1	
Oncinotis species 1	1	
*Tetrorchidium didymostemon***		1
Eugenia capensis	+	
Monanthotaxis species 1	+	
Ouratea bukobensis	+	
Peddiea fischeri	+	
Turrea species 1	+	
Olea africana		+
Unidentified species 1		+
Unidentified species 2		+
Unidentified species 3		+
Trichilia species 1		+

☐ Plant species present in both sample plots on Nsadzi Island.

* Plant species also present on Ngamba Island.

** Ngamba Island chimpanzees' food plants species on Nsadzi Island.

Braun-Blanquet cover abundance classes

Table 6.14 lists the Braun-Blanquet cover abundance classes for the different plants species of woody vegetation on Nsadzi Island. Eight species are present in both sample plots, namely *Calycosiphonia spathicalyx, Coffea eugenioides Menisorus pauciflorus*, *Ouratea hiernii Oxyanthus speciosus var. stenocarpus*, *Rhytigynia species 1, Turrea vogellioides,* and *Uvaria angolensis* (Table 6.14). *Ouratea hiernii* is the most prominent species with scores of 5 and 4 in plot 1 and 2, followed by *Rhytigynia species 1* (2A, 4) and *Uvaria angolensis* (5, +) (Table 6.14). Of the 16 plant species which are only present in one of the two sample plots *Funtumia africana* (5), *Olinea rochetiana* (5) and *Argomuellera macrophylla* (2A) are the most prevalent (Table 6.14).

Mean number of plants per species and per hectare

Figures 6.70 – 6.72 indicate the mean density of woody species for the sample area on Nsadzi Island. Since there are large differences in plant density, the species have been arranged in three different groups, namely (1) species with > 500 plants per hectare, (2) species with > 100 to 500 plants per hectare, and (3) species with 1 to 100 plants per hectare (Figures 6.70 – 6.72).

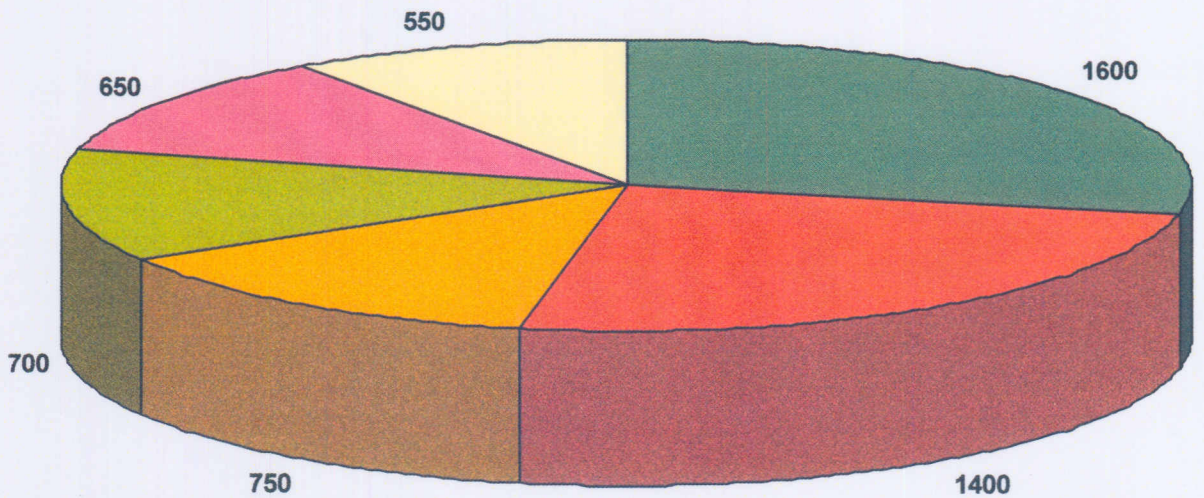

Figure 6.70: Mean density (plants per hectare) for species with > 500 plants per hectare.

