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An updated and annotated checklist of the lizards of Peninsular Malaysia, Singapore, and their adjacent archipelagos

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Abstract

Since the book-formatted, monographic treatment of the lizards of Peninsular Malaysia, Singapore, and their adjacent islands by Grismer (2011), 47 additional species have been added to that fauna bringing the total to 174. One species, *Cyrtodactylus stresemanni,* was removed from the lizard fauna based on its likely mislabeled type locality; 44 species were described as new—29 gekkonids, 11 scincids, five agamids, and one dibamid; and three others, *Cnemaspis narathiwatensis*, *Cyrtodactylus brevipalmatus,* and *Scincella melanosticta* were recently discovered in northern Peninsular Malaysia. Taxonomic changes for seven previously described species occurring after 2011 are noted and significant, new locality records are documented here for additional species. The intent of this review is to provide an up to date peer-reviewed checklist for the lizard species of this region prior to a pending updated book monograph.

Key words: Taxonomy, reptiles, Southeast Asia, conservation, herpetofauna

Introduction

Up until 2011, lizards were the most overlooked and understudied section of the herpetofauna of Peninsular Malaysia and Singapore. Even by 1983, Tweedie had already published three books on the snakes of Peninsular Malaysia (Tweedie 1953, 1957, 1983) which still stand as the best regional comprehensive studies for this group of reptiles. Berry (1975) still stands as the only published monographic work on the frogs of Peninsular Malaysia and although severely outdated, it too remains the best published work on this faunal group. Lim and Das (1999) published a guide to the turtles of Peninsular Malaysia. Nevertheless, up until 2011, lizards as a faunal group remained completely overlooked. Manthey & Grosmann (1997) covered all the genera of amphibians and reptiles of Sundaland and the pocket guide of Cox *et al.* (1998) gave brief accounts of a number of reptile species from the Thai-Malay Peninsula. A field guide to the reptiles of Southeast Asia by Das (2010) lacked detailed illustrations and contained so many errors concerning the lizards of Peninsular Malaysia (see comments in Grismer 2011) and several other reptiles (see Pauwels & David 2011), that in many cases, its use does more harm than good. Grismer (2011) published the first book monographic treatment of the lizards of Peninsular Malaysia, Singapore, and their adjacent archipelagos, which was a synthesis of all the published data from the early 1800s to the date of publication that dealt with the natural history, distribution, geographic variation, and taxonomy of the 128 species known at that time. However, since that publication, 47 species—of which 44 were newly described—have been added to the lizard fauna (Table 1; Figs. 1, 2). Additionally, data on the taxonomy and distribution of a number of other species have been significantly augmented. The intent of this annotated checklist is to update these changes in a peer-reviewed context so as not to present new data in a non-peer reviewed subsequent book volume on the lizards of Peninsular Malaysia, Singapore, and their adjacent archipelagos.

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TABLE 1. Checklist of the lizard species from Peninsular Malaysia, Singapore, and their adjacent archipelagos. N = described after 2011, R = added as a range extension after 2011, T = taxonomy changed after 2011.

