

Appendix A. Forebrain size and flocking attributes in 140 European species

Species	Body mass (g)	Forebrain size		Maximum flock size	Flocking propensity ¹	References ²
		(g)	Mean flock size			
<i>Accipiter gentilis</i>	1100	4.62	1	1	0	1,2
<i>Accipiter nisus</i>	260	1.59	1	1	0	1,2
<i>Acrocephalus scirpaceus</i>	14	0.28	1	1	0	3,4
<i>Aegithalos caudatus</i>	7.5	0.28	13.5	20	1	5,6,7
<i>Aegypius monachus</i>	9000	17.94	1	12	1	1,2,8
<i>Agapornis fischeri</i>	42	1.49	4.5	100	1	9,10,11
<i>Alauda arvensis</i>	39	0.86	4.6	100	1	12,13,14
<i>Alcedo atthis</i>	35	0.51	1	1	0	9,15,16
<i>Amazona versicolor</i>	400	5.96	.	20	1	10,11
<i>Anas crecca</i>	330	1.74	4.5	100	1	17,18,19
<i>Anas penelope</i>	700	2.65	300	11200	1	17,20,21
<i>Anas platyrhynchos</i>	1200	4.00	110	1000	1	17,22
<i>Anser anser</i>	3250	7.91	422	19900	1	17,23,24,25,26
<i>Anthropoides virgo</i>	2000	6.20	.	1000	1	1,27,28
<i>Anthus pratensis</i>	16	0.32	.	300	1	12,29,30
<i>Apus apus</i>	38	0.37	.	80000	1	9,15,31

<i>Apus melba</i>	90	0.62	.	20	1	9,15,31,32
<i>Aquila chrysaetos</i>	5300	12.36	1	4	1	1,2,33
<i>Ara ararauna</i>	850	15.38	.	25	1	10,11,34
<i>Ara chloroptera</i>	1430	19.88	2	.	1	10,11,34
<i>Ardea cinerea</i>	1500	4.97	1	.	0	17,35,36,37
<i>Asio otus</i>	250	4.11	1	1	0	38,39,40
<i>Athene noctua</i>	165	3.02	1	1	0	38
<i>Balearica pavonina</i>	3250	9.77	3.14	33	1	27,28,41
<i>Bombycilla garrulus</i>	55.5	0.71	.	100	1	12
<i>Botaurus stellaris</i>	900	3.29	1	1	0	17,35
<i>Bubo bubo</i>	2000	12.93	1	1	0	38
<i>Burhinus oedicnemus</i>	440	2.08	1	40	1	28,42,43
<i>Buteo buteo</i>	900	5.54	1	1	0	1,2
<i>Cacatua sulphurea</i>	450	6.89	.	.	1	10,11
<i>Caprimulgus europaeus</i>	70	0.34	1	15	1	9,15,44,45
<i>Carduelis cannabina</i>	18	0.43	.	1000	1	46,47,48
<i>Carduelis carduelis</i>	14.5	0.42	9.2	1000	1	46,47,49,50,51
<i>Carduelis spinus</i>	11.5	0.35	.	1000	1	46,47,52,53

<i>Certhis familiaris</i>	8.7	0.28	9	35	1	6,54,55
<i>Chrysolophus pictus</i>	550	1.79	1	3	1	1,56
<i>Ciconia ciconia</i>	3500	9.18	8.8	10000	1	17,57,58,59,60,61
<i>Cinclus cinclus</i>	60	0.90	1	1	0	12,62
<i>Coccothraustes coccothraustes</i>	52	1.12	.	1200	1	46,47,49
<i>Columba livia</i>	300	1.27	248	8000	1	15,62,63,64,65,67
<i>Columba palumbus</i>	450	1.31	57	1000	1	15,64,68,69,70
<i>Corvus corax</i>	1250	12.70	2	2000	1	46,71,72,73,74,75
<i>Corvus corone</i>	520	6.43	8.3	30	1	46,71,76,77,78
<i>Corvus frugilegus</i>	430	6.01	26	75	1	46,71,79,80,81,82,83,84,85
<i>Corvus monedula</i>	200	3.59	15	40	1	46,71,86,87,88
<i>Coturnix chinensis</i>	31	0.24	6	40	1	89
<i>Coturnix coturnix</i>	85	0.40	.	10	1	1,28,89
<i>Crex crex</i>	110	0.75	1	1	0	1,28,90
<i>Cuculus canorus</i>	100	0.83	1	100	1	9,15
<i>Cyanistes caeruleus</i>	11	0.49	15.3	38	1	6,54,91,92
<i>Cygnus olor</i>	11000	10.84	13	171	1	17,93,94,95,96
<i>Delichon urbica</i>	15	0.28	.	100	1	12,29,97

<i>Dendrocopos major</i>	80	1.96	1	15	1	15,98
<i>Dendrocopos medius</i>	58	1.49	1	.	1	15,98
<i>Dromaius novaehollandiae</i>	40500	17.47	1	2	1	99
<i>Dryocopus martius</i>	300	6.15	1	1	0	15,98
<i>Egretta alba</i>	1000	3.19	1	15	1	17,35
<i>Egretta garzetta</i>	500	2.07	1	350	1	17,35,100
<i>Erithacus rubecola</i>	16.2	0.35	1	1	0	12,101,102
<i>Falco tinnunculus</i>	230	2.27	1	1	0	1,2
<i>Fratercula arctica</i>	330	2.54	2	8	1	15,103
<i>Fringilla coelebs</i>	21.6	0.47	74	250	1	46,47,104,105
<i>Fulica atra</i>	410	2.09	.	100	1	1,90,99
<i>Gallinago gallinago</i>	100	0.73	1	1	0	28,42,106,107,108
<i>Gallinula chloropus</i>	230	1.21	15	40	1	1,28,90
<i>Gallus gallus</i>	550	1.43	5	.	1	56
<i>Garrulus glandarius</i>	160	2.91	1	1	0	46,71,109
<i>Gavia stellata</i>	1200	2.43	7	8	1	17,110
<i>Geopelia cuneata</i>	30	0.22	15	30	1	64,111,112
<i>Goura coronata</i>	1500	2.99	4	5	1	64

<i>Grus antigone</i>	7500	14.21	2.02	13	1	27,99
<i>Haematopus ostralegus</i>	500	2.27	11.4	1000	1	42,43,106,113,114
<i>Hirundo rustica</i>	18.5	0.34	6.9	100	1	12,29,97
<i>Ixobrychus minutus</i>	136	0.95	1	1	0	17,35
<i>Jynx torquilla</i>	37	0.49	1	1	0	15,98
<i>Lanius collurio</i>	29.7	0.72	1	1	0	3,115,116
<i>Larus argentatus</i>	1000	2.58	.	1150	1	42,117,118
<i>Larus marinus</i>	1670	4.79	.	.	1	42,119
<i>Larus ridibundus</i>	250	1.55	100	2974	1	42,120,121,122,123
<i>Leptoptilos crumeniferus</i>	6200	22.04	.	200	1	57,58
<i>Lophura nyctemera</i>	1250	2.74	5	8	1	56
<i>Loxia curvirostra</i>	38	0.97	4	100	1	46,47,124,125
<i>Lymnocryptes minimus</i>	60	0.50	1	1	0	28,42,43,106
<i>Melanocorypha calandra</i>	55	0.94	51.8	2500	1	12
<i>Melopsittacus undulatus</i>	36.7	0.78	.	100000	1	10,11,111,126
<i>Mergus serrator</i>	900	2.91		24	1	17,22,127
<i>Merops apiaster</i>	60	0.42	.	100	1	9,15,16
<i>Montifrigilla nivalis</i>	45	0.70	25	150	1	46,47

<i>Motacilla alba</i>	23	0.37	12	175	1	12,128,129,130
<i>Muscicapa striata</i>	16	0.30	1	1	0	5,131
<i>Numenius arquata</i>	650	2.44	9.95	27	1	28,42,43,132,133,134
<i>Nymphicus hollandiae</i>	85	1.96	27.4	1000	1	10,11,111,135
<i>Oriolus oriolus</i>	72	0.91	1	10	1	5,136,137
<i>Otus scops</i>	92	1.44	1	1	0	38
<i>Pandion haliaetus</i>	1500	7.18	1	25	1	1,2,138,139,140
<i>Parus major</i>	17.5	0.64	15.3	50	1	6,54,91,92,,141,142,143
<i>Passer domesticus</i>	28	0.66	25	50	1	46,47,144,145,146,147
<i>Pastor roseus</i>	55.21	0.96	.	100000	1	46,148
<i>Pavo cristatus</i>	3500	4.34	5	5	1	27,28
<i>Pelecanus onocrotalus</i>	9000	22.81	8.5	129	1	17,57,149,150,151
<i>Perdix perdix</i>	370	0.92	10	25	1	1,89,152
<i>Phalacrocorax carbo</i>	2200	6.34	.	10000	1	17,57,149,153,154,155,156,157
<i>Phasianus colchicus</i>	1200	2.26	3.87	50	1	1,56,158,159
<i>Philomachus pugnax</i>	180	0.96	.	260000	1	28,42,43,106,160,161,162
<i>Phoenicopterus ruber</i>	3000	7.37	100	1400	1	57,163,164,165
<i>Pica pica</i>	220	4.27	5	52	1	46,71,166,167

<i>Picus canus</i>	122	2.57	1	1	0	15,98,168
<i>Picus viridis</i>	200	3.22	1	1	0	15,98
<i>Podiceps cristatus</i>	1050	2.12	.	100	1	17,169,170
<i>Porphyrio porphyrio</i>	500	3.27	3.9	300	1	1,28,90,99,171
<i>Porzana porzana</i>	80	0.62	1	4	1	1,28,90
<i>Prunella modularis</i>	18.9	0.44	1	6	1	12,172,173
<i>Psittacula eupatria</i>	96	3.09	.	.	1	10,11
<i>Psittacus erythacus</i>	450	7.53	.	200	1	9,10,11
<i>Pyrhcorax pyrrhcorax</i>	356	5.07	4.8	200	1	46,71,174
<i>Rallus aquaticus</i>	120	1.06	1	30	1	1,90
<i>Regulus regulus</i>	5.4	0.23	2.44	7	1	3,4,175,176
<i>Scolopax rusticola</i>	290	1.63	1	1	0	28,42,43,106
<i>Serinus canaria</i>	8	0.29	.	200	1	46,47
<i>Sitta europaea</i>	23	0.73	15.3	38	1	6,54,91,177,178,179
<i>Somateria mollissima</i>	2050	6.04	1000	4000	1	17,22,180,181
<i>Spheniscus demersus</i>	2700	9.40	4.6	190	1	182,183,184
<i>Sterna albifrons</i>	40	0.44	3	4	1	15,185
<i>Sterna hirundo</i>	120	0.78	16	200	1	15,186,187,188

