

**Table 6.1** Radiative Properties of Plant and Animal Surfaces

<i>(i) Short-wave reflection coefficients <math>\rho</math> (%)</i>				
<b>1</b>	<b>Leaves</b>	<b>Upper</b>	<b>Lower</b>	<b>Average</b>
	Maize			29
	Tobacco			29
	Cucumber			31
	Tomato			28
	Birch	30	33	32
	Aspen	32	36	34
	Oak	28	33	30
	Elm	24	31	28

**Table 6.1 continued: Short-wave reflection coefficients (%) of vegetation canopies**

<b>2 Vegetation at maximum ground cover</b>			
<b>(a)</b>	<b>Farm crops</b>	<b>Latitude of site (degrees)</b>	<b>Daily mean</b>
	Grass	52	24
	Sugar beet	52	26
	Barley	52	23
	Wheat	52	26
	Beans	52	24
	Maize	43	22
	Tobacco	43	24
	Cucumber	43	26
	Tomato	43	23
	Wheat	43	22
	Pasture	32	25
	Barley	32	26
	Pineapple	22	15
	Maize	7	18
	Tobacco	7	19
	Sorghum	7	20
	Sugarcane	7	15
	Cotton	7	21
	Groundnuts	7	17

**Table 6.1 continued: Short-wave reflection coefficients (%) of vegetation**

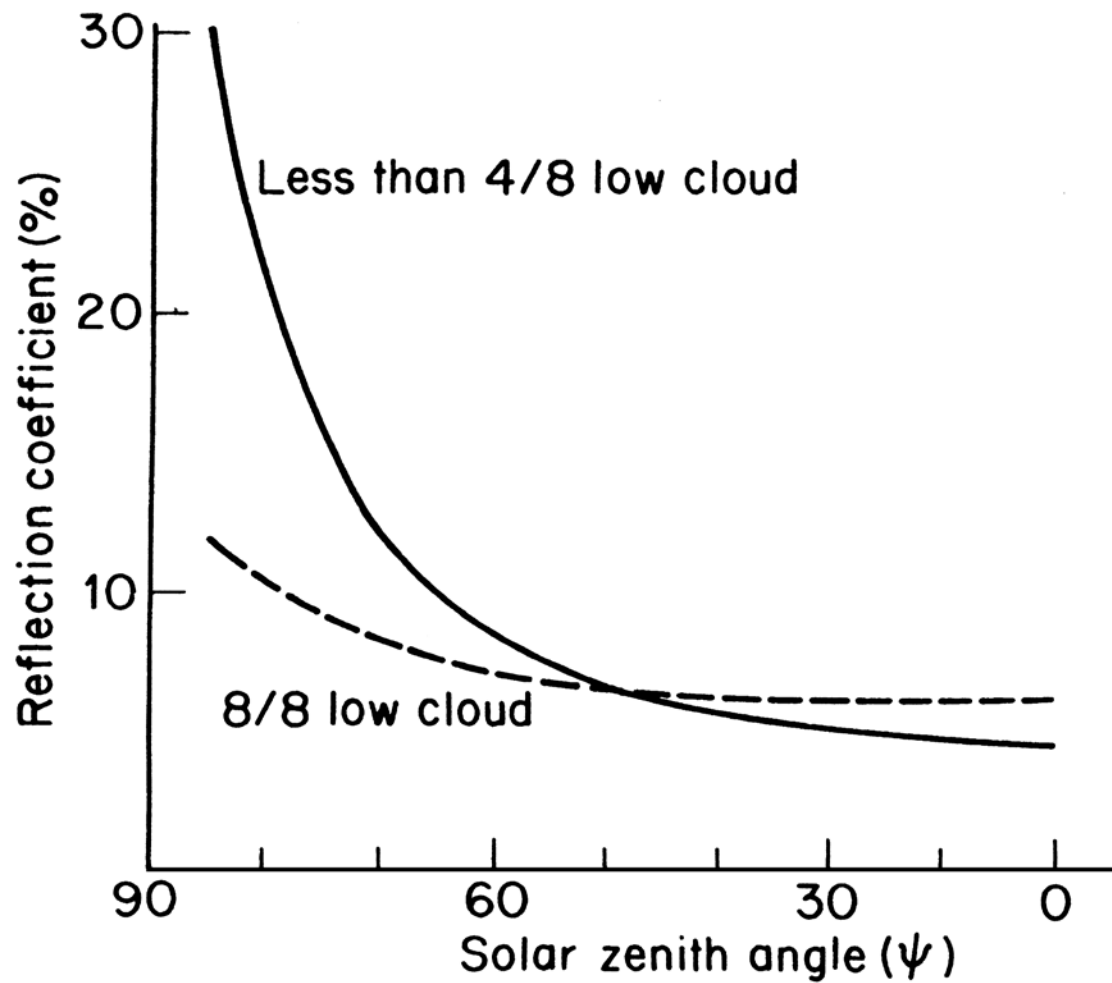
<i>(b)</i>	Natural vegetation and forest	Latitude of site (degrees)	Daily mean
	Heather	51	14
	Bracken	51	24
	Gorse	51	18
	Maquis, evergreen scrub	32	21
	Natural pasture	32	25
	Derived savanna	7	15
	Guinea savanna	9	19
<i>(c)</i>	Forests and orchards		
	Deciduous woodland	51	18
	Coniferous woodland	51	16
	Orange orchard	32	16
	Aleppo pine	32	17
	Eucalyptus	32	19
	Tropical rain forest	7	13
	Swamp forest	7	12