Taxon	Author(s)	Designation
AGAMIDAE		
Acanthosaura armata	(Gray, 1827)	
Acanthosaura bintangensis	Wood, Grismer, Grismer, Ahmad, Chan & Bauer, 2009	
Acanthosaura crucigera	Boulenger, 1885	
Acanthosaura titiwangsaensis	Wood, Grismer, Grismer, Ahmad, Chan & Bauer, 2009	
Aphaniotis fusca	(Peters, 1864)	
Bronchocela cristatella	(Kuhl, 1820)	
Bronchocela rayaensis	Grismer, Wood, Lee, Quah, Anuar, Ngadi & Sites, 2015	N
Bronchocela shenlong	Grismer, Wood, Lee, Quah, Anuar, Ngadi & Sites, 2015	N
Calotes emma	Gray, 1845	
Calotes versicolor	(Daudin, 1802)	
Draco blanfordii	Blanford, 1878	
Draco fimbriatus	Kuhl, 1820	T
Draco formosus	Boulenger, 1900	
Draco haematopogon	Gray, 1831	
Draco maculatus	(Gray, 1845)	
Draco maximus	Boulenger, 1893	
Draco melanopogon	Boulenger, 1887	
Draco punctatus	Boulenger, 1900	T
Draco quinquefasciatus	Hardwicke & Gray, 1827	
Draco sumatranus	Schlegel, 1844	
Draco taeniopterus	Günther, 1861	
Gonocephalus abbotti	Cochran, 1922	
Gonocephalus bellii	(Duméril & Bibon, 1837)	
Gonocephalus chamaeleontinus	(Laurenti, 1768)	
Gonocephalus grandis	(Gray, 1845)	
Gonocephalus liogaster	(Günther, 1872)	
Malayodracon robinsonii	(Boulenger, 1908)	T
Physignathus concinius	Cuvier, 1826	
Pseudocalotes dringi	Hallerman & Böhme, 2000	
Pseudocalotes drogon	Grismer, Quah, Wood, Anuar, Muin, Davis, Murdoch, Grismer & Cota, 2016	N
Pseudocalotes flavigula	(Smith, 1924)	
Pseudocalotes larutensis	Hallerman & McGuire, 2001	
Pseudocalotes rhaegal	Grismer, Quah, Wood, Anuar, Muin, Davis, Murdoch, Grismer & Cota, 2016	N
Pseudocalotes viserion	Grismer, Quah, Wood, Anuar, Muin, Davis, Murdoch, Grismer & Cota, 2016	N
DIBAMIDAE		
Dibamus booliati	Das & Yaakob, 2003	
Dibamus floweri	Quah, Anuar, Grismer, & Grassby-Lewis, 2017	N
Dibamus tiomanensis	Diaz, Leong, Grismer & Yaakob, 2004	

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TABLE 1. (Continued)

Taxon	Author(s)	Designation
EUBLEPHARIDAE		
Aeluroscalabotes felinus	(Günther, 1864)	
GEKKONIDAE		
Cnemaspis affinis	(Stoliczka, 1870)	
Cnemaspis argus	Dring, 1979	
Cnemaspis baueri	Das & Grismer, 2003	
Cnemaspis bayuensis	Grismer, Grismer, Wood & Chan, 2008	
Cnemaspis bidongensis	Grismer, Wood, Ahmad, Sumarli, Vazquez, Ismail, Nance, Mohd-Amin, Othman, Rizzaijesika, Kuss, Murdoch & Cobos, 2014	N
Cnemaspis biocellata	Grismer, Chan, Nasir & Sumontha, 2008	
Cnemaspis flavigaster	Chan & Grismer, 2008	
Cnemaspis flavolineata	(Nicholls, 1949)	
Cnemaspis grismeri	Wood, Quah, Anaur & Muin, 2013	N
Cnemaspis hangus	Grismer, Wood, Anuar, Riyanto, Ahmad, Muin, Sumontha, Grismer, Chan, Quah & Pauwels, 2014	N
Cnemaspis harimau	Chann, Grismer, Anuar, Quah, Muin, Savage, Grismer, Ahmad, Remigo & Greer, 2010	
Cnemaspis karsticola	Grismer, Grismer, Wood & Chan, 2008	
Cnemaspis kumpoli	Taylor, 1963	
Cnemaspis limi	Das & Grismer, 2003	
Cnemaspis mahsuriae	Grismer, Wood, Quah, Anaur, Ngadi & Ahmad, 2015	N
Cnemaspis mcguirei	Grismer, Grismer, Wood & Chan, 2008	
Cnemaspis monachorum	Grismer, Ahmad, Chan, Belabut, Muin, Wood & Grismer, 2009	
Cnemaspis narathiwatensis		
Cnemaspis omari	Grismer, Wood, Anuar, Riyanto, Ahmad, Muin, Sumontha, Grismer, Chan, Quah & Pauwels, 2014	N
Cnemaspis pemanggilensis	Grismer & Das, 2006	
Cnemaspis peninsularis	Grismer, Wood, Anuar, Riyanto, Ahmad, Muin, Sumontha, Grismer, Chan, Quah & Pauwels, 2014	N,T
Cnemaspis perhentianensis	Grismer & Chan, 2008	
Cnemaspis pseudomcguirei	Grismer, Ahmad, Chan, Belabut, Muin, Wood & Grismer, 2009	
Cnemaspis roticanai	Grismer & Chan, 2010	
Cnemaspis selamatkanmerapoh	Grismer, Wood, Mohamed, Chan, Heinz, Sumarli, Chan & Loredo, 2013	
Cnemaspis shahruli	Grismer, Chan, Quah, Muin, Savage, Grismer, Ahmad, Greer & Remegio, 2010	
Cnemaspis stongensis	Grismer, Wood, Anuar, Riyanto, Ahmad, Muin, Sumontha, Grismer, Chan, Quah & Pauwels, 2014	N
Cnemaspis temiah	Grismer, Wood, Anuar, Riyanto, Ahmad, Muin, Sumontha, Grismer, Chan, Quah & Pauwels, 2014	N
Cyrtodactylus astrum	Grismer, Wood, Quah, Anuar, Muin, Sumontha, Ahmad, Bauer, Wangkulangkul, Grismer & Pauwels, 2012	N
Cyrtodactylus aurensis	Grismer, 2005	
Cyrtodactylus australotitiwangsaensis	Grismer, Wood, Quah, Anuar, Muin, Sumontha, Ahmad, Bauer, Wangkulangkul, Grismer & Pauwels, 2012	N
Cyrtodactylus batucolus	Grismer, Chan, Grismer, Wood & Belabut, 2008	

