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Invertebrate Systematics

Supplementary Material

Insights into the phylogenetic position and phylogeography of the monospecific skink-parasite genus *Neoentomelas* (Nematoda: Rhabditida: Rhabdiasidae), with special reference to the effects of the reproductive mode on the genetic diversity

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Table S1. Samples with voucher numbers, collection locality and host species used for molecular analyses

KUZ, Zoological Collection of Kyoto University

Parasites	Voucher number	Locality	Geographical coordinates	Hosts	Host voucher number
Neoentomelas asatoi	KUZ Z2731	Yamato Village, Kagoshima	28°21′38.1″N, 129°20′11.7″E	*Ateuchosaurus pellopleurus*	KUZ R69901
Neoentomelas asatoi	KUZ Z2732	Yamato Village, Kagoshima	28°21′38.1″N, 129°20′19.4″E	*Ateuchosaurus pellopleurus*	KUZ R69902
Neoentomelas asatoi	KUZ Z2733	Amami City, Kagoshima	28°13′27.1″N, 129°21′28.0″E	*Ateuchosaurus pellopleurus*	KUZ R69903
Neoentomelas asatoi	KUZ Z2734	Amami City, Kagoshima	28°21′18.9″N, 129°20′15.3″E	*Ateuchosaurus pellopleurus*	KUZ R69904
Neoentomelas asatoi	KUZ Z2735	Suwanosejima Island, Kagoshima	29°36′39.2"N 129°42′15.1"E	*Ateuchosaurus pellopleurus*	KUZ R69908
Neoentomelas asatoi	KUZ Z2736	Suwanosejima Island, Kagoshima	29°36′39.2"N 129°42′15.1"E	*Ateuchosaurus pellopleurus*	KUZ R69910
Neoentomelas asatoi	KUZ Z2737	Ogimi Village, Okinawa	26°41′26.9"N 128°07′31.6"E	*Ateuchosaurus pellopleurus*	KUZ R70673
Neoentomelas asatoi	KUZ Z2738	Hamahigajima Island, Okinawa	n/a	*Ateuchosaurus pellopleurus*	KUZ R70128
Neoentomelas asatoi	KUZ Z2739	Iojima Island, Kagoshima	30°48′20.50″N, 130°18′10.63″E	*Ateuchosaurus pellopleurus*	KUZ R70422
Neoentomelas asatoi	KUZ Z2740	Takeshima Island, Kagoshima	30°48′42.89″N, 130°25′02.68″E	*Ateuchosaurus pellopleurus*	KUZ R70458
Neoentomelas asatoi	KUZ Z2741	Kumejima Island, Okinawa	26°21′44.28″N, 126°45′53.35″E	*Ateuchosaurus pellopleurus*	KUZ R70497
Neoentomelas asatoi	KUZ Z2742	Kumejima Island, Okinawa	26°19′19.84″N, 126°46′33.51″E	*Ateuchosaurus pellopleurus*	KUZ R70487
Neoentomelas asatoi	KUZ Z2743	Tokashikijima Island, Okinawa	26°12′49.03″N, 127°21′26.65″E	*Ateuchosaurus pellopleurus*	KUZ R70505
Neoentomelas asatoi	KUZ Z2744	Kodakarajima Island, Kagoshima	n/a	*Ateuchosaurus pellopleurus*	KUZ R70150
Neoentomelas asatoi	KUZ Z2745	Ogimi Village, Okinawa	26°41′26.45″N, 128°07′47.37″E	*Ateuchosaurus pellopleurus*	KUZ R77458
Neoentomelas asatoi	KUZ Z2746	Ogimi Village, Okinawa	26°41′28.78″N, 128°07′45.48″E	*Ateuchosaurus pellopleurus*	KUZ R77459
Neoentomelas asatoi	KUZ Z2747	Ogimi Village, Okinawa	26°39′45.00″N, 128°07′53.90″E	*Ateuchosaurus pellopleurus*	KUZ R77446
Neoentomelas asatoi	KUZ Z2748	Amami City, Kagoshima	28°23′43.1"N 129°28′03.8"E	*Ateuchosaurus pellopleurus*	KUZ R77492
Neoentomelas asatoi	KUZ Z2749	Iheyajima Island, Okinawa	27°02′27.30″N, 127°57′54.14″E	*Ateuchosaurus pellopleurus*	KUZ R77532
Neoentomelas asatoi	KUZ Z2750	Tokunoshima Town, Kagoshima	27°47′41.04″N, 128°57′40.27″E	*Ateuchosaurus pellopleurus*	KUZ R77676

