Table 3.1 (a) Observed differences in the shoots and leaves of sun and shade plants of the shrub *Heteromeles arbutifolia*. Standard deviations are given in parentheses; the significance of differences are given following analysis of variance. (b) Consequent whole plant properties of sun and shade plants. (After Valladares & Pearcy, 1998.)

(a)

	Sun	*Shade*	*P*
Internode distance (cm)	1.08 (0.06)	1.65 (0.02)	< 0.05
Leaf angle (degrees)	71.3 (16.3)	5.3 (4.3)	< 0.01
Leaf surface area (cm^2)	10.1 (0.3)	21.4 (0.8)	< 0.01
Leaf blade thickness (μm)	462.5 (10.9)	292.4 (9.5)	< 0.01
Photosynthetic capacity, area basis (μmol CO_2 m^{-2} s^{-1})	14.1 (2.0)	9.0 (1.7)	< 0.01
Photosynthetic capacity, mass basis (μmol CO_2 kg^{-1} s^{-1})	60.8 (10.1)	58.1 (11.2)	NS
Chlorophyll content, area basis (mg m^{-2})	280.5 (15.3)	226.7 (14.0)	< 0.01
Chlorophyll content, mass basis (mg g^{-1})	1.23 (0.04)	1.49 (0.03)	< 0.05
Leaf nitrogen content, area basis (g m^{-2})	1.97 (0.25)	1.71 (0.21)	< 0.05
Leaf nitrogen content, mass basis (% dry weight)	0.91 (0.31)	0.96 (0.30)	NS

(b)

	Sun plants		*Shade plants*	
	Summer	*Winter*	*Summer*	*Winter*
E_P	0.55^a	0.80^b	0.88^b	0.54^a
E_D	0.33^a	$0.38^{a,\ b}$	0.41^b	0.43^b
Fraction self-shaded	0.22^a	0.42^b	0.47^b	0.11^a
$E_{A,\ \mathrm{direct\ PFD}}$	0.28^a	0.44^b	0.55^c	0.53^c
LAR_c (cm^2 g^{-1})	7.1^a	11.7^b	20.5^c	19.7^c

E_P, projection efficiency; E_D, display efficiency; E_A, absorption efficiency; LAR_e, effective leaf area ratio; NS, not significant.
Letter codes indicate groups that differed significantly in analyses of variance ($P < 0.05$).

Table 4.1 A cohort life table for *Phlox drummondii*. The columns are explained in the text. (After Leverich & Levin, 1979.)

Age interval (days) $x - x'$	*Number surviving to day x* a_x	*Proportion of original cohort surviving to day x* l_x	*Proportion of original cohort dying during interval* d_x	*Mortality rate per day* q_x	$\text{Log}_{10} l_x$	*Daily killing power* k_x	F_x	m_x	$l_x m_x$
0–63	996	1.000	0.329	0.006	0.00	0.003	–	–	–
63–124	668	0.671	0.375	0.013	−0.17	0.006	–	–	–
124–184	295	0.296	0.105	0.007	−0.53	0.003	–	–	–
184–215	190	0.191	0.014	0.003	−0.72	0.001	–	–	–
215–264	176	0.177	0.004	0.002	−0.75	0.001	–	–	–
264–278	172	0.173	0.005	0.002	−0.76	0.001	–	–	–
278–292	167	0.168	0.008	0.004	−0.78	0.002	–	–	–
292–306	159	0.160	0.005	0.002	−0.80	0.001	53.0	0.33	0.05
306–320	154	0.155	0.007	0.003	−0.81	0.001	485.0	3.13	0.49
320–334	147	0.148	0.043	0.025	−0.83	0.011	802.7	5.42	0.80
334–348	105	0.105	0.083	0.106	−0.98	0.049	972.7	9.26	0.97
348–362	22	0.022	0.022	1.000	−1.66	–	94.8	4.31	0.10
362–	0	0.000	–	–	–	–	–	–	–
							2408.2		2.41

$$R_0 = \sum l_x m_x = \frac{\sum F_x}{a_0} = 2.41.$$

Table 4.2 Cohort life table for red deer hinds on the island of Rhum that were calves in 1957. (After Lowe, 1969.)

Age (years) x	*Proportion of original cohort surviving to the beginning of age-class x* l_x	*Proportion of original cohort dying during age-class x* d_x	*Mortality rate* q_x
1	1.000	0	0
2	1.000	0.061	0.061
3	0.939	0.185	0.197
4	0.754	0.249	0.330
5	0.505	0.200	0.396
6	0.305	0.119	0.390
7	0.186	0.054	0.290
8	0.132	0.107	0.810
9	0.025	0.025	1.000

Table 4.3 A static life table for red deer hinds on the island of Rhum, based on the reconstructed age structure of the population in 1957. (After Lowe, 1969.)

Age (years) x	Number of individuals observed of age x a_x				Smoothed		
		l_x	d_x	q_x	l_x	d_x	q_x
1	129	1.000	0.116	0.116	1.000	0.137	0.137
2	114	0.884	0.008	0.009	0.863	0.085	0.097
3	113	0.876	0.251	0.287	0.778	0.084	0.108
4	81	0.625	0.020	0.032	0.694	0.084	0.121
5	78	0.605	0.148	0.245	0.610	0.084	0.137
6	59	0.457	0.047	–	0.526	0.084	0.159
7	65	0.504	0.078	0.155	0.442	0.085	0.190
8	55	0.426	0.232	0.545	0.357	0.176	0.502
9	25	0.194	0.124	0.639	0.181	0.122	0.672
10	9	0.070	0.008	0.114	0.059	0.008	0.141
11	8	0.062	0.008	0.129	0.051	0.009	0.165
12	7	0.054	0.038	0.704	0.042	0.008	0.198
13	2	0.016	0.008	0.500	0.034	0.009	0.247
14	1	0.080	−0.023	–	0.025	0.008	0.329
15	4	0.031	0.015	0.484	0.017	0.008	0.492
16	2	0.016	–	–	0.009	0.009	1.000

Table 4.4 Mean clutch size and age of great tits in Wytham Wood, near Oxford, UK. (After Perrins, 1965.)

	1961		*1962*		*1963*	
Age (years)	*Number of birds*	*Mean clutch size*	*Number of birds*	*Mean clutch size*	*Number of birds*	*Mean clutch size*
Yearlings	128	7.7	54	8.5	54	9.4
2	18	8.5	43	9.0	33	10.0
3	14	8.3	12	8.8	29	9.7
4			5	8.2	9	9.7
5			1	8.0	2	9.5
6					1	9.0

Table 4.5 A cohort life table and a fecundity schedule for the barnacle *Balanus glandula* at Pile Point, San Juan Island, Washington (Connell, 1970). The computations for R_0, T_c and the approximate value of r are explained in the text. Numbers marked with an asterisk were interpolated from the survivorship curve.

