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SUPPLEMENTARY MATERIAL

Long-term persistence and vicariance within the Australian Monsoonal Tropics: the case of the Giant Cave and Tree Geckos (*Pseudothecadactylus*)

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Table S1. Locality, specimen and collection details of *Pseudothecadactylus* specimens included in genetic analyses. ID number is to allow identification of specimens on Figures 1 and 2.

Taxon	Specimen	ID	Locality	State	Latitude	Longitude	ND2	RAG1
<i>Pseudothecadactylus australis</i>	QMJ57120	na	Heathlands Ranger Station	QLD	-11.75	142.58	GU459946	FJ855449/JX0245
<i>Pseudothecadactylus cavaticus</i>	WAMR171550	1	Prince Regent Nature Reserve	WA	-15.7605	125.2564	KJ685523	KJ685534
<i>Pseudothecadactylus cavaticus</i>	WAMR171551	2	Prince Regent Nature Reserve	WA	-15.7619	125.2578	KJ685524	KJ685535
<i>Pseudothecadactylus cavaticus</i>	WAMR171453	3	Prince Regent Nature Reserve	WA	-15.5519	125.4792	KJ685522	KJ685533
<i>Pseudothecadactylus cavaticus</i>	WAMR171594	4	Prince Regent Nature Reserve	WA	-15.9788	125.3675	KJ685526	KJ685537
<i>Pseudothecadactylus cavaticus</i>	WAMR38873	5	Donkin's Hill, Mitchell Plateau	WA	-14.9875	125.5069	KJ685527	–
<i>Pseudothecadactylus cavaticus</i>	WAMR171590	6	Mitchell Plateau	WA	-14.8222	125.7106	KJ685525	KJ685536
<i>Pseudothecadactylus lindneri</i>	NTMR27595	1	West Arnhemland, near Kikiyown	NT	-12.19	133.81	KJ685529	–
<i>Pseudothecadactylus lindneri</i>	NMVD72623	2	West Arnhemland, near Kikiyown	NT	-12.19	133.81	KJ685530	–
<i>Pseudothecadactylus lindneri</i>	NTMR35722	3	Oenpelli	NT	-12.32	133.05	KJ685531	KJ685538
<i>Pseudothecadactylus lindneri</i>	NTMR23151	4	Oenpelli	NT	-12.39	133.08	KJ685528	–
<i>Pseudothecadactylus lindneri</i>	AMSR90195	5	Liverpool R (mid reaches)	NT	-12.55	133.88	AY369024	–
<i>Pseudothecadactylus lindneri</i>	MVZ99544	6	Near East Alligator Ranger Station	NT	-12.42	132.96	JX024510	AY662626

Table S2. Summary details of additional gekkotans included in phylogenetic analyses.

Species	Specimen	Locality	ND2	RAG-1
Carphodactylidae				
<i>Carphodactylus laevis</i>	AMS R143258	AUS, Queensland, Lamb Range	GU459943	GU459542
<i>Nephrurus levis</i>	AMS R140561	AUS, WA, Denham	GU459945	GU459544
<i>Nephrurus stellatus</i>	SAMA R36563	AUS, SA, 19.3 km NE Courtabie	JF807337	FJ855446
<i>Orraya occultus</i>	QMA002513	AUS, Qld, Mcllwraith Ranges	JX041389	JQ945320
<i>Phyllurus platurus</i>	AMB42	AUS, NSW, Sydney	JX024357	HQ426314
<i>Saltuarius swaini</i>	AMS R143262	AUS, Queensland, Lamb Range	JX024356	JQ945338
<i>Underwoodisaurus milii</i>	SAMA R38006	AUS, SA, 17 km SE Burra, South Australia	HQ288423	FJ571622
<i>Uvidicolus sphyrurus</i>	AMS152381	AUS, NSW, Kaputar National Park	GU459944	GU459543
Diplodactylidae				
<i>Bavayia cyclura</i>	CAS 157697	NC, Plage de Poé	JX024367	JX024467
<i>Bavayia montana</i>	AMS R144235	NC, Mt. Panié	JX024370	JX024471
<i>Bavayia ornata</i>	AMS R149306	NC, Mt. Panié	DQ533737	JX024472
<i>Bavayia sauvagii</i>	AMS R144318	NC, Mt. Koghis	JX024373	JX024475
<i>Bavayia septuiclavus</i>	CAS 205439	NC, Rivière Bleue, vic. Pont Germain	JX024374	JX024476
<i>Correlophus ciliatus</i> 3	AMS R146594	NC, Rivière Bleue, vic. Pont Germain	JX024439	EF534778
<i>Crenadactylus</i> Cape Range	WAM R132481	AUS, WA, Shothole Canyon, Cape Range National Park	HQ288435	HQ288476
<i>Crenadactylus</i> Carnarvon	WAM R135495	AUS, WA, False Entrance Well	HQ288446	FJ855457
<i>Crenadactylus</i> Central Ranges	SAMA R22245	AUS, Northern Territory, 10 km S Barrow Creek	JX024364	JX024489
<i>Crenadactylus</i> Kimberley A	SAMA R53980	AUS, WA, 24 km N Tunnel Creek	HQ288467	HQ288479
<i>Crenadactylus</i> Kimberley E	WAMR171693	AUS, WA, Long Is	JQ820277	Q820289
<i>Crenadactylus</i> Kimberley F	WAMR168725	AUS, WA, Katers Is	JQ820273	JQ820286
<i>Crenadactylus</i> Kimberley G	WAMR171007	AUS, WA, Adolphus Is	JQ820269	JQ820282
<i>Crenadactylus</i> ocellatus	WAM R129700	AUS, WA, Ravensthorpe	HQ288434	HQ288477
<i>Crenadactylus</i> Pilbara	WAM R132627	AUS, WA, Burrup Peninsula	HQ288450	HQ132627
<i>Dierogekko koniambo</i>	AMS R161129	NC, Headwaters of Rivière Pandanus, Massif de Koniambo	JF972451	JX024493
<i>Dierogekko poumensis</i>	AMS R161205	NC, Sommet Poum, 3 km S Poum	JX024375	JX024495
<i>Dierogekko validiclavus</i>	AMS R144230	NC, Mt. Panié	JF972461	JX024497
<i>Diplodactylus conspicillatus</i>	AMS R158426	AUS, NSW, Sturt National Park	JX024358	JQ173721
<i>Diplodactylus granariensis</i>	AMS R150637	AUS, WA, Dedari	JX024359	JX024498

