鹿児島大学佐多演習林の広葉樹林について

迫　　静　男

On the Broad Leaved Forest of the Sata Exper. Forest of Kagoshima Univ.

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1. 緒　　言

鹿児島大学佐多演習林は1909年に設置された。その当初は大半がクロマツと常緑広葉樹の点在する原野であったが,その後クロマツを上層とする針広混交林が出現した。最近クロマツの虫害が甚しく，下層の広葉樹が発達して暖帯南部における特有の林相を呈して来たので，その植生の変化を観察するため演習林内に永久コドラートを設置し，1975年11月に第1回の調査を行ったのでその結果を報告する。調査に当っては本学林学科学生川原，宮田，泊，畠中，中園，山口諸君の協力を得た。

2. 諸査地の概要と調査方法

第1表と第1図に示す場所に4ケ所の方形区を設定し，森林を樹高に応じて階層を区分し，樹木層は各層毎に樹種別に毎木調査を行い胸高直径を測定して幹材積を計算した。低木層と草本層は各方形区内に2*m*×24*m*の帯状区を設定して直接被度を測定した。

被度記号としては下記の符号を用いた。

＋　1本または2本の個体を示すもの
1　少数またはその被度が plot の面積の1/4以下のもの
2　個体数は多いがその被度は plot の面積の1/4以下のもの
3　plot の1/2～1/4の面積を占めるもの
4　plot の1/2～3/4の面積を占めるもの
5　plot の3/4～1の面積を占めるもの

3. 調査地附近の植生の概況

Plot 1.

第1層ではタブノキが53%，イタジイが29%，クロキが8%，シロダモが6%，ヒメユズリハが4%を占めている。第2層はヒサカキが28%，モクタチバナが19%，ハマヒサカキが9%，イタジイが9%，タブノキが7%，ヒメユズリハが6%，フカノキが5%，オオムラサキシキブが5%，

クロキが4％，ハマセンダンが3％，イヌビワが3％，ヤブニッケイが2％，トベラが1％を占めている。第3層ではビロウが28％，ヒメユズリハが13％，ヒサカキが11％，タブノキが11％，イタジイが9％，イヌビワが7％，ヤブニッケイが5％，モクタチバナが4％，シロダモが3％，オオムラサキシキブが2％，シャリンバイが2％，ハクサンボクが1％，クロキ，フカノキ，ネズミモチ，シマイズセンリョウ，ハマセンダン，ホルトノキ，トベラ，ヤツデ，ハマビワ，クチナシなどが見られる。低木層ではヒメユズリハ，イタジイ，タブノキ，ヤブニッケイ，モクタチバナが多く，イヌビワ，ネズミモチ，ヒサカキ，ハクサンボク，シロダモ，シャリンバイ，マンリョウ，フカノキ，トベラ，シマイズセンリョウ，クロバイ，ビロウ，クチナシ，ハマビワなどが見られる。草本層ではツワブキ，フウトウカズラが多く，ヤブニッケイ，シロダモ，テイカカズラ，シラタマカズラ，オオムラサキシキブ，ヒメユズリハ，イタジイ，コバノカナワラビ，モクタチバナ，ヤツデ，タブノキ，ハマニンドウ，コゴメスゲ，ハゼノキ，アオノクマタケラン，サネカズラ，ホルトノキ，サツマサンキライ，ネズミモチ，クチナシ，ギョクシンカ，イヌビワ，シマイズセンリョウ，サルトリイバラ，トベラ，ハクサンボク，ヒサカキ，マンリョウなどの木本類や草本類が出現している。

Table 1. Explanation of sample plots cited.

No. of sample plots	Alt. in (*m*)	Exposition	Slope	Area	Place
1	40	WNW	20°	25 *m*×25 *m*	Subcompartment へ, Compartment 8
2	70	WNW	25°	25 *m*×25 *m*	Subcompartment つ, Compartment 1
3	200	NE	32°	25 *m*×25 *m*	Subcompartment い, Compartment 6
4	50	WNW	16°	25 *m*×25 *m*	Subcompartment つ, Compartment 1

Table 2. Table showing the number of individuals (No.), volumes (in m^3) (V) per 1/16 *ha*. and percentage volumes (% V) of tree species belonging to the first stratum (from 10 *m* −15 *m* in height) in the sample plot 1.

Diam. class in *cm* / Species	4	6	8	10	12	14	16	18	20	22	24	26	28	30	34	36	42	44	60	No.	V	%V
Persea thunbergii			1		5	1	1	2	3	1	2	1		2	1		1	1	1	23	6.5640	53.2
Castanopsis sieboldii	1	1					1	1	2	1	3		2			1		1		14	3.5400	28.7
Symplocos lucida															1	1				2	1.0280	8.3
Neolitsea sericea									1	1			1							3	0.7000	5.7
Daphniphyllum teijsmannii				1											1					2	0.5120	4.1
Total	1	1	1	1	5	1	2	3	6	3	5	1	3	2	3	2	1	2	1	44	12.3440	100.0

Table 3. Table showing the number of individuals (No.), volumes (in m^3) (V) per 1/16 *ha*. and percentage volumes (% V) of tree species belonging to the second stratum (from 5 *m* − 10 *m* in height) in the sample plot 1.

Species \ Diam. class in *cm*	2	4	6	8	10	12	16	18	No.	V	% V
Eurya japonica		2	4	7		1			14	0.2170	27.7
Ardisia sieboldii	1		1	2	1		1		6	0.1470	18.8
Eurya emarginata								1	1	0.0720	9.2
Castanopsis sieboldii			5	1					6	0.0680	8.7
Persea thunbergii			2	2					4	0.0560	7.1
Daphniphyllum teijsmannii		2	1		1				4	0.0480	6.1
Schefflera octophylla	1	3	2						6	0.0360	4.6
Callicarpa japonica var. luxurians		1	3						4	0.0350	4.5
Symplocos lucida		1			1				2	0.0330	4.2
Evodia meliaefolia		5							5	0.0250	3.2
Ficus erecta		1		1					2	0.0230	2.9
Cinnamomum japonicum	1			1					2	0.0190	2.4
Pittosporum tobira		1							1	0.0050	0.6
Total	3	16	18	14	3	1	1	1	57	0.7840	100.0

Table 4. Table showing the number of individuals (No.), volumes (in m^3) (V)per 1/16*ha*. and percentage volumes (% V) of tree species belonging to the third stratum (from 2*m*−5*m* in height) in the sample plot 1.