Age (years) x	a_x	l_x	m_x	$l_x m_x$	$x l_x m_x$
0	1,000,000	1.000	0	0	
1	62	0.0000620	4,600	0.285	0.285
2	34	0.0000340	8,700	0.296	0.592
3	20	0.0000200	11,600	0.232	0.696
4	15.5*	0.0000155	12,700	0.197	0.788
5	11	0.000110	12,700	0.140	0.700
6	6.5*	0.0000065	12,700	0.082	0.492
7	2	0.0000020	12,700	0.025	0.175
8	2	0.0000020	12,700	0.025	0.200
				1.282	3.928

$$R_0 = 1.282; \quad T_c = \frac{3.928}{1.282} = 3.1; \quad r \approx \frac{\ln R_0}{T_c} = 0.08014.$$

Table 4.6 A comparison of guppies (*Poecilia reticulata*) from relatively low CR, offspring size-insensitive sites (*Crenicichla* – predation concentrated on larger, adult fish) and relatively high CR, offspring size-sensitive sites (*Rivulus* – predation concentrated on small, juvenile fish). In the former, the guppies (male and female) mature earlier and smaller, make a larger reproductive allocation (shorter interlitter interval, higher percentage effort) and produce smaller offspring (and more of them). This is true both for natural populations from contrasting sites (left) and comparing a population introduced to a *Rivulus* site with its unmanipulated control (right). (After Reznick *et al*., 1982, 1990.)

	Reznick (1982)			*Reznick et al. (1990)*		
	Crenicichla		*Rivulus*	*Control (Crenicichla)*		*Introduction (Rivulus)*
Male age at maturity (days)	51.8	$P < 0.01$	58.8	48.5	$P < 0.01$	58.2
Male size at maturity (mg wet)	87.7	$P < 0.01$	99.7	67.5	$P < 0.01$	76.1
Female age at first birth (days)	71.5	$P < 0.01$	81.9	85.7	$P < 0.05$	92.3
Female size at first birth (mg wet)	218.0	$P < 0.01$	270.0	161.5	$P < 0.01$	185.6
Size of litter 1	5.2	$P < 0.01$	3.2	4.5	$P < 0.05$	3.3
Size of litter 2	10.9	NS	10.2	8.1	NS	7.5
Size of litter 3	16.1	NS	16.0	11.4	NS	11.5
Offspring weight (mg dry) litter 1	0.84	$P < 0.01$	0.99	0.87	$P < 0.10$	0.95
Offspring weight litter 2	0.95	$P < 0.05$	1.05	0.90	$P < 0.05$	1.02
Offspring weight litter 3	1.03	$P < 0.01$	1.17	1.10	NS	1.17
Interlitter interval (days)	22.8	NS	25.0	24.5	NS	25.2
Reproductive effort (%)	25.1	$P < 0.05$	19.2	22.0	NS	18.5

NS, not significant.

Habitat property	*Measured by*	*Growing season* Short	*Growing season* Long
Climate variability	$s^2/\bar{x}$ frost-free days per year	3.05	1.56
Competition	Biomass above ground (g m^{-2})	404	1336
Annual recolonization	Winter rhizome mortality (%)	74	5
Annual density variation	$s^2/\bar{x}$ shoot numbers m^{-2}	2.75	1.51
Plant traits		*T. angustifolia*	*T. domingensis*
Days before flowering		44	70
Mean foliage height (cm)		162	186
Mean genet weight (g)		12.64	14.34
Mean number of fruits per genet		41	8
Mean weights of fruits (g)		11.8	21.4
Mean total weight of fruits (g)		483	171

Table 4.7 Life history traits of two *Typha* (cattail) species, along with properties of the habitats in which they grow. '$s^2/\bar{x}$' refers to the variance : mean ratio, a measure of variability. The cattails conform to the *r*/*K* scheme. (After McNaughton, 1975.)

Table 4.8 When nested analyses of variance are performed on data sets for a number of life history traits from a large number of mammal species, the percentage of the variance is greatest at the highest taxonomic level (orders within the class) and least at the lowest level (species within genera). (After Read & Harvey, 1989.)

Trait	*Species within genera*	*Genera within families*	*Families within orders*	*Orders within the class*
Gestation length	2.4	5.8	21.1	70.7
Age at weaning	8.4	11.5	18.9	61.6
Age at maturity	10.7	7.2	26.7	55.4
Interlitter interval	6.6	13.5	16.1	63.8
Maximum lifespan	9.7	10.1	12.4	67.8
Neonatal weight	2.9	5.5	26.6	64.9
Adult weight	2.9	7.5	21.0	68.5

Table 5.1 A comparison of the resource- and organism-weighted densities of five states, based on the 1960 USA census, where the 'resource patches' are the counties within each state. (After Lewontin & Levins, 1989.)

State	*Resource-weighted density (km^{-2})*	*Organism-weighted density (km^{-2})*
Colorado	44	6,252
Missouri	159	6,525
New York	896	48,714
Utah	28	684
Virginia	207	13,824

Table 7.1 Habitat variables potentially determining the abundance of hares (estimated from the frequency of hare sightings), analyzed separately for arable and pasture farms. Analysis was not performed for variables where fewer than 10% of farmers responded (–). For those variables that were significantly related to whether or not hares were seen by farmers (*, $P < 0.05$; **, $P < 0.01$; ***, $P < 0.001$), the variable descriptor associated with most frequent sightings are shown in bold. (After Vaughan *et al.*, 2003.)

Variable	*Variable description*	*Arable farms*	*Pasture farms*
Wheat	Wheat *Triticum aestivum* (no, yes)	***	–
Barley	Barley (no, yes)	**	–
Cereal	Other cereals (no, yes)	NS	–
Spring	Any cereal grown in spring? (no, yes)	*	–
Maize	Maize (no, yes)	NS	–
Rape	Oilseed rape *Brassica napus* (no, yes)	**	–
Legume	Peas/beans/clover *Trifolium* sp. (no, yes)	**	–
Linseed	Flax *Linum usitatissimum* (no, yes)	NS	–
Horticulture	Horticultural crops (no, yes)	NS	–
Beet	Beet *Beta vulgaris* (no, yes)	***	–
Arable	Arable crops present (see above; no, yes)	–	**
Grass	Grass (including ley, nonpermanent) (no, yes)	NS	–
Type grass	Ley, improved, semi-improved, unimproved	NS	***
Fallow	Set aside/fallow (no, yes)	***	–
Woods	Woodland/orchard (no, yes)	NS	*

NS, not significant.

Table 7.2 Estimated annual costs (billions of US$) associated with invaders in the United States. Taxonomic groups are ordered in terms of the total costs associated with them. (After Pimentel *et al.*, 2000.)