**Table 6.1 continued: Short-wave reflection coefficients**

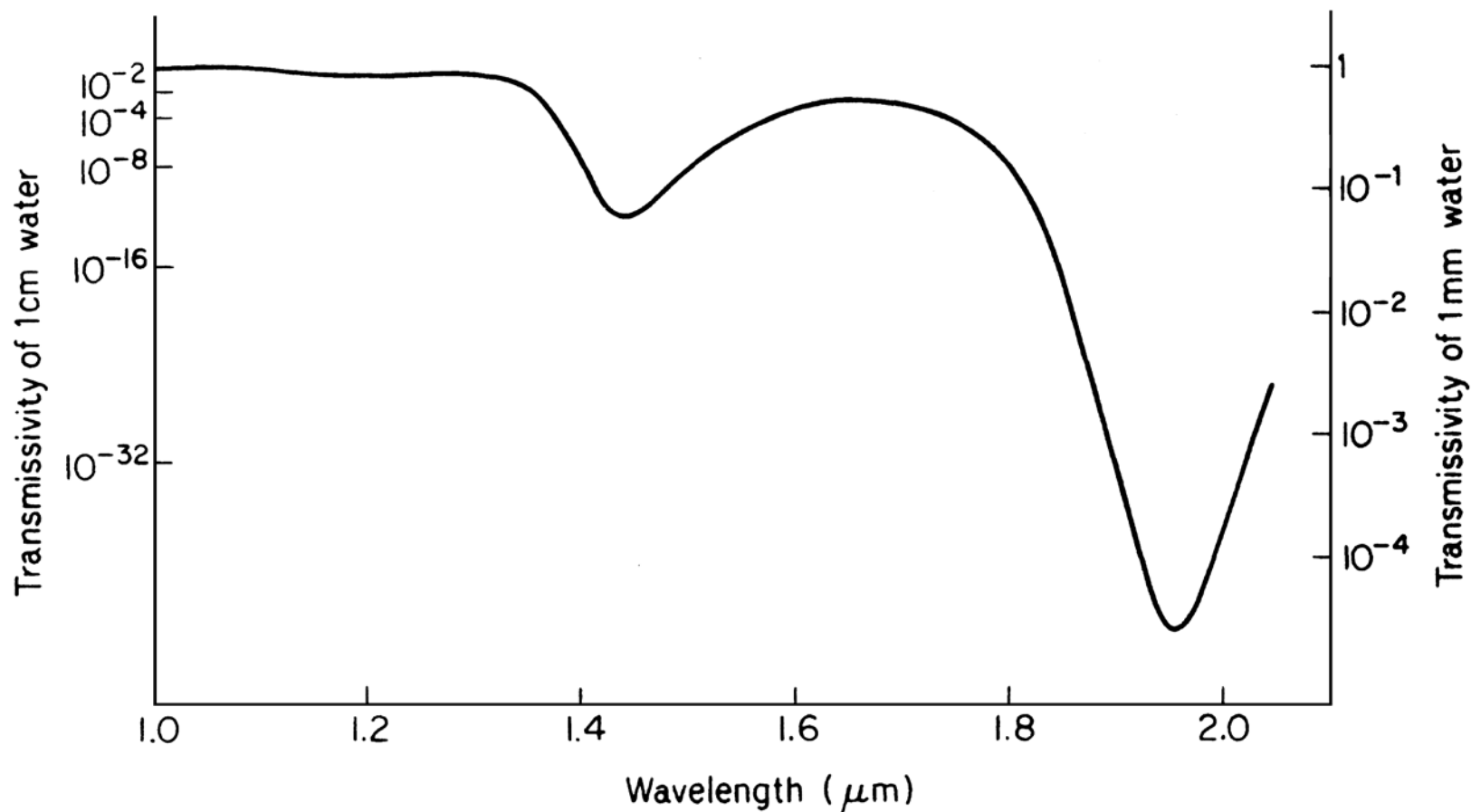
<b>3</b>	<b>Animal coats</b>			
<b>(a)</b>	<b>Mammals</b>	<b>Dorsal</b>	<b>Ventral</b>	<b>Average</b>
	Red squirrel	27	22	25
	Grey squirrel	22	39	31
	Field mouse	11	17	14
	Shrew	19	26	23
	Mole	19	19	19
	Grey fox			34
	Zulu cattle			51
	Red Sussex cattle			17
	Aberdeen Angus cattle			11
	Sheep weathered fleece			26
	Newly shorn fleece			42
	Man			
	Eurasian			35
	Negroid			18
<b>(b)</b>	<b>Birds</b>	<b>Wing</b>	<b>Breast</b>	<b>Average</b>
	Cardinal	23	40	
	Bluebird	27	34	
	Tree swallow	24	57	
	Magpie	19	46	
	Canada goose	15	35	
	Mallard duck	24	36	
	Mourning dove	30	39	
	Starling			34
	Glaucous-winged gull			52

