

**Supplementary Table S1.** *Cox1* gene GenBank accession number used in this study

Genus	Species	Country	Host	Accession no.	Length	A+T%
<i>Laelaps</i>	<i>Laelaps fukienensis</i>	China	<i>Niviventer fulvescens</i>	OL806574 (This study)	438	72.4
	<i>Laelaps chini</i>	China	<i>Eothenomys miletus</i>	OL806586 (This study)	438	71.4
	<i>Laelaps schatzi</i>	Argentina	<i>Oligoryzomys flavescens</i>	MK716211	620	72.7
	<i>Laelaps agilis</i>	Lithuania	<i>Myodes glareolus</i>	MZ048462	582	74.6
	<i>Laelaps echidninus</i>	China	<i>Rattus tanezumi</i>	OL780835 (This study)	421	73.1
	<i>Laelaps nuttalli</i>	China	<i>Rattus nitidus</i>	OL810027 (This study)	418	73.2
	<i>Laelaps muricola</i>	South Africa	<i>Myotis muricola</i>	KU166786	644	73.0
	<i>Laelaps giganteus</i>	South Africa	<i>Rhabdomys dilectus</i>	KU166639	644	71.4
	<i>Laelaps kochi</i>	Canada	<i>Oligoryzomys flavescens</i>	MG414008	653	71.5
	<i>Laelaps taingueni</i>	China	<i>Mus musculus</i>	KF437542	658	71.0
<i>Laelaps hilaris</i>	Lithuania	<i>Apodemus agrarius</i>	MZ048456	582	72.0	
<i>Haemolaelaps</i>	<i>Haemolaelaps traubi</i>	China	<i>Callosciurus erythraeus</i>	OL810029 (This study)	440	71.8
<i>Neocypholaelaps</i>	<i>Neocypholaelaps apicola</i>	Hungary	<i>Apis mellifera</i>	KP966315	709	72.9
	<i>Neocypholaelaps indica</i>	China	<i>Apis mellifera</i>	MF040695	707	70.3
<i>Tropilaelaps</i>	<i>Tropilaelaps thaii</i>	China	<i>Apis laboriosa</i>	EF025452	538	67.3
	<i>Tropilaelaps clareae</i>	Philippines	<i>Apis mellifera</i>	EF025458	538	68.8
	<i>Tropilaelaps mercedesae</i>	Indonesia	<i>Apis dorsata</i>	KY865195	672	65.9
	<i>Tropilaelaps koenigerum</i>	China	<i>Apis laboriosa</i>	EF025449	538	67.5
<i>Androlaelaps</i>	<i>Androlaelaps casalis</i>	France	Poultry	MH983844	657	61.0
	<i>Androlaelaps sp.</i>	France	Poultry	MH983812	658	69.5
<i>Hyperlaplaes</i>	<i>Hyperlaplaes microti</i>	Lithuania	<i>Microtus arvalis</i>	MZ048468	582	72.3