Type of organism	*Number of invaders*	*Major culprits*	*Loss and damage*	*Control costs*	*Total costs*
Microbes (pathogens)	> 20,000	Crop pathogens	32.1	9.1	41.2
Mammals	20	Rats and cats	37.2	NA	37.2
Plants	5,000	Crop weeds	24.4	9.7	34.1
Arthropods	4,500	Crop pests	17.6	2.4	20.0
Birds	97	Pigeons	1.9	NA	1.9
Molluscs	88	Asian clams, Zebra mussels	1.2	0.1	1.3
Fishes	138	Grass carp, etc.	1.0	NA	1.0
Reptiles, amphibians	53	Brown tree snake	0.001	0.005	0.006

NA, not available.

Table 7.3 Ecological traits of forbs that showed a significant relationship with plant performance in years 1–4 after sowing in grassland restoration experiments. The sign shows whether the relationship was positive or negative. (After Pywell *et al.*, 2003.)

Trait	*n*	*Year 1*	*Year 2*	*Year 3*	*Year 4*
Ruderality (colonization ability)	39	+ *	NS	NS	NS
Fall germination	42	+ *	NS	NS	NS
Germination (%)	43	+ **	+ *	+ *	NS
Seedling growth rate	21	NS	+ *	+ **	+ *
Competitive ability	39	+ *	+ **	+ ***	+ ***
Vegetative growth	36	+ **	+ *	+ *	+ *
Seed bank longevity	44	+ *	+ *	+ *	+ *
Stress tolerance	39	– **	– **	– ***	– ***
Generalist habitat	45	+ **	+ **	+ **	+ **

*, $P < 0.05$; **, $P < 0.01$; ***, $P < 0.001$; *n*, number of species in analysis; NS, not significant.

Table 7.4 The current numbers and percentages of named animal and plant species in major taxa judged to be threatened with extinction. The higher values associated with plants, birds and mammals may reflect our greater knowledge of these taxa. (After Smith *et al.*, 1993.)

Taxons	*Number of threatened species*	*Approximate total species*	*Percentage threatened*
Animals			
Molluscs	354	10^5	0.4
Crustaceans	126	4.0×10^3	3
Insects	873	1.2×10^6	0.07
Fishes	452	2.4×10^4	2
Amphibians	59	3.0×10^3	2
Reptiles	167	6.0×10^3	3
Birds	1,029	9.5×10^3	11
Mammals	505	4.5×10^3	11
Total	3,565	1.35×10^6	0.3
Plants			
Gymnosperms	242	758	32
Monocotyledons	4,421	5.2×10^4	9
Monocotyledons: palms	925	2,820	33
Dicotyledons	17,474	1.9×10^5	9
Total	22,137	2.4×10^5	9

Table 7.5 Review of the factors responsible for recorded extinctions of vertebrates and an assessment of risks currently facing species categorized globally as endangered, vulnerable or rare by the International Union for the Conservation of Nature (IUCN). (After Reid & Miller, 1989.)

	*Percentage due to each cause**					
Group	*Habitat loss*	*Overexploitation†*	*Species introduction*	*Predators*	*Other*	*Unknown*
Extinctions						
Mammals	19	23	20	1	1	36
Birds	20	11	22	0	2	37
Reptiles	5	32	42	0	0	21
Fishes	35	4	30	0	4	48
Threatened extinctions						
Mammals	68	54	6	8	12	–
Birds	58	30	28	1	1	–
Reptiles	53	63	17	3	6	–
Amphibians	77	29	14	–	3	–
Fishes	78	12	28	–	2	–

* The values indicated represent the percentage of species that are influenced by the given factor. Some species may be influenced by more than one factor, thus, some rows may exceed 100%.

† Overexploitation includes commercial, sport, and subsistence hunting and live animal capture for any purpose.

Table 7.6 The relationship for a variety of bird species on the Californian Channel Islands between initial population size and probability of populations persisting. (After Thomas, 1990.)

Population size (pairs)	*Time period (years)*	*Percentage persisting*
1–10	80	61
10–100	80	90
100–1000	80	99
1000+	80	100

Table 7.7 Values used as inputs for simulations of koala populations at Oakey (declining) and Springsure (secure), Australia. Values in brackets are standard deviations due to environmental variation; the model procedure involves the selection of values at random from the range. Catastrophes are assumed to occur with a certain probability; in years when the model selects a catastrophe, reproduction and survival are reduced by the multipliers shown. (After Penn *et al.*, 2000.)

Variable	*Oakey*	*Springsure*
Maximum age	12	12
Sex ratio (proportion male)	0.575	0.533
Litter size of 0 (%)	57.00 (± 17.85)	31.00 (± 15.61)
Litter size of 1 (%)	43.00 (± 17.85)	69.00 (± 15.61)
Female mortality at age 0	32.50 (± 3.25)	30.00 (± 3.00)
Female mortality at age 1	17.27 (± 1.73)	15.94 (± 1.59)
Adult female mortality	9.17 (± 0.92)	8.47 (± 0.85)
Male mortality at age 0	20.00 (± 2.00)	20.00 (± 2.00)
Male mortality at age 1	22.96 (± 2.30)	22.96 (± 2.30)
Male mortality at age 2	22.96 (± 2.30)	22.96 (± 2.30)
Adult male mortality	26.36 (± 2.64)	26.36 (± 2.64)
Probability of catastrophe	0.05	0.05
Multiplier, for reproduction	0.55	0.55
Multiplier for survival	0.63	0.63
% males in breeding pool	50	50
Initial population size	46	20
Carrying capacity, *K*	70 (± 7)	60 (± 6)

Table 7.8 Survivorship for 12 elephant age classes in normal years (occur in 47% of 5-year periods), and in years with 10-year droughts (41% of 5-year periods), 50-year and 250-year droughts (10 and 2% of 5-year periods, respectively). (After Armbruster & Lande, 1992.)

	Female survivorship			
Age class (years)	*Normal years*	*10-year droughts*	*50-year droughts*	*250-year droughts*
0–5	0.500	0.477	0.250	0.01
5–10	0.887	0.877	0.639	0.15
10–15	0.884	0.884	0.789	0.20
15–20	0.898	0.898	0.819	0.20
20–25	0.905	0.905	0.728	0.20
25–30	0.883	0.883	0.464	0.10
30–35	0.881	0.881	0.475	0.10
35–40	0.875	0.875	0.138	0.05
40–45	0.857	0.857	0.405	0.10
45–50	0.625	0.625	0.086	0.01
50–55	0.400	0.400	0.016	0.01
55–60	0.000	0.000	0.000	0.00

Table 7.9 An example of a projection matrix for a particular *Silene regia* population from 1990 to 1991, assuming recruitment. Numbers represent the proportion changing from the stage in the column to the stage in the row (bold values represent plants remaining in the same stage). 'Alive undefined' represents individuals with no size or flowering data, usually as a result of mowing or herbivory. Numbers in the top row are seedlings produced by flowering plants. The finite rate of increase λ for this population is 1.67. The site is managed by prescribed burning. (After Menges & Dolan, 1998.)

