Bird Nests and Construction Behaviour

MIKE HANSELL

Pen and ink illustrations by **Raith Overhill**



Contents

Acknowledgements		
1 Animal builders and the importance of bird nests	I	
1.1 Introduction	I	
1.2 Builders extend their control	2	
1.3 The extended phenotype concept	5	
1.4 Building behaviour changes habitats	8	
1.5 Exploitation of the resources by others	10	
1.6 Nests reinforce social life	10	
1.7 The builders	12	
1.8 Are there shared characters among builders?	14	
a) Simple minded	14	
b) No specialist anatomy	16	
c) Techniques shape materials but materials shape		
techniques	16	
1.9 Chapter by chapter	20	
1.10 The taxonomic convention	22	
2 The clutch-nest relationship	23	
2.1 Introduction	23	
2.2 The nests and brood care of dinosaurs	23	
2.3 Why do birds lay eggs?	27	
2.4 Do chicks need nests?	28	
2.5 Clutch size	31	
2.6 The nest and clutch size	35	
3 Standardising the nest description	39	
3.1 The nest profile survey	39	
3.2 Nest identification, morphometrics and type	41	
a) Identity of the nest	41	
b) Nest weight and dimensions	42	
c) Nest shape	44	
d) Nest site	44	
e) Nest attachment	45	
3.3 The four nest zones	49	
3.4 The materials	51	
a) Inorganic materials	52	
b) Animal materials	52	
c) Plant, lichen and fungal materials	54	
d) Others	56	

Contents

.

3.5	Additional information	57
	a) Building techniques	57
	b) Adults and young	58
	c) Biological associations	58
	d) Special features and comments	59
	e) Sketches and photographs	59
4 (Construction	60
4.1	Introduction	60
4.2	Types of construction method	62
4.3	Sculpting	63
4.4	Moulding	64
	Piling up	67
	Sticking together	70
4.7	Interlocking	71
	a) Entangle	71
	b) Stitches and pop-rivets	73
	c) Velcro	74
•	Weaving	80
• •	How difficult is nest building?	84
4.10	Tool use and tool making	89
5	The functional architecture of the nest	93
5.1	Introduction	9 3
5.2	The outer nest layer	95
	a) Nest decoration and nest size	95
	b) Frequency and type of decorative materials	95
	c) Snake skin	101
	d) Heads and tails	103
5.3		106
	a) Number and type of materials in attachments	106
	b) Attachment type and nest support diameter	107
	c) Occurrence of attachment types	107
5.4		112
	 a) Nest weight and nest design in relation to bird weight 	113
	b) Number of materials in the structural layer	J II4
	c) Associations of materials	114
	d) Standard units	115
	e) Silk	115
	f) Grass	110
	g) Sticks	110
	h) Design and convergence	120

.

١

5.5	The nest lining	123
	a) The presence, number and type of lining materials	125
	b) The function of linings	126
6]	The cost of nest building	129
6.1		129
	Calculation of energetic costs	131
	Gathering journeys and building time	132
	Measurement of building costs as clutch reduction	134
	Other evidence of nest building cost	135
	Taking over the nest of another bird	138
6.7	The consequences of nest re-use	141
6.8	Indicators of the cost of nest re-use	142
6.9	The response of nest re-users to blood-feeding	
0.0	ectoparasites	145
	cetopulusites	-4)
7]	The selection of a nest site	152
7.1	Introduction	152
7.2	The availability of nest material	153
7.3	The influence of physical factors	156
7.4	The influence of predators	158
7.5	Predation rates	165
7.6	Coloniality and nest defence	167
7.7	Sites exploiting the nest defence of other birds	169
7.8	Nest sites associated with arthropods	172
	a) Caterpillars and spiders	173
	b) Social insects	175
7.9	Birds and termites	176
7.10	Birds and ants	177
7.11	Birds and bees	180
7.12	Birds and wasps	181
8 E	Bowers, building quality and mate assessment	186
	Introduction	186
	Sexual selection	187
	Nest building and sexual selection	, 189
8.4	Court displays and male quality	191
8.5	Bowers and mate assessment	195
	a) The bowerbirds (Ptilonorhynchidae)	195
	b) The maypole builders	195
	c) The avenue builders	199
	d) Functional design and bower evolution	205
8.6	Bowers and sexual selection theory	210
	Beautiful bowers?	212
,		

.

.

Contents

9	The evolution of nest building	217	
9.1	Introduction	217	
9.2	Innovations of design and of technology	222	
9.3	Taxonomic characters from nests	224	
9.4	Variability and conservatism	226	
9.5	Weaver birds and the ecology of nest evolution	229	
9.6	The Tyrannidae and the flexibility of building		
	behaviour	231	
References			
Author index			
General index			
Species index			

-

.

.

- -

,