

Table 1. Altitudes of evergreen broad-leaved to needle-leaved forest stands studied by IRIKURA (1984), and the CC matrix for trees and shrubs (DBH>5cm), on Yakushima Island, southern Kyushu, Japan. Stands 2 to 17 were used for studies of beta diversity (See Fig. 2).

Stand No.	( 1)	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)	( 8)	( 9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
Altitude (m)	100	200	300	400	500	600	700	800	900	1000	1100	1200	1250	1300	1400	1500	1600	1700	1750		
( 1)	45	39	36	47	26	29	22	16	18	0	6	6	0	0	0	0	0	0	0	0	
( 2)	82	59	59	50	48	46	34	19	7	18	19	8	13	6	7	0	0	0	0	0	
( 3)	71	63	55	60	56	44	28	17	26	29	17	21	14	7	6	0	0	0	0	0	
( 4)	83	71	79	60	40	30	18	28	31	19	23	15	8	7	0	0	0	0	0	0	
( 5)	57	69	53	35	32	23	24	27	16	20	13	7	6	0	0	0	0	0	0	0	
( 6)	81	62	48	38	19	36	32	20	24	16	8	7	0	0	0	0	0	0	0	0	
( 7)	69	54	43	22	32	36	24	27	18	10	8	0	0	0	0	0	0	0	0	0	
( 8)	71	64	50	52	58	53	50	42	26	30	24	13	13	13	13	13	13	13	13	13	
( 9)	56	40	59	58	42	50	33	43	30	12	13	13	13	13	13	13	13	13	13	13	
(10)	59	42	48	50	38	38	20	42	29	15	17	17	17	17	17	17	17	17	17	17	
(11)	53	63	91	63	63	40	42	44	25	29	29	29	29	29	29	29	29	29	29	29	
(12)	70	56	61	52	45	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	
(13)	67	90	70	63	52	31	17	18	18	18	18	18	18	18	18	18	18	18	18	18	
(14)	67	67	43	44	50	29	33	33	33	33	33	33	33	33	33	33	33	33	33	33	
(15)	80	74	61	31	17	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	
(16)	74	78	46	17	17	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	
(17)	55	17	18	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
(18)	38	13	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	
(19)	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	
(20)	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	
(21)																					

Table 2. Beta diversity parameters of three coenoclines, or vegetation gradients, on Yakushima Island. (IA: internal association, ATR: average turnover rate of species, r: correlation coefficient)

Stands	Altitudinal difference (m)	IA	ATR ( $\times 10^{-3}$ )	r
2~17	1300	87.4	-0.81	-0.90**
5~16	900	81.2	-0.78	-0.88**
8~21	950	65.9	-0.72	-0.67*

\* p<0.05, \*\* p<0.01

Table 3. Altitudes of evergreen broad-leaved forest stands studied and the CC matrix (for phytocoenosis), on Mt. Inaodake, southern Kyushu, Japan.

Stand No.	( 1)	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)
Altitude (m)	510	625	670	730	850	900	955
( 1)	66	52	55	33	29	21	
( 2)	61	55	44	35	24		
( 3)	56	41	29	22			
( 4)	53	46	38				
( 5)	65	48					
( 6)	56						
( 7)							

Table 4. CC matrix for trees and shrubs of evergreen broad-leaved forests on Mt. Inaodake.

Stand No.	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)
( 1)	71	49	67	44	46	30
( 2)	58	68	56	54	36	
( 3)	65	56	39	37		
( 4)	62	60	49			
( 5)	70	63				
( 6)	65					
( 7)						

Table 5. CC matrix for herb layers of evergreen broad-leaved forests on Mt. Inaodake.

Stand No.	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)
( 1)	63	52	32	11	6	0
( 2)	62	36	31	18	6	
( 3)	37	23	9	6		
( 4)	41	33	18			
( 5)	45	40				
( 6)	41					
( 7)						

Table 6. Altitudes of summergreen and evergreen broad-leaved forest stands studied NISHIDA (1991), and the CC matrix (for phytocoenosis), on Mt. Hira, central Honshu, Japan.

Stand No.	( 1)	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)	( 8)
Altitude (m)	1061	990	750	640	560	460	330	233
( 1)	62	43	43	33	36	30	33	
( 2)	53	42	43	35	32	39		
( 3)	69	64	57	50	67			
( 4)	63	62	50	56				
( 5)	60	50	62					
( 6)	54	65						
( 7)	54							
( 8)								

Table 7. CC matrix for trees and shrubs (MM, M, N) of summergreen and evergreen broad-leaved forests on Mt. Hira.