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TABLE 1. (Continued)

Taxon	Author(s)	Designation
Cyrtodactylus bintangrendah	Grismer, Wood, Quah, Anuar, Muin, Sumontha, Ahmad, Bauer, Wangkulangkul, Grismer & Pauwels, 2012	N
Cyrtodactylus bintangtinggi	Grismer, Wood, Quah, Anuar, Muin, Sumontha, Ahmad, Bauer, Wangkulangkul, Grismer & Pauwels, 2012	N
Cyrtodactylus brevipalmatus	(Smith, 1923)	R
Cyrtodactylus consobrinus	(Peters, 1871)	
Cyrtodactylus durio	Grismer, Anuar, Quah, Muin, Chan, Grismer & Ahmad, 2010	
Cyrtodactylus elok	Dring, 1979	
Cyrtodactylus guakanthanensis	Grismer, Belabut, Quah, Chan, Wood & Hasim, 2014	N
Cyrtodactylus gunungsenyumensis	Grismer, Wood, Anuar, Davis, Cobos & Murdoch, 2016	N
Cyrtodactylus hidupselamanya	Grismer, Wood, Anuar, Grismer, Quah, Murdoch, Muin, Davis, Aguilar, Klabacka, Cobos, Aowphol & Sites, 2016	N
Cyrtodactylus jarakensis	Grismer, Chan, Grismer, Wood & Belabut, 2008	
Cyrtodactylus jelawangensis	Grismer, Wood, Anuar, Quah, Muin, Mohamed, Chan, Sumarli, Loredo & Heinz, 2014	N
Cyrtodactylus langkawiensis	Grismer, Wood, Quah, Anuar, Muin, Sumontha, Ahmad, Bauer, Wangkulangkul, Grismer & Pauwels, 2012	N
Cyrtodactylus leegrismeri	Chan & Norhayati, 2010	
Cyrtodactylus lenggongensis	Grismer, Wood, Anuar, Grismer, Quah, Murdoch, Muin, Davis, Aguilar, Klabacka, Cobos, Aowphol & Sites, 2016	N
Cyrtodactylus macrotuberculatus	Grismer & Ahmad, 2008	
Cyrtodactylus metropolis	Grismer, Wood, Chan, Anuar & Muin, 2014	N
Cyrtodactylus pantiensis	Grismer, Chan, Grismer, Wood & Belabut, 2008	
Cyrtodactylus payacola	Johnson, Quah, Anuar, Muin, Wood, Grismer, Greer, Chan, Ahmad, Bauer & Grismer, 2012	N
Cyrtodactylus pulchellus	Gray, 1827	
Cyrtodactylus quadrivirgatus	Taylor, 1962	
Cyrtodactylus semenanjungensis	Grismer & Leong, 2005	
Cyrtodactylus seribuatensis	Youmans & Grismer, 2006	
Cyrtodactylus sharkari	Grismer, Wood, Anuar, Quah, Muin, Mohamed, Chan, Sumarli, Loredo & Heinz, 2014	N
Cyrtodactylus sworderi	(Smith, 1925)	
Cyrtodactylus tebuensis	Grismer, Anuar, Muin, Quah & Wood, 2013	N
Cyrtodactylus timur	Grismer, Wood, Anuar, Quah, Muin, Mohamed, Chan, Sumarli, Loredo & Heinz, 2014	N
Cyrtodactylus tiomanensis	Das & Lim, 2000	
Cyrtodactylus trilatofasciatus	Grismer, Wood, Quah, Anuar, Muin, Sumontha, Ahmad, Bauer, Wangkulangkul, Grismer & Pauwels, 2012	N
Gehyra mutilata	(Wiegmann, 1834)	
Gekko gecko	(Linnaeus, 1758)	
Gekko monarchus	(Schlegel, 1836)	
Gekko smithii	Gray, 1842	
Hemidactylus brookii	Gray, 1845	
Hemidactylus craspedotus	Mocquard, 1890	
Hemidactylus frenatus	Duméril & Bibron, 1836	

