

SUPPORTING INFORMATION

Diet of land birds along an elevational gradient in Papua New Guinea

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Figure S1. Regurgit bowl – picture of the inner side with a food sample in it (left), hanging with birds inside (right)



Table S1. Abundance of different food types in the diet of bird species. All 100 bird species represented, and species represented by ≥ 4 food samples are marked with asterisk and indented. Total number 774 successfully obtained samples are summarized here. The following miscellaneous items are not included in the table: fish and small rodent fragments in the samples of *Ceyx lepidus* (n=3), and bones of lizards in the samples of *Colluricincla megarhyncha* (n = 3), *Peneothello cyanus* (n = 2), *Grallina bruijni* (n = 2), *Pitohui dichrous* (n = 1), *Pachycephala hyperythra* (n = 1), and *Tregellasia leucops* (n = 1). One sample of *Alcedo azurea* included a nearly complete crab specimen (*Brachyura*). Small stones were found in samples of many species taking larger insects and/or seeds (e.g. *Colluricincla megarhyncha*, *Ifrita kowaldi*, *Grallina bruijni*), and in samples from all surveyed kingfishers.

Bird Species	Number of samples		Arenae	Chilopoda	Coleoptera	Dermaptera	Diplopoda	Diptera	Gastropoda	Neuroptera	Odonata	Orthoptera	Ricinulei	Hemiptera	Lepidoptera adult	Lepidoptera larvae	Hymenoptera: ants	Hymenoptera: others	Hymenoptera: bees	Hymenoptera: wasps	Insect:egg	Insect: larvae	Insect: pupae	Nectar	Fruit (+Seeds)	No. of invertebrates or fruits obtained per species	Mean number of food items in sample	
	Number of invertebrate taxa	Number of samples																										
<i>Acanthiza murina</i>	4	5	2		4				1						1	1	3	2						Yes	2	17	4.3	
<i>Alcedo azurea</i>	10	3	5	1		2	2		5	4	8	5		10		2										44	4.4	
<i>Aleadryas rufinucha</i>	4	5	2		3					1			1		2	3		1								4	21	5.3
<i>Amalocichla incerta</i>	7	6	2		8			2	1					6	6									Yes	2	33	4.7	
<i>Arses insularis</i>	5	4	4		2									1	3			5								4	23	4.6
<i>Cacomantis castaneiventris*</i>	2		2		2											3	1					1					9	4.5
<i>Ceyx lepidus</i>	4	10	7		8			4			3	1		3		2	2	1	1		3				4	39	9.8	
<i>Chaetorhynchus papuensis*</i>	2				1			1					4		1	1	1				2						11	5.5
<i>Chalcophaps stephani</i>	5	3			2			1																		26	30	6
<i>Clytomias insignis</i>	4	5			2			1							1	3		2								1	10	2.5
<i>Cnemophilus macgregorii</i>	1	1															1						Yes	7		8	8	
<i>Colluricincla megarhyncha</i>	17	8	10		11			1	2		1	1		3		15	4				6		6	Yes	9	69	4.1	
<i>Coracina melas</i>	4	5	1		2			1					1		1	1									1	8	2	
<i>Coracina montana</i>	10	2	8		2					5	1	8									3						28	2.8
<i>Crateroscelis murina</i>	11	12	10	2	19		1	2				1		4		9	8	5			11				6	78	7.1	
<i>Crateroscelis nigrorufa*</i>	1		1					1						1	1	2		1			1			Yes		8	8	
<i>Crateroscelis robusta</i>	22	11	15	2	37			5					1	6		16	17	13	1	1	3	6	9	Yes	15	147	6.7	
<i>Dacelo gaudichaud</i>	4	1		5	3		2																				10	2.5
<i>Dicrurus bracteatus*</i>	1		1		2										1	1					1						6	6
<i>Euaegotheles insignis*</i>	1		1												1	1					1						4	4
<i>Eugerygone rubra*</i>	1		1		1										1	1											4	4
<i>Eulacestoma nigropectus*</i>	1				2								1		1	1											3	3
<i>Gallicolumba beccarii</i>	4	2	1		1			1																		24	27	6.8
<i>Gallicolumba rufigula*</i>	1																									5	5	5
<i>Garritornis isidorei</i>	10	3	8		6							5				1		5								15	40	4
<i>Gerygone chrysogaster</i>	4	9	3	1	4			1				1		1		4	1	1							1	18	4.5	
<i>Gerygone cinerea*</i>	1		1		2									2				1								6	6	
<i>Grallina bruijni*</i>	1				1																					8	9	9
<i>Ifrita kowaldi</i>	4	10	3	1	10		2	3								2	1	2			1					4	29	7.3
<i>Lichenostomus obscurus*</i>	2		1		2			1										1									5	2.5
<i>Lonchura tristissima</i>	4	1																								17	18	4.5
<i>Melampitta lugubris*</i>	1				4											3							2				9	9
<i>Melanocharis nigra</i>	20	6			25					1		2											2	Yes	58	90	4.5	
<i>Melanocharis nigra*</i>	1		5		6									1	3	3	3	2			6		Yes	26	55	55		
<i>Melanocharis striativentris</i>	9	3			2											1	1	1			4				28	36	4	
<i>Melanocharis versteri</i>	35	8	14		10			4						2	3	3	4	4			6		6	Yes	56	112	3.2	
<i>Melidectes belfordi</i>	4	6	1		2			1		1						2	2	2			3				2	14	3.5	
<i>Melidectes fuscus</i>	14	6	10		7			1						2		5		3							10	38	2.7	
<i>Melidectes princeps</i>	13	2	5		3			3								1								Yes		29	2.2	
<i>Melilestes megarhynchus</i>	5	7	17		4	1		1						2		6	6							Yes	5	42	8.4	
<i>Meliphaga analoga</i>	18	5	14		5				1				1			4	2	1			5			Yes	40	73	4.1	
<i>Meliphaga aruensis*</i>	1													1										Yes		2	2	
<i>Meliphaga montana*</i>	1		1		7			4				1		1		4	1				4				3	6	6	
<i>Melipotes fumigatus</i>	8	5	3		2			1									1		1						14	22	2.8	
<i>Microeca papuana</i>	11	10	4		21	3	1				1	1		9		6	9	9		1	8				6	79	7.2	