Key:

- *Uvaria angolensis*
- *Oncinotis species 1*
- *Menisorus pauciflorus*
- *Turrea vogellioides*
- *Ouratea hiernii*
- *Rhytigynia species 1*

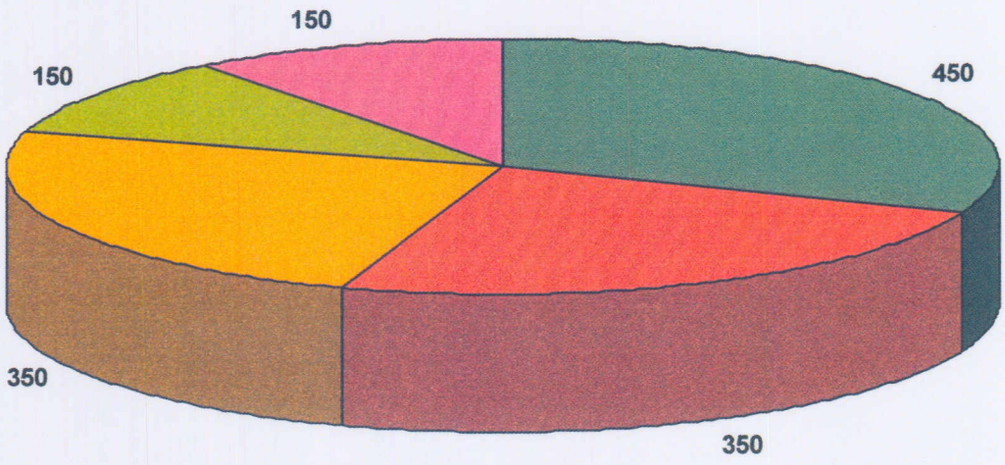

Figure 6.71: Mean density (plants per hectare) for species with > 100 - 500 plants per hectare.

Key:

- *Oxyanthus speciosus var. stenocarpus*
- *Calycosiphonia spathicalyx*
- *Funtumia africana*
- *Dictyandra arborescens*
- *Coffea eugenioides*

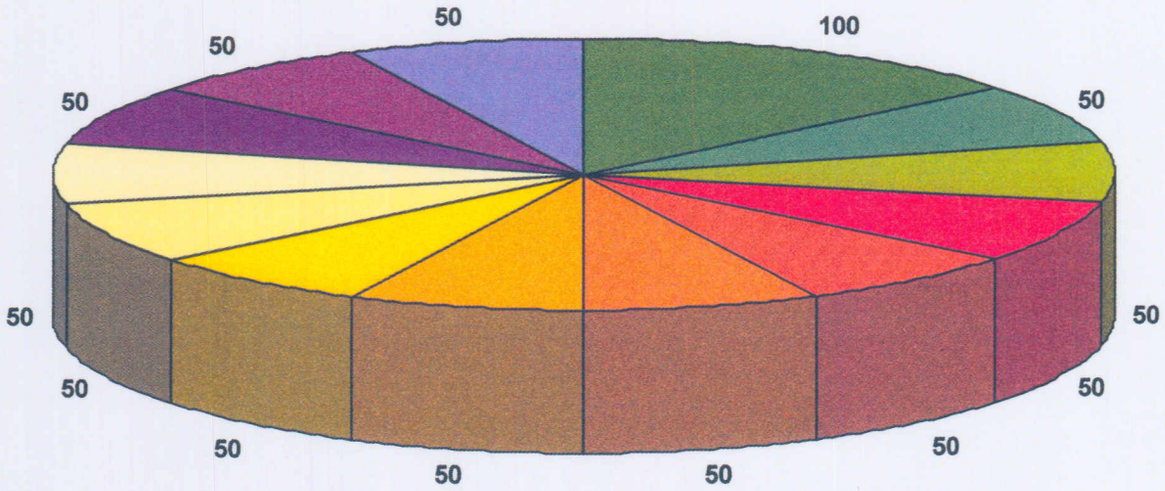

Figure 6.72: Mean density (plants per hectare) for species with 1 - 100 plants per hectare.

Key:

- *Turrea species 1*
- *Trichilia species 1*
- *Tetrorchidium didymostemon*
- *"Unidentified species 3"*
- *"Unidentified species 2"*
- *"Unidentified species 1"*
- *Peddiea fischeri*
- *Ouratea bukabiensis*
- *Olinea rochetiana*
- *Olea africana*
- *Monanthotaxis species 1*
- *Eugenia capensis*
- *Argomuellera macrophylla*

There are only six species in the first group, namely *Rhytigynia species 1*, *Ouratea hiernii*, *Turrea vogellioides*, *Menisorus pauciflorus*, *Oncinotis species 1*, and *Uvaria angolensis* (Figure 6.70). Of those six species only *Oncinotis species 1* is solely present in one sample plot. The other five species are present in both sample plots and thus seem to be rather ubiquitously distributed throughout the whole sample area on Nsadzi Island (Table 6.12 & Figure 6.70).