<i>Streptopelia risoria</i>	143	0.70	.	1000	1	28,64
<i>Strix aluco</i>	450	6.70	1	1	0	38
<i>Struthio camelus</i>	90000	27.07	.	100	1	17,57,189,190
<i>Sturnus vulgaris</i>	80	1.22	49	10000	1	46,148,191,192,193,194,195,196
<i>Sylvia borin</i>	19	0.35	1	1	0	3,4,197
<i>Tachybaptus ruficollis</i>	160	0.95	1	1	0	17,57,198
<i>Tetrao tetrix</i>	1250	2.05	7.9	1000	1	1,27,199,200
<i>Tetrao urogallus</i>	2750	3.10	.	20	1	1,27
<i>Trichoglossus haematodus</i>	136	1.66	2.9	1000	1	10,11,111,201
<i>Tringa hypoleucos</i>	47	0.39	1	1	0	28,42,106,108,132
<i>Troglodytes troglodytes</i>	9.5	0.31	1	1	0	12,202
<i>Turdus ericetorum</i>	67	0.89	.	.	.	
<i>Turdus merula</i>	95	1.16	1	60	1	12,203,204,205
<i>Tyto alba</i>	290	4.55	1	1	0	15,38,206
<i>Upopa epops</i>	55	0.82	1	9	1	9,15
<i>Vanellus vanellus</i>	200	1.22	639	15000	1	42,43,106,120,207

¹ Flocking propensity: 0 = absent; 1 = present

² References: (1) (Cramp and Simmons, 1980); (2) (Ferguson-Lees and Christie, 2001); (3) (Cramp, 1992); (4) (Baker, 1997); (5) (Cramp and Perrins, 1993); (6) (Harrap and Quinn, 1995); (7) (Hatchwell et al., 2001); (8) (Blanco et al., 1997); (9) (Fry et al., 1988); (10) (del Hoyo et al., 1997); (11) (Juniper and Parr, 1998);

(12) (Cramp, 1988); (13) (Cresswell, 1994); (14) (Mason and MacDonald, 1999); (15) (Cramp, 1985); (16) (Fry and Fry, 1992); (17) (Cramp and Simmons, 1977); (18) (Pöysä, 1994); (19) (Gauthier-Clerc et al., 1998); (20) (Larsen, 1996); (21) (van Kanel, 1981); (22) (Palmer, 1976); (23) (Owen, 1980); (24) (Fox et al., 1995); (25) (Bell, 1988); (26) (Kristiansen et al., 2000); (27) (Johnsgard, 1983); (28) (Urban et al., 1986); (29) (Keith et al., 1992); (30) (Vanhinsberg and Chamberlain, 2001); (31) (Chantler, 2000); (32) (Tella et al., 1995); (33) (Halley and Gjershaug, 1998); (34) (Sick, 1993); (35) (Voisin, 1991); (36) (Birkhead, 1973); (37) (Richner, 1986); (38) (Konig et al., 1999); (39) (Pirovano et al., 2000); (40) (Galeotti et al., 1997); (41) (Walkinshaw, 1964); (42) (Cramp and Simmons, 1983); (43) (Hayman et al., 1986); (44) (Cleere, 1998); (45) (Holyoak, 2001); (46) (Cramp and Perrins, 1994); (47) (Clement, 1992); (48) (Drachmann et al., 2002); (49) (Newton, 1972); (50) (Glück, 1986); (51) (Glück, 1987); (52) (Senar et al., 1989); (53) (Laurent, 1986); (54) (Cramp and Perrins, 1993); (55) (Arevalo and Gosler, 1994); (56) (Johnsgard, 1999); (57) (Brown et al., 1982); (58) (Hancock et al., 1992); (59) (Redondo et al., 1995); (60) (Alonso et al., 1994); (61) (Carrascal et al., 1990); (62) (Tyler and Ormerod, 1994); (63) (Sacchi et al., 2002); (64) (Gibbs et al., 2001); (65) (Sol et al., 1998); (66) (Murton et al., 1972); (67) (Johnston and Janiga, 1995); (68) (Bogliani et al., 1999); (69) (Murton et al., 1966); (70) (Murton et al., 1971); (71) (Madge and Brun, 1994); (72) (Marzluff et al., 1996); (73) (Ratcliffe, 1997); (74) (Lovari, 1976); (75) (Heinrich, 1988); (76) (Saino, 1994); (77) (Loman, 1985); (78) (Richner, 1989); (79) (Waite, 1981); (80) (Griffin, 1999); (81) (Marchant and Gregory, 1999); (82) (Griffin and Thomas, 2000); (83) (Henderson and Hart, 1991); (84) (MacDonald and Whelan, 1986); (85) (Patterson et al., 1971); (86) (Johnsson, 1994); (87) (Roell, 1978); (88) (Henderson and Hart, 1995); (89) (Johnsgard, 1988); (90) (Taylor, 1998); (91) (Morse, 1978); (92) (Ekman, 1989); (93) (Perrins and McCleery, 1997); (94) (Keane and O'Halloran, 1992); (95) (Sears, 1989); (96) (Rees et al., 1997); (97) (Turner, 1989); (98) (Winkler et al., 1995); (99) (Marchant and Higgins, 1993); (100) (Kersten et al., 1991); (101) (Harper, 1986); (102) (Figuerola et al., 2001); (103) (Gaston and Jones, 1998); (104) (Beveridge and Deag, 1987); (105) (Marler, 1956); (106) (Johnsgard, 1981); (107) (Mueller, 1999); (108) (Nichols, 1931); (109) (Rolando, 1998); (110) (Barr et al., 2000); (111) (Higgins and Davies, 1999); (112) (Schleuger, 1993); (113) (Ens and Cayford, 1996); (114) (Norris and Johnstone, 1998); (115) (Lefranc, 1997); (116) (Harris, 2000); (117) (Pierotti and Good, 1994); (118) (Monaghan, 1980); (119) (Good, 1998); (120) (Barnard and Thompson, 1985); (121) (Vernon, 1970); (122) (Curtis and Thompson, 1985); (123) (Prevot-Julliard and Lebreton,

1999); (124) (Clouet, 2000); (125) (Adkinsson, 1996); (126) (Wyndham, 1980); (127) (Titman, 1999); (128) (Broom et al., 1976); (129) (Davies, 1976); (130) (Davies and Houston, 1981); (131) (Urban et al., 1997); (132) (Ntiamoa-Baidu et al., 1998); (133) (Abramson, 1979); (134) (Rippe and Dierschke, 1997); (135) (Seibert and Crowell-Davis, 2001); (136) (Digby and Milwright, 1998); (137) (Fry et al., 2000); (138) (Poole, 1989); (139) (Fleming et al., 1992); (140) (Greene, 1987); (141) (Carrascal and Moreno, 1992); (142) (Szekely et al., 1989); (143) (Krams, 1998); (144) (Beer, 1961); (145) (Lowther and Cink, 1992); (146) (Summers-Smith, 1988); (147) (Barnard, 1980); (148) (Feare and Craig, 1998); (149) (Johnsgard, 1993); (150) (Din and Eltringham, 1974); (151) (Saino et al., 1995); (152) (Carroll, 1993); (153) (Hatch et al., 2000); (154) (Marchant and Higgins, 1990); (155) (van Eerden and Voslamber, 1995); (156) (Lindell et al., 1995); (157) (Suter, 1997); (158) (Giudice and Ratti, 2001); (159) (Hill and Robertson, 1988); (160) (Widemo, 1997); (161) (Pearson, 1981); (162) (van Rhijn, 1992); (163) (Johnson, 1997); (164) (Britton et al., 1986); (165) (Anderson, 2000); (166) (McKinstry and Knight, 1993); (167) (Birkhead, 1991); (168) (Rolstad and Rolstad, 1995); (169) (Piersma et al., 1988); (170) (Bukacinska et al., 1993); (171) (Craig, 1979); (172) (Bishton, 2001); (173) (Pons, 2001); (174) (Rolando et al., 1997); (175) (Hilden, 1982); (176) (Hogstad, 1984); (177) (Enoksson and Nilsson, 1983); (178) (Matthysen, 1999); (179) (Herrera, 1979); (180) (Guillemette et al., 1993); (181) (Goudie et al., 2000); (182) (Ryan et al., 1987); (183) (Whittington et al., 1996); (184) (Williams, 1995); (185) (Cherubini et al., 1996); (186) (Burger and Gochfeld, 1991); (187) (Erwin, 1978); (188) (Manco et al., 2001); (189) (del Hoyo et al., 1992); (190) (Bertram, 1980); (191) (Williamson and Gray, 1975); (192) (Whitehead et al., 1995); (193) (Cabe, 1993); (194) (Keys and Dugatkin, 1990); (195) (Fischl and Caccamise, 1985); (196) (Jennings and Evans, 1980); (197) (Shirihai et al., 2001); (198) (Fox, 1994); (199) (Starling-Westerberg, 2001); (200) (Baines, 1994); (201) (Utschick and Brandl, 1989); (202) (Pilastro et al., 1994); (203) (Clement, 2000); (204) (Cresswell, 1997); (205) (Smith et al., 2001); (206) (Marti, 1992); (207) (Kirby, 1997).

Appendix B. Forebrain size and flocking attributes in 55 species

Species	Body mass (g)	Forebrain volume (mm ³)	Mean flock size	Maximum flock size	Flocking propensity ¹	References ²
<i>Agelaius phoeniceus</i>	47.70	180.16	53.22	4011	1	1,2,3
<i>Aphelocoma coerulescens</i>	75.45	8.49	2.96	8	1	4,5,6,7,8
<i>Aphelocoma ultramarina</i>	114.00	11.66	8.67	25	1	4,8,9,10,11,12,13
<i>Cardinalis cardinalis</i>	44.00	695.46	9.2	43	1	14,15,16,17
<i>Carduelis tristis</i>	12.50	181.07	7.2	200	1	17,18,19,20
<i>Cissa erythrorhyncha</i>	202.70	22.94	.	12	1	4,21
<i>Corvus corone</i>	416.95	49.88	8.3	30	1	4,21,22,23,24,25
<i>Corvus frugilegus</i>	335.50	56.80	26	75	1	4,21,22,26,27,28,29
<i>Corvus monedula</i>	209.95	29.17	15	40	1	4,21,22,30,31
<i>Cyanistes caeruleus</i>	13.30	324.15	15.3	38	1	32,33,34,35,36,37
<i>Cyanocitta cristata</i>	113.32	996.91	2	30	1	4,17,38,39
<i>Dendroica coronata</i>	12.40	158.82	3.5	12	1	17,40,41,42,43
<i>Dendroica magnolia</i>	8.20	124.41	.	1	0	17,40,43,44,45,46
<i>Dendroica striata</i>	11.90	175.74	.	.	0	17,40,47,48
<i>Dumetella carolinensis</i>	40.70	506.82	1	1	0	17,49

