Kimmins, J.P. and Krumlik, G.J. (1973). Comparison of the biomass distribution and tree form of old virgin forests at medium and high elevations in the mountains of south coastal British Columbia, Canada. In: "IUFRO Biomass Studies", pp. 317-335. College of Life Sciences and Agriculture, University of Maine, Orono, USA.
Krumlik, G.J. and Kimmins, J.P. (1973). Studies of biomass distribution and tree form in old virgin forests in the mountains of south coastal British Columbia. In: "IUFRO Biomass Studies", pp. 361-374. College of Life Sciences and Agriculture, University of Maine, Orono, USA.

49°13'N 122°36'W 720 m Canada, British Columbia, Haney.

Leached humic podzols
pH 3.7-4.6

Tsuga heterophylla (59%)[a]
Thuja plicata (28%)[a]
Chamaecyparis nookatensis

Age (years)		115-400
Trees/ha		144
Tree height (m)		21
Basal area (m^2/ha)		
Leaf area index		
Stem volume (m^3/ha)		
Dry biomass (t/ha)	Stem wood	27.1
	Stem bark	5.7
	Branches	8.7
	Fruits etc.	
	Foliage	3.0[b]
	Root estimate	
CAI (m^3/ha/yr)		
Net production (t/ha/yr)	Stem wood	
	Stem bark	
	Branches	
	Fruits etc.	
	Foliage	
	Root estimate	

Thirteen trees were sampled and stand values for a 0.79 ha plot were derived from regressions on D and D^2H.
a. Percentage of the total tree number.
b. Including twigs.

Veblen, T.T., Schlegel, F.M. and B. Escobar, R. (1980). Dry matter production of two species of bamboo (*Chusquea culeou* and *C. tenuiflora*) in south-central Chile. *J. Ecol.* 68, 397-404.

39°33'S 72°03' W 700 m Chile, San Pablo.

Deep soils derived from volcanic ash

Chusquea culeou (bamboo) beneath a few overstorey trees

Age (years)		20-30	20-30
Trees/ha		ca.200,000	ca.170,000
Tree height (m)		5-6	5-6
Basal area (m^2/ha)			
Leaf area index			
Stem volume (m^3/ha)			
Dry biomass (t/ha)	Stem wood, Stem bark, Branches	130.5[a]	127.4[a]
	Fruits etc.		
	Foliage	26.1[b]	24.0[b]
	Root estimate		
CAI (m^3/ha/yr)			
Net production (t/ha/yr)	Stem wood, Stem bark, Branches	5.57[c]	6.95[c]
	Fruits etc.		
	Foliage	0.12 + 4.27[d]	0.14 + 4.27[d]
	Root estimate		

About 100 culms were sampled in the autumn and stand biomass values for the above plots of 25 m^2 and 50 m^2 (left and right columns, respectively) were derived from regressions on culm diameter at 1 m height.

a. Culms.
b. Leaves plus leaf sheaths.
c. New growth, excluding mortality.
d. Litterfall measured over one year.

A 20-30 year-old stand of *Chusquea tenuiflora* beneath a dense overstorey had a total biomass of only 12.9 t/ha.

Fölster, H., De Las Salas, G. and Khanna, P. (1976). A tropical evergreen forest site with perched water table, Magdalena Valley, Colombia. Biomass and bioelement inventory of primary and secondary vegetation. *Oecol. Plant.* 11, 297-320.

6°50'N 73°55'W 100 m Colombia, Magdalen Valley, 50 km S of Barrancas Bermeja.

Infertile, acid, surface water gleys

Bellucia grossularioides, Miconia minutiflora et al.