<i>Micropsitta pusio</i>	10																				Yes	24	24	2.4	
<i>Monarcha axillaris</i>	6	6	3	<u>7</u>		2	1		1	3	2	4		6								3	32	5.3	
<i>Monarcha frater*</i>	1		1	1										1	1								4	4	
<i>Monarcha guttula</i>	14	8	<u>16</u>	<u>20</u>		1		1		8	1	9	4	4		5		5				10	84	6	
<i>Monarcha manadensis</i>	4	7	2	2		1				1		2	2	2		3						1	16	4	
<i>Myiagra alecto</i>	10	7	1	<u>5</u>	2	1						2	2	1		3		1				3	20	2	
<i>Myiagra cyanoleuca*</i>	1		2	2						1		2	1			1							9	9	
<i>Myzomela rosenbergii</i>	4	7	3	<u>4</u>		1			1	1			<u>4</u>	1		2				Yes			17	4.3	
<i>Oedistoma iliolophus</i>	4	5	3	3								1	1	2		5				Yes	2	17	4.3		
<i>Pachycephala hyperythra</i>	8	6	4	<u>11</u>		1						2	2	2		5						7	34	4.3	
<i>Pachycephala modesta</i>	4	10	1	<u>4</u>		1		1		1		3	1	1		2	1					2	19	4.8	
<i>Pachycephala rufiventris</i>	4	10	5	<u>13</u>					2	4	2	2	1		1							<u>9</u>	3	44	11
<i>Pachycephala schlegelii</i>	16	12	10	<u>23</u>	1	3		1	1	4	7	10	5	6								<u>16</u>	17	105	6.6
<i>Pachycephala simplex</i>	4	4	1	2									1	1								1	6	1.5	
<i>Pachycephala soror</i>	4	4	1	5								4	1			4						3	18	4.5	
<i>Pachycephalopsis poliosoma</i>	10	0		1		1										<u>2</u>						22	27	2.7	
<i>Paramythia mantium</i>	13	4		1					2			1		1		2						19	26	2	
<i>Peneothello bimaculata</i>	10	11	4	1	<u>19</u>	1	6		1		4	6	7	1		1					6	6	63	6.3	
<i>Peneothello cyanus</i>	22	8	6	<u>31</u>	1	2	1		1	2		5	8	10				4				18	89	4	
<i>Peneothello sigillata</i>	20	11	17	1	<u>35</u>	1	6		1	2	1	<u>24</u>	1	3								13	107	5.4	
<i>Philemon meyeri*</i>	1		2	1																		<u>4</u>	1	8	8
<i>Pitohui dichrous</i>	4	5	4	<u>6</u>	1	1						1	3			1	2					6	25	6.3	
<i>Pitohui kirhocephalus</i>	10	7	2	3		1		1	1	2	2	1									3	8	24	2.4	
<i>Pitohui nigrescens</i>	10	1	2	5		2	2	1	<u>8</u>			<u>9</u>											9	38	3.8
<i>Poecilodryas albispecularis</i>	6	6	3	<u>8</u>					3		3	3	2			5						6	33	5.5	
<i>Poecilodryas hypoleuca</i>	4	7	7	<u>6</u>		1			2	2	2	3	4			7						2	36	9	
<i>Ptilinopus pulchellus*</i>	1		1	1					1	1			1										5	5	
<i>Ptiloprora guisei</i>	4	5	2	4								3		2		<u>8</u>	1					8	28	7	
<i>Ptiloprora perstriata</i>	25	11	<u>17</u>	<u>16</u>	1	5		1	1	2	3	8	3	8	2	2	11			Yes		17	97	3.9	
<i>Ptiloris magnificus</i>	6	8	3	1	5		2			1	4	1	4			<u>8</u>						10	39	6.5	
<i>Ptilorrhoa caerulescens</i>	10	8	2	1	1	1			1	1		1	2	1		1						8	18	1.8	
<i>Rhagologus leucostigma</i>	9	7	1	<u>9</u>	1				1	3	3	2	4				3					2	18	47	5.2
<i>Rhamphocharis</i>				2		1																			
<i>crassirostris*</i>	1																						3	3	
<i>Rhipidura albolimbata</i>	16	8	5	<u>24</u>		4			5	2	2	6	<u>24</u>		1	3		11				6	93	5.8	
<i>Rhipidura atra</i>	34	13	17	1	<u>54</u>	1	22		1	11	2	12	12	<u>39</u>	2		10					19	203	6	
<i>Rhipidura brachyrhyncha</i>	6	7	3	3	1	3		1		<u>7</u>		3	4			3		6				3	38	6.3	
<i>Rhipidura maculipectus*</i>	1		1	3					1	1	1	4	1										12	12	
<i>Rhipidura rufidorsa</i>	10	4	8	10				2			8	5	8										41	4.1	
<i>Rhipidura rufiventris</i>	4	6	2	<u>6</u>		1					1	3	2			2						1	18	4.5	
<i>Rhipidura threnothorax</i>	4	10	6	<u>13</u>	1	10		2	1	1	2	3	9	1		5		5				6	65	16	
<i>Sericornis arfakianus</i>	4	4	1	2						2	3		1										3	12	3
<i>Sericornis nouhuysi</i>	18	9	10	<u>22</u>		1	1	1	1	2	2	5	2	7								<u>19</u>	12	85	4.7
<i>Sericornis papuensis</i>	8	8	6	7		1	1			7	5	1	1			4						6	39	4.9	
<i>Sericornis perspicillatus</i>	22	11	<u>20</u>	<u>36</u>		1	7		1	5	2	7	4	18								2	19	122	5.5
<i>Sericornis spilodera</i>	4	7	2	<u>11</u>	1	1				3	4	6	1									5	3	37	9.3
<i>Sericornis virgatus</i>	4	8	3	3		3		1			1		2	1								<u>8</u>	1	23	5.8
<i>Syma torotoro</i>	10	5	1	3		1				2			1									3		11	1.1
<i>Tanyptera galatea</i>	8	5	5	<u>9</u>	1	1		1		1	4		1	1		3						3	4	34	4.3
<i>Toxorhamphus novaeguineae</i>	11	7	<u>14</u>	<u>10</u>	1	4				2	5	5	5	1		4				Yes		9	60	5.5	
<i>Toxorhamphus poliopterus</i>	5	8	4	<u>8</u>		1			1	1	4		1	2		2		5	Yes		5	34	6.8		
<i>Tregellasia leucops</i>	4	6	3	6						1	3	2	3	2		3		1				3	27	6.8	
<i>Turdus poliocephalus</i>	5			3																			12	15	3
<i>Xanthotis polygrammus</i>	5																			Yes		13	13	2.6	
<i>Zoothera heinei</i>	4	3	1							1		1						1				1	5	1.3	
<i>Zosterops novaeguineae</i>	4	5	1	3		1				1	2	1	1					1				1	12	3	
Number of arthropods, fruits			397	17	718	21	9	139	15	24	16	40	12	144	100	260	199	246	7	13	183	23	147	750	
No. of bird species taking food			80	11	88	17	6	54	10	15	7	22	11	51	39	63	62	61	6	10	46	12	25	75	