<i>Fulmaris glacialis</i>	525.00	1067.10	1.3	10000	1	50,51,52,53
<i>Garrulus glandarius</i>	192.40	23.02	1	1	0	4,21,22,54
<i>Geothlypis trichas</i>	9.40	215.43	1	1	0	17,40,55
<i>Gymnorhinus cyanocephalus</i>	102.35	11.01	144	270	1	4,8,21,56,57,58
<i>Junco hyemalis</i>	19.50	312.41	3.39	34	1	17,59,60,61,62
<i>Melanerpes carolinus</i>	76.50	1353.50	1	1	0	63,64,65
<i>Melanerpes erythrocephalus</i>	69.20	866.50	1	1	0	63,65,66
<i>Melospiza georgiana</i>	18.10	311.10	6	10	1	17,59,67,68
<i>Melospiza melodia</i>	20.75	590.39	.	.	1	59,68,69,70
<i>Molothrus ater</i>	39.70	165.06	6.6	.	1	1,3,71,72
<i>Molothrus badius</i>	43.71	999.30	21	100	1	1,73,74
<i>Molothrus bonariensis</i>	49.34	873.10	.	52	1	1,73,74,75
<i>Molothrus rufoaxillaris</i>	53.93	858.97	.	100	1	1,73,74
<i>Nucifraga columbiana</i>	130.78	13.22	.	100	1	4,8,76,77
<i>Oceanodroma leucorhoa</i>	49.90	372.50	1.6	30	1	50,53,78,79,80,81,82
<i>Parus ater</i>	9.10	300.81	3.52	100	1	22,32,33,37,83,84
<i>Parus atricapillus</i>	10.82	290.90	7.26	14	1	33,85,86,87,88,89
<i>Parus major</i>	19.00	423.02	15.3	50	1	32,33,34,35,37,90,91,92

<i>Parus montanus</i>	10.20	383.86	4.2	8	1	32,33,35,37,93,94
<i>Parus palustris</i>	10.60	303.00	1.9	9	1	32,33,35,37,95
<i>Parus sclateri</i>	11.55	278.46	13.7	100	1	33,89,96
<i>Parus wollweberi</i>	9.61	257.18	7.9	10	1	33,89,97,98
<i>Passer domesticus</i>	25.32	384.22	25	50	1	17,22,99,100,101,102,103
<i>Pheucticus ludovicianus</i>	43.20	374.11	1	1	0	17,104
<i>Pica pica</i>	182.69	28.93	5	52	1	4,21,22,105,106
<i>Picoides pubescens</i>	25.30	627.90	14.04	18	1	43,63,65,107,108,109
<i>Picoides villosus</i>	63.80	1522.00	1	1	0	63,65
<i>Pyrrhocorax graculus</i>	163.00	16.01	4.8	200	1	4,21,22,110
<i>Quiscalus quiscula</i>	92.40	216.36	38.52	2548	1	1,3,111,112
<i>Regulus calendula</i>	7.30	120.55	1.77	20	1	17,98,113
<i>Seiurus aurocapillus</i>	16.90	279.02	1	1	0	17,40,114
<i>Seiurus noveboracensis</i>	19.60	144.06	1	1	0	17,40,115
<i>Setophaga ruticilla</i>	7.20	89.16	.	12	0	17,40,43,116,117,118
<i>Sitta canadensis</i>	11.50	180.01	1.23	6	1	17,33,119,120,121
<i>Sturnus vulgaris</i>	96.50	950.83	49	10000	1	17,22,122,123,124,125,126,127
<i>Sylvia borin</i>	13.90	264.06	1	1	0	128,129,130,131

<i>Sylvia melanocephala</i>	11.30	280.81	1	1	0	128,129,130,131,132
<i>Troglodytes aedon</i>	10.20	263.71	1	1	0	17,133
<i>Turdus migratorius</i>	79.00	681.61	10.4	50	1	17,134,135,136,137
<i>Zonotrichia albicollis</i>	24.20	390.11	2.25	12	1	17,43,59,68,138,139

¹ Flocking propensity: 0 = absent; 1 = present

² References: (1) (Jaramillo and Burke, 1999); (2) (Yasukawa and Searcy, 1995); (3) (Sherry et al., 1993) (4) (Madge and Brun, 1994); (5) (Woolfenden and Fitzpartrick, 1984); (6) (Woolfenden and Fitzpartrick, 1996); (7) (McGowan and Woolfenden, 1989); (8) (Basil et al., 1996); (9) (Hopp et al., 2001); (10) (Brown and Horvath, 1989); (11) (Brown and Li, 1995); (12) (Brown and Brown, 1985); (13) (Brown, 1994); (14) (Halkin and Linville, 1999); (15) (Shuman et al., 1992); (16) (Bent, 1968); (17) (Sherry et al., 1989); (18) (Middleton, 1993); (19) (Desportes et al., 1993); (20) (Popp, 1988); (21) (Healy and Krebs, 1992); (22) (Cramp and Perrins, 1994); (23) (Saino, 1994); (24) (Loman, 1985); (25) (Richner, 1989); (26) (Waite, 1981); (27) (Henderson and Hart, 1991); (28) (MacDonald and Whelan, 1986); (29) (Patterson et al., 1971); (30) (Roell, 1978); (31) (Henderson and Hart, 1995); (32) (Cramp and Perrins, 1993); (33) (Harrap and Quinn, 1995); (34) (Morse, 1978); (35) (Ekman, 1989); (36) (Ulfstrand, 1975); (37) (Healy and Krebs, 1996); (38) (Tarvin and Woolfenden, 1999); (39) (Racine and Thompson, 1983); (40) (Curson et al., 1994); (41) (Hunt and Flaspoler, 1998); (42) (Morse, 1989); (43) (Morse, 1970); (44) (Keast and Morton, 1980); (45) (Stiles and Skutch, 1989); (46) (Hall, 1994); (47) (Sick, 1993); (48) (Hunt and Eliason, 1999); (49) (Cimprich and Moore, 1995); (50) (Warham, 1990); (51) (Hatch and Nettleship, 1998); (52) (Hoffman et al., 1981); (53) (Abbott et al., 1999); (54) (Rolando, 1998); (55) (Guzy and Linville, 1999); (56) (Marzluff and Balda, 1992); (57) (Marzluff and Balda, 1989); (58) (Balda and Balda, 1978); (59) (Byers et al., 1996); (60) (Balph, 1979); (61) (Lima, 1988); (62) (Czikeli, 1983); (63) (Winkler et al., 1995); (64) (Shackleford et al., 2000); (65) (Volman et al., 1997); (66) (Smith et al., 2000); (67) (Mowbray, 1997); (68) (Rising, 1996); (69) (Knapton and Krebs, 1976); (70) (Lee et al., 2001); (71) (Lowther, 1993); (72) (Morris and Thompson, 1998); (73) (Reboreda et al., 1996); (74) (Reboreda, 2002); (75) (Lowther and Post, 1999); (76) (Tomback, 1998); (77) (Tomback, 1977); (78) (Marchant and Higgins, 1990); (79) (Ribic et al.,

1997); (80) (Huntington et al., 1996); (81) (Finch et al., 1978a); (82) (Finch et al., 1978b); (83) (Hogstad, 1988); (84) (Brotons, 2000); (85) (Smith, 1993); (86) (Smith and Van Buskirk, 1988); (87) (Smith, 1991); (88) (Ficken et al., 1981); (89) (Hampton et al., 1995); (90) (Carrascal and Moreno, 1992); (91) (Szekely et al., 1989); (92) (Saitou, 1978); (93) (Haftorn, 1999); (94) (Lahti et al., 1996); (95) (Szekely and Juhasz, 1993); (96) (Ficken and Nosedal, 1992); (97) (Christman, 2001); (98) (Gram, 1998); (99) (Beer, 1961); (100) (Lowther and Cink, 1992); (101) (Summers-Smith, 1988); (102) (Clement, 1992); (103) (Barnard, 1980); (104) (Ridgely and Tudor, 1989); (105) (McKinstry and Knight, 1993); (106) (Birkhead, 1991); (107) (Dolby and Grubb, 2000); (108) (Sullivan, 1985); (109) (Sullivan, 1984); (110) (Rolando et al., 1997); (111) (White et al., 1985); (112) (Peer and Bollinger, 1997); (113) (Ingold and Wallace, 1994); (114) (van Horn and Donovan, 1994); (115) (Eaton, 1995); (116) (Lovette and Holmes, 1995); (117) (Latta and Wunderle, 1996); (118) (Sherry and Holmes, 1997); (119) (Morrison et al., 1987); (120) (Matthysen, 1999); (121) (Ghalambor and Martin, 1999); (122) (Williamson and Gray, 1975); (123) (Keys and Dugatkin, 1990); (124) (Whitehead et al., 1995); (125) (Feare and Craig, 1998); (126) (Fischl and Caccamise, 1985); (127) (Jennings and Evans, 1980); (128) (Cramp, 1992); (129) (Baker, 1997); (130) (Shirihai et al., 2001); (131) (Healy et al., 1996); (132) (Herrandon and Brotons, 2001); (133) (Johnson, 1998); (134) (Chavez-Ramirez and Slack, 1994); (135) (Pinowski and Summers-Smith, 1990); (136) (Sallabanks and James, 1999); (137) (Clement, 2000); (138) (Falls and Kopachena, 1994).

Appendix C. Forebrain size and flocking attributes in 32 species

Species	Body mass (g)	Forebrain size (mm ³)	Mean flock size	Maximum flock size	Flocking propensity ¹	References ²
<i>Alectoris chukar</i>	532	1406.39	20	50	1	1
<i>Anas platyrhynchos</i>	2900	4115.75	110	1000	1	2,3
<i>Ardea cinerea</i>	1900	5028.04	1	1	0	2,4,5,6
<i>Calidris minutilla</i>	29	255.5	.	30	1	7,8,9
<i>Caprimulgus spp.</i>	53	342.75	1	15	0	10,11,12,13
<i>Chaetura pelagica</i>	21	159.92	.	50	1	14
<i>Charadrius vociferus</i>	100	523.69	.	50	1	15,16,17
<i>Chlorostilbon mellisugus</i>	5	56.17	1	1	0	18,19
<i>Chrysolophus pictus</i>	630	1726.01	1	3	1	20,21
<i>Colinus virginianus</i>	214	569.85	20.1	22	1	22,23,24
<i>Columba livia</i>	347	1245.72	248	8000	1	10,25,26,27,28,29
<i>Corvus corone</i>	458	7019.03	8.3	30	1	30,31,32,33,34
<i>Coturnix coturnix</i>	159	369.4	.	10	1	20,22,35
<i>Gallus gallus</i>	2539	1242.46	5	.	1	21
<i>Garrulus glandarius</i>	139	2596.73	1	1	0	30,31,36
<i>Limnodromus griseus</i>	90	725.11	17.5	125	1	37,38,39,40