Five plant species are present in the second group with between > 100 – 500 plants per hectare (Figure 6.71). *Coffea eugenioides* is the most prevalent plant species in this category (450 plants per hectare) and also the only species present in both sample plots on Nsadzi Island (Table 6.11 Figure 6.71). Two Ngamba Island chimpanzees' food plant species are represented in this group, namely *Dictyandra arborescens* (350 plants per hectare) and *Oxyanthus speciosus var. stenocarpus* (150 plants per hectare).

The remaining 13 plant species are all part of the last group of 1 – 100 plants per hectare (Figure 6.72). Only one species, i.e. *Argomuellera macrophylla* is represented with 100 plants per hectare. All other species have a density of 50 plants per hectare (Figure 6.72). This group also contains the third Ngamba Island chimpanzees' food plant species present on Nsadzi Island, namely *Tetrorchidium didymostemon* (50 plants per hectare) (Table 6.4 & Figure 6.72).

Mean density according to height class and growth form and mean distribution of plant species present on both islands according to growth form

Figure 6.73 and Table 6.15 show the mean distribution of height class and growth form for the plant species present on Nsadzi Island. For the plant species present on both islands, namely *Dictyandra arborescens*, *Eugenia capensis*, *Ouratea hiernii*, *Oxyanthus speciosus var. stenocarpus*, *Peddiea fischeri*, *Tetrorchidium didymostemon* and *Trichilia species 1*, the following pattern is observed on Nsadzi island: The sparse shrub growth form is only represented through *Peddiea fischeri* and here only in the 1.0 m height class (50 plants per hectare) (Figure 6.73). The shrub growth form is not represented at all between these seven species. The remaining six plant species are all represented by the tree growth form. *Ouratea hiernii* is the most abundant species and the only species present in all height classes and the most prominent species in the 2.0 m (300 plants per hectare), 3.0 m (250 plants per hectare) and 4.0 – 5.0 m (450 plants per hectare) height class (Figure 6.73).

Dictyandra arborescens is the most prominent species in the 0.5 m (200 plants per hectare) and 1.0 m (500 plants per hectare) height class (Figure 6.73). The overall mean density of woody vegetation is highest for the 1.0 m height class of trees (3 000 per hectare), followed by the 0.5 m height class (1 350 plants per hectare). The remaining height classes contribute about half or less than this number of plants. The two shrub classes only contribute to the two lowest height classes (Figure 6.73). In Comparison with the remaining plant species *Ouratea hiernii* and *Dictyandra arborescens* belong to the most abundant plant species on Nsadzi Island, while the other five species are of minor importance (Table 6.15 & Figure 6.73).