	Seedling	*Vegetative*	*Small flowering*	*Medium flowering*	*Large flowering*	*Alive undefined*
Seedling	–	–	5.32	12.74	30.88	–
Vegetative	0.308	**0.111**	0	0	0	0
Small flowering	0	0.566	**0.506**	0.137	0.167	0.367
Medium flowering	0	0.111	0.210	**0.608**	0.167	0.300
Large flowering	0	0	0.012	0.039	**0.667**	0.167
Alive undefined	0	0.222	0.198	0.196	0	**0.133**

Species category	*Current climate*	*+1.0°C –10% rain*	*+2.0°C –10% rain*	*+2.0°C –15% rain*
Restricted to the reserve				
Cephalocereus columna-trajani	138	27	0	0
Ferocactus flavovirens	317	532	100	55
Mammillaria huitzilopochtli	68	21	0	0
Mammillaria pectinifera	5,130	1,124	486	69
Pachycereus hollianus	175	87	0	0
Polaskia chende	157	83	76	41
Polaskia chichipe	387	106	10	0
Intermediate distribution				
Coryphantha pycnantha	1,367	2,881	1,088	807
Echinocactus platyacanthus f. grandis	1,285	1,046	230	1,148
Ferocactus haematacanthus	340	1,979	1,220	170
Pachycereus weberi	2,709	3,492	1,468	1,012
Widespread distribution				
Coryphantha pallida	10,237	5,887	3,459	2,920
Ferocactus recurvus	3,220	3,638	1,651	151
Mammillaria dixanthocentron	9,934	7,126	5,177	3,162
Mammillaria polyedra	10,118	5,512	3,473	2,611
Mammillaria sphacelata	3,956	5,440	2,803	2,580
Neobuxbaumia macrocephala	2,846	4,943	3,378	1,964
Neobuxbaumia tetetzo	2,964	1,357	519	395
Pachycereus chrysacanthus	1,395	1,929	872	382
Pachycereus fulviceps	3,306	5,405	2,818	1,071

Table 7.10 The potential core distributions (km^2) of cacti under current climatic conditions and for three climate change scenarios for Mexico. Species in the first category of cacti are currently completely restricted to the 10,000 km^2 Tehuacán–Cuicatlán Biosphere Reserve. Those in the second category have a current range more or less equally distributed within and outside the reserve. The current ranges of species in the final category extend widely beyond the reserve boundaries. (After Téllez-Valdés & Dávila-Aranda, 2003.)

Table 8.1 Reciprocal predation (a form of mutual antagonism) between two species of flour beetle, *Tribolium confusum* and *T. castaneum*. Both adults and larvae eat both eggs and pupae. In each case, and overall, the preference of each species for its own or the other species is indicated. Interspecific predation is more marked than intraspecific predation. (After Park *et al*., 1965.)

	'Predator'	*'Shows a preference for . . .'*
Adults eating eggs	*T. confusum*	*T. confusum*
	T. castaneum	*T. confusum*
Adults eating pupae	*T. confusum*	*T. castaneum*
	T. castaneum	*T. confusum*
Larvae eating eggs	*T. confusum*	*T. castaneum*
	T. castaneum	*T. castaneum*
Larvae eating pupae	*T. confusum*	*T. castaneum*
	T. castaneum	*T. confusum*
Overall	*T. confusum*	*T. castaneum*
	T. castaneum	*T. confusum*

Table 8.2 Competition between *Tribolium confusum* and *T. castaneum* in a range of climates. One species is always eliminated and climate alters the outcome, but at intermediate climates the outcome is nevertheless probable rather than definite. (After Park, 1954.)

	Percentage wins	
Climate	*T. confusum*	*T. castaneum*
Hot–moist	0	100
Temperate–moist	14	86
Cold–moist	71	29
Hot–dry	90	10
Temperate–dry	87	13
Cold–dry	100	0

Table 12.1 Specialization in ectoparasites that feed on birds and mammals. (After Price, 1980.)

			Percentage of species restricted to:		
Scientific name	*Common name and lifestyle*	*Number of species*	*1 host*	*2 or 3 hosts*	*More than 3 hosts*
Philopteridae	Bird lice (spend whole life on one host)	122	87	11	2
Streblidae	Blood-sucking flies (parasitize bats)	135	56	35	9
Oestridae	Botflies (females fly between hosts)	53	49	26	25
Hystrichopsyllidae	Fleas (jump between hosts)	172	37	29	34
Hippoboscidae	Louse flies (are highly mobile)	46	17	24	59

Table 12.2 Estimated energetic costs (percentage increase in resting metabolic rate relative to controls) made by various vertebrate hosts when mounting an immune response to a range of 'challenges' that induce such a response. (After Lochmiller & Derenberg, 2000.)

Species	*Immune challenge*	*Cost (%)*
Human	Sepsis	30
	Sepsis and injury	57
	Typhoid vaccination	16
Laboratory rat	Interleukin-1 infusion	18
	Inflammation	28
Laboratory mouse	Keyhole limpet hemocyanin injection	30
Sheep	Endotoxin	10–49

Table 12.3 The impact of various parasites on the fecundity and survival of wild animals, as demonstrated through the experimental manipulation of parasite loads. (After Tompkins & Begon, 1999, where the original references may be found.)

Host	*Parasite*	*Impact*
Anderson's gerbil (*Gerbillus andersoni*)	*Synoternus cleopatrae* (flea)	Reduced survival
Barn swallow (*Hirundo rustica*)	*Ornithonyssus bursa* (mite)	Reduced fecundity
Cliff swallow (*Hirundo pyrrhonota*)	*Oeciacus vicarius* (bug)	Reduced fecundity
European starling (*Sturnus vulgaris*)	*Dermanyssus gallinae* (mite)	Reduced fecundity
	Ornithonyssus sylvarium (mite)	Reduced fecundity
Great tit (*Parus major*)	*Ceratophyllus gallinae* (flea)	Reduced fecundity
House martin (*Delichon urbica*)	*Oeciacus hirundinis* (bug)	Reduced fecundity
Pearly-eyed thrasher (*Margarops fuscatus*)	*Philinus deceptivus* (fly)	Reduced fecundity
Purple martin (*Progne subis*)	*Dermanyssus prognephilus* (mite)	Reduced fecundity
Red grouse (*Lagopus lagopus*)	*Trichostrongylus tenuis* (nematode)	Reduced fecundity
Snowshoe hare (*Lepus americanus*)	*Obeliscoides cuniculi* (nematode)	Reduced survival
Soay sheep (*Ovis aries*)	*Teladorsagia circumcincta* (nematode)	Reduced survival

Table 12.4 For each of 12 bacterial replicates (B1–B12) and their 12 respective phage replicates (ϕ1–ϕ12), entries in the table are the proportion of bacteria resistant to the phage at the end of a period of coevolution (50 transfers ≈ 400 bacterial generations). Coevolving pairs are shown along the diagonal in bold. Note that bacterial strains are usually most resistant to the phage strain with which they coevolved. (After Buckling & Rainey, 2002.)