Species \ Diam. class in *cm*	2	4	6	8	18	26	No.	V	% V
Livistona chinensis var. *subglobosa*					1	1	2	0.1080	27.8
Daphniphyllum teijsmannii	31	4	1	2			38	0.0496	12.6
Eurya japonica		2	6	1			9	0.0430	11.1
Persea thunbergii	7	11	3				21	0.0412	10.6
Castanopsis sieboldii	20	6	2				28	0.0340	8.7
Ficus erecta	17	3		1			21	0.0252	6.5
Cinnamomum japonicum	18	5					23	0.0208	5.3
Ardisia sieboldii	12	2	1				15	0.0162	4.1
Neolitsea sericea	6	2	1				9	0.0126	3.2
Callicarpa japonica var. *luxurians*	7	2					9	0.0082	2.1
Raphiolepis indica var. *integrifolia*	12						12	0.0072	1.9
Viburnum japonicum	9						9	0.0054	1.4
Symplocos lucida	2	2					4	0.0052	1.3
Schefflera octophylla	4	1					5	0.0044	1.1
Ligustrum japonicum	4						4	0.0024	0.6
Maesa tenera	2						2	0.0012	0.3
Evodia meliaefolia	1						1	0.0006	0.2
Elaeocarpus decipens	1						1	0.0006	0.2
Pittosporum tobira	1						1	0.0006	0.2
Zanthoxyllum ailanthoides	1						1	0.0006	0.2
Fatsia japonica	1						1	0.0006	0.2
Litsea japonica	1						1	0.0006	0.2
Gardenia jasminoides f. *grandiflora*	1						1	0.0006	0.2
Total	158	40	14	4	1	1	218	0.3888	100.0

Table 5. Table showing the average cover degrees (C) and percentage frequencies (% F) of species belonging to the fourth stratum (from 0.3 *m* − 2 *m* in height) (shrub) in the sample plot 1.

Species \ No. of sample plots	1	2	3	4	5	6	7	8	9	10	11	12	C	%F
Daphniphyllum teijsmannii			+	+	+	+	+	+	+	2	+	1	0.58	83
Castanopsis sieboldii	+	+		+			+	+	+	+	+	+	+	75
Persea thunbergii	+		+				+		+	+	+	+	+	58
Cinnamomum japonicum	+	+		+		+		+	+				+	50
Ardisia sieboldii			+	+			+		+				+	33
Ficus erecta					+	+	+				+		+	33
Ligustrum japonicum		+		+								+	+	25
Eurya japonica			+		+				+				+	25
Viburnum japonicum					+		+	+					+	25
Neolitsea sericea	+								+				+	17
Raphiolepis indica var. *integrifolia*		+	+										+	17
Ardisia crenata											+	+	+	17
Schefflera octophylla		+											+	8
Pittosporum tobira					+								+	8
Maesa Tenera					+								+	8
Symplocos lucida									+				+	8
Livistona chinensis var. *subglodosa*										+			+	8
Gardenia jasminoides f. *grandiflora*												+	+	8
Litsea japonica											+		+	8

Table 6. Table showing the average cover degrees (C) and percentage frequencies (% F) of species belonging to the fifth stratum (under 0.3 *m* in height) (herbaceous layer) in the sample plot 1.

Species \ No. of sample plots	1	2	3	4	5	6	7	8	9	10	11	12	C	% F
Farfugium japonicum	+	+		+	+	+	+	+	+	+	+	+	+	92
Piper kadzura	+	+	+	+	+	+	+	+		+		+	+	83
Cinnamomum japonicum	2	+	+		+		+	+	+		+	+	+	75
Neolitsea sericea	+	+		+		+	+		+	+	+	+	+	75
Trachelospermum asiaticum	+			+	+		+		+	+	+	+	+	67
Psychotria serpens	+	+		+	+			+	+	+			+	58
Callicarpa japonica var. *luxurians*	+			+	+	+	+	+				+	+	58
Daphniphyllum teijsmannii		+	+	+	+		+	+		+			+	58
Castanopsis sieboldii		+	+			+		+	+	+	+		+	58
Arachniodes pseudo-aristata					+	2	2	+	+	+	+		+	58
Ardisia sieboldii		+	+	+	+			+		+			+	50
Fatsia japonica	+					+		+	+	+			+	42
Persea thunbergii		+	+	+						+			+	33
Lonicera affinis	+						+	+					+	25
Carex brunnea			+	+	+								+	25
Rhus succedanea	+									+			+	17
Alpinia intermedia	+					+							+	17
Kadsura japonica				+								+	+	17
Elaeocarpus decipens			+										+	8
Smilax bracteata			+										+	8
Ligustrum japonicum				+									+	8
Gardenia jasminoides f. *grandiflora*					+								+	8
Tarenna gyokushinkwa						+							+	8
Ficus erecta							+						+	8
Maesa tenera								+					+	8
Smilax china								+					+	8
Pittosporum tobira								+					+	8
Viburnum japonicum								+					+	8
Eurya japonica												+	+	8
Ardisia crenata												+	+	8

Plot 2.

第1層はヒメユズリハが42%，ヤブニッケイが35%，カラスザンショウ，ハマセンダンが7%で，タブノキ，トベラ，モクタチバナ，アカメガシワ，ハクサンボク，ヒサカキ，オオムラサキシキブ，ハマヒサカキ，クマノミズキ，クロマツ，フカノキなどが少数見られる。第2層ではイヌビワが27%，ヒメユズリハが20%，ハクサンボクが14%，ヤブニッケイが12%，オオムラサキシキブが5%で，トベラ，ヒサカキ，シャリンバイ，ネズミモチ，ハマヒサカキ，シロダモ，ヤツデ，ハマビワ，ハマセンダン，カラスザンショウ，タブノキ，クチナシ，アキグミなどが出現している。低木層ではヤブニッケイが多く，シロダモ，ハクサンボク，ネズミモチ，イヌビワ，ヤツデ，タブノキ，シャリンバイ，ヒメユズリハ，アキグミ，ハゼノキ，トベラ，ハマヒサカキ，ヒサカキなどが見られる。草本層ではサルトリイバラ，シラタマカズラ，ヤブニッケイ，ツワブキ，ハクサンボク，ヒメユズリハなどが多く，コゴメスゲ，ナツフジ，シロダモ，モクタチバナ，コバノカナワラビ，ヤツデ，ネズミモチ，イヌビワ，テイカカズラ，マサキ，トベラ，ハマビワ，ヒサカキ，シャリンバイ，マンリョウ，テリハツルウメモドキ，ホルトノキ，アカメガシワ，サネカズラ，アオノクマタケラン，タマシダ，ホラシノブ，アオツヅラフジ，イシカグマ，クマワラビなどが見られる。

Table 7. Table showing the number of individuals (No.), volumes in m^3 (V) per 1/16*ha*. and percentage volumes (% V) of tree species belonging to the first stratum (from 10*m*−5*m* in height) in the sample plot 2.