Table S2. Tree species surveyed for arthropod communities at elevational study sites

	200	700	1200	1700	2200	2700	3200	3700
<i>Ficus arfakensis</i>	X	X	X	X				
<i>Ficus badiopurpurea</i>		X						
<i>Ficus congesta</i>	X							
<i>Ficus conocephalifolia</i>	X	X						
<i>Ficus endochaete</i>			X		X	X		
<i>Ficus hahliana</i> *	X	X	X	X	X	X		
<i>Ficus hispidioides</i>	X							
<i>Ficus hombroniana</i> ‡			X	X	X			
<i>Ficus iodotricha</i>				X	X	X		
<i>Ficus mollior</i>				X				
<i>Ficus saccata</i>					X	X		
<i>Ficus subcuneata</i>		X						
<i>Ficus trichocerasa</i> •	X	X	X	X				
<i>Ficus wassa</i> #					X			
<i>Macaranga melanosticta</i>							X	X
<i>Myrsine papuana</i>							X	X
<i>Myrsine womersleyi</i>							X	X
<i>Pittosporum berberidoides</i>							X	X
Number of species	6	6	4	6	6	4	4	4

* *F. hahliana* is confirmed as a good species from 200-1,200 m of our elevational gradient. After this (1,700m-2,700m) a close relative/sister species occurs. However, this potential split was discussed only recently based on molecular differences. We were not able to distinguish the two species in the time of our experiment.

‡ *F. hombroniana* is found between 200-1,200m. There are a few individuals at 1,200 m but most individuals from 1,700 m classified as *F. hombroniana* are probably *F. ihuensis*.

• *F. trichocerasa* has two sub-species along the elevational gradient. *F. trichocerasa* subsp. *trichocerasa* occurs between 200-1,700 m and *F. trichocerasa* subsp. *pleioclada* occurs between 1,700 m and 2,200 m. They co-occur at 1,700 m, and both subspecies were included in our study as they are difficult to distinguish in the field at 1,700m.

F. wassa comprises many varieties along the elevational gradient of Mt. Wilhelm. The variety included in our study was *F. wassa* var. *nubigena* which occurs along the gradient from 1,300 to 3,000 m.

Table S3. Literature based feeding specialization of bird species occurring along Mt. Wilhelm elevational gradient. References mentioned in comments: (1) = Hoyo d. J., Elliott J., Sargatal J. & Christie D. A. (1992-2011) *Handbook of the Birds of the World (vol. 1-16)*. Lynx Editions, Barcelona, Spain. (2) Beehler, B. M., Pratt, T. K. & Zimmerman, D. A. 1986. *Birds of New Guinea*. Princeton Univ. Press. (3) Freeman B. G. & Freeman A. M. C. (2014) Rapid upslope shifts in New Guinean birds illustrate strong distributional responses of tropical montane species to global warming. *Proceedings of the National Academy of Sciences* **111**, 4490-4. (4) Personal communication Andrew Mack. Feeding guilds: Fr – frugivores, Fr-In – frugivore-nectarivores, In – insectivores, In-Ne – insectivore-nectarivores, Ne – nectarivores, Gr – granivores.

Species (Scientific)	Species (English)	Comments	Guild Lit.	Food survey	Number of samples including:				Total	Guild Observed	Guild confirmed
					Fr	In	Fr-In	Ne-In			
<i>Acanthiza cinerea</i>	Grey Thornbill	Insectivorous, but no details of prey (1, 2).	In								
<i>Acanthiza murina</i>	New Guinea Thornbill	Primarily insectivorous. Seeds, fruit and flowers found in gizzard (1). Insectivorous (2).	In	Yes		1	2	1	4	Fr-In	No
<i>Aegotheles albertisi</i>	Mountain Owlet-nightjar	Diet consist of insect (1).	In								
<i>Aegotheles insignis</i>	Feline Owlet-nightjar	Insectivore (1).	In								
<i>Aepyodius arfakianus</i>	Wattled Brushturkey	Fallen fruit and seeds, probably also insect (1).	Fr								
<i>Ailuroedus buccoides</i>	White-eared Catbird	Fruits and insect (1). Frugivore (2)	Fr-In								
<i>Ailuroedus melanotis</i>	Spotted Catbird	Omnivorous, but predominantly eating a variety of fruits (1). Frugivore (2).	Fr-In								
<i>Aleadryas rufinucha</i>	Rufous-naped Whistler	Insectivore (1, 2)	In	Yes		4			4	In	Yes
<i>Alisterus chloropterus</i>	Papuan King Parrot	Takes fruits, seeds, berries and nuts (1).	Fr								
<i>Alopecoenas beccarii</i>	Bronze Ground Dove	Frugivore (1,2)	Fr	Yes			4		4	Fr-In	No
<i>Alopecoenas jobiensis</i>	White-breasted Ground Dove	Fruits and seeds, with some insects (1).	Fr								
<i>Amalocichla incerta</i>	Lesser Ground Robin	Insectivore (1).	In	Yes		4	2	1	7	Fr-In	No
<i>Amblyornis macgregoriae</i>	MacGregor's Bowerbird	Frugivore (1, 2).	Fr								
<i>Anthus gutturalis</i>	Alpine Pipit	Mainly small insects and their larvae, and other arthropods; grass seeds, berries and green herbaceous matter also recorded (1).	In								
<i>Aplonis cantoroides</i>	Singing Starling	Fruit, especially figs; also insects (1). Omnivore (2).	Fr-In								
<i>Aplonis metallica</i>	Metallic Starling	Omnivore (1, 2).	Fr-In								
<i>Arses insularis</i>	Ochre-collared Monarch	Insectivore (1, 2)	In	Yes		1	4		5	Fr-In	No
<i>Artamus maximus</i>	Great Woodswallow	Insectivore (1).	In								
<i>Astrapia stephaniae</i>	Princess Stephanie's Astrapia	Frugivore (1,2)	Fr								
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Frugivore (1,2)	Fr								
<i>Cacomantis castaneiventris</i>	Chestnut-breasted Cuckoo	Insectivore (1, 2)	In								
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	Caterpillars and other insect (1).	In								

