SUPPORTING INFORMATION

**Resource Partitioning by Mangrove Bird Communities in North Australia**

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TABLES

TABLE S1. Foraging substrates, techniques and heights used by the most abundant bird species in mangroves of Darwin region. Substrates Ar = air; Br = branch; Db = dead branch; Gr = ground; Rt = root; Tr = trunk techniques, Dr =drill; Gl = glean; Hk = hawk; Hv = hover; Pn = pounce; Pr = probe; Sn =snatch; heights, H1= 0-0.2 m; H2 = 0.2-2 m; H3 = 2-4m; H4 = > 4 m. zones Av = *Avicennia marina*; Br = *Bruguiera exaristata*; Cr = *Ceriops australis*; FM = fringe mangroves; Lz = *Lumnitzera* *racemosa*; Rh = *Rhizophora stylosa*; Sn = *Sonneratia alba*; Vn = vine thickets

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Species |  | Foraging substrate (%) | | | | | | | Foraging technique (%) | | | | | | | Foraging height (%) | | | | | | Zonal distribution (%) | | | | | | | |
|  | N | Ar | Br | Db | Fl | Gr | Rt | Tr | Dr | Gl | Hk | Hv | Pn | Pr | Sn | HC1 | HC2 | HC3 | HC4 | Mean | SE | Av | Br | Cr | FM | Lz | Rh | Sn | Vn |
| **Gleaners** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Green-backed Gerygone (GBG) | 12 | 0 | 25 | 0 | 75 | 0 | 0 | 0 | 0 | 83 | 0 | 0 | 0 | 0 | 17 | 0 | 17 | 33 | 50 | 5.3 | 1.0 | 8 | 8 | 17 | 0 | 42 | 0 | 0 | 25 |
| Large-billed Gerygone (LBG) | 154 | 0 | 13 | 1 | 81 | 1 | 3 | 1 | 0 | 84 | 1 | 2 | 0 | 0 | 13 | 0 | 28 | 36 | 36 | 3.9 | 0.2 | 32 | 13 | 9 | 4 | 8 | 26 | 2 | 5 |
| Mangrove Gerygone (MG) | 103 | 1 | 8 | 0 | 89 | 0 | 1 | 1 | 0 | 92 | 1 | 0 | 0 | 0 | 7 | 1 | 51 | 38 | 10 | 2.7 | 0.2 | 80 | 1 | 8 | 2 | 5 | 4 | 0 | 1 |
| Rufous-banded Honeyeater (RBHE) | 94 | 1 | 15 | 2 | 81 | 0 | 0 | 1 | 0 | 64 | 1 | 0 | 1 | 30 | 3 | 0 | 33 | 44 | 23 | 3.4 | 0.2 | 59 | 4 | 3 | 0 | 5 | 10 | 15 | 4 |
| White-gaped Honeyeater (WGHE) | 54 | 4 | 33 | 6 | 44 | 0 | 4 | 9 | 2 | 49 | 0 | 2 | 0 | 42 | 6 | 0 | 26 | 30 | 44 | 4.2 | 0.3 | 22 | 20 | 7 | 2 | 6 | 7 | 24 | 11 |
| Yellow White-eye (YWE) | 108 | 0 | 14 | 3 | 82 | 0 | 1 | 0 | 0 | 93 | 0 | 0 | 1 | 5 | 2 | 0 | 27 | 44 | 29 | 3.6 | 0.2 | 48 | 6 | 12 | 2 | 6 | 16 | 6 | 6 |
| Varied Triller (VT) | 14 | 0 | 79 | 0 | 21 | 0 | 0 | 0 | 0 | 77 | 0 | 0 | 0 | 0 | 23 | 0 | 14 | 21 | 64 | 6.3 | 1.0 | 21 | 0 | 0 | 0 | 29 | 0 | 7 | 43 |
| **Snatchers** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Arafura Fantail (AF) | 10 | 0 | 20 | 0 | 50 | 0 | 10 | 20 | 0 | 0 | 0 | 10 | 0 | 0 | 90 | 0 | 70 | 20 | 10 | 2.2 | 0.7 | 10 | 20 | 40 | 0 | 0 | 30 | 0 | 0 |
| Broad-billed Flycatcher (BBFC) | 48 | 0 | 42 | 10 | 27 | 2 | 19 | 0 | 0 | 6 | 0 | 4 | 0 | 0 | 90 | 2 | 44 | 33 | 21 | 3.0 | 0.3 | 23 | 13 | 4 | 2 | 0 | 33 | 25 | 0 |
| Grey Whistler (GW) | 47 | 0 | 43 | 9 | 47 | 0 | 0 | 2 | 0 | 40 | 0 | 0 | 2 | 0 | 58 | 2 | 17 | 19 | 62 | 5.0 | 0.4 | 36 | 11 | 6 | 2 | 17 | 19 | 0 | 9 |
| Lemon-bellied Flycatcher (LBFC) | 66 | 5 | 41 | 26 | 24 | 3 | 2 | 0 | 0 | 16 | 2 | 3 | 0 | 2 | 78 | 0 | 33 | 30 | 36 | 4.4 | 0.5 | 53 | 2 | 5 | 3 | 0 | 8 | 27 | 3 |
| Little Bronze-cuckoo (LBC) | 16 | 0 | 75 | 0 | 19 | 0 | 0 | 6 | 0 | 30 | 0 | 0 | 10 | 0 | 60 | 0 | 38 | 19 | 44 | 3.4 | 0.6 | 50 | 6 | 0 | 0 | 13 | 0 | 13 | 19 |
| Mangrove Golden Whistler (MGW) | 11 | 0 | 27 | 0 | 36 | 0 | 9 | 27 | 0 | 64 | 0 | 0 | 0 | 0 | 36 | 0 | 27 | 18 | 55 | 4.4 | 0.9 | 9 | 9 | 9 | 0 | 0 | 64 | 9 | 0 |
| Mangrove Robin (MR) | 12 | 0 | 17 | 8 | 0 | 17 | 17 | 42 | 0 | 8 | 0 | 0 | 42 | 0 | 50 | 8 | 83 | 8 | 0 | 1.1 | 0.3 | 0 | 50 | 33 | 0 | 0 | 17 | 0 | 0 |
| Northern Fantail (NF) | 44 | 2 | 55 | 23 | 20 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 5 | 91 | 0 | 18 | 20 | 61 | 5.5 | 0.5 | 41 | 14 | 2 | 2 | 7 | 23 | 5 | 7 |
| Shining Flycatcher (SF) | 50 | 14 | 12 | 4 | 0 | 32 | 22 | 16 | 2 | 17 | 15 | 0 | 27 | 0 | 40 | 20 | 58 | 10 | 12 | 1.7 | 0.4 | 28 | 14 | 16 | 0 | 14 | 18 | 8 | 2 |
| Rainbow Bee-eater (RBE) | 31 | 42 | 26 | 26 | 3 | 3 | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 91 | 3 | 10 | 13 | 74 | 7.3 | 1.0 | 55 | 0 | 0 | 6 | 6 | 0 | 16 | 16 |
| **Probers** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Brown Honeyeater (BHE) | 265 | 0 | 12 | 1 | 86 | 0 | 0 | 0 | 0 | 23 | 0 | 3 | 0 | 71 | 3 | 0 | 28 | 40 | 31 | 3.8 | 0.1 | 17 | 32 | 4 | 5 | 9 | 13 | 14 | 7 |
| Helmeted Friarbird (HF) | 25 | 0 | 68 | 4 | 24 | 0 | 4 | 0 | 0 | 16 | 0 | 0 | 0 | 76 | 8 | 0 | 16 | 40 | 44 | 5.0 | 0.8 | 8 | 40 | 4 | 0 | 0 | 12 | 32 | 4 |
| Red-headed Honeyeater (RHHE) | 478 | 1 | 9 | 2 | 88 | 0 | 0 | 0 | 0 | 25 | 0 | 2 | 0 | 71 | 1 | 0 | 31 | 43 | 27 | 3.5 | 0.1 | 12 | 50 | 5 | 2 | 8 | 18 | 2 | 4 |