Species \ Diam. class in *cm*	4	6	8	10	12	14	16	18	20	24	26	34	No.	V m^3	%V
Daphniphyllum teijsmannii	7	15	14	14	10	4	1		1	1		1	68	0.1940	42.4
Cinnamomum japonicum	1	4	9	1	2	2	3	1	1		3	1	28	0.1590	34.7
Zanthoxyllum ailanthoides			2	2	2	1			1				8	0.0312	6.8
Evodia meliaefolia	1	2	3		1	1				1			9	0.0306	6.7
Persea thunbergii						1	1						2	0.0117	2.6
Pittosporum tobira						1							1	0.0051	1.1
Ardisia sieboldii					1								1	0.0037	0.8
Mallotus japonicus					1								1	0.0037	0.8
Viburnum japonicum		2	1										3	0.0034	0.7
Eurya japonica	4	2											6	0.0034	0.7
Callicarpa japonica var. *luxurians*	1	3											4	0.0031	0.7
Eurya emarginata	1	3											4	0.0031	0.7
Cornus macrophylla	1	1	1										3	0.0029	0.6
Pinus thunbergii				1									1	0.0026	0.6
Schefflera octophylla	1												1	0.0004	0.1
Total	17	32	30	18	17	10	5	1	3	2	3	2	140	0.4579	100.0

Table 8. Table showing the number of individuals (No.), volomes in m^3 (V) per 1/16 *ha*. and percentage volumes (% V) of tree species belonging to the second stratum (from 5*m*−2*m* in height) in the sample plot 2.

Species \ Diam. class in *cm*	2	4	6	8	10	No.	V *m*	% V
Ficus erecta	21	24	13			58	0.1256	26.8
Daphniphyllum teijsmannii	10	8	4	4	1	27	0.0930	19.8
Viburnum japonicum	25	17	3			45	0.0640	13.6
Cinnamomum japonicum	14	12	2		1	29	0.0574	12.2
Callicarpa japonica var. *luxurians*	2	9	1			12	0.0242	5.2
Pittosporum tobira	9	4	1			14	0.0184	3.9
Eurya japonica	8	4	1			13	0.0178	3.8
Raphiolepis indica var. *integrifolia*	1	2	2			5	0.0146	3.1
Ligustrum japonicum	2	2	1			5	0.0102	2.2
Eurya emarginata	10	2				12	0.0100	2.1
Neolitsea sericea	7	2				9	0.0082	1.7
Fatsia japonica	1	3				4	0.0066	1.4
Litsea japonica	6	1				7	0.0056	1.2
Evodia meliaefolia	2	2				4	0.0052	1.1
Zanthoxyllum ailanthoides			1			1	0.0050	1.1
Persea thunbergii	3					3	0.0018	0.4
Gardenia jasminoides f. *grandiflora*	2					2	0.0012	0.3
Elaeagnus umbellata	1					1	0.0006	0.1
Total	124	92	29	4	2	251	0.4694	100.0

Table 9. Table showing the average cover degrees (C) and percentage friequencies (% F) of species belonging to the third stratum (from 2*m*～0.3*m* in height) (shrub) in the sample plot 2.

Species \ No. of sample plots	1	2	3	4	5	6	7	8	9	10	11	12	C	%F
Cinnamomum japonicum	+	+	+	+		+	+	+	+	+		+	0.71	83
Neolitsea sericea			+		1	+							+	25
Viburnum japonicum				+			+	+					+	25
Ligustrum japonicum								+			+	+	+	25
Ficus erecta				+	+								+	17
Fatsia japonica					+				1				+	17
Persea thunbergii						1						+	+	17
Raphiolepis indica var. *integrifolia*									+			+	+	17
Daphniphyllum teijsmannii	+												+	8
Elaeagnus macrophylla					+								+	8
Rhus succedanea							+						+	8
Pittosporum tobira								+					+	8
Eurya emarginata								+					+	8
Eurya japonica											+		+	8

Table 10. Table showing the average cover degrees (C) and percentage friequencies (% F) of species belonging to the fourth stratum (under 0.3 *m* in height) (herbaceous layer) in the sample plot 2.

Species \ No. of sample plots	1	2	3	4	5	6	7	8	9	10	11	12	C	%F
Smilax china	+	+	+	+		+	+	+		+			+	67
Psychotria serpens	+		+	+	+	+	+	+	+				+	67
Cinnamomum japonicum	+	+				+		+		+	2	+	+	58
Farfugium japonicum	+				+	+			+		+	+	+	50
Viburnum japonicum	+	+		+	+	+	+						+	50
Thelypteris acuminata	+	+	+	+		+						3	+	50
Daphniphyllum teijsmannii	+	+	+	+	+								+	42
Carex brunnea	+		+	+	+								+	33
Millettia japonica	+		+	+	+								+	33
Neolitsea sericea				+			+		+			+	+	33
Ardisia sieboldii					+		+				+	+	+	33
Arachniodes pseudo-aristata							+	+	+	+			+	33
Fatsia japonica						+	+		+				+	25
Ligustrum japonicum						+					+		+	17
Ficus erecta				+						+			+	17
Trachelospermum asiaticum					+	+							+	17
Euonymus japonicus	+									+			+	17
Pittosporum tobira	+												+	8
Litsea japonica		+											+	8
Eurya japonica		+											+	8
Raphiolepis indica var. *integrifolia*					+								+	8
Ardisia crenata							+						+	8
Celastrus punctatus							+						+	8
Elaeagnus macrophylla								+					+	8
Mallotus japonicus								+					+	8
Kadsura japonica										+			+	8
Alpinia intermedia												+	+	8
Nephrolepis auriculata	+												+	8
Sphenomeris chinensis	+												+	8
Cocculus orbiculatus										+			+	8
Microlepia strigosa										+			+	8
Dryopteris lacera											1		+	8

Plot 3.

第1層ではヤブニッケイが20%，タブノキ，ヒメユズリハが18%，クロキが17%で，ハゼノキ，モクタチバナ，マテバシイ，トベラ，ネズミモチ，フカノキ，ハクサンボク，ハマヒサカキ，ハマビワなどが出現している。第2層ではクロキが19%，ハクサンボクが14%，イヌビワが11%，トベラが9%でタブノキ，ヒメユズリハ，ネズミモチ，ヤブニッケイ，ハゼノキ，ハマヒサカキ，ヒサカキ，アカメガシワ，マテバシイ，フカノキ，シロダモ，シャリンバイ，ヤツデ，ハマビワ，モクタチバナ，マサキ，ホルトノキ，クチナシ，オオムラサキシキブなどが見られる。低木層ではヒメユズリハが多く，ヤブニッケイ，タブノキ，ハマビワ，イヌビワ，ネズミモチ，ゲットウ，クロキ，ハクサンボク，シャリンバイ，モクタチバナ，ヤツデ，マサキ，シロダモ，サカキカズラ，ハマヒサカキ，オオムラサキシキブ，ナツフジ，サンゴジュ，ヒサカキ，アオノクマタケランなどが出現している。林床にはアオノクマタケラン，フウトウカズラ，シラタマカズラが多く，トベラ，イヌビワ，コゴメスゲ，ホシダ，ホウロクイチゴ，ヤブニッケイ，ツワブキ，サルトリイバラ，ハマビワ，モクタチバナ，ヒメユズリハ，オオムラサキシキブ，ヤツデ，シロダモ，ハマニンドウ，ケチヂミザサ，マンリョウ，シャリンバイ，オキナワシタキソウ，ネズミモチ，ビロウ，オトコエシ，クロキ，マルバニッケイ，フカノキ，ハクサンボク，サネカズラなどが見られる。

Table 11. Table showing the number of individuals (No.), volumes (in m^3) (V) per 1/16 *ha*. and percentage volumes (% V) of tree species belonging to the first stratum (from $10m-5m$ in height) in the sample plot 3.