**Table 6.1 continued: Long-wave emissivities (%)**

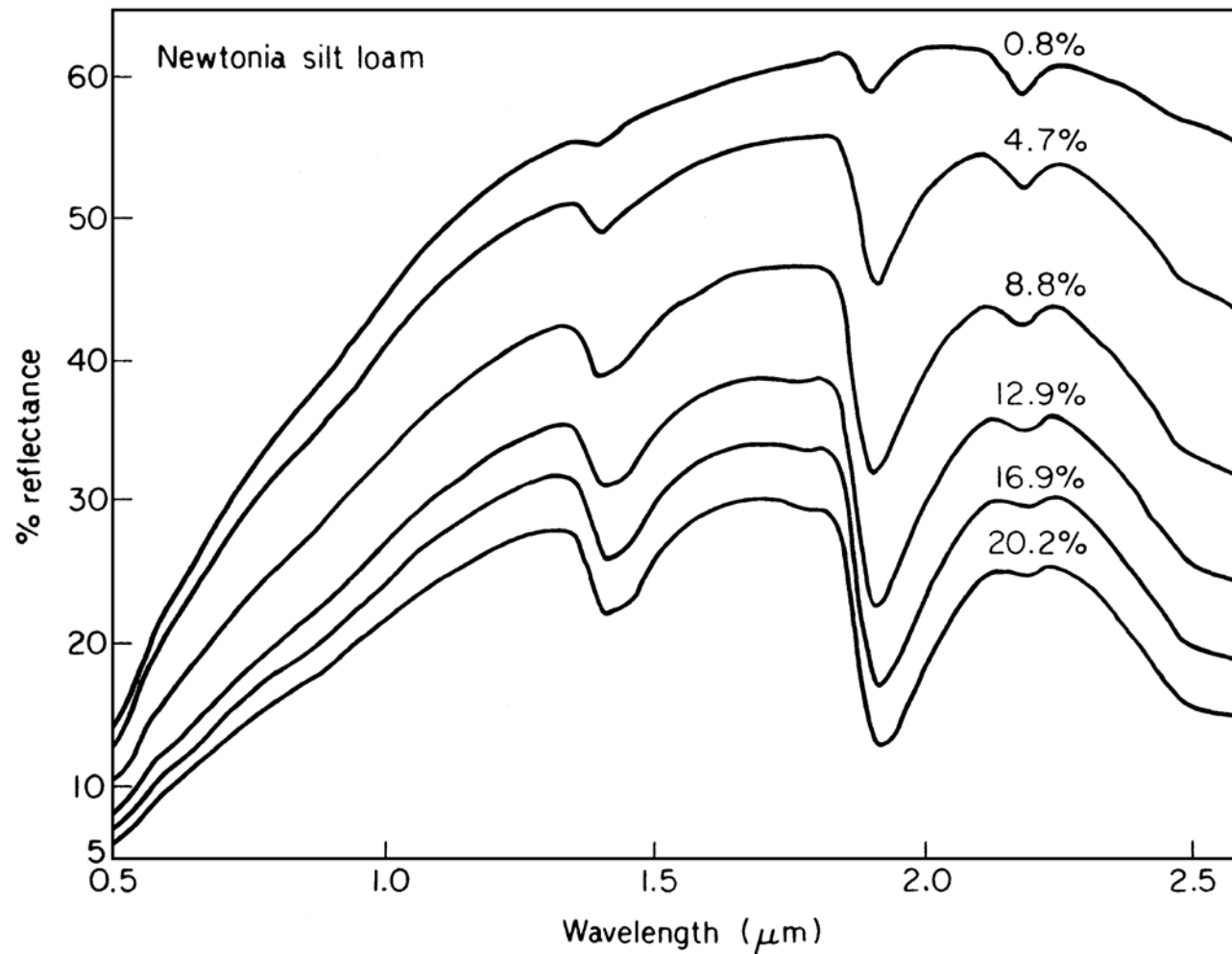
<b>1</b>	<b>Leaves</b>			<b>Average</b>
		Maize		$94.4 \pm 0.4$
		Tobacco		$97.2 \pm 0.6$
		French bean		$93.8 \pm 0.8$
		Cotton		$96.4 \pm 0.7$
		Sugarcane		$99.5 \pm 0.4$
		Poplar		$97.7 \pm 0.4$
		Geranium		$99.2 \pm 0.2$
		Cactus		$97.7 \pm 0.2$
<b>2</b>	<b>Animals</b>	<b>Dorsal</b>	<b>Ventral</b>	<b>Average</b>
	Red squirrel	95–98	97–100	
	Grey squirrel	99	99	
	Mole	97	–	
	Deer mouse	–	94	
	Grey wolf			99
	Caribou			100
	Snowshoe hare			99
	Man			98



**Figure 6.1** Reflection coefficient of a plane water surface as a function of solar zenith angle and cloudiness (from Deacon, 1969).