TABLE S2. The observed frequency of use by mangrove birds of the size classesa of insects/arthropods, and the use of mangrove flowersb by five species of honeyeaters. The availability (see bottom row) of insect and flowers are based on monthly sweep net samples and the summed FAI respectively.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Species* | *IC1* | *IC2* | *IC3* | *IC4* | *IC5* | *IC6* | *IC7* | *N* | *Mean* | *SE* | *A.corni.* | *A.marina* | *B.exaris.* | *C. aust.* | *L.race.* | *R.styl.* | *S. alba* | *N* |
| **Gleaners** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Green-backed Gerygone (GBG) | 89 | 11 | 0 | 0 | 0 | 0 | 0 | 9 | 0.4 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Large-billed Gerygone (LBG) | 80 | 15 | 5 | 0 | 0 | 0 | 0 | 65 | 0.4 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mangrove Gerygone (MG) | 85 | 13 | 3 | 0 | 0 | 0 | 0 | 40 | 0.4 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rufous-banded Honeyeater (RBHE) | 56 | 28 | 11 | 0 | 6 | 0 | 0 | 18 | 0.6 | 0.1 | 0 | 74 | 4 | 0 | 11 | 0 | 11 | 27 |
| White-gaped Honeyeater (WGHE) | 40 | 20 | 0 | 20 | 20 | 0 | 0 | 5 | 1.0 | 0.4 | 7 | 0 | 53 | 7 | 7 | 0 | 27 | 15 |
| Yellow White-eye (YWE) | 67 | 21 | 9 | 0 | 3 | 0 | 0 | 33 | 0.5 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Varied Triller (VT) | 0 | 0 | 40 | 60 | 0 | 0 | 0 | 5 | 1.2 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Snatchers** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Arafura Fantail (AF) | 40 | 60 | 0 | 0 | 0 | 0 | 0 | 5 | 0.5 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Broad-billed Flycatcher (BBFC) | 0 | 53 | 29 | 0 | 6 | 6 | 6 | 17 | 1.2 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grey Whistler (GW) | 25 | 31 | 6 | 6 | 13 | 19 | 0 | 16 | 1.2 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lemon-bellied Flycatcher (LBFC) | 27 | 36 | 9 | 5 | 14 | 9 | 0 | 22 | 1.1 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Little Bronze-cuckoo (LBC) | 64 | 18 | 0 | 9 | 0 | 0 | 9 | 11 | 0.9 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mangrove Golden Whistler (MGW) | 0 | 40 | 20 | 40 | 0 | 0 | 0 | 5 | 1.1 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mangrove Robin (MR) | 0 | 60 | 0 | 40 | 0 | 0 | 0 | 5 | 1.0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Northern Fantail (NF) | 0 | 67 | 17 | 8 | 8 | 0 | 0 | 12 | 1.0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Shining Flycatcher (SF) | 28 | 39 | 11 | 6 | 11 | 0 | 6 | 18 | 1.0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rainbow Bee-eater (RBE) | 0 | 0 | 7 | 20 | 13 | 0 | 60 | 15 | 3.0 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Probers** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Brown Honeyeater (BHE) | 40 | 40 | 10 | 0 | 10 | 0 | 0 | 10 | 0.7 | 0.2 | 4 | 8 | 45 | 4 | 11 | 11 | 18 | 171 |
| Helmeted Friarbird (HF) | 0 | 20 | 60 | 0 | 0 | 0 | 20 | 5 | 2.6 | 1.4 | 0 | 0 | 56 | 6 | 0 | 0 | 39 | 18 |
| Red-headed Honeyeater (RHHE) | 76 | 20 | 4 | 0 | 0 | 0 | 0 | 25 | 0.4 | 0.0 | 1 | 3 | 68 | 2 | 9 | 14 | 3 | 325 |
| **Availability** | 766 | 793 | 137 | 23 | 5 | 6 | 19 |  |  |  | 400 | 109,447 | 84,346 | 224,291 | 7539 | 38,165 | 11,141 |  |