<i>Meleagris gallopavo</i>	6460	3764.53	6	200	1	41,42,43
<i>Melopsittacus undulatus</i>	41	825.12	.	100000	1	44,45,46
<i>Numida meleagris</i>	1624	2223.28	70.25	200	1	47,48
<i>Ortalis canicollis</i>	720	1829.65	2.26	30	1	49
<i>Passer domesticus</i>	27	637.56	25	50	1	30,50,51,52,53,54
<i>Pavo cristatus</i>	3930	4264.04	5	5	1	21
<i>Perdix perdix</i>	401	956.57	10	25	1	20,22,55
<i>Phalacrocorax auritus</i>	1531	4341.73	1	175	1	56,57
<i>Phasianus colchicus</i>	1050	1579.09	3.87	50	1	20,21,58,59
<i>Pionus menstruus</i>	325	3851.82	.	100	1	44
<i>Rhea americana</i>	25000	10281.31	8.82	50	1	60,61
<i>Spheniscus magellanicus</i>	3365	10890.21	.	100	1	62,63
<i>Sterna hirundo</i>	96	808.53	16	200	1	10,64,65,66
<i>Streptopelia roseogrisea</i>	132	630.98	.	1000	1	26,35
<i>Taenopygia guttata</i>	15	207.83	9	300	1	67,68,69

¹ Flocking propensity: 0 = absent; 1 = present

² References: (1) (Christensen, 1996); (2) (Cramp and Simmons, 1977); (3) (Palmer, 1976); (4) (Voisin, 1991); (5) (Birkhead, 1973); (6) (Richner, 1986); (7) (Myers, 1984); (8) (Paulson, 1993); (9) (Cooper, 1994); (10) (Cramp, 1985); (11) (Cleere, 1998); (12) (Holyoak, 2001); (13) (Fry et al., 1988); (14) (Chantler, 2000); (15) (Jackson and Jackson, 2000); (16) (Heck, 1985); (17) (Schardien, 1981); (18) (del Hoyo et al., 1996); (19) (Sick, 1993); (20) (Cramp and Simmons,

1980); (21) (Johnsgard, 1999); (22) (Johnsgard, 1988); (23) (Brennan, 1999); (24) (Moore et al., 1988); (25) (Sacchi et al., 2002); (26) (Gibbs et al., 2001); (27) (Sol et al., 1998); (28) (Murton et al., 1972); (29) (Johnston and Janiga, 1995); (30) (Cramp and Perrins, 1994); (31) (Madge and Brun, 1994); (32) (Saino, 1994); (33) (Loman, 1985); (34) (Richner, 1989); (35) (Urban et al., 1986); (36) (Rolando, 1998); (37) (Jehl et al., 2001); (38) (Mallory and Schneider, 1979); (39) (Burger et al., 1979); (40) (Myers and McCaffery, 1984); (41) (Eaton, 1992); (42) (Watts and Stokes, 1971); (43) (Dickson, 1992); (44) (Juniper and Parr, 1998); (45) (Higgins and Davies, 1999); (46) (Wyndham, 1980); (47) (Marx and Stoltz, 1988); (48) (van Nierek, 1979); (49) (Brooks, 1997); (50) (Beer, 1961); (51) (Lowther and Cink, 1992); (52) (Summers-Smith, 1988); (53) (Clement, 1992); (54) (Barnard, 1980); (55) (Carroll, 1993); (56) (Johnsgard, 1993); (57) (Hatch and Weseloh, 1999); (58) (Giudice and Ratti, 2001); (59) (Hill and Robertson, 1988); (60) (Martella et al., 1995); (61) (Bruning, 1974); (62) (Williams, 1995); (63) (Boersma, 2002); (64) (Burger and Gochfeld, 1991); (65) (Erwin, 1978); (66) (Manco et al., 2001); (67) (Zann, 1996); (68) (Zann and Straw, 1984); (69) (Dunn and Zann, 1996).

- Abbott, M.L., Walsh, C.J., Storey, A.E., Stenhouse, L.J. and Harley, C.W. 1999. Hippocampal volume is related to complexity of nesting habitat in Leach's storm-petrel, a nocturnal Procellariiform seabird. *Brain Behav Evol*, **53**: 271-276.
- Abramson, M. 1979. Vigilance as a factor influencing flock formation among curlews *Numenius arquata*. *Ibis*, **121**: 213-216.
- Adkinsson, C.S. 1996 Common crossbill. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 256, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Alonso, J.A., Alonso, J.C., Carrascal, L.M. and Munozpulido, R. 1994. Flock size and foraging decisions in central place foraging white storks, *Ciconia ciconia*. *Behaviour*, **129**: 279-292.
- Anderson, M.D. 2000. The status of flamingos in the northern Cape Province, South Africa. *Ostrich*, **71**: 430-434.
- Arevalo, J.E. and Gosler, A.G. 1994. The behaviour of treecreepers *Certhia familiaris* in mixed-species flocks in winter. *Bird Study*, **41**: 1-6.
- Baines, D. 1994. Seasonal differences in habitat selection by black grouse *Tetrao tetrix* in the northern Pennines, England. *Ibis*, **136**: 39-41.
- Baker, K. 1997. *Warblers of Europe, Asia and North Africa*. Princeton, Princeton University Press.
- Balda, R.P. and Balda, J.H. 1978. The care of young pinyon jays (*Gymnorhinus cyanocephalus*) and their integration into the flock. *J Ornithol*, **119**: 146-171.
- Balph, M.H. 1979. Flock stability in relation to social dominance and agonistic behavior in wintering dark-eyed juncos. *Auk*, **96**: 714-722.

- Barnard, C.J. 1980. Flock feeding and time budgets in the house sparrow (*Passer domesticus* L.). *Anim Behav*, **28**: 295-309.
- Barnard, C.J. and Thompson, D.B.A. 1985. *Gulls and plovers: The ecology and behaviour of mixed-species feeding groups*. London, Croom Helm.
- Barr, J.F., Eberl, C. and McIntyre, J.W. 2000 Red-throated loon. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 513, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Basil, J.A., Kamil, A.C., Balda, R.P. and Fite, K.V. 1996. Differences in hippocampal volume among seed-eating Corvids. *Brain Behav Evol*, **47**: 156-164.
- Beer, J.R. 1961. Winter feeding patterns in the house sparrow. *Auk*, **78**: 63-71.
- Bell, M.V. 1988. Feeding behaviour of wintering pink-footed and greylag geese in south-east Scotland. *Wildfowl*, **39**: 43-53.
- Bent, A.C. 1968. *Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows, and allies: Order Passeriformes, family Fringillidae*. Washington, Smithsonian Institution Press.
- Bertram, B.C.R. 1980. Vigilance and group size in ostriches. *Anim Behav*, **28**: 278-286.
- Beveridge, F.M. and Deag, J.M. 1987. The effects of sex, temperature and companions on looking up and feeding in single and mixed species flocks of house sparrows (*Passer domesticus*), chaffinches (*Fringilla coelebs*) and starlings (*Sturnus vulgaris*). *Behaviour*, **100**: 303-320.
- Birkhead, T.R. 1973. A winter roost of grey herons. *Br Birds*, **66**: 147-156.
- Birkhead, T.R. 1991. *The magpies*. London., T. & A.D. Poyser.

- Bishton, G. 2001. Social structure, habitat use and breeding biology of hedgerow dunnocks *Prunella modularis*. *Bird Study*, **48**: 188-193.
- Blanco, G., Traverso, J.M., Marchamalo, J. and Martinez, F. 1997. Interspecific and intraspecific aggression among griffon and cinereous vultures at nesting and foraging sites. *J Raptor Res*, **31**: 77-79.
- Boersma, D. (2002). Personal communication.
- Bogliani, G., Sergio, F. and Tavecchi, G. 1999. Wood pigeons nesting in associations with hobby falcons: advantages and choice rules. *Anim Behav*, **57**: 125-131.
- Brennan, L.A. 1999 Northern bobwhite. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 397, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Britton, R.H., de Groot, E.R. and Johnson, A.R. 1986. The daily cycle of feeding activity of the greater flamingo in relation to the dispersion of the prey *Artemia*. *Waterfowl*, **37**: 151-155.
- Brooks, D.M. 1997 Population and ecological parameters of the Chaco chachalaca (*Ortalis canicollis*). In *The Cracidae: Their biology and conservation* (S.D. Strahl, S. Beaujon, D.M. Brooks, A.J. Begazo, G. Sedaghatkish and F. Olmos, eds), pp. 412-417. Surrey, Hancock House Publishers.
- Broom, D.M., Dick, W.J.A., Johnson, C.E., Sales, D.I. and Zahavi, A. 1976. Pied wagtail roosting and feeding behaviour. *Bird Study*, **23**: 267-279.
- Brotons, L. 2000. Winter spacing and non-breeding social system of the coal tit *Parus ater* in a subalpine forest. *Ibis*, **142**: 657-667.

- Brown, J.L. 1994 Mexican jay. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 118, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Brown, J.L. and Brown, E.R. 1985. Ecological correlates of group size in a communally-breeding jay. *Condor*, **87**: 309-315.
- Brown, J.L. and Horvath, E.G. 1989. Geographic variation of group size, ontogeny, rattle calls, and body size in *Aphelocoma ultramarina*. *Auk*, **106**: 124-128.
- Brown, J.L. and Li, S.-H. 1995. Phylogeny of social behavior in *Aphelocoma* jays: a role for hybridization? *Auk*, **112**: 464-472.
- Brown, L.H., Urban, E.K. and Newman, K. 1982. *The birds of Africa*. London, Academic Press.
- Bruning, D.F. 1974. Social structure and reproductive behavior of the greater rhea. *Living Bird*, **13**: 251-294.
- Bukacinska, M., Bukacinski, D. and Jabkonski, P. 1993. Colonial and noncolonial great crested grebes (*Podiceps cristatus*) at Lake Luknajno - Nest site characteristics, clutch size and egg biometry. *Col Waterbirds*, **16**: 111-118.
- Burger, J., Caldwell Hahn, D. and Chase, J. 1979. Aggressive interactions in mixed-species flocks of migrating shorebirds. *Anim Behav*, **27**: 459-469.
- Burger, J. and Gochfeld, M. 1991. *The common tern*. New York, Columbia University Press.
- Byers, C., Olsson, U. and Curson, J. 1996. *Buntings and sparrows*. Sussex, Pica Press.

- Cabe, P.R. 1993 Starling. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 48, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Carrascal, L.M., Alonso, J.C. and Alonso, J.A. 1990. Aggregation size and foraging behaviour of white storks *Ciconia ciconia* during the breeding season. *Ardea*, **78**: 399-404.
- Carrascal, L.M. and Moreno, E. 1992. Proximal costs and benefits of heterospecific social foraging in the great tit, *Parus major*. *Can J Zool*, **70**: 1947-1952.
- Carroll, J.P. 1993 Gray partridge. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 58, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Chantler, P. 2000. *Swifts: A guide to the swifts and treeswifts of the world*. Sussex, Pica Press.
- Chavez-Ramirez, F. and Slack, R.D. 1994. Effects of avian foraging and post-foraging behavior on seed dispersal patterns of ashe juniper. *Oikos*, **71**: 40-46.
- Cherubini, G., Serra, L. and Baccetti, N. 1996. Primary moult, body mass and moult migration of little tern *Sterna albifrons* in ne Italy. *Ardea*, **84**: 99-114.
- Christensen, G.C. 1996 Chukar. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 258, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Christman, B.J. 2001. Low flock coherence in mild winters leads to a lack of subordination costs in bridled titmouse foraging groups. *Ibis*, **143**: 617-626.