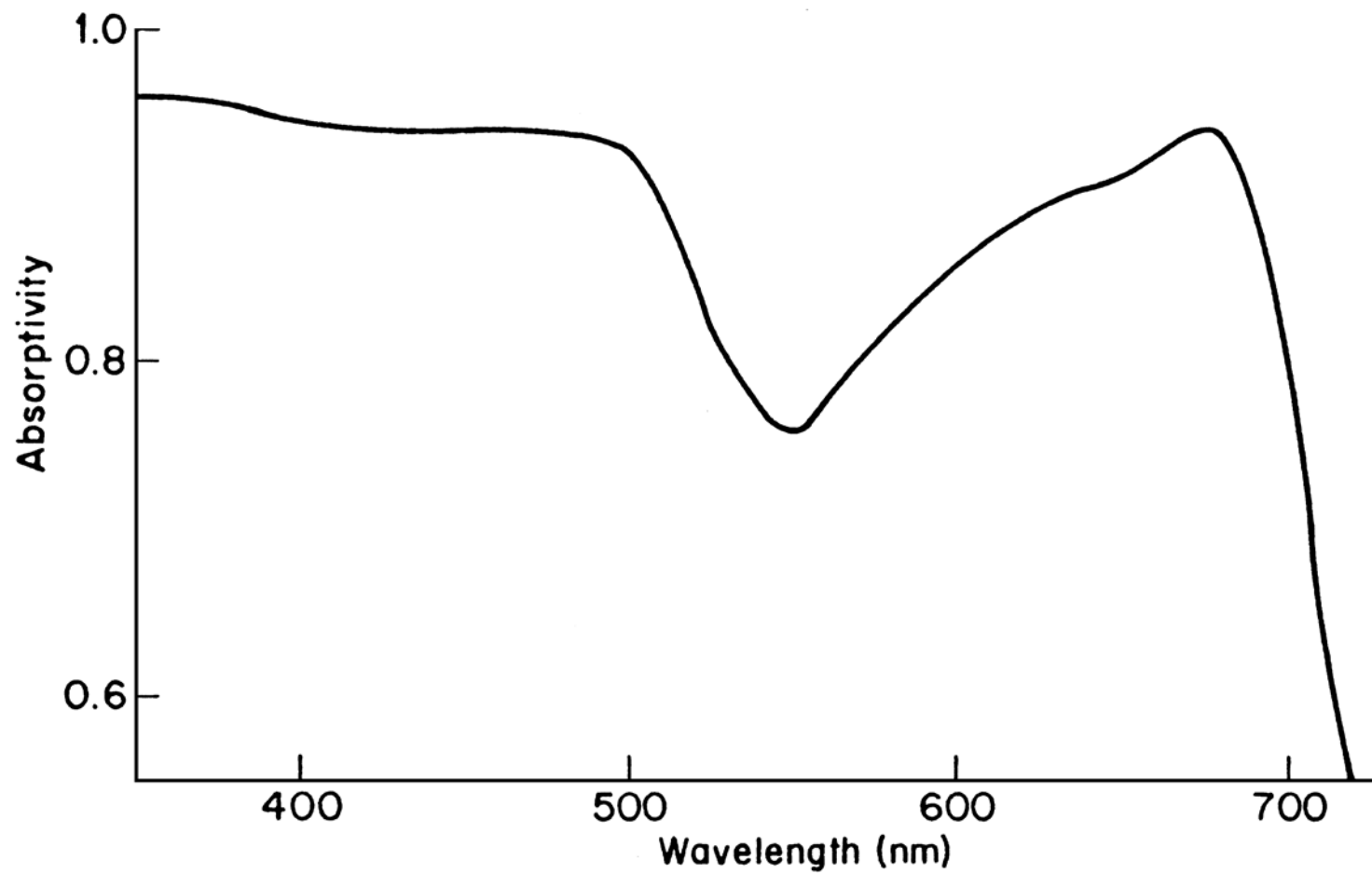


**Figure 6.2** Transmissivity of pure water as a function of wavelength. Note logarithmic scales for 1 cm water (left-hand axis) and 1 mm (right-hand axis).