	Bacterial replicates											
Phage replicates	*B1*	*B2*	*B3*	*B4*	*B5*	*B6*	*B7*	*B8*	*B9*	*B10*	*B11*	*B12*
ϕ1	**0.8**	0.9	1	1	1	1	1	1	0.85	0.85	0.75	0.65
ϕ2	0.1	**1**	0.3	1	0.85	0.25	1	1	0.85	0.9	0.8	0.65
ϕ3	0.75	0.75	**1**	1	1	0.9	1	1	0.85	0.9	0.9	0.65
ϕ4	0.15	0.9	0.8	**1**	0.85	0.6	0.6	1	0.85	1	0.85	0.35
ϕ5	0.25	0.9	1	1	**1**	0.9	1	0.8	0.85	1	0.8	0.65
ϕ6	0.2	1	0.85	0.8	0.75	**0.8**	0.85	0.9	0.85	0.75	0.45	0.25
ϕ7	0.2	0.75	0.6	1	0.4	0.45	**1**	0.9	0.85	1	0.75	0.35
ϕ8	0	0.95	0.55	0.95	0.35	0.25	0.8	**1**	0.85	1	0.7	0.25
ϕ9	0	0.7	0.55	0.45	0.7	0.35	1	1	**0.85**	1	0.5	0.1
ϕ10	0	0.7	0.9	0.7	0.55	0.9	1	1	0.7	**1**	0.5	0.4
ϕ11	0	0.5	0.9	0.75	0.7	1	1	0.95	0.75	1	**1**	0.35
ϕ12	0	0.15	0	0.1	0.65	0.35	1	1	0.7	0.8	0.85	**0.4**

Table 13.1 A number of the bacterial species of the rumen, illustrating their wide range of functions and the wide range of products that they generate. (After Allison, 1984; Stevens & Hume, 1998.)

Species	*Function*	*Products*
Bacteroides succinogenes	C, A	F, A, S
Ruminococcus albus	C, X	F, A, E, H, C
R. flavefaciens	C, X	F, A, S, H
Butyrivibrio fibrisolvens	C, X, PR	F, A, L, B, E, H, C
Clostridium lochheadii	C, PR	F, A, B, E, H, C
Streptococcus bovis	A, SS, PR	L, A, F
B. amylophilus	A, P, PR	F, A, S
B. ruminicola	A, X, P, PR	F, A, P, S
Succinimonas amylolytica	A, D	A, S
Selenomonas ruminantium	A, SS, GU, LU, PR	A, L, P, H, C
Lachnospira multiparus	P, PR, A	F, A, E, L, H, C
Succinivibrio dextrinosolvens	P, D	F, A, L, S
Methanobrevibacter ruminantium	M, HU	M
Methanosarcina barkeri	M, HU	M, C
Spirochete species	P, SS	F, A, L, S, E
Megasphaera elsdenii	SS, LU	A, P, B, V, CP, H, C
Lactobacillus sp.	SS	L
Anaerovibrio lipolytica	L, GU	A, P, S
Eubacterium ruminantium	SS	F, A, B, C

Functions: A, amylolytic; C, cellulolytic; D, dextrinolytic; GU, glycerol utilizing; HU, hydrogen utilizer; L, lipolytic; LU, lactate utilizing; M, methanogenic; P, pectinolytic; PR, proteolytic; SS, major soluble sugar fermenter; X, xylanolytic.

Products: A, acetate; B, butyrate; C, carbon dioxide; CP, caproate; E, ethanol; F, formate; H, hydrogen; L, lactate; M, methane P, propionate; S, succinate; V, valerate;.

Table 14.1 Typical set of life table data collected by Harcourt (1971) for the Colorado potato beetle (in this case for Merivale, Canada, 1961–62).

Age interval	*Numbers per 96 potato hills*	*Numbers 'dying'*	*'Mortality factor'*	*$\text{Log}_{10}N$*	*k value*	
Eggs	11,799	2,531	Not deposited	4.072	0.105	(k_{1a})
	9,268	445	Infertile	3.967	0.021	(k_{1b})
	8,823	408	Rainfall	3.946	0.021	(k_{1c})
	8,415	1,147	Cannibalism	3.925	0.064	(k_{1d})
	7,268	376	Predators	3.861	0.024	(k_{1e})
Early larvae	6,892	0	Rainfall	3.838	0	(k_2)
Late larvae	6,892	3,722	Starvation	3.838	0.337	(k_3)
Pupal cells	3,170	16	*D. doryphorae*	3.501	0.002	(k_4)
Summer adults	3,154	126	Sex (52% ♀)	3.499	−0.017	(k_5)
♀ × 2	3,280	3,264	Emigration	3.516	2.312	(k_6)
Hibernating adults	16	2	Frost	1.204	0.058	(k_7)
Spring adults	14			1.146		
					2.926	(k_{total})

Mortality factor	*k*	*Mean k value*	*Regression coefficient on k_{total}*	*b*	*r^2*
Eggs not deposited	k_{1a}	0.095	−0.020	−0.05	0.27
Eggs infertile	k_{1b}	0.026	−0.005	−0.01	0.86
Rainfall on eggs	k_{1c}	0.006	0.000	0.00	0.00
Eggs cannibalized	k_{1d}	0.090	−0.002	−0.01	0.02
Eggs predation	k_{1c}	0.036	−0.011	−0.03	0.41
Larvae 1 (rainfall)	k_2	0.091	0.010	0.03	0.05
Larvae 2 (starvation)	k_3	0.185	0.136	0.37	0.66
Pupae (*D. doryphorae*)	k_4	0.033	−0.029	−0.11	0.83
Unequal sex ratio	k_5	−0.012	0.004	0.01	0.04
Emigration	k_6	1.543	0.906	2.65	0.89
Frost	k_7	0.170	0.010	0.002	0.02
	k_{total}	2.263			

Table 14.2 Summary of the life table analysis for Canadian Colorado beetle populations. *b* is the slope of the regression of each *k* factor on the logarithm of the numbers preceding its action; r^2 is the coefficient of determination. See text for further explanation. (After Harcourt, 1971.)