Species \ Diam. class in *cm*	4	6	8	10	12	14	16	18	20	22	24	26	28	30	40	No.	V	% V
Cinnamomum japonicum	1	3	5	5	1	3			1	1		1	1			22	1.0350	19.7
Persea thunbergii		1	3		3			1		2				2		12	0.9650	18.4
Daphniphyllum teijsmannii	1	4	5	4	6	1	3		1		1					26	0.9460	18.1
Symplocos lucida	5	6	8	4	4	2			3							32	0.8650	16.5
Rhus succedanea															1	1	0.4120	7.9
Ardisia sieboldii	2		1	2	1		2	2								10	0.4110	7.9
Lithocarpus edulis	1				3	2	1									7	0.2830	5.4
Pittosporum tobira	3		1		1	1										6	0.1160	2.2
Ligustrum japonicum	2	3	2													7	0.0670	1.3
Schefflera octophylla	1	2	1	1												5	0.0640	1.2
Viburnum japonicum						1										1	0.0510	1.0
Eurya emarginata	1	1														2	0.0130	0.3
Litsea japonica		1														1	0.0090	0.2
Total	17	21	26	16	19	10	6	3	5	3	1	1	1	2	1	132	5.2370	100.0

Table 12. Table showing the number of individuals (No.), volumes (in m^3) (V) per 1/16*ha*. and percentage volumes (% V) of tree species belonging to the second stratum (from $5m-2m$ in height) in the sample plot 3.

Species \ Diam. class in *cm*	2	4	6	8	10	12	14	28	No	V	%V
Symplocos lucida	16	14	6	1	1	2			40	0.1336	19.4
Viburnum japonicum	20	3	4	3			1		31	0.0940	13.7
Ficus erecta	23	18	2		1				44	0.0748	10.9
Pittosporum tobira	13	5	2	4					24	0.0638	9.3
Persea thunbergii	16	4	3	1	1			1	29	0.0566	8.2
Daphniphyllum teijsmannii	18	4	4		2	1			26	0.0538	7.8
Ligustrum japonicum	6	9	1		1				17	0.0416	6.0
Cinnamomum japonicum	5	1	2		1				9	0.0300	4.3
Rhus succedanea		1	1		1				3	0.0220	3.2
Eurya emarginata	4	5		1					10	0.0214	3.1
Eurya japonica		2			1				3	0.0190	2.7
Mallotus japonicus	1	6	1						8	0.0176	2.5
Lithocarpus edulis	2	4	1						7	0.0142	2.1
Schefflera octophylla		1		1					2	0.0110	1.6
Neolitsea sericea	1	1	1						3	0.0076	1.1
Raphiolepis indica var. *integrifolia*		1	1						2	0.0070	1.1
Fatsia japonica	2	2							4	0.0052	0.8
Litsea japonica	3	1							4	0.0038	0.6
Ardisia sieboldii	2	1							3	0.0032	0.5
Euonymus japonicus		1							1	0.0020	0.3
Cornus macrophylla		1							1	0.0020	0.3
Elaeocarpus decipens		1							1	0.0020	0.3
Gardenia jasminoides f. *grandiflora*	1								1	0.0006	0.1
Callicarpa japonica var. *luxurianus*	1								1	0.0006	0.1
Total	134	86	29	11	9	3	1	1	274	0.6928	100.0

Table 13. Table showing the average cover degrees (C) and percentage frequencies (%F) of species belonging to the thirdstratum (from 2*m*~0.3*m* in height) (shrub) in the sample plot 3.

Species \ No. of sample plots	1	2	3	4	5	6	7	8	9	10	11	12	C	%F
Daphniphyllum teijsmannii	+		+	+	+	2	+	+	+			+	+	75
Cinnamomum japonicum		+	+			+	+	+		+	+		+	58
Persea thunbergii			+		+	+				+	2	+	+	50
Litsea japonica	+		+		+	+	+				+		+	50
Ficus erecta			+		+	+		+	+			+	+	50
Ligustrum japonicum		+	+								+	+	+	33
Alpinia speciosa			+	+				+				+	+	33
Symplocos lucida		+	+	2									+	25
Viburnum japonicum	1			+		+							+	25
Raphiolepis indica var. *integrifolia*				+	+				+				+	25
Ardisia sieboldii					+							+	+	17
Fatsia japonica										1			+	8
Euonymus japonicus		+											+	8
Neolitsea sericea				+									+	8
Anodendron affine							+						+	8
Eurya emarginata								+					+	8
Gardinia jasminoides f. *grandiflora*								+					+	8
Millettia japonica									+				+	8
Viburnum odoratissimum var. *awabucki*										+			+	8
Eurya japonica												+	+	8
Alpinia intermedia												+	+	8

Table 14. Table showing the average cover degrees (C) and percentage frequencies (% F) of species belonging to the fourth stratum (under 0.3*m* in height) (herbaceous layer) in the sample plot 3.

Species \ No. of sample plots	1	2	3	4	5	6	7	8	9	10	11	12	C	% F
Alpinia intermedia		1	+	+	+	+	+	+	+	+	+	+	+	92
Piper kadzura		+	+	+	+	+	+	+		+	+	+	+	83
Persea thunbergii	+	+	+	+	+	+	+	+		+	+		+	83
Psychotria serpens	+	+	+	+	+	+	+			1		+	+	75
Pittosporum tobira		+				+		+	+	+	+	+	+	58
Ficus erecta	+	+				+	+	+			+		+	50
Carex brunnea	+	+	+					+		+	+		+	50
Thelypteris acuminata	+	+	+	+	+	+							+	50
Rubus sieboldii	+				+	+	+		+	+			+	50
Cinnamomum japonicum	+	+	+	+				+				+	+	50
Farfugium japonicum		+			+			+	+	+	+		+	50
Smilax china				+	+	+	+			+		+	+	50
Litsea japonica				+					+	+	+		+	33
Ardisia sieboldii					+				+			+	+	25
Daphniphyllum teijsmannii								+		+	+		+	25
Callicarpa japonica var. *luxurians*	+			+									+	17
Fatsia japonica	+			+									+	17
Neolitsea sericea						+					+		+	17
Lonicera affinis								+			+		+	17
Oplismenus undulatifolius									+		+		+	17
Ardisia crenata									+		+		+	17
Raphiolepis indica var. *integrifolia*			+										+	8
Stephanotis liukiuensis			+										+	8
Ligustrum japonicum					+								+	8
Livistona chinensis var. *subglobosa*						+							+	8
Patrinia villosa							+						+	8
Symplocos lucida								+					+	8
Cinnamomum daphnoides								+					+	8
Schefflera octophylla									+				+	8
Viburnum iaponicum											+		+	8
Kadsura japonica												+	+	8

Plot 4.

