

Table 3. Seasonal leaf litter from dominant species (expressed as percentage of annual total) in the leaf canopy of Australian plant communities

Plant community	Locality	Annual leaf fall (kg ha ⁻¹)	Seasonal leaf litter fall (% of annual total)												Years of record	Reference
			Winter			Spring			Summer			Autumn				
			J	J	A	S	O	N	D	J	F	M	A	M		
<i>E. marginata</i> open-forest	Dwellingup, W.A.	1240	1	1	1	1	1	3	7	34	32	13	4	2	2	Hatch (1955)
<i>E. marginata</i> open-forest	Dwellingup, W.A.	1660	5				22			68			5		6	Loneragan (1971)
<i>Acacia aneura</i> tall shrubland	Wiltuna, W.A.	270	8	6	12	14	14	10	7	3	3	7	8	8	2	Wilcox (1960)
Open-heath (<i>Banksia-Casuarina</i>)	Dark Island, near Keith, S.A.	875	2	3	3	2	7	11	16	12	10	17	12	5	1	Specht and Rayson (1957)
Closed-heath (<i>Leptospermum</i>)	Frankston, Vic.	1250	7	3	3	7	10	14	10	27	8	5	4	2	2	Jones (1968)
<i>E. ovata-E. viminalis</i> open-forest	Brisbane Ranges, Vic.	1029	3	2	3	8	8	15	19	20	13	3	3	3	1+2	Scarlett, N. (pers. comm., 1974)
<i>E. obliqua-E. macrohyncha</i> open-forest	Brisbane Ranges, Vic.	1224	2	1	1	5	5	14	22	28	15	3	2	2	1+2	Scarlett, N. (pers. comm., 1974)
<i>E. obliqua-E. radiata</i> open-forest	Near Kinglake West, Vic.	2690-2910	4	1	1	1	1	8	21	35	13	9	5	1	1	Gill (1964)
<i>E. reginae</i> tall open-forest	Near Kinglake West, Vic.	2740-3720	3	2	3	3	5	7	11	17	20	14	10	5	5	Ashton (1956)
<i>Nothofagus cunninghamii</i> closed-forest	Mt. Donna Buang, Vic.	2700	10	8	6	2	5	7	6	5	5	15	24	7	1	Howard (1973)
<i>Acmena smithii-Acacia melanoxylon</i> closed-forest	Wilson's Prom., Vic.	1189* of 2964	4	5	3	6	11	16	18	11	3	8	8	7	1	Frankenberg (1965)

Table 3 (Continued)

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			J	J	A	S	O	N	D	J	F	M	A	M		
<i>E. maculata</i> open-forest	Bateman's Bay, N.S.W.	2480	2	3	2	6	18	20	22	14	5	3	3	2	1-5	McColl (1966)
Dry sclerophyll forest	Near Sydney, N.S.W.	370	3	7	6	12	26	15	—	—	—	—	—	6	0-5	Turner (1954)
Closed-forest	Near Sydney, N.S.W.	1630	4	4	6	12	25	20	—	—	—	—	—	4	0-5	Turner (1954)
<i>Eucalyptus-Angophora</i> open-forest	Near Sydney, N.S.W.	2970	1	1	9	9	10	12	15	15	15	9	2	2	1	Hannon (1958)
<i>Eucalyptus-Angophora</i> low open-forest	Near Sydney, N.S.W.	3630	2	5	8	18	25	8	9	7	6	6	4	2	1	Hannon (1958)
<i>E. pitularis</i> tall open-forest	Taree, N.S.W.	2440-3700	4	3	4	9	11	12	11	14	12	8	7	5	2	Florence (1961)
<i>E. pitularis</i> tall open-forest	Whian Whian State Forest, N.S.W.	6500†	3	8	5	4	14	18	16	8	9	4	6	5	1	Webb <i>et al.</i> (1969)
Simple notophyll vine forest (<i>Ceratopetalum</i>)	Whian Whian State Forest, N.S.W.	3440	3	7	4	9	22	18	9	7	9	4	4	4	1	Webb <i>et al.</i> (1969)
Complex notophyll vine forest (<i>Argyrodendron</i>)	Whian Whian State Forest, N.S.W.	5940	5	9	7	8	24	14	4	5	6	5	5	8	1	Webb <i>et al.</i> (1969)
<i>Acacia harpophylla</i> open-forest	Meandarra Qld.	1110	1	1	1	3	7	16	16	33	12	6	2	2	2	Tunstall (1973)
<i>Callitris columellaris</i> open-forest	Yuleba, near Dalby, Qld.	1367‡	3	4	4	7	18	25	11	9	9	3	3	4	5	Hawkins (1966)

* *Acmencia smithii* only. † Included leaf fall from rain-forest understorey. ‡ Leaves, twigs and fruits.

Gill (1964) and others have shown that foliation and defoliation tend to occur simultaneously in Australian perennial evergreen plant communities. The seasonal pattern of leaf litter fall from the dominants of the leaf canopy can thus give a reasonable picture of seasonal shoot growth. Details of seasonal leaf fall, collected in litter traps established in a range of plant communities, are therefore collated in Table 3.

Apparently studies on seasonal patterns of shoot growth or leaf litter fall have been made only on the mainland of Australia, south of the Tropic of Capricorn. As explained above, the precision of these records could be greatly improved. No details are available for plant communities within the tropical part of Australia or in Tasmania.

In spite of imperfections in the information available, the following conclusions emerge when the seasonal patterns are matched with the mean climatic data (Aust. Bureau of Meteorology 1956) for each sampling area:

(1) Shoot growth does not appear to be controlled by day length.

(2) Shoot growth in evergreen species appears to be limited by soil water. However, deciduous tropical species of *Eucalyptus* and of the families Sterculiaceae, Cochlospermaceae and Bombacaceae in northern Australia produce new shoots when the mean monthly temperature rises above 28°C—even though soil water is at its lowest level at this period.

(3) Provided soil moisture is not limiting, shoot growth is temperature-sensitive.

(i) *Acacia harpophylla*, *A. aneura* and *A. sowdenii* grow vigorously when the mean monthly temperature is above 24–26°C.

(ii) Evergreen *Eucalyptus* spp., *Myoporum platycarpum*, *Heterodendrum oleifolium* and most dominant species of heath vegetation grow vigorously when the mean monthly temperature is above 16–18°C.

(iii) *Acmena smithii* and less prominent heath species (e.g. *Leptospermum myrsinoides*) grow vigorously when the mean monthly temperature is above 13–14°.

(iv) *Pinus radiata* shows vigorous shoot growth when the mean monthly temperature rises above 10° in spring, though little shoot growth is observed in autumn after growth has ceased during the summer drought.

(v) *Nothofagus cunninghamii* grows only when the mean monthly temperature falls below 16° but is above 10°. Only autumn growth was observed in the single year of record from Victoria, though New Zealand studies indicate that spring growth is common (Howard 1973).