<i>Epimachus meyeri</i>	Brown Sicklebill	Fruits, also arthropods and small vertebrates, in fairly equal proportions (1).	Fr-In							
<i>Erythropitta erythrogaster</i>	Red-bellied Pitta	Insectivore (1, 2)	In							
<i>Eudynamis scolopaceus</i>	Asian Koel	Omnivorous, consuming a variety of insects, caterpillars, eggs, small vertebrates, and fruits (1).	Fr-In							
<i>Eugerygone rubra</i>	Garnet Robin	Insectivore (1, 2)	In							
<i>Eulacestoma nigropectus</i>	Wattled Ploughbill	Insectivore (1, 2)	In							
<i>Eurystomus orientalis</i>	Oriental Dollarbird	Exclusively flying insects (1).	In							
<i>Garritornis isidorei</i>	Papuan Babbler	Range of arthropods; small reptiles also taken (1).	In	Yes	10		10	In	Yes	
<i>Geoffroyus geoffroyi</i>	Red-cheeked Parrot	Frugivore (1,2)	Fr							
<i>Geoffroyus simplex</i>	Blue-collared Parrot	Seeds found in stomachs, but regularly visits flowering trees presumably for nectar and blossoms (1). Frugivore (2).	Fr							
<i>Gerygone chloronota</i>	Green-backed Gerygone	Insectivore (1).	In							
<i>Gerygone chrysogaster</i>	Yellow-bellied Gerygone	Insectivorous, but no details of prey (1).	In	Yes	3	1	4	In	Yes	
<i>Gerygone palpebrasa</i>	Fairy Gerygone	Insectivore (1, 2)	In							
<i>Gerygone ruficollis</i>	Brown-breasted Gerygone	Insectivore (1, 2)	In							
<i>Grallina bruijnii</i>	Torrent-lark	Invertebrate; small lizards occasionally (1).	In							
<i>Gymnophaps albertisii</i>	Papuan Mountain Pigeon	Frugivore (1,2)	Fr							
<i>Henicophaps albifrons</i>	New Guinea Bronzewing	Takes fallen fruits, grubs and insect (1).	Fr							
<i>Heteromyias albispecularis</i>	Ashy Robin	Insectivore (1).	In	Yes	2	4	6	Fr-In	No	
<i>Ifrita kowaldi</i>	Blue-capped Ifrit	Insects, including beetles; occasionally soft fruit (1). Insectivore (2).	In	Yes	4		4	In	Yes	
<i>Lalage atrovirens</i>	Black-browed Triller	Fruits and arthropods; no information on relative proportions of each (1).	Fr-In							
<i>Leptocoma sericea</i>	Black Sunbird	Various arthropods, fruit and nectar (1). Nectarivore (2)	In-Ne							
<i>Loboparadisea sericea</i>	Yellow-breasted Satinbird	Frugivore (1,2)	Fr							
<i>Lonchura tristissima</i>	Streak-headed Mannikin	Seeds of grasses (1).	Gr	Yes	3 (seed)	1 (most seeds)	4	Gr	Yes	
<i>Lophorina superba</i>	Superb Bird-of-paradise	Fruits and variety of arthropods; proportions vary seasonally, from nearly all arthropods to almost entirely fruits (1). Omnivore (2).	Fr-In							
<i>Loriculus aurantiifrons</i>	Orange-fronted Hanging Parrot	Nectar, fruits, buds, flowers and seeds (1).	Ne							
<i>Lorius lory</i>	Black-capped Lory	Flowers for their pollen and nectar, also fruits and small insects (1). Nectarivore (2).	Ne							
<i>Machaerirhynchus flaviventer</i>	Yellow-breasted Boatbill	Insectivore (1, 2)	In							
<i>Machaerirhynchus nigripectus</i>	Black-breasted Boatbill	Insectivore (1, 2).	In							
<i>Macropygia amboinensis</i>	Slender-billed Cuckoo-Dove	Frugivore (1,2)	Fr							
<i>Macropygia nigrirostris</i>	Bar-tailed Cuckoo-Dove	Frugivore (1,2)	Fr							

<i>Malurus alboscapulatus</i>	White-shouldered Fairywren	Arthropods (1).	In										
<i>Manucodia chalybatus</i>	Crinkle-collared Manucode	Frugivore (1,2)	Fr										
<i>Megapodius decollatus</i>	New Guinea Scrubfowl	No information available, but presumably omnivorous (1).	Fr-In										
<i>Melampitta lugubris</i>	Lesser Melampitta	Insects, also vertebrates and fruits (1).	In										
<i>Melanocharis longicauda</i>	Mid-mountain Berrypecker	Small berries, likely to take also insect (1).	Fr-In										
<i>Melanocharis nigra</i>	Black Berrypecker	Small berries, also insect (1). Frugivore (2)	Fr-In	Yes	7	7	5	1	20	Fr-In	Yes		
<i>Melanocharis striativentris</i>	Streaked Berrypecker	Known to take small berries (1). Frugivore (2).	Fr	Yes	6		3		9	Fr	Yes		
<i>Melanocharis versteri</i>	Fan-tailed Berrypecker	Feeds on small berries and arthropods (1). Frugivore (2).	Fr-In	Yes	12	3	19	1	35	Fr-In	Yes		
<i>Melanorectes nigrescens</i>	Black Pitohui	Insects and fruit, occasionally seeds (1).	Fr-In	Yes		10			10	In	No		
<i>Melidectes belfordi</i>	Belford's Melidectes	Arthropods, mainly insect, including large ants and beetles, also nectar, fruit, also nectar and probably pollen (1).	In-Ne	Yes			4		4	Fr-In	No		
<i>Melidectes fuscus</i>	Sooty Melidectes	Arthropods, nectar, pollen and fruit (1). Mostly insectivorous (4).	In-Ne	Yes		3	8	3	14	In-Ne	Yes		
<i>Melidectes princeps</i>	Long-bearded Melidectes	No info (1). 60% food samples included insect only, 40% included insect and nectar (3).	In-Ne	Yes		8		5	13	In-Ne	Yes		
<i>Melidectes rufocrissalis</i>	Yellow-browed Melidectes	Diet includes insects, nectar and fruit; commonly seen in flowering or fruiting trees (1). Omnivore (2)	Fr-In										
<i>Melidectes torquatus</i>	Ornate Melidectes	Diet invertebrates, mainly insect and their larvae, also nectar and small fruits (1). Omnivore (2)	Fr-In										
<i>Melidora macrorrhina</i>	Hook-billed Kingfisher	Large insects, also frogs (1). Insectivore (2).	In										
<i>Melilestes megarhynchus</i>	Long-billed Honeyeater	Small arthropods, small lizards, nectar, occasionally fruit (1). Insectivore (2).	In-Ne	Yes		3	1	1	5	In-Ne	Yes		
<i>Meliphaga analoga</i>	Mimic Honeyeater	Omnivore (1, 2). Insect and fruits taken (3).	Fr-In	Yes	5	4	8	1	18	Fr-In	Yes		
<i>Meliphaga aruensis</i>	Puff-backed Honeyeater	Diet includes fruit, seeds, and arthropods; probably also nectar (1). Omnivore (2).	Fr-In										
<i>Meliphaga montana</i>	Forest Honeyeater	Fruit, seed, and arthropods, probably also nectar, but said rarely, if ever (1).	Fr-In										
<i>Meliphaga orientalis</i>	Mountain Honeyeater	Diet nectar, arthropods (mainly insects), sometimes fruit (1). Omnivore (2).	In-Ne										
<i>Melipotes fumigatus</i>	Common Smoky Honeyeater	Predominantly frugivores, but insect and some floral parts also taken, not known to eat nectar (1). Frugivore (2).	Fr-In	Yes	2	2	4		8	Fr-In	Yes		
<i>Merops ornatus</i>	Rainbow Bee-eater	Insectivore (1).	In										
<i>Microdynamis parva</i>	Dwarf Koel	Fruit (1).	Fr										
<i>Microeca flavovirescens</i>	Olive Flyrobin	Insectivore (1).	In										
<i>Microeca griseoceph</i>	Yellow-legged Flyrobin	Insects and other small arthropods (1).	In										
<i>Microeca papuana</i>	Canary Flyrobin	Insectivore (1, 2)	In	Yes		6	5		11	Fr-In	No		
<i>Micropsitta bruijnii</i>	Red-breasted Pygmy Parrot	Lichen, fungi and moss with perhaps insects (Lexicon of Parrots).	In-Ne										
<i>Micropsitta pusio</i>	Buff-faced Pygmy Parrot	Lichen, bark fungus, and probably termites; insect remains, tiny black seeds, yellow fruit flesh and flowers in stomachs (1).	In-Ne	Yes					10	10	In-Ne	Yes	