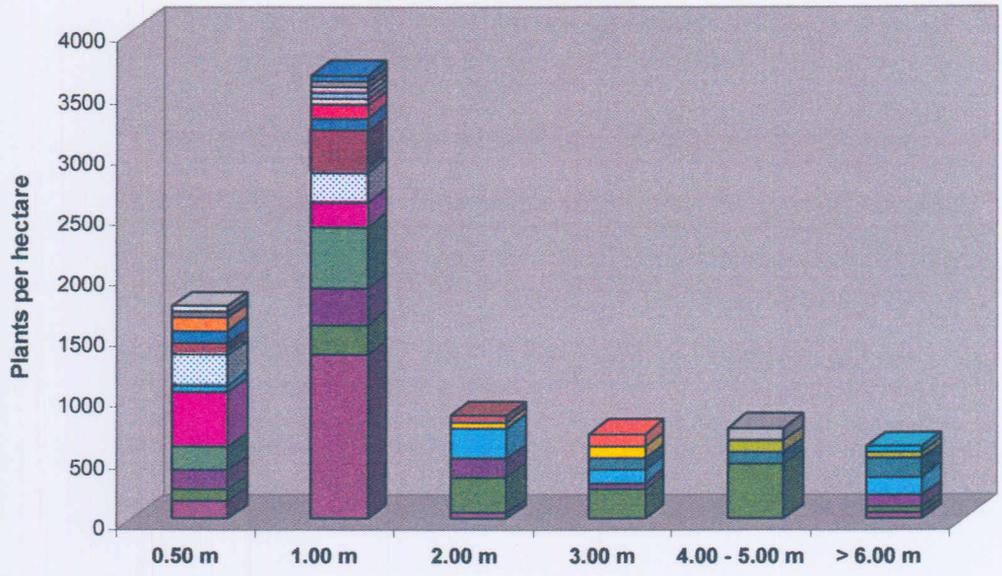

Figure 6.73: Mean density (plants per hectare) of tree (full colour), sparse shrub (points) and shrub (lines) according to height class and species.

Key:

- *Turrea species 1*
- *Unidentified species 3*
- *Unidentified species 2*
- *Unidentified species 1*
- *Ouratea bukobensis*
- *Olinea rochetiana*
- *Olea africana*
- *Monanthotaxis species 1*
- *Peddiea fischeri*
- *Argomuellera macrophylla*
- *Trichilia species 1*
- *Tetrorchidium didymostemon*
- *Eugenia capensis*
- *Calycosiphonia spathicalyx*
- *Oxyanthus speciosus var. stenocarpus*
- *Funtumia africana*
- *Menisorus pauciflorus*
- *Coffea eugenioides*
- *Menisorus pauciflorus*
- *Uvaria angolensis*
- *Oncinotis species 1*
- *Dictyandra arborescens*
- *Turrea vogellioides*
- *Ouratea hiernii*
- *Rhytigynia species 1*

Table 6.14: *Mean density of woody vegetation according to height class and growth form*

Height class	Mean density of woody vegetation			
	Tree	Sparse shrub	Shrub	TOTAL
> 6.00m	600			600
4.00 – 5.00 m	750			750
3.00 m	650			650
2.00 m	850			850
1.00 m	3 000	300	50	3 350
0.50 m	1 350	250		1 600
TOTAL	7 200	550	50	7 800

Mean density of "Dead Trees"

Table 6.16 shows the mean number of "Standing dead" and "Fallen dead" trees per stem diameter and hectare for the sample area, while Figure 6.74 classifies the sample area according to its mean density of total number of dead trees per hectare and Figure 6.75 according to its mean percentage of total density contributed by dead trees.

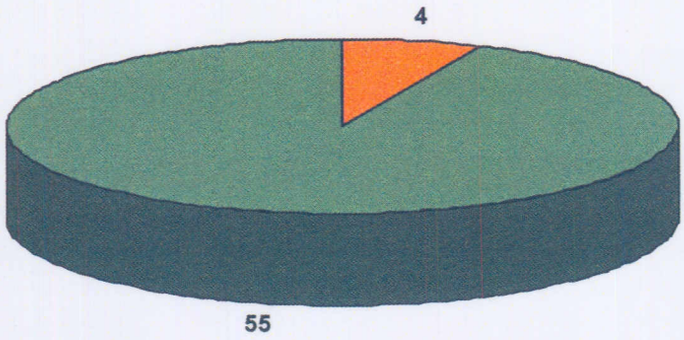

Figure 6.74: Mean number of dead trees per hectare.

Key: Standing dead tress
Fallen dead trees

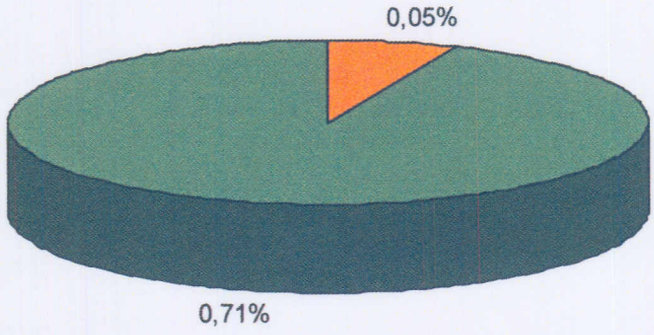

Figure 6.75: Mean percentage of total density contributed by dead trees.