Table 14.3 Key factor (or key phase) analysis for wood frog populations from three areas in the United States: Maryland (two ponds, 1977–82), Virginia (seven ponds, 1976–82) and Michigan (one pond, 1980–93). In each area, the phase with the highest mean k value, the key phase and any phase showing density dependence are highlighted in bold. (After Berven, 1995.)

Age interval	*Mean k value*	*Coefficient of regression on k_{total}*	*Coefficient of regression on log (population size)*
Maryland			
Larval period	1.94	**0.85**	**Pond 1: 1.03 ($P = 0.04$)**
			Pond 2: 0.39 ($P = 0.50$)
Juvenile: up to 1 year	0.49	0.05	0.12 ($P = 0.50$)
Adult: 1–3 years	**2.35**	0.10	0.11 ($P = 0.46$)
Total	4.78		
Virginia			
Larval period	**2.35**	**0.73**	0.58 ($P = 0.09$)
Juvenile: up to 1 year	1.10	0.05	−0.20 ($P = 0.46$)
Adult: 1–3 years	1.14	0.22	**0.26 ($P = 0.05$)**
Total	4.59		
Michigan			
Larval period	1.12	**1.40**	1.18 ($P = 0.33$)
Juvenile: up to 1 year	0.64	1.02	0.01 ($P = 0.96$)
Adult: 1–3 years	**3.45**	–1.42	**0.18 ($P = 0.005$)**
Total	5.21		

Table 14.4 Columns 1–4 contain life table data for the females of a population of red deer, *Cervus elaphus*, on the island of Rhum, Scotland, using data collected between 1971 and 1983 (Clutton-Brock *et al.*, 1985): x is age, l_x is the proportion surviving at the start of an age class, k_x, killing power, has been calculated using natural logarithms, and m_x, fecundity, refers to the birth of female calves. These data represent averages calculated over the period, the raw data having been collected both by following individually recognizable animals from birth and aging animals at death. The next two columns contain the sensitivities of λ, the population growth rate, to k_x and m_x in each age class. In the final two columns, the contributions of the various age classes have been grouped as shown. These columns show the contrasting results of a key factor analysis and a λ contribution analysis as the regression coefficients of k_x and m_x on k_{total} and λ_{total}, respectively, where λ_{total} is the deviation each year from the long-term average value of λ. (After Sibly & Smith, 1998, where details of the calculations may also be found.)

Age (years) at start of class, x	l_x	k_x	m_x	*Sensitivity of λ to k_x*	*Sensitivity of λ to m_x*	*Regression coefficients of k_x, left, and m_x, right, on k_{total}*	*Regression coefficients of k_x, left, and m_x, right, on λ_{total}*
0	1.00	0.45	0.00	−0.14	0.16	0.01, –	0.32, –
1	0.64	0.08	0.00	−0.14	0.09	0.01, –	0.14, –
2	0.59	0.08	0.00	−0.14	0.08		
3	0.54	0.03	0.22	−0.13	0.07	0.00, 0.05	0.03, 0.04
4	0.53	0.03	0.22	−0.11	0.06		
5	0.51	0.04	0.35	−0.10	0.05	−0.00, 0.03	0.08, 0.16
6	0.49	0.04	0.35	−0.08	0.05		
7	0.47	0.04	0.35	−0.07	0.04		
8	0.45	0.06	0.37	−0.05	0.04	0.01, 0.15	0.09, 0.12
9	0.42	0.06	0.37	−0.04	0.03		
10	0.40	0.06	0.37	−0.03	0.03		
11	0.38	0.06	0.37	−0.02	0.02		
12	0.35	0.06	0.37	−0.02	0.02		
13	0.33	0.30	0.30	−0.01	0.02	−0.05, 0.80	0.01, −0.00
14	0.25	0.30	0.30	−0.006	0.01		
15	0.18	0.30	0.30	−0.004	0.008		
16	0.14	0.30	0.30	−0.002	0.005		
17	0.10	0.30	0.30	−0.001	0.004		
18	0.07	0.30	0.30	−0.001	0.002		
19	0.06	0.30	0.30	−0.000	0.002		

	Toxicity				
	Rat	*Fish*	*Bird*	*Honeybee*	*Persistence*
Permethrin (pyrethroid)	2	4	2	5	2
DDT (organochlorine)	3	4	2	2	5
Lindane (organochlorine)	3	3	2	4	4
Ethyl parathion (organophosphate)	5	2	5	5	2
Malathion (organophosphate)	2	2	1	4	1
Carbaryl (carbamate)	2	1	1	4	1
Diflubenzuron (chitin-synthesis inhibitor)	1	1	1	1	4
Methoprene (juvenile hormone analogue)	1	1	1	2	2
Bacillus thuringiensis	1	1	1	1	1

Table 15.1 The toxicity to nontarget organisms, and the persistence, of selected insecticides. Possible ratings range from a minimum of 1 (which may, therefore, include zero toxicity) to a maximum of 5. Most damage is done by insecticides that combine persistence with acute toxicity to nontarget organisms. This clearly applies, to an extent, to each of the first six (broad-spectrum) insecticides. (After Metcalf, 1982; Horn, 1988.)

Table 15.2 History of pesticide use against the aquatic larvae of blackflies, the vectors of river blindness in Africa. After early concentration on Temephos and Chlorphoxim, to which the insects became resistant, pesticides were used on a rotational basis to prevent the evolution of resistance. (After Davies, 1994.)

Name of pesticide	*Class of chemical*	*History of use*
Temephos	Organophosphate	1975 to present
Chlorphoxim	Organophosphate	1980–90
Bacillus thuringiensis H14	Biological insecticide	1980 to present
Permethrin	Pyrethroid	1985 to present
Carbosulfan	Carbamate	1985 to present
Pyraclofos	Organic phosphate	1991 to present
Phoxim	Organophosphate	1991 to present
Etofenprox	Pyrethroid	1994 to present

Table 15.3 The record of insects as biological control agents against insect pests and weeds. (After Waage & Greathead, 1988.)

	Insect pests	*Weeds*
Control agent species	563	126
Pest species	292	70
Countries	168	55
Cases where agent has become established	1063	367
Substantial successes	421	113
Successes as a percentage of establishments	40	31

Table 15.4 Parameter estimates from three fits to the catch per unit effort (CPUE) time series for yellowfin tuna shown in Figure 15.18. *r* is the intrinsic rate of increase, *K* is the carrying capacity (equilibrium abundance in the absence of harvesting) and *q* is the harvesting efficiency. Effort is measured in fishing days; *K* and maximum sustainable yield (MSY) in tons. (After Hilborn & Walters, 1992.)