- Cimprich, D.A. and Moore, F.R. 1995 Gray catbird. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 167, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Cleere, N. 1998. *Nightjars*. Sussex, Pica Press.
- Clement, P. 1992. *Finches and sparrows*. Princeton, Princeton University Press.
- Clement, P. 2000. *Thrushes*. Princeton, Princeton University Press.
- Clouet, M. 2000. The breeding biology of the common crossbill *Loxia curvirostra* in the central Pyrennees. *Bird Study*, **47**: 186-194.
- Cooper, J.M. 1994 Least sandpiper. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 115, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Craig, J.L. 1979. Habitat variation in the social organization of a communal gallinule, the pukeko, *Porphyrio porphyrio melanotus*. *Behav Ecol Sociobiol*, **5**: 331-338.
- Cramp, S. 1985. *Handbook of the birds of Europe, the Middle East and North Africa*. Oxford, Oxford University Press.
- Cramp, S. 1988. *Handbook of the birds of Europe, the Middle East and North Africa*. Oxford, Oxford University Press.
- Cramp, S. 1992. *Handbook of the birds of Europe, the Middle East and North Africa*. Oxford, Oxford University Press.
- Cramp, S. and Perrins, C.M. 1993. *Handbook of the birds of Europe, the Middle East and North Africa*. Oxford, Oxford University Press.
- Cramp, S. and Perrins, C.M. 1994. *Handbook of the birds of Europe, the Middle East and North Africa*. Oxford, Oxford University Press.

- Cramp, S. and Simmons, K.E.L. 1977. *Handbook of the birds of Europe, the Middle East and North Africa*. Oxford, Oxford University Press.
- Cramp, S. and Simmons, K.E.L. 1980. *Handbook of the birds of Europe, the Middle East and North Africa*. Oxford, Oxford University Press.
- Cramp, S. and Simmons, K.E.L. 1983. *Handbook of the birds of Europe, the Middle East and North Africa*. Oxford, Oxford University Press.
- Cresswell, W. 1994. Song as a pursuit-deterrent signal, and its occurrence relative to other anti-predation behaviours of skylark (*Alauda arvensis*) on attack by merlins (*Falco columbarius*). *Behav Ecol Sociobiol*, **34**: 217-223.
- Cresswell, W. 1997. Interference competition at low competitor densities in blackbirds *Turdus merula*. *J Anim Ecol*, **66**: 461-471.
- Curson, J., Quinn, D. and Beadle, D. 1994. *Warblers of the Americas*. Boston, Houghton Mifflin.
- Curtis, D.J. and Thompson, D.B.A. 1985. Spacing and foraging behaviour of black-headed gulls *Larus ridibundus* in an estuary. *Ornis Scand*, **16**: 245-252.
- Czikeli, H. 1983. Agonistic interactions within a winter flock of slate-colored juncos (*Junco hyemalis*). Evidence for the dominants' strategy. *Z Tierpsychol*, **61**: 61-66.
- Davies, N.B. 1976. Food, flocking and territorial behaviour of the pied wagtail (*Motacilla alba*) in winter. *J Anim Ecol*, **45**: 235-254.
- Davies, N.B. and Houston, A.I. 1981. Owners and satellites: the economics of territory defence in the pied wagtail, *Motacilla alba*. *J Anim Ecol*, **50**: 157-180.
- del Hoyo, J., Elliott, A. and Sargatal, J. 1992. *Handbook of the birds of the world*. Barcelona, Lynx Edicions.

- del Hoyo, J., Elliott, A. and Sargatal, J. 1996. *Handbook of the birds of the world*.
Barcelona, Lynx Edicions.
- del Hoyo, J., Elliott, A. and Sargatal, J. 1997. *Handbook of the birds of the world*.
Barcelona, Lynx Edicions.
- Desportes, J.P., Metcalfe, N.B., Popp, J.W., Meyer, R.M., Gallo, A. and Cézilly, F. 1993.
Relationships between scan and interscan durations in three avian species. *Can J Zool*, **71**: 1466-1469.
- Dickson, J.G. 1992. *The wild turkey*. Mechanicsburg, Stackpole Books.
- Digby, R. and Milwright, P. 1998. Breeding biology of the golden oriole *Oriolus oriolus*
in the fenland basin of eastern Britain. *Bird Study*, **45**: 320-330.
- Din, N.A. and Eltringham, S.K. 1974. Ecological separation between white and pink-
backed pelicans in the Ruwenzori National Park. *Ibis*, **116**: 28-43.
- Dolby, A.S. and Grubb, T.C. 2000. Social context affects risk taking by a satellite species
in a mixed-species foraging group. *Behav Ecol*, **11**: 110-114.
- Drachmann, J., Braberg, M.M. and Sogaard, P. 2002. Nest predation and semi-colonial
breeding in linnets *Carduelis cannabina*. *Bird Study*, **49**: 35-41.
- Dunn, A.M. and Zann, R.A. 1996. Undirected song in wild zebra finch flocks - contexts
and effects of mate removal. *Ethology*, **102**: 529-539.
- Eaton, S.W. 1992 Wild turkey. In *The birds of North America* (A. Poole and F.B. Gill,
eds), Vol. 22, Philadelphia and Washington, D.C., The Academy of Natural
Sciences and The American Ornithologists' Union.

- Eaton, S.W. 1995 Northern waterthrush. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 182, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Ekman, J. 1989. Ecology of non-breeding social systems of *Parus*. *Wilson Bull*, **101**: 263-288.
- Enoksson, B. and Nilsson, S.G. 1983. Territory size and population density in relation to food supply in the nuthatch (*Sitta europaea*). *J Anim Ecol*, **52**: 927-936.
- Ens, B.J. and Cayford, J.T. 1996 Feeding with other oystercatchers. In *The oystercatcher: from individuals to populations* (J.D. Goss-Custard, ed, pp. 77-104. Oxford, Oxford University Press.
- Erwin, R.M. 1978. Coloniality in terns: The role of social feeding. *Condor*, **80**: 211-215.
- Falls, J.B. and Kopachena, J.G. 1994 White-throated sparrow. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 128, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Feare, C. and Craig, A. 1998. *Starlings and mynas*. London, Christopher Helm.
- Ferguson-Lees, J. and Christie, D.A. 2001. *Raptors of the world*. London, Christopher Helm.
- Ficken, M.S. and Nosedal, J. 1992 Mexican chickadee. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 8, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Ficken, M.S., Witkin, S.R. and Weise, C.M. 1981. Associations among members of a black-capped chickadee flock. *Behav Ecol & Sociobiol*, **8**: 245-249.

- Figuerola, J., Jovani, R. and Sol, D. 2001. Age-related habitat segregation by robins *Erithacus rubecola* during the winter. *Bird Study*, **48**: 252-253.
- Finch, D.W., Russell, W.C. and Thompson, E.V. 1978a. Pelagic birds in the Gulf of Maine. *American Birds*, **32**: 140-155.
- Finch, D.W., Russell, W.C. and Thompson, E.V. 1978b. Pelagic birds in the Gulf of Maine. A report based on observations from the M.V. Bluenose with extensive notes on identification. II. *American Birds*, **32**: 281-294.
- Fischl, J. and Caccamise, D.F. 1985. Influence of habitat and season on foraging flock composition in the European starling (*Sturnus vulgaris*). *Oecologia*, **67**: 532-539.
- Fleming, S.P., Smith, P.C., Seymour, N.R. and Bancroft, R.P. 1992. Ospreys use local enhancement and flock foraging to locate prey. *Auk*, **109**: 649-654.
- Fox, A.D. 1994. Estuarine winter feeding patterns of little grebes *Tachybaptus ruficollis* in central Wales. *Bird Study*, **41**: 15-24.
- Fox, A.D., Kahlert, J., Ettrup, H., Nilsson, L. and Hounisen, J.P. 1995. Moulting greylag geese *Anser anser* on the Danish island of Saltholm: numbers, phenology, status and origins. *Wildfowl*, **46**: 16-30.
- Fry, C.H. and Fry, K. 1992. *Kingfishers, bee-eaters and rollers*. London, Christopher Helm.
- Fry, C.H., Keith, S. and Urban, E.K. 1988. *Birds of Africa*. London, Academic Press.
- Fry, C.H., Keith, S. and Urban, E.K. 2000. *Birds of Africa*. London, Academic Press.
- Galeotti, P., Pilastro, A., Tavecchia, G., Bonetti, A. and Congiu, L. 1997. Genetic similarity in long-eared owl communal winter roosts - a DNA fingerprinting study. *Mol Ecol*, **6**: 429-435.

- Gaston, A.J. and Jones, I.L. 1998. *The Auks*. Oxford, Oxford University Press.
- Gauthier-Clerc, M., Tamisier, A. and Cézilly, F. 1998. Sleep-vigilance trade-off in green-winged teal (*Anas crecca crecca*). *Can J Zool*, **76**: 2214-2218.
- Ghalambor, C.K. and Martin, T.E. 1999 Red-breasted nuthatch. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 459, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Gibbs, D., Barnes, E. and Cox, J. 2001. *Pigeons and doves*. New Haven, Yale University Press.
- Giudice, J.H. and Ratti, J.T. 2001 Pheasant. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 572, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Glück, E. 1986. Flock size and habitat-dependent food and energy intake of foraging goldfinches. *Oecologia*, **71**: 268-272.
- Glück, E. 1987. Benefits and costs of social foraging and optimal flock size in goldfinches (*Carduelis carduelis*). *Ethology*, **74**: 65-79.
- Good, T.P. 1998 Greater black-backed gull. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 330, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Goudie, R.I., Robertson, G.J. and Reed, A. 2000 Common eider. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 546, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Gram, W.K. 1998. Winter participation by Neotropical migrant and resident birds in mixed-species flocks in northeastern Mexico. *Condor*, **100**: 44-53.

- Greene, E. 1987. Individuals in an osprey colony discriminate between high and low quality information. *Nature*, **329**: 239-241.
- Griffin, L.R. 1999. Colonization patterns at rook *Corvus frugilegus* colonies: implications for survey strategies. *Bird Study*, **46**: 170-173.
- Griffin, L.R. and Thomas, C.J. 2000. The spatial distribution and size of rook (*Corvus frugilegus*) breeding colonies is affected by both the distribution of foraging habitat and by intercolony competition. *Proc R Soc Lond B Biol Sci*, **267**: 1463-1467.
- Guillemette, M., Himmelman, J.H., Barette, C. and Reed, A. 1993. Habitat selection by common eiders in winter and its interaction with flock size. *Can J Zool*, **71**: 1259-1266.
- Guzy, M.J. and Linville, S.U. 1999 Common yellowthroat. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 448, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Haftorn, S. 1999. Flock formation, flock size and flock persistence in the willow tit *Parus montanus*. *Ornis Fen*, **76**: 49-63.
- Halkin, S.L. and Linville, S.U. 1999 Northern cardinal. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 440, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Hall, G.A. 1994 Magnolia warbler. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 136, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.