<i>Mino anais</i>	Golden Myna	Only fruit (1).	Fr	Yes	4	2	6	In	No	
<i>Mino dumontii</i>	Yellow-faced Myna	Mainly fruit, also insects (1).	Fr-In	Yes	9	5	14	Fr-In	Yes	
<i>Monachella muelleriana</i>	Torrent Flyrobin	Insectivore (1).	In	Yes	3	1	4	In	Yes	
<i>Monarcha frater</i>	Black-winged Monarch	Food items not well known, mostly small to medium-size invertebrates (1), Insectivorous (2)	In							
<i>Monarcha rubiensis</i>	Rufous Monarch	Largely unknown, but mainly invertebrates (1).	In							
<i>Myiagra alecto</i>	Shining Flycatcher	Largely insectivorous; some fruit, may be taken (1). Insectivore (2).	In	Yes	9	1	10	In	Yes	
<i>Myzomela rosenbergii</i>	Red-collared Myzomela	Primarily nectar, also small arthropods, occasionally smam fruits (1). Nectarivore (2).	In-Ne	Yes	1	3	4	In-Ne	Yes	
<i>Neopsittacus musschenbroekii</i>	Yellow-billed Lorikeet	Pollen, nectar, flowers, small fruits and berries. Also may feed on insect (1).	Ne							
<i>Neopsittacus pullicauda</i>	Orange-billed Lorikeet	Eats pollen, nectar, flowers, fruits and less often, seeds (1).	Ne							
<i>Oedistoma iliolophus</i>	Dwarf Longbill	Feeds on insect, nectar and sometimes fruits (1). Insectivore (2).	In-Ne	Yes	2	1	1	4	In-Ne	Yes
<i>Oreocharis arfaki</i>	Tit Berrypecker	Stomach contents included entirely small fruits (1). Frugivore (2).	Fr							
<i>Oreopsittacus arfaki</i>	Plum-faced Lorikeet	Nectar and perhaps pollen (1). Nectarivore (2).	Ne							
<i>Oriolus szalayi</i>	Brown Oriole	Fruits, insect, also some grass seeds and probably nectars (1). Frugivore (2).	Fr-In							
<i>Ornorettes cristatus</i>	Crested Pitohui	Insectivore (1, 2)	In							
<i>Otidiphaps nobilis</i>	Pheasant Pigeon	Seeds and fallen fruit (1). Frugivore (2).	Fr							
<i>Pachycare flavogriseum</i>	Goldenface	Insectivore (1, 2)	In							
<i>Pachycephala hyperythra</i>	Rusty Whistler	Insectivore (1, 2)	In	Yes	3	5	8	Fr-In	No	
<i>Pachycephala modesta</i>	Brown-backed Whistler	Insects, occasionally fruits (1).	In	Yes	3	1	4	In	Yes	
<i>Pachycephala schlegelii</i>	Regent Whistler	Insectivore (1, 2)	In	Yes	6	10	16	Fr-In	No	
<i>Pachycephala simplex</i>	Grey Whistler	Mainly insects, spiders; occasionally seeds (1). Insectivore (2).	In	Yes	3	1	4	In	Yes	
<i>Pachycephala soror</i>	Sclater's Whistler	Insectivore (1, 2)	In	Yes	1	2	4	Fr-In	No	
<i>Pachycephalopsis poliosoma</i>	White-eyed Robin	Insectivore (1, 2)	In	Yes	10		10	In	Yes	
<i>Paradisaea minor</i>	Lesser Bird-of-paradise	Mostly fruits, also arthropods (1). Diet includes fruits and animal prey (5).	Fr-In							
<i>Paramythia montium</i>	Crested Berrypecker	Almost entirely small fruits, insects recorded rarely in stomach (1).	Fr	Yes	9	4	13	Fr	Yes	
<i>Peltops blainvillii</i>	Lowland Peltops	Mainly flying insects (1).	In							
<i>Peltops montanus</i>	Mountain Peltops	Insectivore (1, 2)	In							
<i>Peneothello bimaculata</i>	White-rumped Robin	Insectivore (1, 2)	In	Yes	8	2	10	In	Yes	
<i>Peneothello cyanus</i>	Slaty Robin	Insectivore (1, 2)	In	Yes	8	14	22	Fr-In	No	
<i>Peneothello sigillata</i>	White-winged Robin	Insectivore (1, 2)	In	Yes	7	13	20	Fr-In	No	
<i>Philemon buceroides</i>	Helmeted Friarbird	Eats nectar, fruit, insects and other invertebrates (1).	In-Ne							