Fit number	*r*	*K* (× *1000*)	*q* (× 10^{-7})	*MSY* (× *1000*)	*Effort at MSY* (× *1000*)	*Sum of squares*
1	0.18	2103	9.8	98	92	3.8
2	0.15	4000	4.5	148	167	3.8
3	0.13	8000	2.1	261	310	3.8

Scale and behavior measure	*Introduced Harmonia axyridis*	*Native Coleomegilla maculata*
Within clover cells		
Stems visited per minute	0.80 ± 0.05	1.20 ± 0.07
Between clover cells		
Cells visited per minute	0.22 ± 0.07	0.10 ± 0.04
Primary mode of movement	Fly	Crawl
Plot-wide movement		
Mean step length (m)	1.90 ± 0.21	1.10 ± 0.04
Displacement ratio	0.49 ± 0.05	0.19 ± 0.03

Table 15.5 Search behavior of introduced and native labybird beetles at different scales in experimental clover landscapes. Values are means ±1 SE. Each 16 × 16 m plot contains 256 cells (each 1 m^2); clover cells are those cells in which clover was present. For individual ladybirds that made at least five cell transitions, plot-wide movements were quantified in terms of mean step length and displacement ratio. Displacement ratio is net displacement (straight-line distance) divided by overall path length. (After With *et al*., 2002.)

Table 16.1 A 50-year tree-by-tree transition matrix from Horn (1981). The table shows the probability of replacement of one individual by another of the same or different species 50 years hence.

	Occupant 50 years hence			
Present occupant	*Grey birch*	*Blackgum*	*Red maple*	*Beech*
Grey birch	0.05	0.36	0.50	0.09
Blackgum	0.01	0.57	0.25	0.17
Red maple	0.0	0.14	0.55	0.31
Beech	0.0	0.01	0.03	0.96

Table 16.2 The predicted percentage composition of a forest consisting initially of 100% grey birch. (After Horn, 1981.)

	Age of forest (years)						
Species	*0*	*50*	*100*	*150*	*200*	∞	*Data from old forest*
Grey birch	100	5	1	0	0	0	0
Blackgum	0	36	29	23	18	5	3
Red maple	0	50	39	30	24	9	4
Beech	0	9	31	47	58	86	93

Table 16.3 Physiological characteristics of early and late successional plants. (After Bazzaz, 1979.)

Attribute	*Early successional plants*	*Late successional plants*
Seed dispersal in time	Well dispersed	Poorly dispersed
Seed germination:		
enhanced by		
light	Yes	No
fluctuating temperatures	Yes	No
high NO_3^-	Yes	No
inhibited by		
far-red light	Yes	No
high CO_2 concentration	Yes	No?
Light saturation intensity	High	Low
Light compensation point	High	Low
Efficiency at low light	Low	High
Photosynthetic rates	High	Low
Respiration rates	High	Low
Transpiration rates	High	Low
Stomatal and mesophyll resistances	Low	High
Resistance to water transport	Low	High
Recovery from resource limitation	Fast	Slow
Resource acquisition rates	Fast	Slow?

Table 16.4 Seasonal patterns in bare space and species richness on boulders in each of three classes, categorized according to the force (in Newtons) required to move them. (After Sousa, 1979b.)

Census date	*Boulder class (N)*	*Percentage bare space*	*Species richness*		
			Mean	*Standard error*	*Range*
November 1975	< 49	78.0	1.7	0.18	1–4
	50–294	26.5	3.7	0.28	2–7
	> 294	11.4	2.5	0.25	1–6
May 1976	< 49	66.5	1.9	0.19	1–5
	50–294	35.9	4.3	0.34	2–6
	> 294	4.7	3.5	0.26	1–6
October 1976	< 49	67.7	1.9	0.14	1–4
	50–294	32.2	3.4	0.40	2–7
	> 294	14.5	2.3	0.18	1–6
May 1977	< 49	49.9	1.4	0.16	1–4
	50–294	34.2	3.6	0.20	2–5
	> 294	6.1	3.2	0.21	1–5

Table 16.5 Measures of area, perimeter and perimeter : area ratio for the experimental gaps created in two experiments on semiexposed shores in southeast Brazil. (From Tanaka & Magalhaes, 2002.)

	Area (cm^2)	*Perimeter (cm)*	*Perimeter : area ratio*
Patch size effects			
Square	25	20	0.8
Square	100	40	0.2
Square	400	80	0.2
Patch shape effects			
Square	100.0	40.0	0.4
Circle	78.5	31.4	0.4
Rectangle	112.5	45.0	0.4
Sector	190.1	78.6	0.4

Table 16.6 Initial size, and growth and mortality rates over a 1-year period of saplings of three mangrove species in lightning-induced gaps and under intact forest canopy. (After Sherman *et al.*, 2000.)

	Initial sapling diameter (cm ± SE)		*Growth rate–diameter increment (cm ± SE)*		*Mortality (%)*	
	Gaps	*Canopy*	*Gaps*	*Canopy*	*Gaps*	*Canopy*
Rhizophora mangle	1.9 ± 0.06	2.3 ± 0.06	0.58 ± 0.03	0.09 ± 0.01	9	16
Laguncularia racemosa	1.7 ± 0.11	1.8 ± 0.84	0.46 ± 0.04	0.11 ± 0.06	32	40
Avicennia germinans	1.3 ± 0.25	1.7 ± 0.45	0.51 ± 0.04	–	56	88

Table 16.7 Numbers of individuals of each species observed occupying sites, or parts of sites, that had been vacated during the immediately prior interperiod between censuses through the loss of residents of each species. The sites vacated through loss of 120 residents have been reoccupied by 131 fish; the species of the new occupant is not dependent on the species of the previous resident.

	Reoccupied by:		
Resident lost	*E. apicalis*	*P. lacrymatus*	*P. wardi*
Eupomacentrus apicalis	9	3	19
Plectroglyphidodon lacrymatus	12	5	9
Pomacentrus wardi	27	18	29

Marine	*NPP*	*Terrestrial*	*NPP*
Tropical and subtropical oceans	13.0	Tropical rainforests	17.8
Temperate oceans	16.3	Broadleaf deciduous forests	1.5
Polar oceans	6.4	Mixed broad/needleleaf forests	3.1
Coastal	10.7	Needleleaf evergreen forests	3.1
Salt marsh/estuaries/seaweed	1.2	Needleleaf deciduous forests	1.4
Coral reefs	0.7	Savannas	16.8
		Perennial grasslands	2.4
		Broadleaf shrubs with bare soil	1.0
		Tundra	0.8
		Desert	0.5
		Cultivation	8.0
Total	48.3	Total	56.4

Table 17.1 Net primary production (NPP) per year for major biomes and for the planet in total (in units of petragrams of C). (From Geider *et al.*, 2001.)

Table 17.2 Gross primary productivity (GPP) of forests at various latitudes in Europe and North and South America, estimated as the sum of net ecosystem productivity and ecosystem respiration (calculated from CO_2 fluxes measured in the forest canopies – only one estimate for tropical forest was included by the reviewers). (From data in Falge *et al*., 2002.)