第1層ではヒメユズリハが35%，タブノキが23%，クロマツとカラスザンショウが11%で，アカメガシワ，ヒサカキ，ハゼノキ，ヤブニッケイ，マルバニッケイ，シロダモ，ネズミモチ，ハマヒサカキ，トベラ，イヌビワ，ハクサンボクなどが見られる。第2層ではヒメユズリハが24%で，ヒサカキが11%，ネズミモチが10%で，ハマヒサカキ，ヤブニッケイ，トベラ，クロマツ，アカメガシワ，タブノキ，イヌビワ，ハゼノキ，クロキ，オオムラサキシキブ，カンコノキ，カラスザンショウ，シロダモ，ハクサンボク，フカノキなどが見られる。第3層ではハマヒサカキが32%で，ネズミモチ，ヒメユズリハ，イヌビワ，トベラ，ヒサカキ，ハクサンボク，ヤブニッケイ，ハゼノキ，タブノキ，オオムラサキシキブ，クロキ，シャリンバイ，カラスザンショウ，マルバニッケイ，ヤツデ，カンコノキ，アカメガシワ，シロダモ，クチナシ，モクタチバナ，マンリョウなどが見られる。低木層ではハクサンボク，ヤブニッケイ，イヌビワが多く，トベラ，ネズミモチ，ホウロクイチゴ，ヒメユズリハ，ハマヒサカキ，シャリンバイ，シロダモ，モクタチバナ，キキョウラン，ツワブキ，ウラジロなどが見られる。林床ではウラジロ，ナツフジ，ツワブキ，サルトリイバラが多く，シラタマカズラ，イヌビワ，トベラ，ホシダ，ケチヂミザサ，ホウロクイチゴ，ヒメユズリハ，

Table 15. Table showing the number of individuals (No.) volumes in m^3 (V) per 1/16 *ha.* and percentage volumes (% V) of tree species belonging to the first stratum (from $8m-5m$ in height) in the sample plot 4.

Species \ Diam. class in *cm*	2	4	6	8	10	12	14	16	18	20	22	30	No.	V m^3	%V
Daphniphyllum teijsmannii		1	4	2	2	7	2	2	1				21	0.6370	34.8
Persea thunbergii										1	1	1	3	0.4160	22.8
Pinus thunbergii								2		1			3	0.2040	11.2
Zanthoxyllum ailanthoides		1			4	1	1						7	0.1990	10.9
Mallotus japonicus	1		5	1	2								9	0.1019	5.6
Eurya japonica			1	3									4	0.0530	2.9
Rhus succedanea		1	2		1								4	0.0430	2.4
Cinnamomum japonicum		1	1		1								3	0.0350	1.9
Cinnamomum daphnoides						1							1	0.0340	1.9
Neolitsea sericea						1							1	0.0340	1.9
Ligustrum japonicum			1		1								2	0.0310	1.7
Eurya emarginata		2	1										3	0.0160	0.9
Pittosporum tobira	1		1										2	0.0089	0.5
Ficus erecta			1										1	0.0080	0.4
Viburnum japonicum		1											1	0.0040	0.2
Total	2	7	17	6	11	10	3	4	1	2	1	1	65	1.8248	100.0

コゴメスゲ，チガヤ，マンリョウ，ヤブニッケイ，ハクサンボク，シロダモ，タチツボスミレ，コバノカナワラビ，ヒメジソ，ヘクソカズラ，アオノクマタケラン，ウマノミツバ，キキョウラン，キイレツチトリモチ，ヒヨドリバナ，ヒメアブラススキ，タブノキ，アカメガシワ，ネズミモチ，ヤツデ，フウトウカズラ，マサキ，シャリンバイ，ヒサカキ，ハスノハカズラなどが見られる。

Table 16. Table showing the number of individuals (No.) volumes in m^3 (V) per 1/16 *ha.* and percentage volumes (%V) of tree species belonging to the second stratum (from $5m-3m$ in height) in the sample plot 4.

Species \ Diam class in *cm*	2	4	6	8	10	12	14	16	No.	V	%V
Daphniphyllum teijsmannii	15	27	18	7	3				70	0.3305	23.8
Eurya japonica	5	13	3	6		1			28	0.1525	11.0
Ligustrum japonicum	18	10	9	2	1				40	0.1366	9.9
Eurya emarginata	16	12	6	3					37	0.1162	8.4
Cinnamomum japonicum	7	8	6	1	2				24	0.1119	8.1
Pittosporum tobira	9	7	11	1					28	0.1043	7.5
Pinus thunbergii	1		1	1	2			1	6	0.0890	6.4
Mallotus japonicus	2	5	2	3	1				13	0.0694	5.0
Persea thunbergii		2	3	1		1			7	0.0610	4.4
Ficus erecta		12	2	1					15	0.0590	4.3
Rhus succedanea	5			1	2				8	0.0505	3.6
Symplocos lucida			1				1		2	0.0410	3.0
Callicarpa japonica var. *luxurians*	4	2	2	1					9	0.0318	2.3
Glochidion obovatum				1					1	0.0110	0.8
Zanthoxyllum ailanthoides	1		1						2	0.0067	0.5
Neolitsea sericea		2							2	0.0060	0.4
Viburnum japonicum	7								7	0.0049	0.4
Schefflera octophylla		1							1	0.0030	0.2
Total	90	101	65	29	11	2	1	1	300	1.3853	100.0

Table 17. Table showing the number of individuals (No.) volumes in m^3(V) per 1/16 *ha*. and percentage volumes (%V) of tree species belongling to the third stratum (from 3m−1.5m in height) in the sample plot 4.