Regrowth after clear-felling

Age (years)		2	5	16
Trees/ha			3700	1222[a]
Tree height (m)		3	12	to 20
Basal area (m^2/ha)				20.0[a]
Leaf area index				
Stem volume (m^3/ha)				
Dry biomass (t/ha)	Stem wood	0.0	48.9	176.8
	Stem bark			
	Branches	9.8	11.2 + 3.9[c]	16.0 + 3.0[c]
	Fruits etc.			
	Foliage	5.2 + 0.4[b]	3.3 + 0.6[c]	6.3 + 0.2[b] + 0.6[c]
	Root estimate			
CAI (m^3/ha/yr)				
Net production (t/ha/yr)	Stem wood			
	Stem bark			
	Branches			
	Fruits etc.			
	Foliage			
	Root estimate			

Stand values for the 2 and 5-year-old stands were estimated by harvesting all trees within three plots of 16 m^2 and 64 m^2, respectively. Twenty-three trees were sampled from the 16-year-old stand, and values for 3 plots of 64 m^2 were derived from regressions on D^2H.

a. Trees over 10 cm D.
b. Palms.
c. Woody undergrowth.

Fölster, H., De Las Salas, G. and Khanna, P. (1976). A tropical evergreen forest site with perched water table, Magdalena Valley, Colombia. Biomass and bioelement inventory of primary and secondary vegetation. *Oecol. Plant.* 11, 297-320.

6°50'N 73°55'W 100 m Colombia, Magdalen Valley, 50 km S of Barrancas Bermeja.

Infertile acid, surface water gleys

Evergreen seasonal tropical rainforests

	Jessenia polycarpa (palm) *Pseudolmedia rigida et al.* Terrace forest	*Clathotropis brachipetalum*, *Couma macrocarpa et al.* Slope forest
Age (years)	Mature	Mature
Trees/ha	720[b]	600[b]
Tree height (m)	6-14, 20-30[a]	to over 30
Basal area (m^2/ha)	21.6[b]	32.0[b]
Leaf area index		
Stem volume (m^3/ha)		
Dry biomass (t/ha): Stem wood, Stem bark	120.0 + 10.6[c]	248.0 + 1.7[c]
Dry biomass (t/ha): Branches	34.8 + 2.8[d]	66.8 + 0.3[d]
Dry biomass (t/ha): Fruits etc.		
Dry biomass (t/ha): Foliage	4.2 + 5.8[c] + 0.4[d]	7.0 + 1.4[c] + 0.6[d]
Dry biomass (t/ha): Root estimate		
CAI (m^3/ha/yr)		
Net production (t/ha/yr): Stem wood		
Net production (t/ha/yr): Stem bark		
Net production (t/ha/yr): Branches		
Net production (t/ha/yr): Fruits etc.		
Net production (t/ha/yr): Foliage		
Net production (t/ha/yr): Root estimate		

Forty-three trees were sampled and stand values for the above two 2500 m^2 plots were derived from regressions on D^2H, using separate regressions for palms. There was 3.4 t/ha of dead trees in the left column. Nutrient contents were determined.

a. Lower and upper storeys.
b. Trees over 10 cm D.
c. Palms.
d. Woody undergrowth.

Kubicek, F. and 6 others (1977). "Primary Productivity of an Oak-Hornbeam Ecosystem." Slovenská Akademia Vied, Bratislava.
Kubicek, F. (1974). Leaf number, leaf area index and leaf production of hornbeam (*Carpinus betulus* L.). *Biológia, Bratisl.* 29, 39-49.
Kubicek, F. (1972). Leaf litter in the oak-hornbeam forest. *Biológia, Bratisl.* 27, 775-783.
Biskupsky, V. (1981). In: "Dynamic Properties of Forest Ecosystems" (D.E. Reichle, ed.), p. 580. Cambridge University Press, Cambridge, London, New York, Melbourne.

48°11'N 17°54'E 209 m Czechoslovakia, Nitra, Bab.

Well-drained loess soil pH 5.8-6.1

Carpinus betulus, Acer campestre, Quercus cerris, Quercus petraea et al.