Table S2. List of the DDBJ accession numbers of DNA sequences of Neoentomelas asataoi determined by the present study

Taxa	Locality number	Haplotype number		*COI*	*12S*	*18S–28S*	Analyses		
		mt	n				Phylogenetic tree (mtDNA)	Phylogenetic tree (nDNA)	Statistical parsimony network
Neoentomelas asatoi	5	Aa5	-	LC632153	LC632222	-	x	-	-
Neoentomelas asatoi	5	Aa5	H6	LC632154	LC632223	LC631538	x	-	x
Neoentomelas asatoi	3	T1	H1	LC632093	LC632169	LC631498	x	-	x
Neoentomelas asatoi	10	O2	H3	LC632155	LC632224	LC631539	x	x	x
Neoentomelas asatoi	6	Ay1	H6	LC632082	LC632158	LC631491	x	-	x
Neoentomelas asatoi	6	Ay1	H6	LC632083	LC632159	LC631492	x	-	x
Neoentomelas asatoi	6	Ay2	-	LC632084	LC632160	-	x	-	-
Neoentomelas asatoi	6	Ay6	-	LC632085	LC632161	-	x	-	-
Neoentomelas asatoi	6	Ay7	-	LC632086	LC632162	-	x	-	-
Neoentomelas asatoi	6	Ay8	-	LC632087	LC632163	-	x	-	-
Neoentomelas asatoi	6	Ay9	-	LC632088	LC632164	-	x	-	-
Neoentomelas asatoi	6	Ay3	H6	LC632089	LC632165	LC631494	x	-	x
Neoentomelas asatoi	3	T1	H1	LC632091	LC632167	LC631496	x	-	x
Neoentomelas asatoi	3	T1	H1	LC632092	LC632168	LC631497	x	-	x
Neoentomelas asatoi	11	Hm1	H8	LC632094	LC632170	LC631499	x	-	x
Neoentomelas asatoi	11	Hm1	H8	LC632095	LC632171	LC631500	x	-	x
Neoentomelas asatoi	11	Hm1	-	LC632096	LC632172	-	x	-	-
Neoentomelas asatoi	11	Hm1	-	LC632097	LC632173	-	x	-	-
Neoentomelas asatoi	11	Hm1	-	LC632098	LC632174	-	x	-	-
Neoentomelas asatoi	6	Ay4	-	LC632099	LC632175	-	x	-	-
Neoentomelas asatoi	6	Ay5	H6	LC632102	LC632178	LC631503	x	-	x
Neoentomelas asatoi	6	Ay3	H6	LC632090	LC632166	LC631495	x	-	x
Neoentomelas asatoi	6	Ay4	H6	LC632100	LC632176	LC631501	x	-	x
Neoentomelas asatoi	6	Ay4	H6	LC632101	LC632177	LC631502	x	-	x
Neoentomelas asatoi	2	M2	-	LC632103	LC632179	-	x	-	-
Neoentomelas asatoi	2	M2	H2	LC632104	LC632180	LC631504	x	-	x
Neoentomelas asatoi	2	M2	-	LC632105	LC632181	-	x	-	-
Neoentomelas asatoi	2	M2	-	LC632106	LC632182	-	x	-	-
Neoentomelas asatoi	2	M1	H2	LC632108	LC632184	LC631507	x	-	x
Neoentomelas asatoi	2	M2	H2	LC632107	LC632183	LC631506	x	-	x
Neoentomelas asatoi	12	Tka1	H8	LC632109	LC632185	LC631508	x	-	x
Neoentomelas asatoi	12	Tka1	H8	LC632110	LC632186	LC631509	x	-	x
Neoentomelas asatoi	13	K2	H8	LC632111	LC632187	LC631510	x	-	x
Neoentomelas asatoi	13	K2	H8	LC632112	LC632188	LC631511	x	-	x
Neoentomelas asatoi	13	K3	-	LC632115	LC632191	-	x	-	-
Neoentomelas asatoi	13	K4	H8	LC632116	LC632192	LC631514	x	-	x
Neoentomelas asatoi	13	K5	H7	LC632117	LC632193	LC631515	x	-	x
Neoentomelas asatoi	13	K1	-	LC632118	-	-	x	-	-
Neoentomelas asatoi	13	K2	H8	LC632113	LC632189	LC631512	x	-	x
Neoentomelas asatoi	13	K6	H8	LC632119	LC632194	LC631516	x	-	x
Neoentomelas asatoi	13	K2	H8	LC632114	LC632190	LC631513	x	-	x
Neoentomelas asatoi	12	Tka2	H8	LC632120	LC632195	LC631517	x	-	x
Neoentomelas asatoi	13	T2	-	LC632121	LC632196	-	x	-	-
Neoentomelas asatoi	13	T2	H6	LC632122	LC632197	LC631518	x	-	x