Key: Standing dead tress
Fallen dead trees

Table 6.16: *Mean number per hectare and percentage of total density contributed by "Fallen dead" and "Standing dead" trees per hectare according to stem diameter*

	Stem diameter [cm]					
	10 - 15	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 50	Total
Number (and percentage) of "Fallen dead" trees	40 (72.73)		2 (3.64)	13 (23.64)		55 (100)
Number (and percentage) of "Standing dead" trees	2 (50)		2 (50)			4 (100)

The mean density of dead trees for the sample area on Nsadzi Island is 59 plants per hectare, composed of a mean of 4 "Standing dead" and 55 "Fallen dead" trees per hectare (Figure 6.74). The mean percentage contribution to the total density made by dead trees is 0.76% for the whole sample area with 0.05% "Standing dead" and 0.71% "Fallen dead" trees per hectare (Figure 6.75).

Most of the "Fallen dead" trees, i.e. 72.73% (40 plants per hectare) of all "Fallen dead" trees, have a stem diameter of 10 – 15 cm, followed by the > 25 – 30 cm class (23.64%) (Table 6.16). Only two stem diameter classes with furthermore the same number and percentage, i.e. 2, respectively 50% of all "Standing dead" trees, occur, namely the 10 – 15 cm class and the 20 – 25 cm class (Table 6.16).

Ngamba Island chimpanzees' food plant species present on Nsadzi Island

Three food plant species are present in the sample area on Nsadzi Island (Table 6.14). With a mean number of 350 plants per hectare *Dictyandra arborescens* is the most prominent species (Figure 6.71), followed by *Oxyanthus speciosus* (150 plants per hectare) (Figure 6.71), and finally *Tetrorchidium didymostemon* (50 plants per hectare) (Figure 6.72). Only *Oxyanthus speciosus* occurs in both sample plots on Nsadzi Island (Table 6.14).

Total projected canopy cover and canopy regime at different height levels

Mean total projected canopy cover at different height classes

Figure 6.76 shows the mean total projected canopy cover for all height classes on Nsadzi Island. The > 6.0 m height class with 325.68% contributes the highest percentage of canopy cover (Figure 6.76). The percentage canopy cover declines sharply over the following height classes and only the 1.0 m height class (9.51%) has a slightly higher mean percentage canopy cover compared to the 2.0 m height class (7.93%) (Figure 6.76). The overall mean canopy cover is 491.12% per hectare for the sample area on Nsadzi Island.

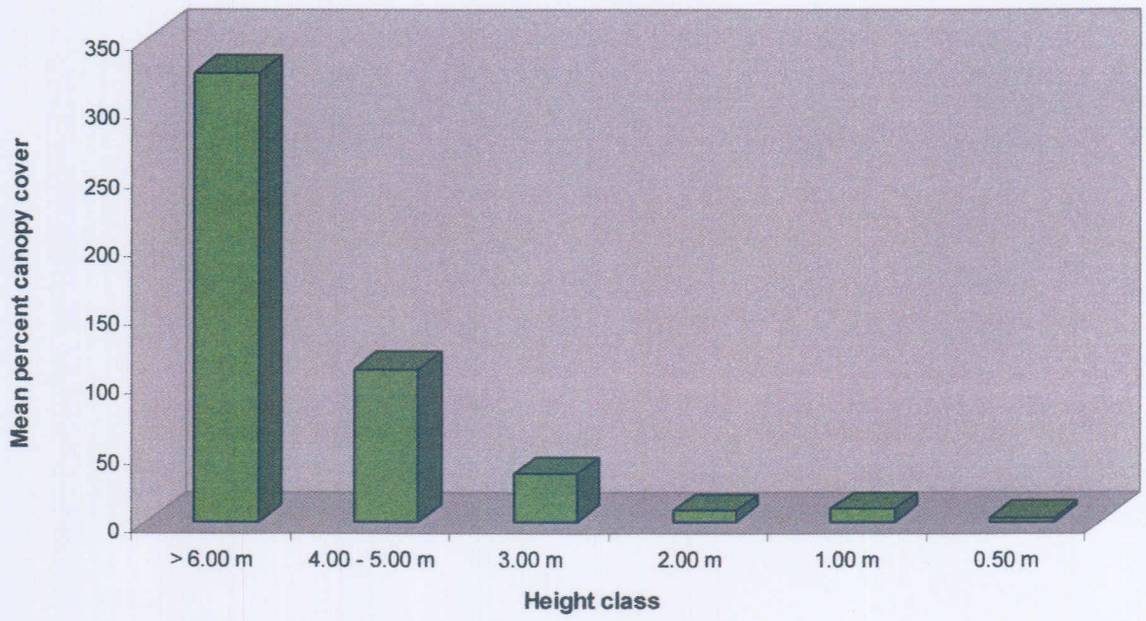

Figure 6.76: Mean total projected canopy cover of all height classes for the sample area.