	(Kubicek 1972, 1974, 1977)	(Biskupsky 1981)
Age (years)		50-70
Trees/ha		733
Tree height (m)		19
Basal area (m^2/ha)		25.6
Leaf area index	3.8[a]	5.2
Stem volume (m^3/ha)		
Dry biomass (t/ha) Stem wood	165	100.4
Dry biomass (t/ha) Stem bark	165	14.3
Dry biomass (t/ha) Branches	165	42.8 + 8.2[d]
Dry biomass (t/ha) Fruits etc.	165	1.7
Dry biomass (t/ha) Foliage	165	3.4
Root estimate	79	75.1
CAI (m^3/ha/yr)		
Net production (t/ha/yr) Stem wood	5.5 + 0.9[b] + 1.9[b]	2.88[e]
Net production (t/ha/yr) Stem bark	5.5 + 0.9[b] + 1.9[b]	0.41[e]
Net production (t/ha/yr) Branches	5.5 + 0.9[b] + 1.9[b]	4.01[e] + 0.14[de]
Net production (t/ha/yr) Fruits etc.	0.9[b]	
Net production (t/ha/yr) Foliage	3.5[c]	3.4
Root estimate		

a. Trees only; including shrubs the LAI was 4.4
b. Litterfall of twigs (0.9 t/ha/yr), miscellaneous matter (1.9 t/ha/yr) and seeds etc. (0.9 t/ha/yr).
c. Mean leaf litterfall measured over 5 years was 2.9 t/ha/yr, of which 49% was *Quercus* spp.
d. Understorey shrubs.
e. Excluding woody litterfall.

Vyskot, M. (1972). Aerial biomass of silver fir (*Abies alba* Mill.). *Acta Universitatis agriculturae (BRNO) Series C.* 41, 243-294.
Vyskot, M. (1973). Root biomass of silver fir (*Abies alba* Mill.). *ibid.* 42, 215-61.
Vyskot, M. (1976a). Biomass production of the tree layer in a floodplain forest near Lednice. In: "Oslo Biomass Studies" pp. 177-202 and pp. 205-209. College of Life Sciences and Agriculture, University of Maine, Orono, USA.
Vyskot, M. (1976b). "Tree Storey Biomass in Lowland Forests in Southern Moravia." Rozpravy Ceskosl. Akad. Ved, Rada Matemat. a Prirodnich Ved. Rocnik 86 - Sesit 10.

Czechoslovakia	49°19'N 16°40'E 460 m Olomucany Forest District	48°48'N 16°26' E 162 m S. Moravia, Lednice.
	Abies alba	*Quercus robur* (19%)[a] *Fraxinus excelsior* (19%)[a] *Tilia* sp., *Acer* sp. *et al.*
	Shelterwood. Brown forest sandy clays	River floodplain sands and loams
Age (years)	51	96
Trees/ha	1667	854
Tree height (m)	ca.17	25-30
Basal area (m^2/ha)		
Leaf area index	3.4[b]	4.6
Stem volume (m^3/ha)	216	465
Dry biomass (t/ha) Stem wood	103.8	218.4
Dry biomass (t/ha) Stem bark		29.8
Dry biomass (t/ha) Branches	18.7	62.7
Dry biomass (t/ha) Fruits etc.		
Dry biomass (t/ha) Foliage	6.8	3.5
Dry biomass (t/ha) Root estimate	14.7	46.0[c]
CAI (m^3/ha/yr)		21.3
Net production (t/ha/yr) Stem wood		11.19[d]
Net production (t/ha/yr) Stem bark		
Net production (t/ha/yr) Branches		3.46[d]
Net production (t/ha/yr) Fruits etc.		
Net production (t/ha/yr) Foliage		3.23
Net production (t/ha/yr) Root estimate		

In both studies stand biomass values were derived by multiplying the means of 5 sampled dominant trees, 5 co-dominants and 5 subdominants by the numbers of trees in each of these classes. Roots of all 15 sample trees were excavated.
a. Percentage of the total stem volume per hectare.
b. All-sided LAI was 7.8.
c. Including 25.3 t/ha of stumps.
d. Excluding woody litterfall and mortality.

Möller, C.M. (1945). Untersuchungen über Laubmenge, Stoffverlust und Stoffproduktion des Waldes. *Forst. ForsVaes. Danm.* 17, 1-287.

Möller, C.M., Müller, D. and Nielsen, J. (1954b). Graphic presentation of dry matter production of European beech. *Forst. ForsVaes. Danm.* 21, 327-335.