<i>Eurydactyloides occidentalis</i>	AMS R166218	NC, Marais Fournier, Mouéara, Gouaro-Déva	DQ533776	JX024500
<i>Eurydactyloides vieillardii</i>	AMS R149485	NC, Fôret Plate	DQ533773	JX024502
<i>Hesperoedura reticulata</i>	SAMA R23035	AUS, WA, 73 km E. Norseman	EF681803	FJ855450
<i>Hoplodactylus duvaucelli</i>	FT174	NZ, Mercury Island	GU459843	GU459440
<i>Lucasium byrnei</i>	SAMA R52296	AUS, SA, Camel Yard Spring	EF681801	FJ855453
<i>Lucasium maini</i>	AMS R150647	AUS, WA, Dedari	JX024362	JX024503
<i>Mniarogekko chahoua</i>	AMS R144171	NC, Sarraméa	JX024432	JX024505
<i>Mokopirirakau cryptozoicus</i>	RAH 489	NZ, Takitimu Mtns.	GU459808	GU459405
<i>Mokopirirakau granulatus</i>	RAH 66	NZ, Northcross	GU459817	GU459414
<i>Naultinus grayi</i>	RAH 253	NZ, Kaimaumu Swamp	GU459766	GU459363
<i>Oedodera marmorata</i>	AMS R161254	Creek à Paul, Sommet Noir, Paagoumène, 11 km, NW Koumac	AY858957	JQ173726
<i>Oedura marmorata</i>	AMS R143861	AUS, Qld, Stonehenge area	GU459951	GU459550
<i>Amalasia rhombifer A</i>	SAMAR34513	QLD: Townsville	JQ173660	FJ855472
<i>Amalasia rhombifer B</i>	AMS R136216	AUS, NT, 3.5 km upstream from Bells Gorge	JX024363	JX024509
<i>Paniegekko madjo</i>	AMS R149329	NC, Mt. Panié	GU459950	GU459549
<i>Rhacodactylus auriculatus</i>	AMS R152650	NC, Plaine des Lacs, Kwa Néie	JX024378	JX024516
<i>Rhacodactylus leachianus</i>	AMS R152651	NC, Plaine des Lacs, Kwa Néie	JX024444	JX024554
<i>Rhacodactylus trachycephalus</i>	CAS 214440	NC, Îlot Môrô	JX024465	JX024559
<i>Rhynchoedura ornata</i>	AMS R155371	AUS, NSW, Sturt National Park	GU459954	JX024563
<i>Strophurus intermedius</i>	AMS R158434	AUS, NSW, 35 km from Mt. Hope on Euabalong Road	GU459952	GU459551
<i>Strophurus jeanae</i>	SAMA R53984	AUS, QLD, 11 km S of Wycliffe Well	KJ685532	FJ855477
<i>Toropuku stephensi</i>	RAH 137	NZ, Stephens Is.	GU459782	GU459379
<i>Tukutuku rakuriae</i>	RAH 238	NZ, Stewart Is.	GU459785	GU459382
<i>Woodworthia chrysoireticus</i>	RAH 476	NZ, Mana Is.	GU459841	GU459438
<i>Woodworthia maculata</i>	RAH 292	NZ, Titahi Bay	GU459852	GU459449
Pygopodidae				
<i>Aprasia inaurita</i>	SAMA R40729	AUS, SA, 2 km E Burra	AY134574	FJ571632
<i>Delma australis</i>	SAMA R22784	AUS, SA, Mt Remarkable NP, SA	AY134582	FJ571633
<i>Delma mollerii</i>	SAMA R23137	AUS, SA, Mt Remarkable NP, SA	AY134593	FJ571635
<i>Lialis burtonis</i>	JFBM8	captive (no data)	JX024354	GU459540
<i>Pygopus lepidopodus</i>	WBJ1206	AUS, WA, Lesueur National Park	AY134603	HQ426319
<i>Pygopus nigriceps</i>	MVZ 197233	AUS, NT, 81 km S Alice springs	JX024355	EF534783
<i>Ophidiocephalus taeniatus</i>	SAMA R44653	AUS, SA, Todmorden Stn	AY134601	FJ571645