Key: Percent canopy cover

Mean total projected canopy cover at different height classes for all height levels

The > 6.0 m height class only contributes any canopy cover, namely 325.68%, at the > 6.0 m height level (Figure 6.77). The 4.00 – 5.00 m height class contributes about one-third of the percentage of the > 6.0 m height class to the total projected canopy cover (Figure 6.77). The remaining height classes contribute on average only 10% or less of the percentage of the > 6.0 m height class to the total projected canopy cover. Only the 1.0 m and 0.5 m height class contribute any canopy cover (2.48% and 2.68%) to the 0.5 m height level (Figure 6.77). Every other height class also contributes the largest percentage of mean total projected canopy cover in its highest height level (Figure 6.77).

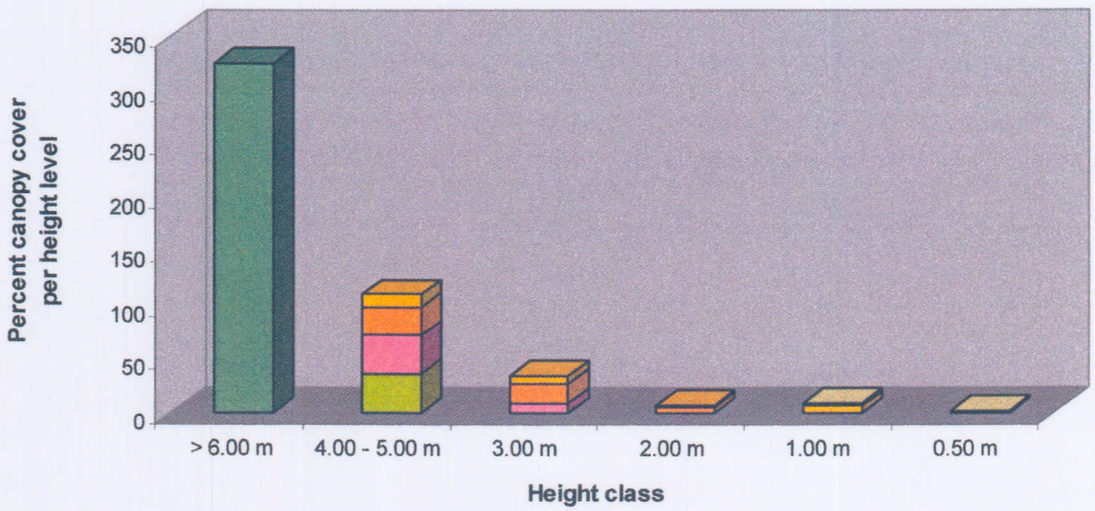

Figure 6.77: Mean total projected canopy cover at different height classes for all height levels.

Key:

- 0.5 m height class
- 1.0 m height class
- 2.0 m height class
- 3.0 m height class
- 4.0 – 5.0 m height class
- > 6.0 m height class

Mean total projected canopy cover at different height levels

The > 6.0 m height level contributes by far the highest percentage of mean total projected canopy cover, namely 325.68% (Figure 6.78). All other height levels contribute around 15% or less of this percentage to the mean total projected canopy cover (Figure 6.78).