Forest type	*Range of GPP estimates (g C m^{-2} year^{-1})*	*Mean of estimates (g C m^{-2} year^{-1})*
Tropical rainforest	3249	3249
Temperate deciduous	1122–1507	1327
Temperate coniferous	992–1924	1499
Cold temperate deciduous	903–1165	1034
Boreal coniferous	723–1691	1019

Table 17.3 Above-ground net primary productivity (ANPP) for forest age sequences in contrasting biomes. (After Gower *et al.*, 1996.)

Biome/species	*Location*	*Range of stand ages, in years (no. of stands shown in brackets)*	*ANPP (t dry mass ha^{-1} year^{-1})*		
			Peak	*Oldest*	*% change*
Boreal					
Larix gmelinii	Yakutsk, Siberia	50–380 (3)	4.9	2.4	−51
Picea abies	Russia	22–136 (10)	6.2	2.6	−58
Cold temperate					
Abies baisamea	New York, USA	0–60 (6)	3.2	1.1	−66
Pinus contorta	Colorado, USA	40–245 (3)	2.1	0.5	−76
Pinus densiflora	Mt Mino, Japan	16–390 (7)	16.1	7.4	−54
Populus tremuloides	Wisconsin, USA	8–83 (5)	11.1	10.7	−4
Populus grandidentata	Michigan, USA	10–70	4.6	3.5	−24
Pseudotsuga menziesii	Washington, USA	22–73 (4)	9.9	5.1	−45
Warm temperate					
Pinus elliottii	Florida, USA	2–34 (6)	13.2	8.7	−34
Pinus radiata	Puruki, NZ (Tahi)	2–6 (5)	28.5	28.5	0
	(Rue)	2–7 (6)	29.2	23.5	−20
	(Toru)	2–8 (7)	31.1	31.1	0
Tropical					
Pinus caribaea	Afaka, Nigeria	5–15 (4)	19.2	18.5	−4
Pinus kesiya	Meghalaya, India	1–22 (9)	30.1	20.1	−33
Tropical rainforest	Amazonia	1–200 (8)	13.2	7.2	−45

Table 18.1 Annual nutrient budgets for forested catchments at Hubbard Brook (kg ha^{-1} year^{-1}). Inputs are for dissolved materials in precipitation or as dryfall. Outputs are losses in streamwater as dissolved material plus particulate organic matter. (After Likens *et al.*, 1971.)

	NH_4^+	NO_3^-	K^+	Ca^{2+}	Mg^{2+}	Na^+
Input	2.7	16.3	1.1	2.6	0.7	1.5
Output	0.4	8.7	1.7	11.8	2.9	6.9
Net change*	+2.3	+7.6	−0.6	−9.2	−2.2	−5.4

* Net change is positive when the catchment gains matter and negative when it loses it.

Table 19.1 Area, distance to mainland and occurrence of breeding pairs of pygmy owls and three species of tit. (After Kullberg & Ekman, 2000.)

Island	*Area (km^2)*	*Distance to mainland (km)*	*Pygmy owl*	*Coal tit*	*Willow tit*	*Crested tit*
Åland	970	50	+	+	+	+
Ösel	3000	15	+	+	+	+
Dagö	989	10	+	+	+	+
Karlö	200	7	+	+	+	+
Gotland	3140	85		+		
Öland	1345	4		+		
Bornholm	587	35		+		
Hanö	2.2	4		+		
Visingsö	30	6		+		

Table 20.1 The influence of nutrient addition on species richness, equitability ($H/\ln S$) and diversity (Shannon's index, H) in two fields; and grazing by African buffalo on species diversity in two areas of vegetation. (After McNaughton, 1977.)

	Control plots	*Experimental plots*	*Statistical significance*
Nutrient addition			
Species richness per 0.5 m^2 plot			
Species-poor plot	20.8	22.5	NS
Species-rich plot	31.0	30.8	NS
Equitability			
Species-poor plot	0.660	0.615	NS
Species-rich plot	0.793	0.740	$P < 0.05$
Diversity			
Species-poor plot	2.001	1.915	NS
Species-rich plot	2.722	2.532	$P < 0.05$
Grazing			
Species diversity			
Species-poor plot	1.069	1.357	NS
Species-rich plot	1.783	1.302	$P < 0.005$

NS, not significant.

Table 21.1 Values of the slope *z*, of species–area curves ($\log S = \log C + z \log A$, where *S* is species richness, *A* is area and *C* is a constant giving the number of species when *A* has a value of 1), for arbitrary areas of mainland, oceanic islands and habitat islands. (After Preston, 1962; May, 1975b; Gorman, 1979; Browne, 1981; Matter *et al.*, 2002; Barrett *et al.*, 2003; Storch *et al.*, 2003.)

Taxonomic group	*Location*	z
Arbitrary areas of mainland		
Birds	Central Europe	0.09
Flowering plants	England	0.10
Birds	Neoarctic	0.12
Savanna vegetation	Brazil	0.14
Land plants	Britain	0.16
Birds	Neotropics	0.16
Oceanic islands		
Birds	New Zealand islands	0.18
Lizards	Californian islands	0.20
Birds	West Indies	0.24
Birds	East Indies	0.28
Birds	East Central Pacific	0.30
Ants	Melanesia	0.30
Land plants	Galápagos	0.31
Beetles	West Indies	0.34
Mammals	Scandinavian islands	0.35
Habitat islands		
Zooplankton (lakes)	New York State	0.17
Snails (lakes)	New York State	0.23
Fish (lakes)	New York State	0.24
Birds (Paramo vegetation)	Andes	0.29
Mammals (mountains)	Great Basin, USA	0.43
Terrestrial invertebrates (caves)	West Virginia	0.72

Table 22.1 Activities permitted or prohibited for each of four planned levels of protection (from left to right in order of decreasing protection) for the Asinara Island National Marine Reserve of Italy. (After Villa *et al.*, 2002.)

Category	*Activity*	*No-take, no-entry*	*Entry, no-take*	*General reserve*	*Partial reserve*
Research	Nondestructive research	Aa	Aa	A	A
Sea access	Sailing	P	L	A	A
	Motor boating	P	P	L	L
	Swimming	P	P	A	A
Staying	Anchorage	P	P	L	L
	Mooring	P	L	Aa	A
Recreation	Diving	P	L	Aa	A
	Guided tours	P	L	Aa	A
	Recreational fishing	P	P	L	A
Exploitation	Artisanal	P	P	L	L
	Sport	P	P	P	L
	Scuba	P	P	P	P
	Commercial fishing	P	P	P	P

A, allowed without authorization; Aa, allowed upon authorization; L, subject to specific limitations; P, prohibited.