Specis \ Diam. class in *cm*	2	4	6	8	10	No.	V	% V
Eurya emarginata	92	39	10	9		150	0.2178	31.5
Ligustrum japonicum	59	14	9			82	0.0876	12.9
Daphniphyllum teijsmannii	45	12	7		1	65	0.0830	12.2
Ficus erecta	34	6	9			49	0.0616	9.1
Pittosporum tobira	27	7	6			40	0.0488	7.2
Eurya japonica	37	15				52	0.0448	7.2
Viburnum japonicum	93					93	0.0372	5.5
Cinnamomum japonicum	24	7	2			33	0.0316	4.7
Rhus saccedanea	7	2	1			10	0.0108	1.6
Persea thunbergii	6	4				10	0.0104	1.5
Callicarpa japonica var. *luxurians*	9	2				11	0.0076	1.1
Symplocos lucida	4	1	1			6	0.0076	1.1
Raphiolepis indica var. *integrifolia*	8	2				10	0.0072	1.1
Zanthoxyllum ailanthoides		1	1			2	0.0060	0.9
Cinnamomum daphnoides	2	2				4	0.0048	0.7
Fatsia japonica	9					9	0.0036	0.5
Glochidion obovatum	2	1				3	0.0028	0.4
Mallotus japonicus	5					5	0.0020	0.3
Neolitsea sericea	4					4	0.0016	0.2
Gardenia jasminoides f. *grandiflora*	2					2	0.0008	0.1
Ardisia sieboldii	1					1	0.0004	0.1
Ardisia crenata	1					1	0.0004	0.1
Total	471	115	46	9	1	642	0.6784	100.0

Table 18. Table showing the average cover degrees (C) and percentage frequencies (% F) of species belonging to the fourth stratum (from 1.5*m*−0.3*m* in height) (shrub) in the sample plot 4.

Species \ No. of sampl plots	1	2	3	4	5	6	7	8	9	10	11	12	C	%F
Viburnum japonicum		1			2	3	3	1	1	+	1	+	1.08	75
Cinnamomum japonicum	+		1				+	+	+		+	+	+	58
Ficus erecta					+	+	+	+		+		+	+	50
Pittosporum tobira	+			+		+	+	+					+	42
Ligustrum japonicum						+		+	+		+		+	33
Rubus sieboldii		+	+	+									+	25
Daphniphyllum teijsmannii					+					+	+		+	25
Eurya emarginata								+	+			+	+	25
Raphiolepis indica var. *integrifolia*	+												+	8
Neolitsea sericea	+												+	8
Ardisia sieboldii		+											+	8
Dianella ensifolia								+					+	8
Farfugium japonicum								+					+	8
Gleichenia japonica												+	+	8

Table 19. Table showing the average cover degrees (C) and percentage frequencies (%F) of species belonging to the fifth stratum (under 0.3*m* in height) (herbaceous layer) in the sample plot 4.

Species \ No. of sample plots	1	2	3	4	5	6	7	8	9	10	11	12	C	%F
Gleichenia japonica	+	+	3	5	5	4							1.5	50
Milettia japonica	+	+	+	+	+	+	+	+	+			+	+	83
Farfugium japonicum	+	+	+	+	+		+		+	+	+	+	+	83
Smilax china	+			+	+	+	+	+	+	+		+	+	75
Psychotria serpens	+	+	+	+	+	+							+	50
Ficus erecta	+	+				+	+	+	+				+	50
Pittosporum tobira	+	+	+			+	+			+			+	50
Thelypteris acuminata	+						+		+	+	2	2	+	50
Oplismenus undulatifolius	+	+		+						+		+	+	42
Rubus sieboldii					+	+				+	+	+	+	42
Daphniphyllum teijsmannii							+	+	+	+	+		+	42
Carex brunnea		+	+							+	3		+	33
Imperata cylindrica var. *major*			+			+	+		+				+	33
Ardisia crenata							+		+		+	+	+	33
Cinnamomum japonicum	+		+					+					+	25
Viburnum japonicum							+			+		+	+	25
Neolitsea sericea										+	+	+	+	25
Viola greypoceras	+	+											+	17
Arachniodes pseudo-aristata		+	+										+	17
Mosla dianthera			+				+						+	17
Paederia scandens				+							+		+	17
Alpinia intermedia								+				+	+	17
Sanicula chinensis									+	+			+	17
Dianella ensifolia	+												+	17
Balanophora tobiracola		+											+	8
Eupatorium chinense var. *simplicifolium*			+										+	8
Persea thunbergii				+									+	8
Bothriochloa parviflora				+									+	8
Mallotus japonicus						+							+	8
Ligustrum japonicum								+					+	8
Fatsia japonica									+				+	8
Piper kadzura									+				+	8
Euonymus japonicus									+				+	8
Raphiolepis indica var. *integrifolia*									+				+	8
Eurya japonica										+			+	8
Stephania japonica											+		+	8

4. 調査結果

Plot 1. タブーヒサカキービロウーヒメユズリハーツワブキ基群集
Plot 2. ヒメユズリハーイヌビワーヤブニッケイーサルトリイバラ基群集
Plot 3. ヤブニッケイークロキーヒメユズリハーアオノクマタケラン基群集
Plot 4. ヒメユズリハーハマヒサカキーハクサンボクーウラジロ基群集

文 献

1) 迫静男・初島住彦：塵児島大学佐多演習林の植物，鹿大農学部演習林報告，3，25～70（1975）

Summary

1. In order to effect the investigation, four quadrats of 25*m* ×25*m* were located in the forest at different elevations of the Sata Exper. Forest of Kagoshima Univ. as shown Table 1. According to the heights of the forest trees, 4 to 5 strata were differentiated, and the volumes of all the trees up to 2*cm* in diameter of the breast-height were measured. The belt-transects of 2*m*×24*m* were located on the respective quadrats. The aim of settling these belt-transects was to obtain any informations concerning the floristic compostion, cover-degrees and frequencies of all the species belonging to the shrub and herbaceous layers.

2. From the three studies it was ascertained that the structure of the broad-leaved-forest of the Sata Exper. Forest of Kagoshima Univ. was as follows :

Plot 1. *Persea thumbergii-Eurya japonica-Livistna chinensis* var. *subglobsa-Daphniphyllum teijismannii Farfugium japonicum* sociation.

Plot 2. *Daphniphyllum teijismannii-Ficus erecta-Cinnamomum japonica-Smilax china* sociation.

Plot 3. *Cinnamomum japonica-Symplocos lucida-Daphniphyllum teijismannii-Alpinia intermedia* sociation

Plot 4. *Daphniphyllum teijismannii-Eurya emarginata-Viburnum japonicum-Gleichenia japonica* sociat ion.