Stand No.	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)	( 8)
( 1)	72	46	47	35	42	34	36
( 2)	59	44	47	41	38	44	
( 3)	73	67	64	57	71		
( 4)	70	70	61	63			
( 5)	66	66	68				
( 6)	67	72					
( 7)	64						
( 8)							

Table 8. CC matrix for herb layers (Ch, G, and H) of summergreen and evergreen broad-leaved forests on Mt. Hira.

Stand No.	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)	( 8)
( 1)	32	32	34	22	21	25	23
( 2)	29	38	25	17	23	19	
( 3)	58	53	38	39	53		
( 4)	36	40	31	33			
( 5)	38	21	36				
( 6)	35	45					
( 7)	37						
( 8)							

Table 9. Altitudes of needle-leaved forest stands studied by MATSUI et al. (1985), and the CC matrix for trees and shrubs, on Mt. Onnebetsu, eastern Hokkaido, Japan.

Table 10. Beta diversity parameters I in evergreen and summergreen broad-leaved, and needle-leaved forests in Japan. (IA: internal association, ATR: average turnover rate of species, and r: correlation coefficient)

Locality (Altitudinal difference)	Phytocoenosis			Trees and shrubs			Herbs and dwarf shrubs		
	IA	ATR ( $\times 10^{-3}$ )	r	IA	ATR ( $\times 10^{-3}$ )	r	IA	ATR ( $\times 10^{-3}$ )	r
(Evergreen broad-leaved)									
Yakushima (1300 m)		—		87.4	-0.81	-.90		—	
Mt. Inaodake (445 m)	71.3	-1.18	-.88	74.8	-0.76	-.82	99.0	-3.48	-.89
Mt. Tatera (420 m)	92.6	-1.22	-.93	92.1	-0.95	-.88	92.1	-1.50	-.88
(Summergreen broad-leaved)									
Mt. Daisen (540 m)	89.2	-1.12	-.83	88.6	-0.79	-.79	100.0	-2.42	-.75
Mt. Hira (828 m)	68.4	-0.41	-.80	77.6	-0.42	-.82	43.7	-0.39	-.61
(Needle-leaved)									
Mt. Onnebetsu (550 m)		—		91.5	-1.38	-.93		—	

Table 11. Beta diversity parameters II.

(HC, WHITTAKER's half change; CL, coenocline length as expressed by ATR x altitudinal difference; AR50, AR80 and AR95, altitudinal range (m) for 50%, 80% and 95% changes in species composition)

Locality	Phytocoenosis					Trees and shrubs					Herb layer				
	HC	CL	AR50	AR80	AR95	HC	CL	AR50	AR80	AR95	HC	CL	AR50	AR80	AR95
(Evergreen broad-leaved)															
Yakushima (1300 m)		—				3.49	1050	372	864	1608		—			
Mt. Inao-dake (445 m)	2.73	825	162	377	702	1.11	337	398	924	1719	5.14	1547	87	201	374
Mt. Tatera (420 m)	1.70	512	247	573	1067	1.33	399	315	736	1363	2.07	630	201	466	870
(Summergreen broad-leaved)															
Mt. Daisen (540 m)	2.00	603	269	626	1164	1.42	428	380	882	1641	4.34	1306	124	289	538
Mt. Hira (828 m)	1.13	341	731	1696	3157	1.16	347	716	1664	3097	1.07	323	771	1791	3333
(Needle-leaved)															
Mt. Onnebetsu (550 m)		—				2.51	758	218	502	944		—			

Table 12. Beta diversity parameters in the Galapagos vegetation. Trees and shrubs (DBH  $>3$  cm) were studied; herbaceous plants were not treated because of their seasonal and yearly fluctuations and variability. Abbreviations are the same as in Tables 8 and 9.

Island Location	Isla Santa Cruz		Isla Isabela V. Alcedo
	South side	North side	
Altitudinal range (m)	10 ~ 140	90 ~ 640	5 ~ 1000
Altitudinal difference (m)	130	550	995
IA	93.3	91.2	75.5
ATR ( $\times 10^{-3}$ )	3.9	1.3	0.90
r	-.76	-.83	-.87
HC	1.68	2.38	2.97
CL	507	715	895
AR50	77	232	335
AR80	179	538	777
AR95	334	1001	1446