<i>Paradelma orientalis</i>	QMJ56089	AUS, 20 km N Capella, QLD, Australia	JX041398	HQ426304
<i>Pletholax gracilis</i>	WAM R104374	AUS, WA, Victoria Park	AY134602	FJ571631
Gekkonids				
<i>Gehyra variegata</i>			AY369026	FJ855439
<i>Gekko gekko</i>			AF114249	AY662625
<i>Sphaerodactylus shrevei</i>			AY662547	AY662623
<i>Teratoscincus przewalskii</i>			U71326	AY662624

Table S3. Primer combinations and reaction conditions.

Locus	Primers	Sequence	Fragment size	PCR mix	Thermocycler conditions
ND2	ND2.F ND2.R	GCCCATACCCCGAAAATSTTG TTAGGGTRGTTATTTGHGAYATKC	~900 bp	GoTaq HotStart MM	5 min @ 95C, 40 x (30s @ 95C, 30 sec @ 55C, 1 min @ 72C), 5 min @ 72C, hold at 15C
	ND2b.f ND2f.r	GCCCATACCCCAAAAATGTYG TGTRGTTATRTGDGATATYCG	~900 bp	GoTaq HotStart MM	5 min @ 95C, 40 x (30s @ 95C, 30 sec @ 50C, 1 min @ 72C), 5 min @ 72C, hold at 15C
	ND2b.f ND2e.r	GCCCATACCCCAAAAATGTYG GCGCGCTGGTTGGGTDWTTAGYTGTAA	~900 bp	GoTaq HotStart MM	5 min @ 95C, 40 x (30s @ 95C, 30 sec @ 50C, 1 min @ 72C), 5 min @ 72C, hold at 15C
RAG1	RAG1R13.F RAG1r.Stroph840	TCTGAATGGAAATTCAAGCTGTT AAGTGCTTGCATGTTGTTTC	~800 bp	GoTaq HotStart MM	5 min @ 95C, 40 x (30s @ 95C, 30 sec @ 55C, 1 min @ 72C), 5 min @ 72C, hold at 15C
	RAG1f.Stroph379 RAG1R18.R	GTGAGAGGAGACATTGAYACA GATGCTGCCTCGGTCGGCCACCTTT	~800 bp	GoTaq HotStart MM	5 min @ 95C, 40 x (30s @ 95C, 30 sec @ 55C, 1 min @ 72C), 5 min @ 72C, hold at 15C

References:

ND2. F, ND2. R – Oliver, P.M., Hugall, A.H., Adams, M.A., Cooper S.J.B. and Hutchinson, M.N. (2007) Genetic elucidation of cryptic and ancient diversity in a group of Australian diplodactyline geckos; the *Diplodactylus vittatus* complex. *Molecular Phylogenetics and Evolution*. **44**, 77-88.

ND2b.f, ND2f.r ND2e.r - Jennings B., Pianka, E.R., Donnellan, S.C. (2003). Systematics of the lizard family Pygopodidae with implications for the diversification of Australian temperate biotas. *Systematic Biology*, **52**: 757–780.

RAG1r.Stroph840, RAG1f.Stroph379 – Courtesy of Stuart Nielson, unpublished

RAG1R13.F, RAG1R18.R - Groth, J.G., Barrowclough, G.F., 1999. Basal divergences in birds and the phylogenetic utility of the nuclear RAG-1 gene. *Mol. Phylogenet. Evol.* **12**, 115–123.