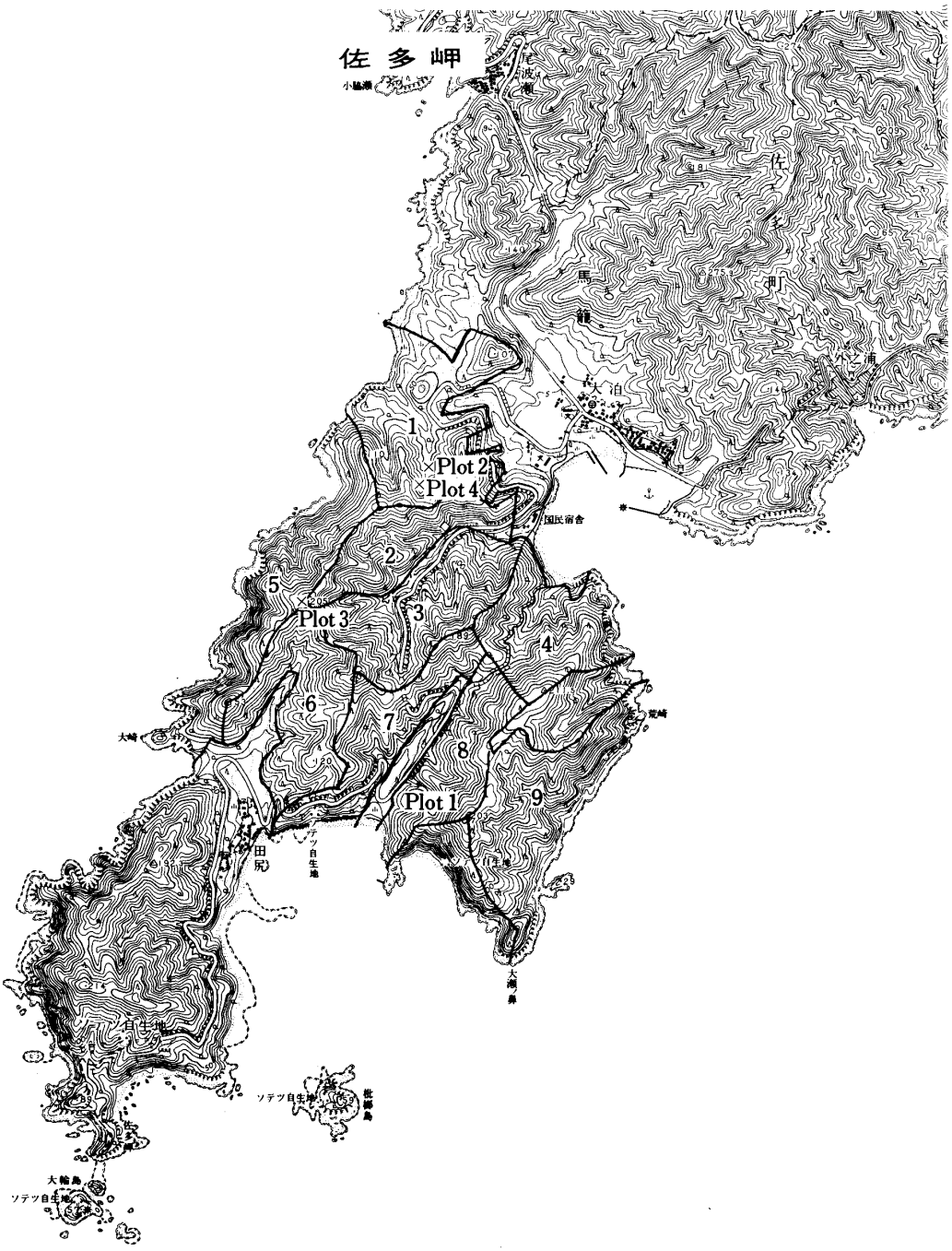

Fig 1. Map of the Sata Experimental Forest of Kagoshima University.
scale 1 : 50000

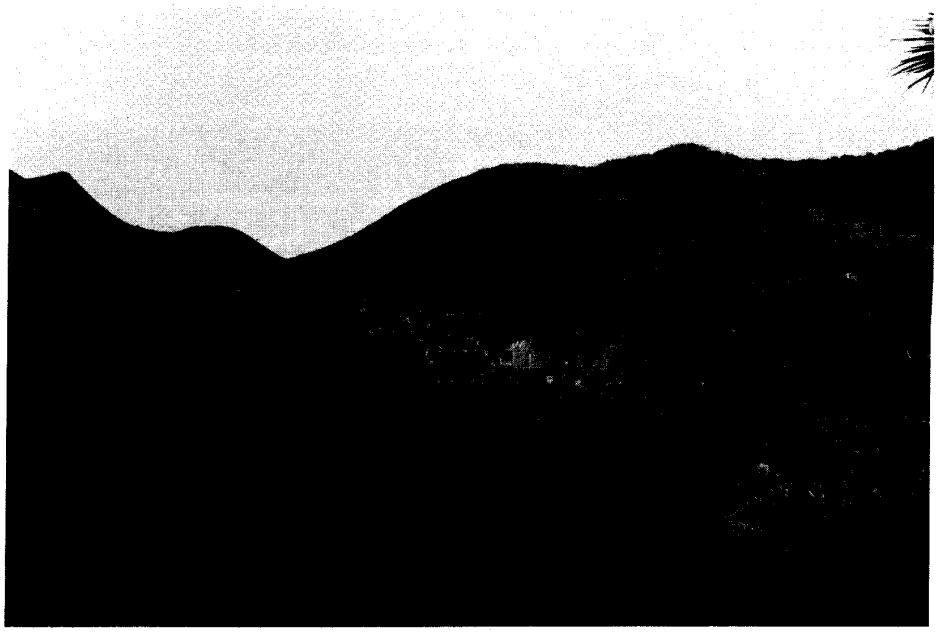

Photo. 1. A view of the Sata Exper. Forest of Kagoshima Univ. (sample plot 1) seen from a distance.

Photo. 2. An inner view of the sample plot 1 of broad leaved forest of the Sata Exper. Forest of Kagoshima Univ.. (Subcompertment ヘ, Compentment 8)

Photo. 3. An inner view of the sample plot 1 of broad leaved forest of the Sata Exper. Forest of Kagoshima Univ..
(Subcompertment へ, Compertment 8)

Photo. 4. An inner view of the sample 1 of broad leaved plot forst of the Sata Exper. Forest of Kagoshima Univ..
(Subcompertment へ, Compertment 8)

