

**Supplementary material**

## Appendix 1

Figure A1. Scatter plots showing all two-variable comparisons among seven morphological characters.

Table A1. Oligonucleotides used for PCR amplification and sequencing of mtDNA cytochrome b (*cyt b*), Control Region (CR) and nuclear gene beta fibrinogen intron 7 ( $\beta$ fib7). Primers denoted with \* are from the primer database of the Allan Wilson Centre for Molecular Ecology and Evolution, Massey University, Palmerston North that were designed, modified and/or improved by various researchers.

<b>Loci</b>	<b>Primer</b>	<b>Sequence (5' to 3')</b>	<b>Source</b>
<i>cyt b</i>	AV15107F*	CATCCGTTGCCCACACATGYCG	
	AV16065R*	GYGRTCTTCYGTCTTTGGTTTACAAGAC	
CR	ROD01	CACCGCGGCATGTAATCATGTAC	Ozaki <i>et al.</i> (2010)
	ROD02	GGACGAAGTCCATTGATGCTCAC	Ozaki <i>et al.</i> (2010)
$\beta$ fib-7	Fib-BI7U	GGAGAAAACAGGACAATGACAATTCAC	Prychitko and Moore (1997)
	Fib-BI7L	TCCCCAGTAGTATCTGCCATTAGGGTTT	Prychitko and Moore (1997)

Table A2. Taxa, museum voucher numbers and GenBank accession numbers of data included in *Lewinia* phylogeographic analysis. *Lewinia muelleri* samples were gathered from live birds on Adams island (Auckland Islands) and released at the site of capture.

Species	Museum voucher	Mitochondrial genes		Nuclear gene
		<i>cyt b</i>	CR	$\beta$ fib-7
<i>L. mirifica</i>	<i>FMNH 454894</i>	KR094924	KR094905	KR094886
	<i>FMNH 454895</i>	KR094925	KR094906	KR094887
	<i>FMNH 454896</i>	KC614088	KR094907	KC613882
<i>L. pectoralis</i>	<i>ANWC B34220</i>	KC614093	KR094888	KC613887
	<i>ANWC B44851</i>	KR094909	KR094889	KR094871
	<i>EBU 47835</i>	KR094910	KR094890	KR094872
	<i>EBU 53101</i>	KR094911	KR094891	KR094873
	<i>MV 4328</i>	KR094912	KR094892	KR094874
	<i>MV 2101</i>	KR094913	KR094893	KR094875
	<i>MV 4096</i>	KR094914	KR094894	KR094876
	<i>MV 4238</i>	KR094915	KR094895	KR094877
	<i>MV 1976</i>	KR094916	KR094896	KR094878
	<i>MV 1889</i>	KR094917	KR094897	KR094879
<i>L. muelleri</i>	<i>none</i>	KR094918	KR094898	KC613886
	<i>none</i>	KR094919	KR094899	KR094880
	<i>none</i>	KC614092	KR094900	KR094881
	<i>none</i>	KR094920	KR094901	KR094882
	<i>none</i>	KR094921	KR094902	KR094883
	<i>none</i>	KR094922	KR094903	KR094884
	<i>none</i>	KR094923	KR094904	KR094885

Table A3. GenBank accession numbers of data included in this study for phylogenetic analysis.

Species	GenBank Accession No.					
	Nuclear genes			Mitochondrial genes		
	$\beta$ fib-7	RAG-1	16S	cyt <i>b</i>	COI	CR
<i>Aramidopsis plateni</i>				JQ347988		JQ360451
<i>Crex crex</i>	KC613865	KC613919	KC613986	KC614069	GU571355	
<i>Diaphorapteryx hawkinsi</i>				KC614124		
<i>Dryolimnas cuvieri</i>	KC613866	KC613920	KC613987	KC614070	KC614039	
<i>Eulabeornis castaneoventris</i>	KC613867	KC613921	KC613988	KC614071	KC614058	JQ360452
<i>Gallirallus australis</i>	KC613911	KC613977	KC614035	KC614123	BROMB346-06	JQ360453
<i>G. calayanensis</i>				KC614128		FJ207363
<i>G. dieffenbachii</i>				KC614127		
<i>G. insignis</i>				JQ347978		FJ207360
<i>G. lafresnayanus</i>				KC614130		JQ360455
<i>G. modestus</i>				KC614125		FJ207351
<i>G. okinawae</i>			NC012140	NC012140	NC012140	NC012140
<i>G. owstoni</i>		KC613935	KC614000		KC614043	EF219133
<i>G. pendiculentus</i>						FJ207350
<i>G. philippensis</i>	AY695241	KC613936	DQ485860	DQ485907	BROMB322-06	FJ207381
<i>G. ripleyi</i>				JQ347996		FJ207347
<i>G. roviae</i>				JQ348012		FJ207353
<i>G. striatus</i>	KC613879	KC613937	KC614001	KC614085	JQ342122	KR094908
<i>G. sylvestris</i>	KC613910	KC613976	KC614034	KC614122	KC614057	JQ360458
<i>G. torquatus</i>				JQ347980		FJ207354
<i>G. wakensis</i>				JQ348014		FJ207357
<i>Habroptila wallacii</i>				JQ347984		JQ360460
<i>Lewinia mirifica</i>	KC613882	KC613940	KC614005	KC614088	KC614045	KR094905
<i>L. muelleri</i>	KC613886	KC613945	KC614007	KC614092	KC614047	KR094898
<i>L. pectoralis</i>	KC613887	KC613946	KC614008	KC614093	KC614048	KR094888
<i>Nesoclopeus woodfordi</i>	KC613891	KC613949	KC614012	KC614096	BROMB695-07	FJ207361
<i>Rallus aquaticus</i>	EF552781	KC613966	KC614027	KC614115	GU097261	
<i>R. caerulescens</i>	KC613905	KC613967	KC614028	KC614116	KC614055	
<i>R. elegans</i>	KC613906	KC613968	KC614029	KC614117	AY666315	
<i>R. indicus</i>					GU097233	
<i>R. limicola</i>	AY695242	KC613970	KC614031	KC614119	GU097263	JQ360463
<i>R. longirostris</i>	AY695243	KC613971	DQ485861	DQ485908	DQ433164	FJ240174