<i>Philemon meyeri</i>	Meyer's Friarbird	Fruit, nectar and insect (1).	In-Ne								
<i>Phylloscopus maforensis</i>	Island Leaf Warbler	Insectivore (1, 2)	In								
<i>Pitohui dichrous</i>	Hooded Pitohui	Mainly fruit, including small figs (<i>Ficus</i>); some insects and grass seeds (1). Insectivore (2)	Fr-In	Yes		4		4	Fr-In	Yes	
<i>Pitohui kirhocephalus</i>	Northern Variable Pitohui	Insects and fruit (1). Insectivore (2).	In	Yes		10		10	In	Yes	
<i>Pitta sordida</i>	Hooded Pitta	Insects of many kinds (1). Insectivore (2).	In								
<i>Podargus ocellatus</i>	Marbled Frogmouth	Insectivore (1, 2)	In								
<i>Poecilodryas albonotata</i>	Black-throated Robin	Insect (1), Insectivorous (2)	In								
<i>Poecilodryas hypoleuca</i>	Black-sided Robin	Insectivore (1).	In	Yes		3	1	4	In	Yes	
<i>Probosciger aterrimus</i>	Palm Cockatoo	Feed on seeds, nuts, berries (1).	Fr								
<i>Pseudeos fuscata</i>	Dusky Lory	Feeds on flowers, fruits and insects (1).	Fr-In								
<i>Pseudorectes ferrugineus</i>	Rusty Pitohui	Insects and fruit (1). Omnivore (2).	Fr-In								
<i>Psittacella brehmii</i>	Brehm's Tiger Parrot	Frugivore (1,2)	Fr								
<i>Psittacella picta</i>	Painted Tiger Parrot	Eats seeds, berries, and fruits (1).	Fr								
<i>Psittaculirostris edwardsii</i>	Edwards's Fig Parrot	Feeds on fruits, nectar and possibly insects (1).	Fr								
<i>Psitteuteles goldiei</i>	Goldie's Lorikeet	Pollen, nectar, flowers and berries (1).	Ne								
<i>Psittrichas fulgidus</i>	Pesquet's Parrot	Highly specialised frugivore (<i>Ficus</i> ; 1).	Fr								
<i>Pteridophora alberti</i>	King of Saxony Bird-of-paradise	Mostly fruits, also insects and spiders (1).	Fr-In								
<i>Ptilinopus coronulatus</i>	Coroneted Fruit Dove	Frugivorous, feed on variety of fruits, particularly figs (1).	Fr								
<i>Ptilinopus iozonus</i>	Orange-bellied Fruit Dove	Feed on fruits, mainly on figs (84%; 1).	Fr								
<i>Ptilinopus magnificus</i>	Wompoo Fruit Dove	Frugivore (1,2)	Fr								
<i>Ptilinopus ornatus</i>	Ornate Fruit Dove	Frugivore (1,2)	Fr								
<i>Ptilinopus perlatus</i>	Pink-spotted Fruit Dove	Feed on fruit, especially figs (1).	Fr								
<i>Ptilinopus pulchellus</i>	Beautiful Fruit Dove	Frugivore (1,2)	Fr								
<i>Ptilinopus rivoli</i>	White-bibbed Fruit Dove	Frugivore (1,2)	Fr								
<i>Ptilinopus superbus</i>	Superb Fruit Dove	Frugivore (1,2)	Fr								
<i>Ptiloprora guisei</i>	Rufous-backed Honeyeater	Predominantly arthropods, also fruit, seeds and nectar (1). Omnivore (2).	Fr-In	Yes		2	2	4	Fr-In	Yes	
<i>Ptiloprora perstriata</i>	Grey-streaked Honeyeater	Diet includes arthropods, fruit and nectar (1).	Fr-In	Yes	4	9	10	2	25	Fr-In	Yes
<i>Ptiloris magnificus</i>	Magnificent Riflebird	Fruits and arthropods; overall a greater proportion of arthropods eaten, but relative proportions vary seasonally (1). Insectivore (2)	Fr-In	Yes		2	4	6	Fr-In	Yes	
<i>Ptilorrhoa caerulescens</i>	Blue Jewel-babbler	Insectivore (1).	In	Yes		10		10	In	Yes	
<i>Ptilorrhoa castanonota</i>	Chestnut-backed Jewel-babbler	Insects; possibly also small frogs (1). Insectivore (2).	In								
<i>Ptilorrhoa leucosticta</i>	Spotted Jewel-babbler	Insectivore (1, 2).	In								
<i>Pycnopygius ixoides</i>	Plain Honeyeater	Diet small fruits and nectar (1).	Fr								