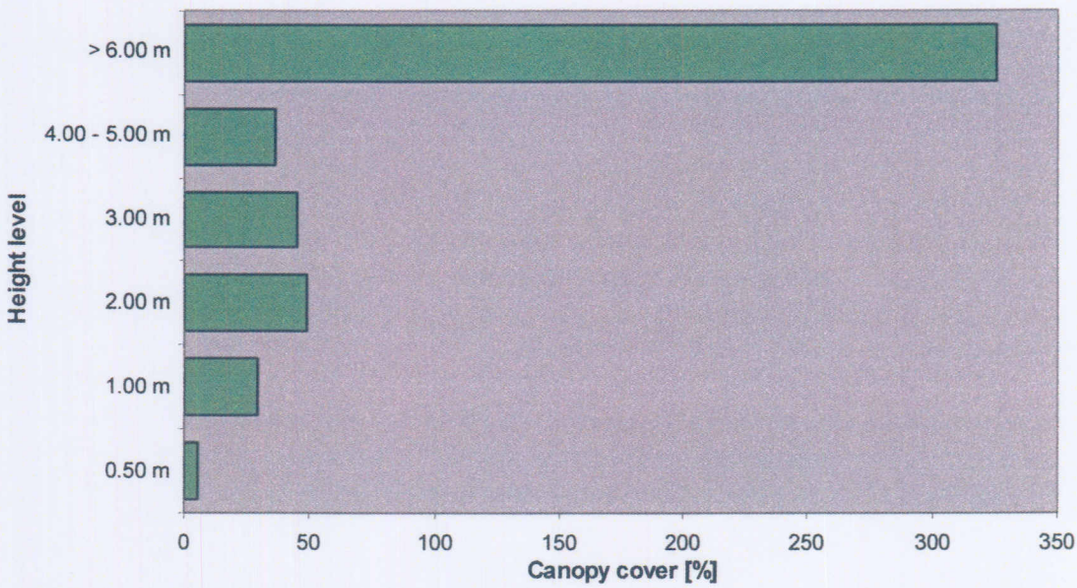

Figure 6.78: Mean total projected canopy cover at different height levels for the sample area.

Key: Percent canopy cover

Mean total projected canopy cover according to growth form

The sparse shrub and shrub growth form contribute less than one percent (0.47% and 0.38%) to the mean total projected canopy cover according to growth form for the sample area on Nsadzi Island (Table 6.17 & Figure 6.79). The tree growth form contributes nearly all of the 491.12% of mean total canopy cover, i.e. 490.27% (Table 6.17 & Figure 6.79). The two shrub growth forms only contribute any canopy cover in the two lowest height classes, and here only 0.33% or less per growth form and height level (Table 6.17).

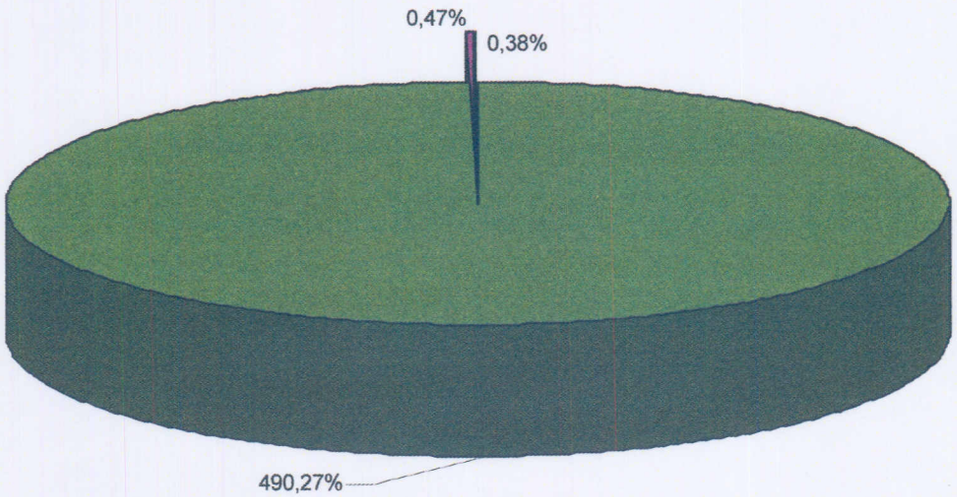

Figure 6.79: Mean total projected canopy cover according to growth form.

Key:
- Shrub
- Sparse shrub
- Tree

Table 6.17: *Mean total projected canopy cover at different height levels according to growth form*

Height level	Canopy cover [%]			
	Tree	Sparse shrub	Shrub	TOTAL
> 6.00 m	325.68			325.68
4.00 - 5.00 m	36.61			36.61
3.00 m	45.27			45.27
2.00 m	49.30			49.30
1.00 m	28.58	0.33	0.19	29.10
0.50 m	4.83	0.14	0.19	5.16
TOTAL	490.27	0.47	0.38	491.12