a size classes IC1 = <0.5cm; IC2 = 0.5-1.0cm; IC3 = 1.0-1.5cm; IC4 = 1.5-2.0cm; IC5 = 2.0-2.5cm; IC6 = 2.5-3.0cm and IC7 = >3cm.

b *A. corni.* = *Aegialitis corniculatum; A. marina = Avicennia marina; B. exaris. = Bruguiera exaristata; C. aust. = Ceriops australis; L. race. =Lumnitzera racemosa; R. styl. = Rhizophora stylosa; S. alba = Sonneratia alba.*

FIGURES

FIGURE S1.



FIGURE S1. The relationship between bird density and mean insect abundance at 13 mangrove sites. Insect abundance is calculated as the mean number of insects collected from 20 sweep samples per site per month. Vertical and horizontal bars describe the standard errors about the estimates.

FIGURE S2.



FIGURE S2. Interaction network of bird species versus insect size class showing that nearly all mangrove bird species feed mainly on the smaller insects (<1cm in length). For each web, the width of the lower bars represents proportional insect abundance within a size class consumed by the birds and the width of the upper bar represents bird species abundance, while the linkage width indicates the frequency of interaction. Lower bar from right: IC1 = <0.5cm; IC2 = 0.5-0.9cm; IC3 = 1.0-1.4cm; IC4 = 1.5-1.9cm; IC5 = 2.0-2.4cm; IC6 = 2.5-3.0cm and IC7 = >3cm. Species acronyms in the upper bar are given in Table 2.