Taxa	Locality number	Haplotype number		*COI*	*12S*	*18S–28S*	Analyses		
		mt	n				Phylogenetic tree (mtDNA)	Phylogenetic tree (nDNA)	Statistical parsimony network
Neoentomelas asatoi	13	T3	-	LC632123	LC632198	-	x	-	-
Neoentomelas asatoi	13	T3	-	LC632124	LC632199	-	x	-	-
Neoentomelas asatoi	8	Tku2	H4	LC632125	-	LC631519	x	x	x
Neoentomelas asatoi	10	O1	H3	LC632128	LC632201	LC631522	x	-	x
Neoentomelas asatoi	10	O1	H3	LC632129	LC632202	LC631523	x	-	x
Neoentomelas asatoi	10	O1	-	LC632130	LC632203	-	x	-	-
Neoentomelas asatoi	10	O1	-	LC632131	LC632204	-	x	-	-
Neoentomelas asatoi	10	O3	H6	LC632132	LC632205	LC631524	x	-	x
Neoentomelas asatoi	5	Aa1	H6	LC632133	LC632206	LC631525	x	-	x
Neoentomelas asatoi	5	Aa1	-	LC632134	LC632207	-	x	-	-
Neoentomelas asatoi	5	Aa1	-	LC632135	LC632208	-	x	-	-
Neoentomelas asatoi	5	Aa1	H6	LC632136	LC632209	LC631526	x	-	x
Neoentomelas asatoi	5	Aa1	-	LC632137	LC632210	-	x	-	-
Neoentomelas asatoi	5	Aa3	-	LC632138	LC632211	-	x	-	-
Neoentomelas asatoi	5	Aa2	H6	LC632140	LC632213	LC631528	x	-	x
Neoentomelas asatoi	5	Aa3	H6	LC632139	LC632212	LC631527	x	-	x
Neoentomelas asatoi	5	Aa4	H6	LC632141	LC632214	LC631529	x	-	x
Neoentomelas asatoi	9	I2	-	LC632142	LC632215	-	x	-	-
Neoentomelas asatoi	9	I3	H6	LC632144	LC632217	LC631530	x	-	x
Neoentomelas asatoi	9	I1	H6	LC632145	LC632218	LC631531	x	-	x
Neoentomelas asatoi	9	I1	H6	LC632146	LC632219	LC631532	x	-	x
Neoentomelas asatoi	9	I2	-	LC632143	LC632216	-	x	-	-
Neoentomelas asatoi	9	I4	H6	LC632147	LC632220	LC631533	x	-	x
Neoentomelas asatoi	9	I4	H6	LC632148	LC632221	LC631534	x	-	x
Neoentomelas asatoi	8	Tku2	H5	LC632126	LC632200	LC631520	x	-	x
Neoentomelas asatoi	7	Tku1	H4	LC632149	-	LC631535	x	-	x
Neoentomelas asatoi	7	Tku1	H4	LC632150	-	LC631536	x	-	x
Neoentomelas asatoi	7	Tku1	H4	LC632151	-	LC631537	x	-	x
Neoentomelas asatoi	8	Tku2	H4	LC632127	-	LC631521	x	-	x
Neoentomelas asatoi	7	Tku1	-	LC632152	-	-	x	-	-
Kurilonema markovi	-	-	-	LC632156	LC632225	-	x	-	-
Kurilonema markovi	-	-	-	LC632157	LC632226	-	x	-	-
Kurilonema markovi	-	-	-	-	-	LC631541	-	x	-
Kurilonema markovi	-	-	-	-	-	LC631542	-	x	-
Kurilonema markovi	-	-	-	-	-	LC631540	-	x	-