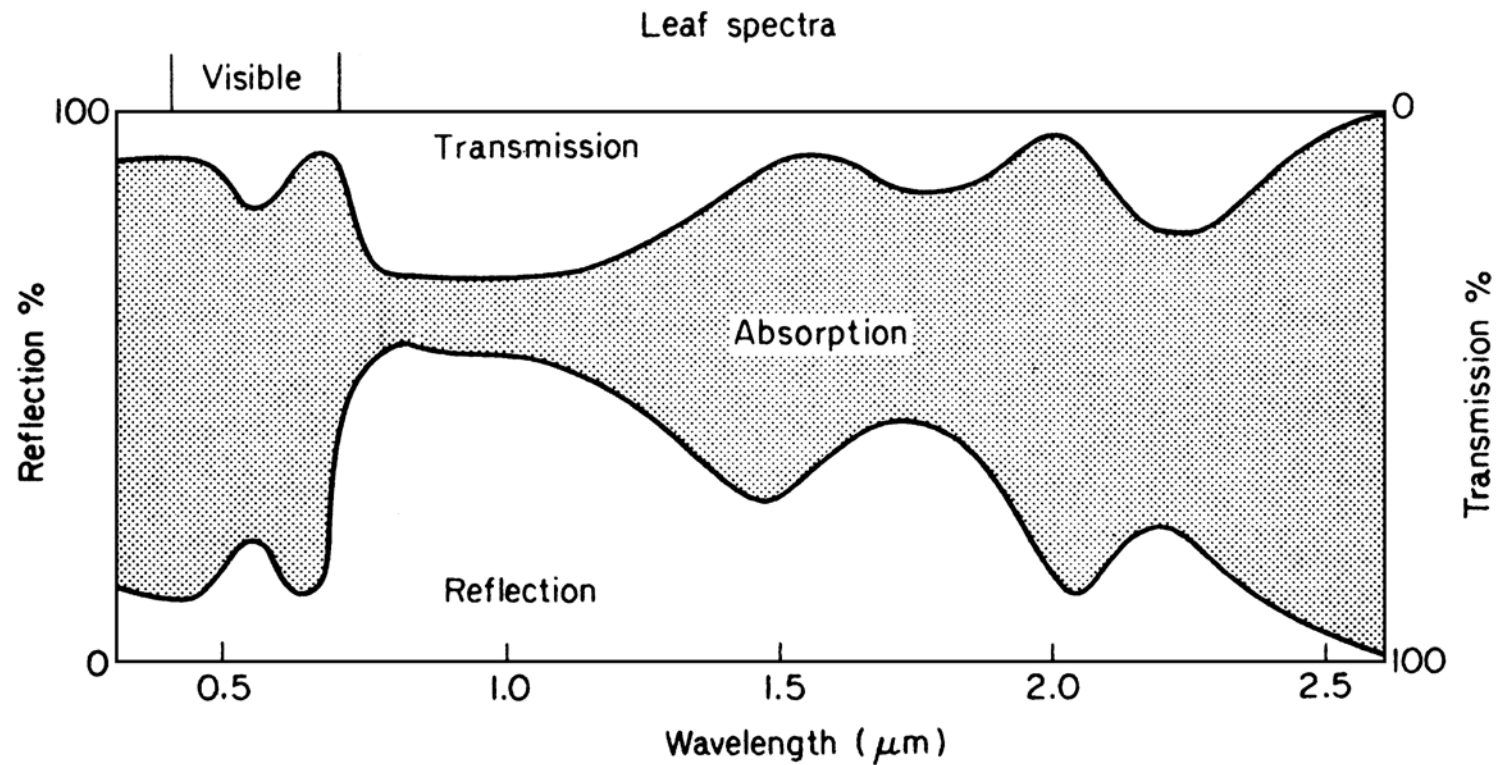


**Figure 6.3** Reflectance (reflection coefficient) of a loam soil as a function of wavelength and water content (from Bowers and Hanks, 1965).