- Halley, D.J. and Gjershaug, J.O. 1998. Inter- and intra-specific dominance relationships and feeding behaviour of golden eagles *Aquila chrysaetos* and sea eagles *Haliaeetus albicilla* at carcasses. *Ibis*, **140**: 295-301.
- Hampton, R.R., Sherry, D.F., Shettleworth, S.J., Khurgel, M. and Ivy, G. 1995. Hippocampal volume and food-storing behavior are related in Parids. *Brain Behav Evol*, **45**: 54-61.
- Hancock, J.A., Kushlan, J.A. and Kahl, M.P. 1992. *Storks, ibises and spoonbills of the world*. London, Academic Press.
- Harper, D. 1986. Communal roosting by robins *Erithacus rubecola*. *Bird Study*, **33**: 223-226.
- Harrap, S. and Quinn, D. 1995. *Chicakdees, tits, nuthatches and treecreepers*. Princeton, Princeton University Press.
- Harris, T. 2000. *Shrikes and bush-shrikes*. Princeton, Princeton University Press.
- Hatch, J.J., Brown, K.M., Hogan, G.G. and Morris, R.D. 2000 Great cormorant. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 553, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Hatch, J.J. and Weseloh, D.V. 1999 Double-crested cormorant. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 441, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Hatch, S.A. and Nettleship, D.N. 1998 Northern fulmar. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 361, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.

- Hatchwell, B.J., Anderson, C., Ross, D.J., Fowlie, M.K. and Blackwell, P.G. 2001. Social organization of cooperatively breeding long-tailed tits: kinship and spatial dynamics. *J Anim Ecol*, **70**: 820-830.
- Hayman, P., Marchant, J. and Prater, T. 1986. *Shorebirds: an identification guide to the waders of the world*. London, Croom Helm.
- Healy, S.D., Gwinner, E. and Krebs, J.R. 1996. Hippocampal volumen in migratory and non-migratory warblers: effects of age and experience. *Behav Brain Res*, **81**: 61-68.
- Healy, S.D. and Krebs, J.R. 1992. Food storing and the hippocampus in Corvids: Amount and volume are correlated. *Proc R Soc Lond B Biol Sci*, **248**: 241-245.
- Healy, S.D. and Krebs, J.R. 1996. Food storing and the hippocampus in Paridae. *Brain Behav Evol*, **47**: 195-199.
- Heck, M.K. 1985: The social organization of wintering killdeer flocks. M.Sc., Carolina State University, Raleigh.
- Heinrich, B. 1988. Winter foraging at carcasses by three sympatric corvids, with emphasis on recruitment by the raven, *Corvus corax*. *Behav Ecol & Sociobiol*, **23**: 141-156.
- Henderson, I.G. and Hart, P.J.B. 1991. Age-specific differences in the winter foraging strategies of rooks *Corvus frugilegus*. *Oecologia*, **85**: 492-497.
- Henderson, I.G. and Hart, P.J.B. 1995. Dominance, food acquisition and reproductive success in a monogamous passerine - the jackdaw *Corvus monedula*. *J Avian Biol*, **26**: 217-224.

- Herrandon, S. and Brotons, L. 2001. Fluctuating asymmetry in Sardinian warblers *Sylvia melanocephala* inhabiting two shrublands affected by fire. *Bird Study*, **48**: 180-187.
- Herrera, C.M. 1979. Ecological aspects of heterospecific flock formation in a Mediterranean passerine bird community. *Oikos*, **33**: 85-96.
- Higgins, P.J. and Davies, S.J.J.F. 1999. *Handbook of Australian, New Zealand and Antarctic birds*. Melbourne, Oxford University Press.
- Hilden, O. 1982. Winter ecology and partial migration of the goldcrest *Regulus regulus* in Finland. *Ornis Fen*, **59**: 99-122.
- Hill, D. and Robertson, P. 1988. *The pheasant*. Oxford, BSP Professional Books.
- Hoffman, W., Heinemann, D. and Wiens, J.A. 1981. The ecology of seabird feeding flocks in Alaska. *The Auk*, **98**: 437-456.
- Hogstad, O. 1984. Variation in numbers, territoriality and flock size of a goldcrest *Regulus regulus* population in winter. *Ibis*, **126**: 296-306.
- Hogstad, O. 1988. Advantages of social foraging of willow tits *Parus montanus*. *Ibis*, **130**: 275-283.
- Holyoak, D.T. 2001. *Nightjars and their allies*. Oxford, Oxford University Press.
- Hopp, S.L., Jablonski, P. and Brown, J.L. 2001. Recognition of group membership by voice in Mexican jays, *Aphelocoma ultramarina*. *Anim Behav*, **62**: 297-303.
- Hunt, P.D. and Eliason, B.C. 1999 Blackpoll warbler. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 431, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.

- Hunt, P.D. and Flaspoler, D.J. 1998 Yellow-rumped warbler. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 376, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Huntington, C.E., Butler, R.G. and Mauck, R.A. 1996 Leach's storm-petrel. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 233, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Ingold, J.L. and Wallace, G.E. 1994 Ruby-crowned kinglets. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 119, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Jackson, B.J.S. and Jackson, J.A. 2000 Killdeer. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 517, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Jaramillo, A. and Burke, P. 1999. *New world blackbirds: The icterids*. Princeton, Princeton University Press.
- Jehl, J.R., Klima, J. and Harris, R.E. 2001 Short-billed dowitcher. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 564, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Jennings, T. and Evans, S.M. 1980. Influence of position in the flock and flock size on vigilance in the starling, *Sturnus vulgaris*. *Anim Behav*, **28**: 634-635.
- Johnsgard, P.A. 1981. *The plovers, sandpipers, and snipes of the world*. Lincoln, University of Nebraska Press.
- Johnsgard, P.A. 1983. *Cranes of the world*. Bloomington, Indiana University Press.

- Johnsgard, P.A. 1988. *The quails, partridges, and francolins of the world*. Oxford, Oxford University Press.
- Johnsgard, P.A. 1993. *Cormorants, darters and pelicans of the world*. Washington, Smithsonian Institute Press.
- Johnsgard, P.A. 1999. *Pheasants of the world*. Oxford, Oxford University Press.
- Johnson, A.R. 1997. Greater flamingo. *Birds of Western Palearctic Update*, **1**: 15-23.
- Johnson, L.S. 1998 House wren. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 380, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Johnsson, K. 1994. Colonial breeding and nest predation in the jackdaw *Corvus monedula* using old black woodpecker *Dryocopus martius* holes. *Ibis*, **136**: 313-317.
- Johnston, R.F. and Janiga, M. 1995. *Feral pigeons*. Oxford, Oxford University Press.
- Juniper, T. and Parr, M. 1998. *Parrots: A guide to parrots of the world*. New Haven, Yale University Press.
- Keane, E. and O'Halloran, J. 1992. The behaviour of a wintering flock of mute swans *Cygnus olor* in southern Ireland. *Wildfowl*, **43**: 12-19.
- Keast, A. and Morton, E.S. 1980. *Migrant birds in the Neotropics: Ecology, behavior, distribution and conservation*. Washington, Smithsonian Institution Press.
- Keith, S., Urban, E.K. and Fry, C.H. 1992. *Birds of Africa*. London, Academic Press.
- Kersten, M., Britton, R.H., Dugan, P.J. and Hafner, H. 1991. Flock feeding and food intake in little egrets: the effects of prey distribution and behaviour. *J Anim Ecol*, **60**: 241-252.

- Keys, G.C. and Dugatkin, L.A. 1990. Flock size and position effects on vigilance, aggression and prey capture in the European starling. *Condor*, **92**: 151-159.
- Kirby, J.S. 1997. Influence of environmental factors on the numbers and activity of wintering lapwings and golden plovers. *Bird Study*, **44**: 97-110.
- Knapton, R.W. and Krebs, J.R. 1976. Dominance hierarchies in winter song sparrows. *Condor*, **78**: 567-569.
- Konig, B., Weick, F. and Becking, J.-H. 1999. *Owls: A guide to the owls of the world*. New Haven, Yale University Press.
- Krams, I. 1998. Dominance-specific vigilance in the great tit. *J Avian Biol*, **29**: 55-60.
- Kristiansen, J.N., Fox, A.D., Boyd, H. and Stroud, D.A. 2000. Greenland white-fronted geese *Anser albifrons flavivostris* benefit from feeding in mixed-species flocks. *Ibis*, **142**: 142-144.
- Lahti, K., Koivula, K., Orell, M. and Rytönen, S. 1996. Social dominance in free-living willow tits *Parus montanus* - determinants and some implications of hierarchy. *Ibis*, **138**: 539-544.
- Larsen, J.K. 1996. Wigeon *Anas penelope* offsetting dependence on water by feeding in mixed-species flocks: a natural experiment. *Ibis*, **138**: 555-557.
- Latta, S.C. and Wunderle, J.M. 1996. The composition and foraging ecology of mixed-species flocks in pine forests of Hispaniola. *Condor*, **98**: 595-607.
- Laurent, J.-L. 1986. Études des regroupements plurispécifiques, ou rondes, de petits passereaux insectivores du mélèze en hiver. *L'oiseau et RFO*, **56**: 263-286.

- Lee, D.W., Smith, G.T., Tramontin, A.D., Soma, K.K., Brenowitz, E.A. and Clayton, N.S. 2001. Hippocampal volume does not change seasonally in a non food-storing songbird. *NeuroReport*, **12**: 1925-1928.
- Lefranc, N. 1997. *Shrikes*. New Haven, Yale University Press.
- Lima, S.L. 1988. Vigilance during the initiation of daily feeding in dark-eyed juncos. *Oikos*, **53**: 12-16.
- Lindell, L., Mellin, M., Musil, P., Przybysz, J. and Zimmerman, H. 1995. Status and population development of breeding cormorants *Phalacrocorax carbo sinensis* of the central European flyway. *Ardea*, **83**: 81-92.
- Loman, J. 1985. Social organization in a population of the hooded crow. *Ardea*, **73**: 61-75.
- Lovari, S. 1976. Population trends and seasonal flock size variation of alpine chough, chough and ravens in the Abruzzo National Park, Italy. *Gerfaut*, **66**: 207-219.
- Lovette, I.J. and Holmes, R.T. 1995. Foraging behavior of American redstarts in breeding and wintering habitats: Implications for relative food availability. *Condor*, **97**: 782-791.
- Lowther, P.E. 1993 Brown-headed cowbird. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 47, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Lowther, P.E. and Cink, C.L. 1992 House sparrow. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 12, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.