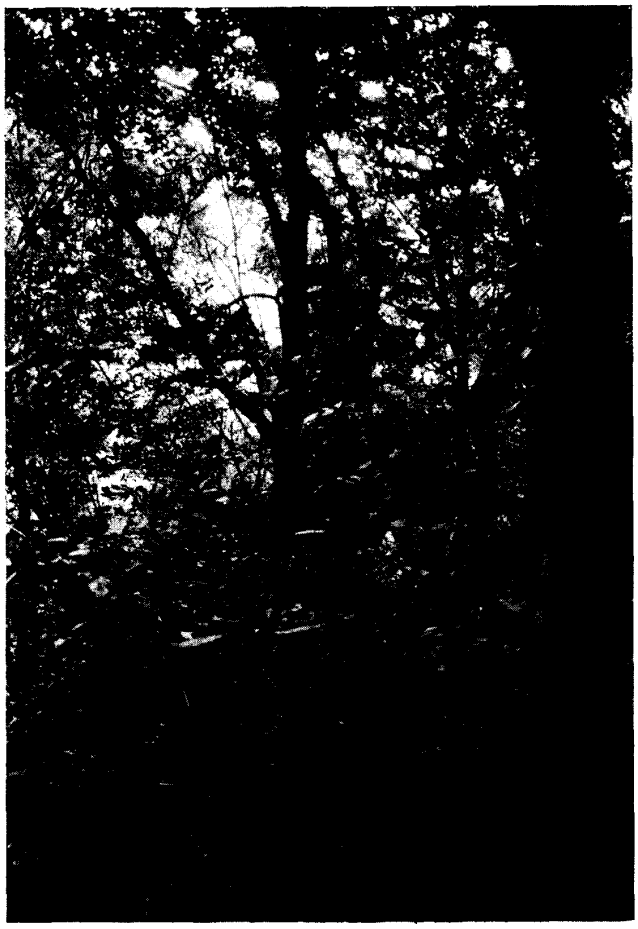

Photo. 5. An inner view of the sample plot 2 of broad leaved forest of the Sata Exper. Forest of Kagoshima Univ.. (Subcompertment つ, Compertment 1)

Photo. 6. An inner view of the sam le plot 2 of broad leaved forest of the Sata Exper. Forest of Kagoshima Univ.. (Subcompertment つ, Compertment 1)

Photo. 7. An inner view of the sample plot 2 of broad leaved forest of the Sata Exper. Forest of Kagoshima Univ.. (Subcompertment つ, Compertment 1)

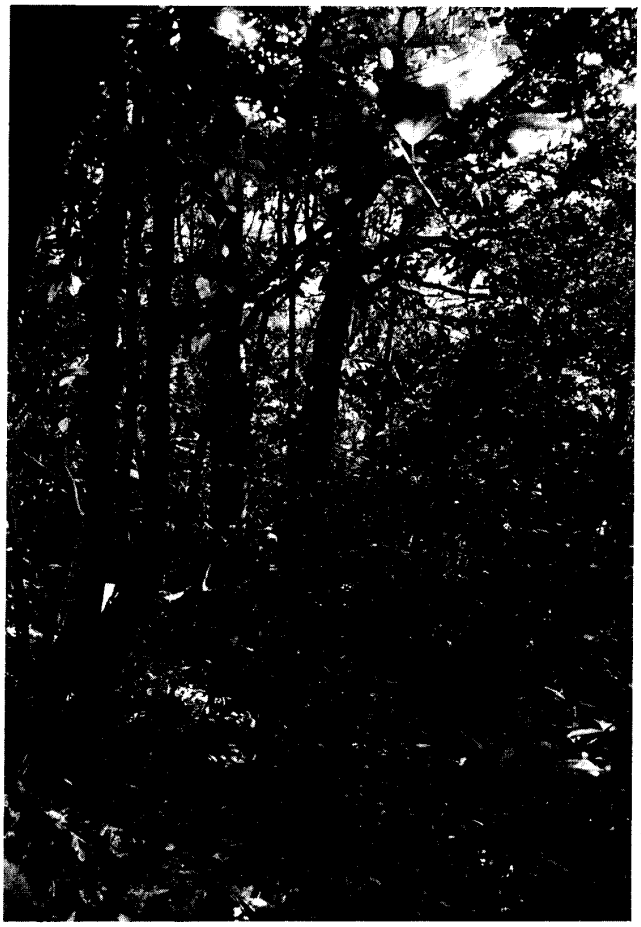

Photo. 8. An inner view of the sample plot 3 of broad leaved forest of the Sata Exper. Forest of Kagoshima Univ.. (Subcompertment い, Compertment 6)

Photo. 9. An inner view of the sample plot 3 of broad leaved forest of the Sata Exper. Forest of Kagoshima Univ.. (Subcompertment い, Compertment 6)

'hoto. 10. An inner view of the sample plot 3 of broad leaved forest of the Sata Exper. Forest of Kagoshima Univ.. (Subcompertment い, Compertment 6)

Photo. 11. An inner view of the sample plot 4 of broad leaved forest of the Sata Exper. Forest of Kagoshima Univ..
(Subcompertment つ, Compertment 1)

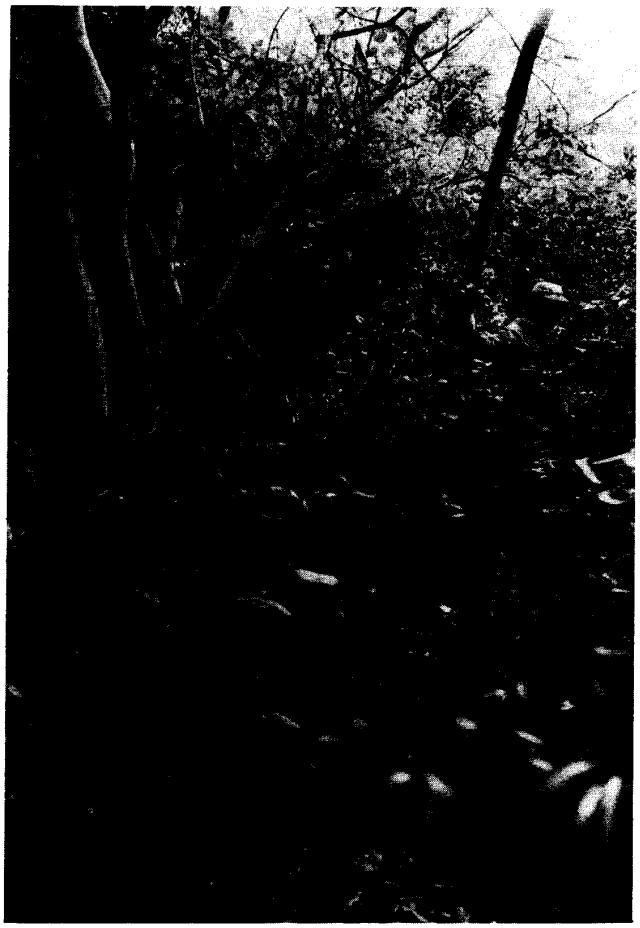

Photo. 12. An inner view of the sample plot 4 of broad leaved forest of the Sata Exper. Forest of Kagoshima Univ..
(Subcompertment つ, Compertment 1)

Photo. 13. An inner view of the sample plot 4 of broad leaved forest of the Sata Exper Forest of Kagoshima Univ..
(Subcompertment つ, Compertment 1)