Table A4. Available morphological (in mm) and weight (g) data of *Lewinia mirifica*, *L. pectoralis* and *L. muelleri*. Measurements of *L.*

*pectoralis* are present for each of the eight currently subspecies recognized. Note that some sources of data indicated a range of values and these were not taken into account for mean, standard deviation and coefficient of variation analyses in Table 1. Empty cells indicate lack of information.

Species	Location	Sex	Age	Bill	Tarsus	Toe	Wing	Tail	Weight	Culmen	Comments	Source
<i>Lewinia muelleri</i>	Adams island		Immature	22.10	29.44	32.74						This study
	Adams island		Immature	21.36	29.10	30.20			60.0			This study
	Adams island		Adult	30.46	29.45	29.06	75.96	36.28	85.0			This study
	Adams island		Immature	23.48	31.65	28.79			58.0			This study
	Adams island		Adult						83.0			This study
	Adams island		Immature						69.0			This study
	Adams island		Adult	31.10	27.80	32.20	76.0	31.0	92.0			Elliot et al. 1991
	Adams island		Adult	32.30	29.20	32.70	85.0	29.0	89.0			Elliot et al. 1991
	Adams island		Adult	31.50	28.80	32.10	82.0	40.0	91.0			Elliot et al. 1991
	Adams island		Adult	30.40	27.90	33.20	84.0	35.0	100.0			Elliot et al. 1991
	Adams island				27.30	27.30	29.0	77.0	42.0			Elliot et al. 1991
	Adams island					28.0	33.0	83.0	33.0		28.0	Falla 1967
Adams island					27.0	29.90	78.0	28.50		25.0	Falla 1967	
<i>Lewinia mirifica</i>	Luzon	Female	Adult		30.0	37.0	108.0			27.0		Parkers and Amadon 1959
	Luzon	Female	Adult		29.0	36.0	106.0			25.0		Parkers and Amadon 1959
	Luzon	Female	Adult		29.0	38.0	106.0			26.0		Parkers and Amadon 1959
	Luzon	Male	Immature		28.0	35.0				24.0		Parkers and Amadon 1959
	Luzon	Male	Immature		30.0	37.0	107.0			26.0		Parkers and Amadon 1959
	Luzon	Male	Immature		28.0	33.0	106.0			25.0		Parkers and Amadon 1959
	Luzon	Male	Immature		29.0	34.0	103.0			25.0		Parkers and Amadon 1959
	Luzon		Immature		27.0	28.0		105.0	45.0			Round and Allen 2010
	Luzon		Immature		25.2	29.7		106.0	46.0	53.6		Round and Allen 2010
	Luzon		Immature		26.0	28.8		106.0	44.0	65.8		Round and Allen 2010
	Luzon		Immature		25.5	29.2		109.0		56.9		Round and Allen 2010
	Luzon		Immature		25.9	28.6		109.0	42.0	60.6		Round and Allen 2010