- Lowther, P.E. and Post, W. 1999 Shiny cowbird. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 399, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- MacDonald, R.A. and Whelan, J. 1986. Seasonal variations in feeding range and flock structure of the rook *Corvus frugilegus* in eastern Ireland. *Ibis*, **128**: 540-557.
- Madge, S. and Brun, H. 1994. *Crows and jays: A guide to the crows, jays and magpies of the world*. Boston, Houghton Mifflin.
- Mallory, E.P. and Schneider, D.C. 1979. Agonistic behavior in short-billed dowitchers feeding on a patchy resource. *Wilson Bull*, **91**: 271-278.
- Manco, L., Favero, M. and Bo, M.S. 2001. Food and feeding biology of the common tern during the nonbreeding season in Samborambon Bay, Buenos Aires, Argentina. *Waterbirds*, **24**: 88-96.
- Marchant, J.H. and Gregory, R.D. 1999. Number of nesting rooks *Corvus frugilegus* in the United Kingdom in 1996. *Bird Study*, **46**: 258-273.
- Marchant, S. and Higgins, P.J. 1990. *Handbook of Australian, New Zealand and Antarctic birds*. Melbourne, Oxford University Press.
- Marchant, S. and Higgins, P.J. 1993. *Handbook of Australian, New Zealand and Antarctic birds*. Melbourne, Oxford University Press.
- Marler, P. 1956. Behaviour of the Chaffinch. *Behaviour Supplement*, **5**:
- Martella, M.B., Renison, D. and Navarro, J.L. 1995. Vigilance in the greater rhea: effect of vegetation height and group size. *J Field Ornithol*, **66**: 215-220.

- Marti, C.D. 1992 Barn owl. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 1, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Marx, J.T. and Stoltz, L.P. 1988. Group size, dispersion and activity patterns of helmeted guineafowl in the Willem Pretorius game reserve. *Ostrich*, **59**: 139-141.
- Marzluff, J.M. and Balda, R.P. 1989. Causes and consequences of female-biased dispersal in a flock-living bird, the pinyon jay. *Ecology*, **70**: 316-328.
- Marzluff, J.M. and Balda, R.P. 1992. *The pinyon jay*. London, T. & A.D. Poyser.
- Marzluff, J.M., Heinrich, B. and Marzluff, C.S. 1996. Raven roosts are mobile information centres. *Anim Behav*, **51**: 89-103.
- Mason, C.F. and MacDonald, S.M. 1999. Winter birds numbers and land-use preferences in an arable landscape in eastern England. *Bird Con Intl*, **9**: 119-127.
- Matthysen, E. 1999. *The nuthatches*. London, T. & A.D. Poyser.
- McGowan, K.J. and Woolfenden, G.E. 1989. A sentinel system in the Florida scrub jay. *Anim Behav*, **37**: 1000-1006.
- McKinstry, M.C. and Knight, R.L. 1993. Foraging ecology of wintering black-billed magpies. *Auk*, **110**: 632-635.
- Middleton, A.L.A. 1993 American goldfinch. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 80, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Monaghan, P. 1980. Dominance and dispersal between feeding sites in the herring gull (*Larus argentatus*). *Anim Behav*, **28**: 521-527.

- Moore, J., Simberloff, D. and Freehling, M. 1988. Relationships between bobwhite quail social-group size and intestinal helminth parasitism. *Am Nat*, **131**: 22-32.
- Morris, D.L. and Thompson, F.R. 1998. Effects of habitat and invertebrate density on abundance and foraging behavior of brown-headed cowbirds. *Auk*, **115**: 376-385.
- Morrison, M.L., With, K.A., Timossi, I.C. and Milne, K.A. 1987. Composition and temporal variation in flocks in the Sierra Nevada. *Condor*, **89**: 739-745.
- Morse, D.H. 1970. Ecological aspects of some mixed-species foraging flocks of birds. *Ecol Monogr*, **40**: 119-168.
- Morse, D.H. 1978. Structure and foraging patterns of flocks of tits and associated species in an English woodland during winter. *Ibis*, **120**: 298-312.
- Morse, D.H. 1989. *American warblers: An ecological and behavioral perspective*. Cambridge, Harvard University Press.
- Mowbray, T.B. 1997 Swamp sparrow. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 279, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Mueller, H. 1999 Common snipe. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 417, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Murton, R.K., Coombs, C.F.B. and Thearle, R.J.P. 1972. Ecological studies of the feral pigeon, *Columba livia* var. II. Flock behaviour and social organization. *J Appl Ecol*, **9**: 875-899.

- Murton, R.K., Isaacson, A.J. and Westwood, N.J. 1966. The relationships between wood-pigeons and their clover food supply and the mechanisms of population control. *J Appl Ecol*, **3**: 55-96.
- Murton, R.K., Isaacson, A.J. and Westwood, N.J. 1971. The significance of gregarious feeding behaviour and adrenal stress in a population of wood-pigeons *Columba palumbus*. *J Zool*, **165**: 53-84.
- Myers, J.P. 1984 Spacing behavior of non-breeding shorebirds. In *Shorebirds, Migration and foraging behavior* (J. Burger and B.L. Olla, eds), pp. 271-321. New York, Plenum Press.
- Myers, J.P. and McCaffery, B.J. 1984. Paracas revisited: do shorebirds compete on their wintering grounds? *Auk*, **101**: 197-199.
- Newton, I. 1972. *Finches*. London, William Collins and Sons.
- Nichols, J.T. 1931. Notes on the flocking of shore birds. *Auk*, **48**: 181-185.
- Norris, K. and Johnstone, I. 1998. Interference competition and the functional response of oystercatchers searching for cockles by touch. *Anim Behav*, **56**: 639-650.
- Ntiamoa-Baidu, Y., Piersma, T., Wiersma, P., Poot, M., Battley, P. and Gordon, C. 1998. Water depth selection, daily feeding routines and diets of waterbirds in coastal lagoons in Ghana. *Ibis*, **140**: 89-103.
- Owen, M. 1980. *Wild geese of the world*. London, Batsford.
- Palmer, R.S. 1976. *Handbook of North American birds*. New Haven, Yale University Press.
- Patterson, I.J., Dunnet, G.M. and Fordham, R.A. 1971. Ecological studies of the rook, *Corvus frugilegus* L., in north-east Scotland. Dispersion. *J Appl Ecol*, **8**: 815-833.

- Paulson, D.R. 1993. *Shorebirds of the Pacific Northwest*. Vancouver, University of British Columbia Press.
- Pearson, D. 1981. The wintering and moult of ruffs *Philomachus pugnax* in the Kenyan Rift valley. *Ibis*, **123**: 158-182.
- Peer, B.D. and Bollinger, E.K. 1997 Common grackle. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 271, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Perrins, C.M. and McCleery, R.H. 1997. Pairing behaviour in a colony of mute swans, *Cygnus olor*. *Wildfowl*, **47**: 31-41.
- Pierotti, R.J. and Good, T.P. 1994 Herring gull. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 124, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Piersma, T., Lindeboom, R. and van Eerden, M.R. 1988. Foraging rhythm of great crested grebes *Podiceps cristatus* adjusted to diel variations in the vertical distribution of their prey *Osmerus eperlanus* in a shallow eutrophic lake in the Netherlands. *Oecologia*, **76**: 481-486.
- Pilastro, A., Berterolle, G. and Marin, G. 1994. Winter fattening strategies of two passerine species: environmental and social influences. *J Avian Biol*, **26**: 25-32.
- Pinowski, J. and Summers-Smith, J.D. 1990. *Granivorous birds in the agricultural landscape*. Warszawa, Polish Scientific Publishers.
- Pirovano, A., Rubolini, D. and De Michelis, S. 2000. Winter roost occupancy and behaviour at evening departure of urban long-eared owls. *Ital J Zool*, **67**: 63-66.

- Pons, P. 2001. The wintering of migrant dunnocks *Prunella modularis* in two Mediterranean habitats after fire. *Bird Study*, **48**: 68-75.
- Poole, A.F. 1989. *Ospreys: a natural and unnatural history*. Cambridge, Cambridge University Press.
- Popp, J.W. 1988. Effects of food-handling time on scanning rates among American goldfinches. *Auk*, **105**: 384-385.
- Pöysä, H. 1994. Group foraging, distance to cover and vigilance in the teal, *Anas crecca*. *Anim Behav*, **48**: 921-928.
- Prevot-Julliard, A.C. and Lebreton, J.D. 1999. Spatial organization of foraging within a black-headed gull *Larus ridibundus* colony. *Ibis*, **141**: 144-149.
- Racine, R.N. and Thompson, N.S. 1983. Social organization of wintering blue jays. *Behaviour*, **87**: 237-255.
- Ratcliffe, D. 1997. *The raven*. London, T. & A.D. Poyser.
- Reboreda, J.C. (2002). Personal communication.
- Reboreda, J.C., Clayton, N.S. and Kacelnik, A. 1996. Species and sex differences in hippocampus size in parasitic and non-parasitic cowbirds. *Neuroreport*, **7**: 505-508.
- Redondo, T., Tortosa, F.S. and Arias de Reyna, L. 1995. Nest switching and alloparental care in colonial white storks. *Anim Behav*, **49**: 1097-1110.
- Rees, E.C., Kirby, J.S. and Gilburn, A. 1997. Site selection by swans wintering in Britain and Ireland: the importance of habitat and geographic location. *Ibis*, **139**: 337-352.

- Ribic, C.A., Ainley, D.G. and Spear, L.B. 1997. Seabird associations in Pacific equatorial waters. *Ibis*, **139**: 482-487.
- Richner, H. 1986. Winter feeding strategies of individually marked herons. *Anim Behav*, **34**: 881-886.
- Richner, H. 1989. Phenotypic correlates of dominance in carrion crows and their effects on access to food. *Anim Behav*, **38**: 606-612.
- Ridgely, R.S. and Tudor, G. 1989. *The birds of South America: Oscine Passerines*. Austin, University of Texas Press.
- Rippe, H. and Dierschke, V. 1997. Picking out the plum jobs - Feeding ecology of curlews *Numenius arquata* in a Baltic Sea wind flat. *Mar Ecol Prog Ser*, **159**: 239-247.
- Rising, J.D. 1996. *A guide to the identification and natural history of the sparrows of the United States and Canada*. San Diego, Academic Press.
- Roell, A. 1978. Social behaviour of the jackdaw, *Corvus monedula*, in relation to its niche. *Behaviour*, **64**: 1-124.
- Rolando, A. 1998. Factors affecting movements and home ranges in the jay (*Garrulus glandarius*). *J Zool*, **246**: 249-257.
- Rolando, A., Laiolo, P. and Formica, M. 1997. The influence of flocking on the foraging behaviour of the chough (*Pyrrhocorax pyrrhocorax*) and the alpine chough (*P. graculus*) coexisting in the Alps. *J Zool*, **242**: 299-308.
- Rolstad, J. and Rolstad, E. 1995. Seasonal patterns in home range and habitat use of the grey-headed woodpecker *Picus canus* is influenced by the availability of food. *Ornis Fen*, **72**: 1-13.