Table S3. Samples used for phylogenetic analyses based on *18S–28S* with GenBank accession numbers

Taxa	Accession number
Entomelas dujardini	KF999591
Entomelas entomelas	KF999592
Entomelas kazachstanica	KF999597
Entomelas ophisauri	KF999595
Entomelas sp.	KF999601
Pneumonema sp.	KF999603
Pneumonema sp. 2	KF999612
Pneumonema tiliquae	KF999611
Rhabdias ambystomae	KF999590
Rhabdias americanus	KF999589
Rhabdias bakeri	DQ264770
Rhabdias bermani	KF999610
Rhabdias bufonis	KF999593
Rhabdias bulbicauda	KF999600
Rhabdias cf. *africanus*	KF999598
Rhabdias cf. *bufonis* 1	KF999606
Rhabdias cf. *bufonis* 2	KF999609
Rhabdias cf. *hylae* SD-2008 IV V A1	EU836866
Rhabdias cf. *hylae* SD-2008 V A2	EU836863
Rhabdias cf. *hylae* SD-2008 VI A2	EU836868
Rhabdias cf. *hylae* SD-2008 VII A1	EU836874
Rhabdias cf. *joaquinensis* 1	KF999608
Rhabdias cf. *joaquinensis* 2	KF999602
Rhabdias cf. *joaquinensis* 3	KF999607
Rhabdias delangei	MT298095
Rhabdias elegans	KF999604
Rhabdias engelbrechti	MG428406
Rhabdias joaquinensis	KF999594
Rhabdias kongmongthaensis	KF999599
Rhabdias nicaraguensis	KF999605
Rhabdias picardiae	MG195567
Rhabdias pseudosphaerocephala	DQ845737
Rhabdias ranae	DQ264766
Rhabdias rubrovenosa	KF999596
Rhabdias sp. SD-2008 II A1	EU836870
Rhabdias sphaerocephala	DQ845739
Rhabdias sylvestris	KJ018777
Rhabdias tarichae	MH023521
Serpentirhabdias elaphe	MH283884
Serpentirhabdias eustreptos	JX826441
Serpentirhabdias fuscovenosa	KF999588
Serpentirhabdias fuscovenosa	JX826442
Serpentirhabdias moi	MH283886
Serpentirhabdias sp. 1 VVT-2019	MK680941
Steinernema affine	KY818705
Steinernema beddingi	AY603397
Steinernema intermedium	AF122016
Steinernema poinari	KF241753
Strongyloides callosciureus	AB272230
Strongyloides fuelleborni	AB272235
Strongyloides robustus	AB272232
Rhabditis blumi	DQ121436
Rhabditis terricola	KX036749