<i>Rallicula forbesi</i>	Forbes's Forest Rail	Invertebrates, small vertebrates, and seeds (1).	In								
<i>Reinwardtoena reinwardti</i>	Great Cuckoo-Dove	Feeds on a variety of small seeds and fruit (1). Frugivore (2).	Fr								
<i>Rhagologus leucostigma</i>	Mottled Berryhunter	Insect, berries (1). Omnivore (2). 80% included insect and fruits in equal proportion (3).	Fr-In	Yes	1	1	7	9	Fr-In	Yes	
<i>Rhipidura albolimbata</i>	Friendly Fantail	Insectivore (1, 2).	In	Yes		14	2	16	In	Yes	
<i>Rhipidura atra</i>	Black Fantail	Insectivore (1,2)	In	Yes		30	4	34	In	Yes	
<i>Rhipidura brachyrhyncha</i>	Dimorphic Fantail	Insectivore (1, 2).	In	Yes		3	3	6	Fr-In	No	
<i>Rhipidura leucothorax</i>	White-bellied Thicket Fantail	Insectivore (1).	In								
<i>Rhipidura rufidorsa</i>	Rufous-backed Fantail	Insectivore (1).	In	Yes		10		10	In	Yes	
<i>Rhipidura rufiventris</i>	Northern Fantail	Insectivore (1, 2).	In	Yes		4		4	In	Yes	
<i>Rhipidura threnothorax</i>	Sooty Thicket Fantail	Small insects (1). Insectivore (2).	In	Yes		3	1	4	In	Yes	
<i>Rhyticeros plicatus</i>	Blyth's Hornbill	Mainly of fruits – especially figs (Ficus) - occasionally supplemented with insect (1).	Fr								
<i>Saxicola caprata</i>	Pied Bush Chat	Insectivore (3).	In								
<i>Scolopax rosenbergii</i>	New Guinea Woodcock	Two stomach analysed yielded caterpillars and moth pupae (1).	In								
<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo	Fruit, especially figs; also insects (1).	Fr-In								
<i>Sericornis arfakianus</i>	Grey-green Scrubwren	Poorly known, likely to be insectivorous (1). Insectivorous (1).	In	Yes		4		4	In	Yes	
<i>Sericornis nouhuysi</i>	Large Scrubwren	Insectivore (1, 2).	In	Yes		6	12	18	Fr-In	No	
<i>Sericornis papuensis</i>	Papuan Scrubwren	Insectivore (1, 2).	In	Yes		2	6	8	Fr-In	No	
<i>Sericornis perspicillatus</i>	Buff-faced Scrubwren	Insectivore (1, 2).	In	Yes		9	13	22	Fr-In	No	
<i>Sericornis spilodera</i>	Pale-billed Scrubwren	Insectivore (1, 2).	In	Yes		1	3	4	In	Yes	
<i>Syma megarhyncha</i>	Mountain Kingfisher	Insects, larvae, and small lizards (1). Insectivore (2).	In	Yes		3	1	4	In	Yes	
<i>Syma torotoro</i>	Yellow-billed Kingfisher	Insect and small lizards (when in forest), small fish (in mangrove habitats (1)).	In	Yes		10		10	In	Yes	
<i>Symposiachrus axillaris</i>	Black Monarch	Insectivore (1,2)	In								
<i>Symposiachrus guttula</i>	Spot-winged Monarch	Insectivore (1, 2)	In								
<i>Symposiachrus manadensis</i>	Hooded Monarch	Insectivore (1).	In								
<i>Talegalla jobiensis</i>	Collared Brushturkey	No information available, though considered to be probably omnivorous (1).	Fr-In								
<i>Tanyiptera galatea</i>	Common Paradise Kingfisher	Insectivore (1, 2).	In	Yes		8		8	In	Yes	
<i>Timeliopsis fulvigula</i>	Olive Straightbill	Insectivore (1, 2).	In								
<i>Todiramphus macleayii</i>	Forest Kingfisher	Invertebrates (1).	In								
<i>Toxorhamphus novaeguineae</i>	Yellow-bellied Longbill	Insectivorous, taking also nectar but details not known (1).	In-Ne	Yes	2	7	1	1	11	In-Ne	Yes
<i>Toxorhamphus poliopterus</i>	Slaty-headed Longbill	Diet poorly known; feeds on arthropods and nectar (1). Nectarivore (2). Insect in 100% of samples, nectar in 40% of samples (3).	In-Ne	Yes		2	2	1	5	In-Ne	Yes

<i>Tregellasia leucops</i>	White-faced Robin	Insectivore (1, 2).	In	Yes	2	2	4	Fr-In	No		
<i>Trichoglossus haematodus</i>	Coconut Lorikeet	Nectar and pollen (1). Nectarivore (2).	Ne								
<i>Turdus poliocephalus</i>	Island Thrush	Insectivore (1, 2).	In	Yes	2	1	2	5	Fr-In	No	
<i>Xanthotis flaviventer</i>	Tawny-breasted Honeyeater	Mainly insects, also nectar and fruit, e.g. of figs (1). Insectivore (2).	In-Ne	Yes	2		1	2	5	In-Ne	Yes
<i>Zoothera heinei</i>	Russet-tailed Thrush	Worms and molluscs; also some fruit (1). Invertebrates and fruits (2).	Fr-In	Yes		2	2	4	Fr-In	Yes	
<i>Zosterops minor</i>	Black-fronted White-eye	Insects and fruits; latter include various figs (1). Congeners mostly insectivorous (3).	In	Yes		3	1	4	In	Yes	
<i>Zosterops novaeguineae</i>	Papuan White-eye	Stomach contents included spiders, insects, fruits and seeds (1).	In								

Figure S2. Relative importance of food types (plant material or arthropod's body parts) in food samples of birds partitioned into feeding guild according to literature and mist-netted in understory of Mt. Wilhelm elevational gradient. Note that we did not mist-net any representatives of some guilds at some elevational study sites (i.e. elevation is missing at axis X).