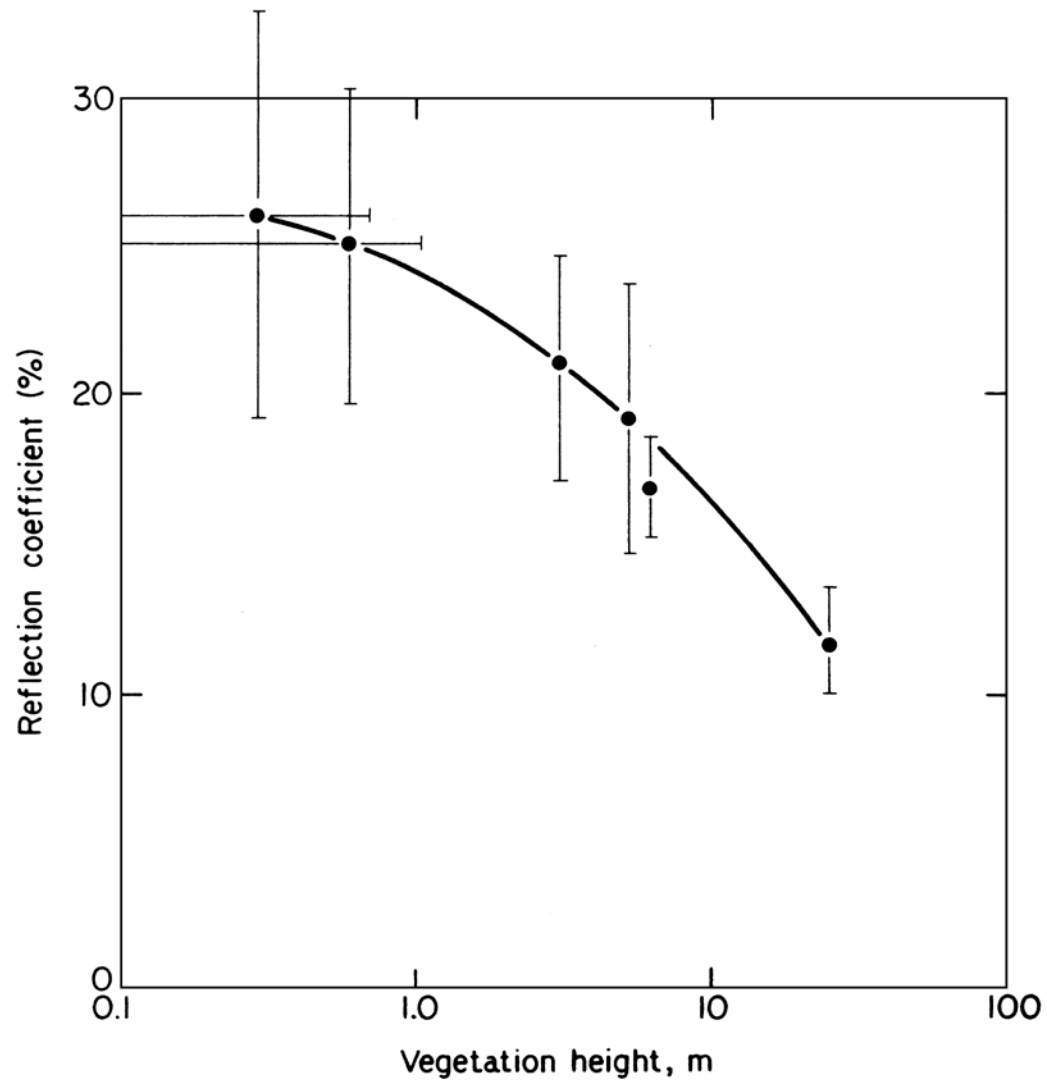




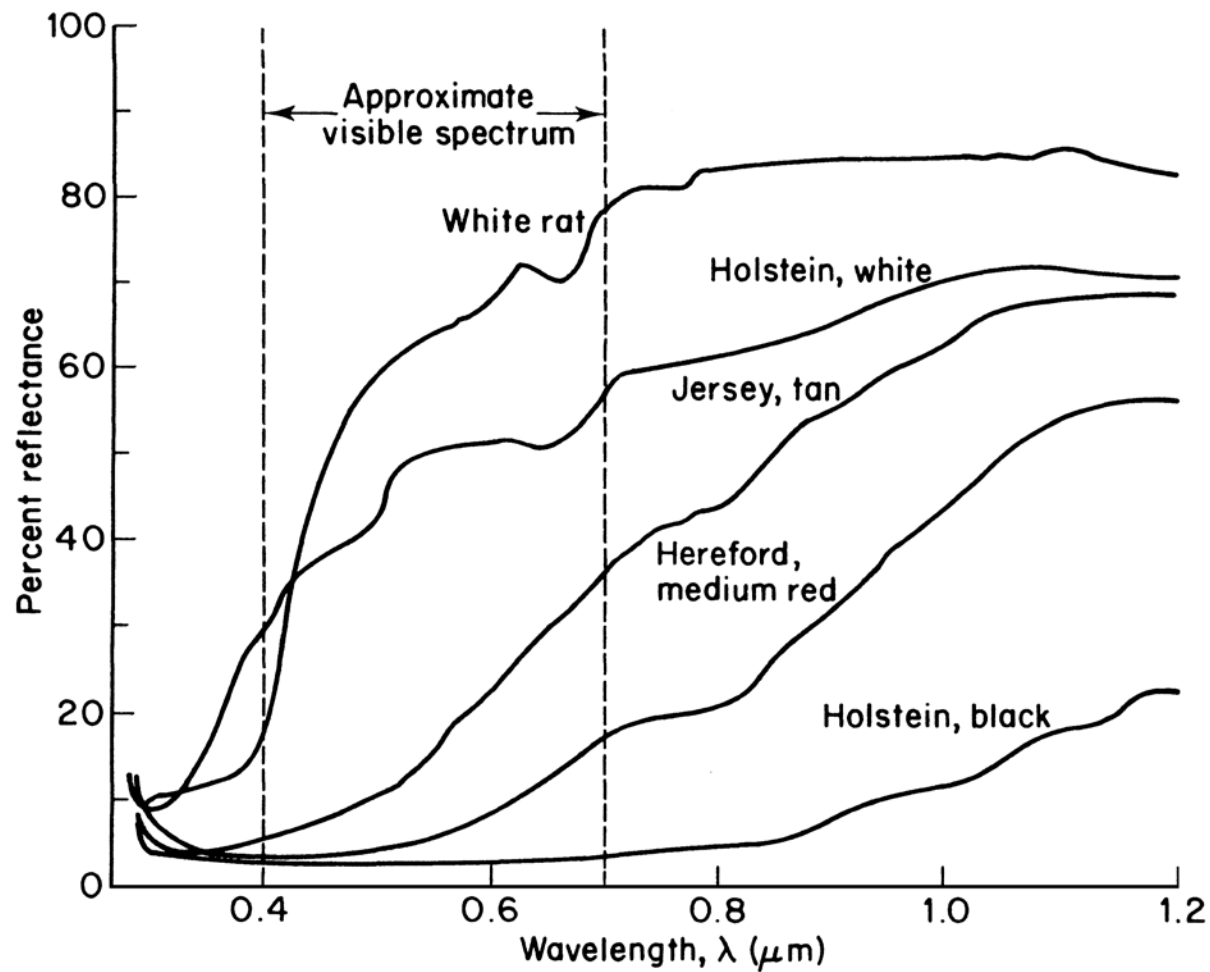
**Figure 6.4** Average absorptivity for leaves of eight field-grown crop species (from McCree, 1972).