Möller, C.M., Müller, D. and Nielsen, J. (1954a). Loss of branches in European beech. *Forst. ForsVaes. Danm.* 21, 253-271.

56°00'N 12°20'E 200 m Denmark, Nödelbo.

Red alluvial soils.

Fagus sylvatica

Age (years)		47	54	58	118	150	200
Trees/ha		1433	956	1266	271	300	154
Tree height (m)		14.6	16.1	14.5	24.8	22.1	26.0
Basal area (m^2/ha)		18.8	20.5	18.2	30.0	29.6	27.9
Leaf area index		4.1	4.3	5.0	5.4	6.6	5.4
Stem volume (m^3/ha)		172	204	165	429	378	415
Dry biomass (t/ha)	Stem wood	129	153	124	322	284	311
	Stem bark						
	Branches						
	Fruits etc.						
	Foliage	2.1	2.2	2.5	2.6	2.9	2.6
	Root estimate						
CAI (m^3/ha/yr)		11.1	12.7	8.2	10.1	6.1	5.9
Net production (t/ha/yr)	Stem wood	8.3+1.2[a]	9.5+1.2[a]	6.2+1.2[a]	7.6[b]	4.6[b]	4.4[b]
	Stem bark						
	Branches						
	Fruits etc.						
	Foliage	2.1	2.2	2.5	2.6	2.9	2.6
	Root estimate						

Stand biomass values were derived by multiplying mean tree values by the numbers of trees per hectare. Stem wood specific gravity was assumed to be 0.75 g/c.c. Branch values were not estimated.

a. Woody litterfall was estimated to be 1.2 t/ha/yr in stands 25 to 85 years old.

b. Excluding woody litterfall.

[Möller (1945) reported similar estimates of stem and leaf biomass and production for over 20 other stands of *F. sylvatica* in Denmark.]

Holm, E. and Jensen, V. (1981). In: "Dynamic Properties of Forest Ecosystems" (D.E. Reichle, ed.), p. 581. Cambridge University Press, Cambridge, London, New York and Melbourne.

56°18'N 10°29'E 11-28 m Denmark, Hestehaven.

Grey brown podzol, pH 4.5-5.8

Fagus sylvatica

Age (years)		85-90
Trees/ha		370
Tree height (m)		28.6
Basal area (m^2/ha)		28.5
Leaf area index		5.0
Stem volume (m^3/ha)		
Dry biomass (t/ha)	Stem wood	163.0
	Stem bark	7.4
	Branches	43.2 + 5.4[a]
	Fruits etc.	
	Foliage	2.1
	Root estimate	43.2
CAI (m^3/ha/yr)		
Net production (t/ha/yr)	Stem wood	4.91
	Stem bark	0.26
	Branches	4.45 + 0.90[b]
	Fruits etc.	0.23[b]
	Foliage	2.69[b]
	Root estimate	

a. Understorey shrubs.
b. Litterfall.

Boysen Jensen, P. (1932). "Die Stoffproduktion der Pflanzen." Verlag von Gustav Fischer, Jena, Germany.

55°26'N 11°34'E 25 m Denmark, Soro, Lille Bogeskov.

Plantations

Fraxinus excelsior

Age (years)		12	14
Trees/ha		5300	ca.4000
Tree height (m)			
Basal area (m^2/ha)			
Leaf area index		5.4	5.4
Stem volume (m^3/ha)		54	72
Dry biomass (t/ha)	Stem wood	25	33
	Stem bark		
	Branches		
	Fruits etc.		
	Foliage	2.7	2.7
	Root estimate		
CAI (m^3/ha/yr)			8.9
Net production (t/ha/yr)	Stem wood		4.1
	Stem bark		
	Branches		0.6[a]
	Fruits etc.		
	Foliage		2.7[a]
	Root estimate		

Stand biomass values were obtained by multiplying mean tree values by the number of trees per hectare. Increments were estimated between ages 12 and 14.
a. Litterfall only; the branch increment was not estimated.