- Ryan, P.G., Wilson, R.P. and Cooper, J. 1987. Intraspecific mimicry and status signal in juvenile African penguins. *Behav Ecol & Sociobiol*, **20**: 69-76.
- Sacchi, R., Gentili, A., Razzetti, E. and Barbieri, F. 2002. Effects of building features on density and flock distribution of feral pigeons *Columba livia* var. *domestica* in an urban environment. *Can J Zool*, **80**: 48-54.
- Saino, N. 1994. Time budget variation in relation to flock size in carrion crows, *Corvus corone corone*. *Anim Behav*, **47**: 1189-1196.
- Saino, N., Fasola, M. and Waiyaki, E. 1995. Do white pelicans *Pelecanus onocrotalus* benefit from foraging in flocks using synchronous feeding. *Ibis*, **137**: 227-230.
- Saitou, T. 1978. Ecological study of social organization in the great tit, *Parus major* L. I. Basic structure of the winter flocks. *Jap J Ecol*, **28**: 199-214.
- Sallabanks, R. and James, F.C. 1999 American robin. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 462, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Schardien, B.J. 1981: Behavioral ecology of a southern population of killdeer. Ph.D., Mississippi State University.
- Schleuger, E. 1993. Life in extreme dryness and heat: A telemetric study of the behaviour of the diamond dove *Geopelia cuneata* in its natural habitat. *Emu*, **93**: 251-258.
- Sears, J. 1989. Feeding activity and body condition of mute swans *Cygnus olor* in rural and urban areas of a lowland river system. *Wildfowl*, **40**: 88-98.
- Seibert, L.M. and Crowell-Davis, S.L. 2001. Gender effects on aggression, dominance rank, and affiliative behaviors in a flock of captive adult cockatiels (*Nymphicus hollandicus*). *Appl Anim Behav Sci*, **71**: 155-170.

- Senar, J.C., Camerino, M. and Metcalfe, N.B. 1989. Agonistic interactions in siskin flocks: why are dominants sometimes subordinate? *Behav Ecol & Sociobiol*, **25**: 141-145.
- Shackleford, C.E., Brown, R.E. and Conner, R.N. 2000 Red-bellied woodpecker. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 500, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Sherry, D.F., Forbes, M.R.L., Khurgel, M. and Ivy, G.O. 1993. Females have a larger hippocampus than males in the brood-parasitic brown-headed cowbird. *Proc Natl Acad Sci*, **90**: 7839-7843.
- Sherry, D.F., Vaccarino, A.L., Buckenham, K. and Herz, R.S. 1989. The hippocampal complex of food-storing birds. *Brain Behav Evol*, **34**: 308-317.
- Sherry, T.W. and Holmes, R.T. 1997 American redstart. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 277, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Shirihai, H., Gargallo, G. and Helbig, A.J. 2001. *Sylvia warblers*. Princeton, Princeton University Press.
- Shuman, T.W., Robel, R.J. and Zimmerman, J.L. 1992. Time budgets of confined northern cardinals and Harris' sparrows in flocks of different size and composition. *J Field Ornithol*, **63**: 129-137.
- Sick, H. 1993. *Birds in Brazil*. Princeton, Princeton University Press.
- Smith, D.C. and Van Buskirk, J. 1988. Winter territoriality and flock cohesion in the black-capped chickadee *Parus atricapillus*. *Anim Behav*, **36**: 466-476.

- Smith, K.G., Withgott, J.H. and Rodewald, P.G. 2000 Red-headed woodpecker. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 518, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Smith, R.D., Ruxton, G.D. and Cresswell, W. 2001. Dominance and feeding interference in small groups of blackbirds. *Behav Ecol*, **12**: 475-481.
- Smith, S.M. 1991. *The black-capped chickadee: Behavioral ecology and natural history*. Ithaca, Comstock Publishing Associates.
- Smith, S.M. 1993 Black-capped chickadee. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 39, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Sol, D., Santos, D.M., Garcia, J. and Cuadrado, M. 1998. Competition for food in urban pigeons: the cost of being juvenile. *Condor*, **100**: 298-304.
- Starling-Westerberg, A. 2001. The habitat use and diet of black grouse *Tetrao tetrix* in the Pennine hills of northern England. *Bird Study*, **48**: 76-89.
- Stiles, F.G. and Skutch, A.F. 1989. *A guide to the birds of Costa Rica*. Ithaca, Cornell University Press.
- Sullivan, K.A. 1984. The advantages of social foraging in downy woodpeckers. *Anim Behav*, **32**: 16-22.
- Sullivan, K.A. 1985. Vigilance patterns in downy woodpeckers. *Anim Behav*, **33**: 328-330.
- Summers-Smith, J.D. 1988. *The sparrows*. Straffordshire, T. & A.D. Poyser.

- Suter, W. 1997. Roach rules: Shoaling fish are a constant factor in the diet of cormorants *Phalacrocorax carbo* in Switzerland. *Ardea*, **85**: 9-27.
- Szekely, T. and Juhasz, T. 1993. Flocking behaviour of tits (*Parus* spp.) and associated species: The effect of habitat. *Ornis Hungarica*, **3**: 1-6.
- Szekely, T., Szep, T. and Juhasz, T. 1989. Mixed species flocking of tits (*Parus* spp.): a field experiment. *Oecologia*, **78**: 490-495.
- Tarvin, K.A. and Woolfenden, G.E. 1999 Blue jay. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 469, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Taylor, B. 1998. *Rails: A guide to the rails, coots, crakes, gallinules and coots of the world*. New Haven, Yale University Press.
- Tella, J.L., Gortazar, C., Lopez, R. and Osacar, J.J. 1995. Age related differences in biometrics and body condition in a Spanish population of alpine swift (*Apus melba*). *J Ornithol*, **136**: 77-79.
- Titman, R.D. 1999 Red-breasted merganser. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 443, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Tomback, D.F. 1977. Foraging strategies of Clark's nutcrackers. *Living Bird*, **16**: 123-161.
- Tomback, D.F. 1998 Clark's nutcracker. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 331, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.

- Turner, A. 1989. *A handbook to the swallows and martins of the world*. London, Christopher Helm.
- Tyler, S.J. and Ormerod, S.J. 1994. *The dippers*. London, T. & A.D. Poyser.
- Ulfstrand, S. 1975. Bird flocks in relation to vegetation diversification in a south Swedish coniferous plantation during winter. *Oikos*, **26**: 65-73.
- Urban, E.K., Fry, C.H. and Keith, S. 1986. *The birds of Africa*. London, Academic Press.
- Urban, E.K., Fry, C.H. and Keith, S. 1997. *The birds of Africa*. London, Academic Press.
- Utschick, H. and Brandl, R. 1989. Roosting activity of the rainbow lory (*Trichoglossus haematodus*) at Wau, Papua New Guinea. *Spixiana*, **11**: 303-310.
- van Eerden, M.R. and Voslamber, B. 1995. Mass fishing by cormorants *Phalacrocorax carbo sinensis* at Lake IJsselmeer, the Netherlands: a recent and successful adaptation to a turbid environment. *Ardea*, **83**: 199-212.
- van Horn, M.A. and Donovan, T.M. 1994. Ovenbird. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 88, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- van Kanel, A. 1981. Winter feeding ecology of wigeon *Anas penelope* at the Ouse Washes, England. *Ibis*, **123**: 438-449.
- van Nierek, J.H. 1979. Social and breeding behaviour of crowned guineafowl in the Krugerdorp game reserve. *Ostrich*, **50**: 188-189.
- van Rhijn, J.G. 1992. *The ruff*. London, T. & A.D. Poyser.
- Vanhinsberg, D.P. and Chamberlain, D.E. 2001. Habitat associations of breeding meadow pipits *Anthus pratensis* in the British uplands. *Bird Study*, **48**: 159-172.

- Vernon, J.D.R. 1970. Feeding habitats and food of the black-headed and common gulls. *Bird Study*, **17**: 287-296.
- Voisin, C. 1991. *The herons of Europe*. London, T. & A.D. Poyser.
- Volman, S.F., Grubb, T.C. and Schuett, K.C. 1997. Relative hippocampal volume in relation to food-storing behavior in four species of woodpeckers. *Brain Behav Evol*, **49**: 110-120.
- Waite, R.K. 1981. Local enhancement for food finding by rooks (*Corvus frugilegus*) foraging on grassland. *Z Tierpsychol*, **57**: 15-36.
- Walkinshaw, L.H. 1964. The African crowned cranes. *Wilson Bull*, **76**: 355-377.
- Warham, J. 1990. *The petrels*. London, Academic Press.
- Watts, C.R. and Stokes, A.W. 1971. The social order of turkeys. *Scientific American*, **224**: 112-118.
- White, S.B., Dolbeer, R.A. and Bookhout, T.A. 1985. Ecology, bioenergetics, and agricultural impacts of a winter-roosting population of blackbirds and starlings. *Wildl Monogr*, **93**:
- Whitehead, S.C., Wright, J. and Cotton, P.A. 1995. Winter field use by the European starling *Sturnus vulgaris*: habitat preferences and the availability of prey. *J Avian Biol*, **26**: 193-302.
- Whittington, P.A., Hofmeyr, J.H. and Cooper, J. 1996. Establishment, growth and conservation of a mainland colony of jackass penguins *Spheniscus demersus* at Stony Point, Betty's Bay, South Africa. *Ostrich*, **67**: 144-150.
- Widemo, F. 1997. The social implications of traditional use of lek sites in the ruff *Philomachus pugnax*. *Behav Ecol*, **8**: 211-217.

- Williams, T.D. 1995. *The penguins*. Oxford, Oxford University Press.
- Williamson, P. and Gray, L. 1975. Foraging behavior of the starling (*Sturnus vulgaris*) in Maryland. *Condor*, **77**: 84-89.
- Winkler, H., Christie, D.A. and Wurney, D. 1995. *Woodpeckers: A guide to the woodpeckers, piculets and wrynecks of the world*. Sussex, Pica Press.
- Woolfenden, G.E. and Fitzpartrick, J.W. 1984. *The Florida scrub jay: Demography of a cooperative-breeding bird*. Princeton, Princeton University Press.
- Woolfenden, G.E. and Fitzpartrick, J.W. 1996 Florida scrub jay. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 228, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Wyndham, E. 1980. Diurnal cycle, behaviour and social organization of the budgerigar *Melopsittacus undulatus*. *Emu*, **80**: 25-33.
- Yasukawa, K. and Searcy, W.A. 1995 Red-winged blackbird. In *The birds of North America* (A. Poole and F.B. Gill, eds), Vol. 184, Philadelphia and Washington, D.C., The Academy of Natural Sciences and The American Ornithologists' Union.
- Zann, R.A. 1996. *The zebra finch*. Oxford, Oxford University Press.
- Zann, R.A. and Straw, B. 1984. Feeding ecology and breeding of zebra finches in farmland in Northern Victoria. *Australian J Wildl Res*, **11**: 533-552.