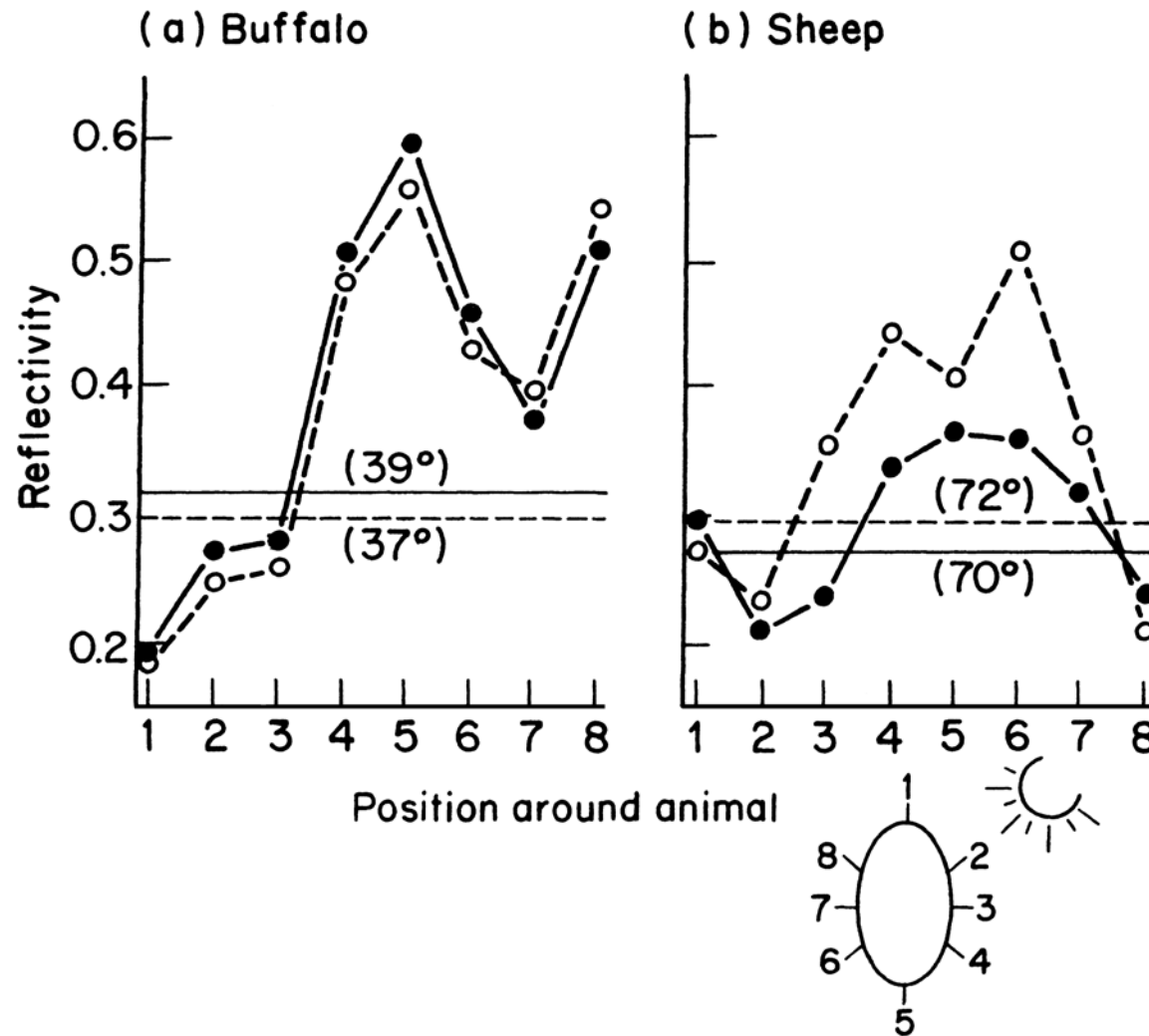
**Figure 6.5** Idealized relation between the spectral reflectivity, transmissivity, and absorptivity of a green leaf.