	Luzon		Immature	28.3	27.9		113.0	46.0	67.1			Round and Allen 2010
	Luzon		Immature	28.6	30.1		113.0	41.0	64.2			Round and Allen 2010
	Luzon		Adult	29.4	28.9		114.0	48.0	72.7			Round and Allen 2010
	Luzon		Immature	26.0	29.0		115.0	45.0	57.6			Round and Allen 2010
	Luzon		Immature	29.8	30.1		116.0	44.0	68.0			Round and Allen 2010
<i>Lewinia pectoralis</i>												
<i>L. p. exsul</i>	South Flores Island	Male	Adult		29.0	36.0	100.0			27.0		Parkers and Amadon 1959
					28.0-30.0		101.0-108.0	44.0-46.0		27.0-29.50	All measurements are from 3 birds	Ripley 1977
<i>L. p. insulsus</i>	Wau, New Guinea	Female	Adult		29.0	34.0	99.0			27.0		Parkers and Amadon 1959
	Hertzog Mt, New Guinea	Female	Adult		30.0		103.0			29.0		Ripley 1977
<i>L. p. alberti</i>	Angabunga river, New Guinea	Male	Adult		32.0	37.0	92.0			30.0		Parkers and Amadon 1959
	New Guinea				28.0	34.0	87.0	32.0		28.0		Falla 1967
	Southeast New Guinea	Male					93.0			29.0		Mayr and Gilliard 1951
	Southeast New Guinea	Male					94.0			30.0		Mayr and Gilliard 1951
	Southeast New Guinea	Female					93.0			27.0		Mayr and Gilliard 1951
	Southeast New Guinea	Female					93.50			28.0		Mayr and Gilliard 1951
	Southeast New Guinea	Female					94.0					Mayr and Gilliard 1951
	Southeast New Guinea	Female					94.0					Mayr and Gilliard 1951
	Southeast New Guinea	Female					97.0					Mayr and Gilliard 1951
<i>L. p. captus</i>	Mount Hagen, New Guinea	Male	Adult		34.0	41.0	100.0			35.0		Parkers and Amadon 1959
	Wahgi region	Male					95.0		78.0	32.0		Mayr and Gilliard 1951
	Wahgi region	Male					96.0			33.0		Mayr and Gilliard 1951
	Wahgi region	Male					101.0			33.0		Mayr and Gilliard 1951
	Wahgi region	Male					101.0			33.0		Mayr and Gilliard 1951
	Wahgi region	Male					102.0			34.50		Mayr and Gilliard 1951
	Wahgi region	Female					97.0		58.0	29.0		Mayr and Gilliard 1951
	Wahgi region	Female					100.0			31.0		Mayr and Gilliard 1951
	Wahgi region	Female					101.0			34.0		Mayr and Gilliard 1951
	Bele river	Female					96.0			33.0		Mayr and Gilliard 1951
	Telefomin region	Male					99.0			31.50		Gilliard and Lecroy 1961
	Telefomin region	Male					101.0			32.50		Gilliard and Lecroy 1961
	Telefomin region	Male					102.50			34.0		Gilliard and Lecroy 1961
	Telefomin region	Male					105.0			35.0		Gilliard and Lecroy 1961
	Telefomin region	Female					97.50			31.0		Gilliard and Lecroy 1961
	Telefomin region	Female					98.0			32.0		Gilliard and Lecroy 1961
	New Guinea				32.0	35.0	106.0	42.0		34.0		Falla 1967
	New Guinea				29.0	33.0	92.0	35.0		29.0		Falla 1967
<i>L. p. mayri</i>	Panial Lake	Male	Adult	31.0	29.0		98.0	36.0		34.0	Junge (1953) described it as <i>L. p.</i>	Junge 1953