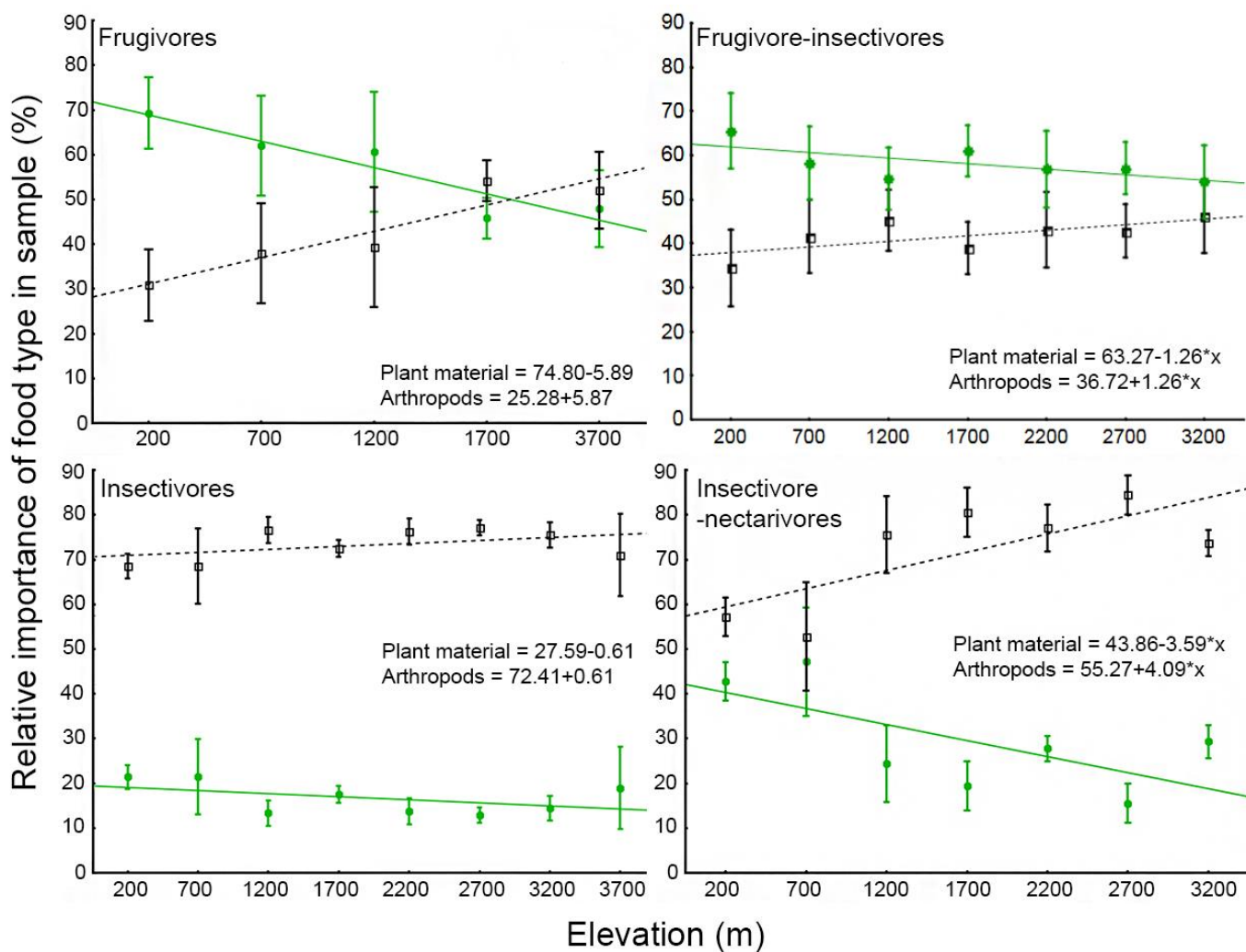


Figure S3. Randomised accumulation curves of food morphotypes taken by six bird species (with $N \geq 9$ from the same elevation). Sample = regurgitated food from an individual bird. CollMega = *Colluricincla megarhyncha*, 200m; MelaNigr = *Melanocharis nigra*, 700m; CratRobu = *Crateroscelis robusta*, 2700m; MelaVers = *Melanocharis versteri*, 1700m; SeriPers = *Sericornis perspicillatus*, 2700m; RhipAtra = *Rhipidura atra*.

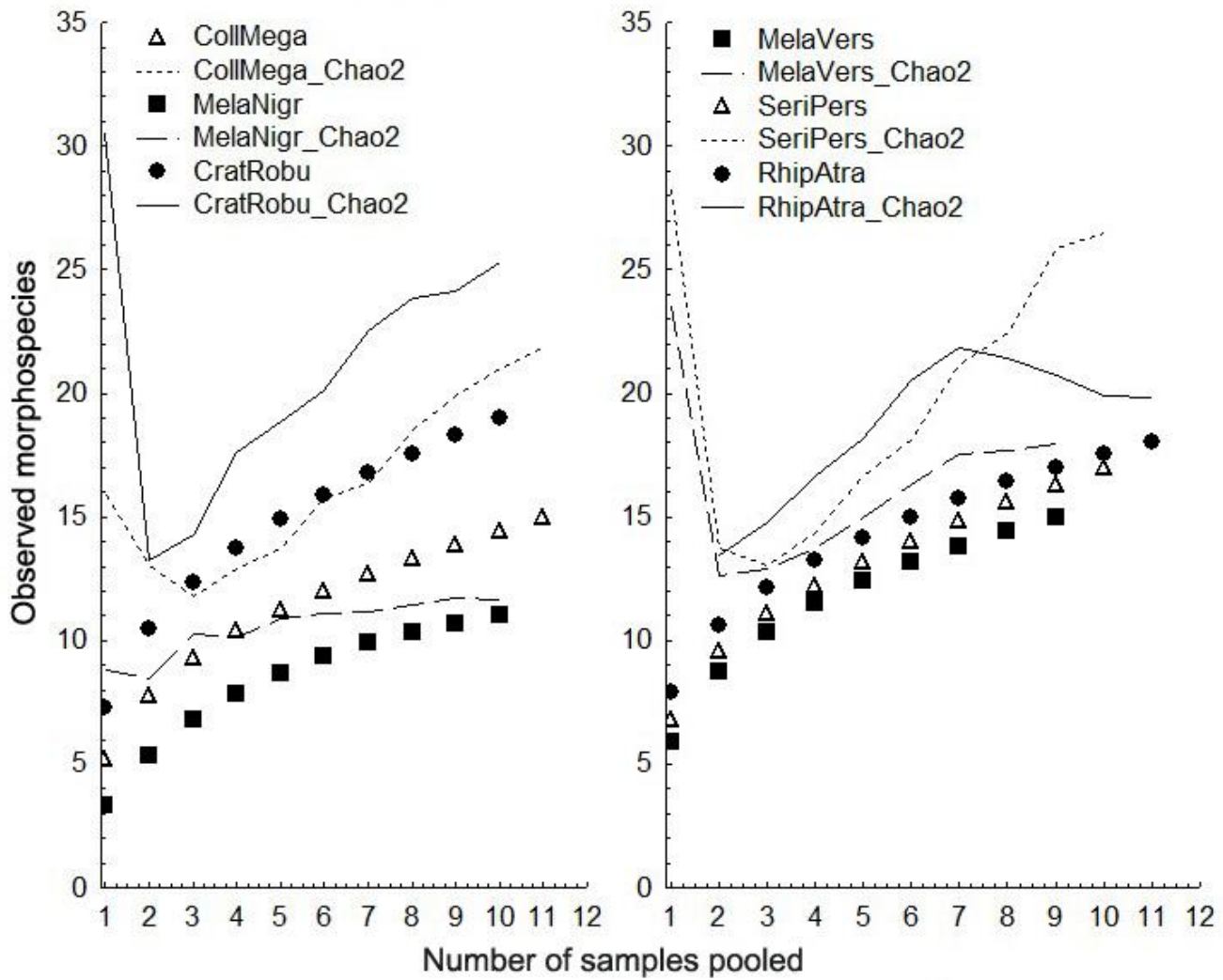


Figure S4. Relative species richness of birds along Andean (a) and Costa Rica (b) elevational gradients. Data extracted from Terborgh 1977 and Blake et al. 2000. Elevational study sites are shown approximately. (Terborgh, J. 1977. Bird species diversity on an Andean elevational gradient. *Ecology* **58**:1007-1019.; Blake, G. John, Loiselle and A. Bette 2000. Diversity of birds along an elevational gradient in the Cordillera Central, Costa Rica. *The Auk* **117**: 663-686.)