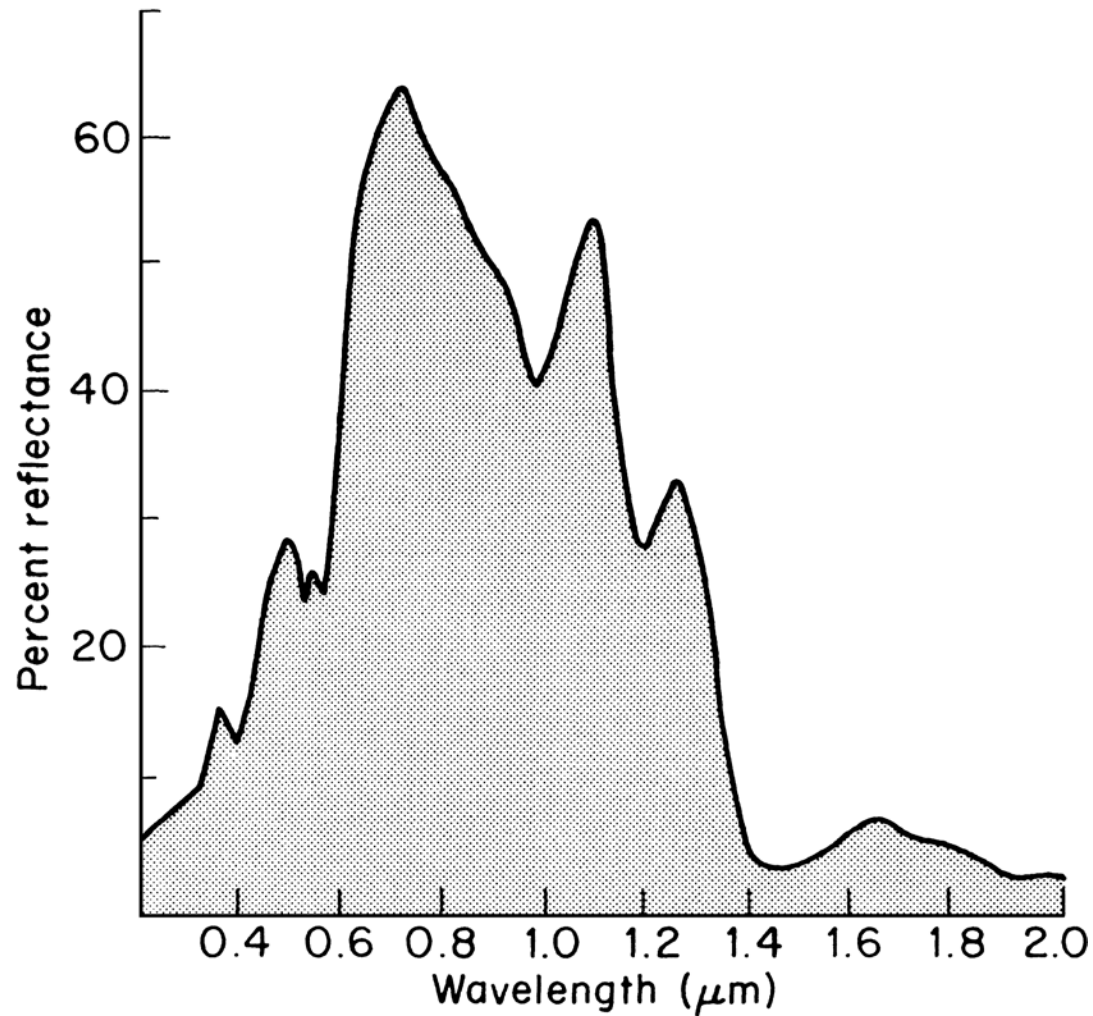
**Figure 6.6** Relation between height of vegetation and reflection coefficient (from Stanhill, 1970).



**Figure 6.7** Spectral reflectance (reflectivity) of animal coats. Hereford, Holstein, and Jersey are breeds of cattle (from Mount, 1968).



**Figure 6.8** Reflection coefficient (solar reflectivity) in individual positions, and weighted mean reflection coefficient (horizontal lines) (a) for swamp water buffalo calves and (b) for Merino sheep with fleeces 6 cm deep. The animals stood sideways onto the sun. Numbers in brackets represent mean solar elevation (from Hutchinson et al., 1975).



**Figure 6.9** Spectral reflectivity of skin on an author's thumb from a recording by Dr. Warren Porter in his laboratory at the University of Wisconsin on 18 April 1969.