Panial Lake	Male	Adult	32.0	30.0		99.0	37.0		34.0	<i>connectens</i> . In Avibase it is synonym of <i>L. p. captus</i> but in Ripley (1977) is included as synonym of <i>L. p. mayri</i>	Junge 1953
Panial Lake	Male	Adult	33.0	30.0		99.0	38.0		35.0		Junge 1953
Panial Lake	Male	Adult	33.0	30.0		99.0	39.0		36.0		Junge 1953
Panial Lake	Male	Adult	33.0	30.0		100.0	39.0		36.0		Junge 1953
Panial Lake	Male	Adult	34.0	31.0		100.0	39.0		37.0		Junge 1953
Panial Lake	Male	Adult	34.0	31.0		100.0	39.0		37.0		Junge 1953
Panial Lake	Male	Adult	34.0	31.0		101.0	40.0		37.0		Junge 1953
Panial Lake	Male	Adult	34.0	31.0		101.0	40.0		37.0		Junge 1953
Panial Lake	Male	Adult	34.0	31.0		101.0	41.0		37.0		Junge 1953
Panial Lake	Male	Adult	34.0	31.0		101.0	41.0		37.0		Junge 1953
Araboebivak	Male	Adult	35.0	32.0		102.0	41.0		37.0		Junge 1953
Araboebivak	Male	Adult	35.0	32.0		102.0	42.0		38.0		Junge 1953
Araboebivak	Male	Adult	35.0	32.0		102.0	43.0		38.0		Junge 1953
Araboebivak	Male	Adult	36.0	32.0		102.0	43.0		38.0		Junge 1953
Araboebivak	Male	Adult	37.0	32.0		103.0	44.0		39.0		Junge 1953
Araboebivak	Male	Adult	37.0	33.0		103.0	45.0		39.0		Junge 1953
Araboebivak	Male	Adult	37.0	33.0		104.0			41.0		Junge 1953
Panial Lake	Male	Immature	34.0	30.0		97.0	35.0		35.0		Junge 1953
Panial Lake	Male	Immature	34.0	30.0		100.0	41.0		35.0		Junge 1953
Panial Lake	Male	Immature	35.0	30.0		106.0	42.0		36.0		Junge 1953
Panial Lake	Female	Adult	30.0	28.0		96.0	35.0		32.0		Junge 1953
Panial Lake	Female	Adult	31.0	29.0		96.0	35.0		32.0		Junge 1953
Panial Lake	Female	Adult	32.0	30.0		97.0	36.0		33.0		Junge 1953
Panial Lake	Female	Adult	32.0	30.0		97.0	36.0		34.0		Junge 1953
Panial Lake	Female	Adult	32.0	30.0		97.0	37.0		34.0		Junge 1953
Panial Lake	Female	Adult	33.0	30.0		97.0	37.0		34.0		Junge 1953
Araboebivak	Female	Adult	33.0	30.0		98.0	38.0		34.0	Junge 1953	
Araboebivak	Female	Adult	33.0	31.0		99.0	39.0		35.0	Junge 1953	
Araboebivak	Female	Adult	34.0	31.0		100.0	40.0		35.0	Junge 1953	
Araboebivak	Female	Adult	34.0	31.0		100.0	40.0		36.0	Junge 1953	
Araboebivak	Female	Adult	34.0	32.0		101.0	41.0		36.0	Junge 1953	
Araboebivak	Female	Adult	34.0	32.0		101.0	41.0		36.0	Junge 1953	
Araboebivak	Female	Adult	35.0	32.0		103.0	42.0		36.0	Junge 1953	
Araboebivak	Female	Adult	35.0	32.0		103.0	43.0		36.0	Junge 1953	
Araboebivak	Female	Adult	35.0	32.0		105.0			37.0	Junge 1953	
Araboebivak	Female	Adult	35.0	33.0		108.0			37.0	Junge 1953	
Araboebivak	Female	Immature	33.0	29.0		105.0	34.0		34.0	Junge 1953	
Araboebivak	Female	Immature	33.0	30.0		105.0	38.0		36.0	Junge 1953	



	Kofo, Arfak, New Guinea	Male	Adult		34.0	39.0	104.0		91.0-103.0	39.0	Parkers and Amadon 1959
	Vogelkop, New Guinea	Male					105.0			38.0	Mayr and Gilliard 1951
	Vogelkop, New Guinea	Male					105.0			39.0	Mayr and Gilliard 1951
	Vogelkop, New Guinea	Male					109.0			39.0	Mayr and Gilliard 1951
	Vogelkop, New Guinea	Female					98.0			35.0	Mayr and Gilliard 1951
	Vogelkop, New Guinea	Female					101.0			35.0	Mayr and Gilliard 1951
		Males					105.0-109.0		91.0-102.0	38.0-39.0	Ripley 1977
		Females					101.0-104.0			34.5-36.0	Ripley 1977
<i>L. p. pectoralis</i>	Victoria, Australia	Male	Adult		30.0	35.0	104.0			33.0	Parkers and Amadon 1959
				29.0-32.0	28.0-30.0		90.0-98.0				Measurements from 9 specimens Harrison 1975
	Victoria, Australia				30.0	35.0	100.0	45.0		33.0	Falla 1967
		Males/Females			26.0-36.0		93.0-114.0			33.0-42.0	Ripley 1977
<i>L. p. brachipus</i>	Tasmania	Male	Adult		31.0	39.0	103.0			31.0	Parkers and Amadon 1959
	Tasmania			38.0							Leicester 1960
	Tasmania			22.80			101.60			35.50	Ripley 1977
	Tasmania			36.0	32.0		104.0				Little 1910 (from Harrison 1975)
	Tasmania			38.0							Skemp 1955 (from Harrison 1975)
	Tasmania		Immature	35.0	31.0		101.0	38.0		33.0	Falla 1967
	Tasmania			37.0	32.0		102.0				Harrison 1975
<i>L. p. clelandi</i>	south WA			42.0	36.0		114.0				Mathews 1910 (from Harrison 1975)
	south WA			39.0-45.0	35.0-37.0		109.0-114.0				Measurements from 3 specimens Harrison 1975