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TABLE 1. (Continued)

Taxon	Author(s)	Designation
Hemidactylus garnotti	Duméril & Bibron, 1836	
Hemidactylus platyurus	(Schneider, 1797)	
Hemiphyllodactylus bintik	Grismer, Wood, Anuar, Quah, Muin, Chan, Sumarli & Loredo, 2015	N
Hemiphyllodactylus cicak	Cobos, Grismer, Wood, Quah, Anuar & Muin, 2016	N
Hemiphyllodactylus harterti	(Werner, 1900)	
Hemiphyllodactylus larutensis	(Boulenger, 1900)	
Hemiphyllodactylus tehtarik	Grismer, Wood, Anuar, Muin, Quah, McGuire, Brown, van Tri & Thai, 2013	N
Hemiphyllodactylus titwangsaensis	Zug, 2010	
Hemiphyllodactylus typus	Bleeker, 1860	
Lepidodactylus lugubris	(Duméril & Bibron, 1836)	
Luperosaurus browni	Russell, 1979	
Ptychozoon horsfieldii	(Gray, 1827)	
Ptychozoon kuhli	(Stejneger, 1902)	
Ptychozoon lionotum	Annandale, 1905	
IGUANIDAE		
Iguana iguana	(Linneaus, 1758)	
LACERTIDAE		
Takydromus sexlineatus	Daudin, 1802	
SCINCIDAE		
Dasia grisea	(Gray, 1845)	
Dasia olivacea	Gray, 1839	
Emoia atrocostata	(Lesson, 1830)	
Eutropis longicaudata	(Hallowell, 1857)	
Eutropis macularia	(Blyth, 1853)	
Eutropis multifasciata	(Kuhl, 1820)	
Eutropis rugifera	(Stoliczka, 1870)	
Larutia larutensis	(Boulenger, 1900)	
Larutia miodactyla	(Boulenger, 1903)	
Larutia penangensis	Grismer, Huat, Siler, Chan, Wood, Grismer, Sah & Ahmad, 2011	
Larutia seribuatensis	Grismer, Leong & Yaakob, 2003	
Larutia trifasciata	(Tweedie, 1940)	
Leiolepis belliana	(Hardwicke & Gray, 1827)	
Leiolepis triploida	Peters 1971	
Lipinia sekayuensis	Grismer, Ismail, Awang, Rizal & Ahmad, 2014	N
Lipinia surda	Boulenger, 1900	
Lipinia vittigera	(Boulenger, 1894)	
Lygosoma albopunctata	(Gray, 1846)	
Lygosoma bowringii	(Günther, 1864)	
Lygosoma herberti	Smith, 1916	
Lygosoma peninsularae	Grismer, Quah, Duzulkafly, & Yambun 2018	N, T
Lygosoma siamensis	Siler, Heitz, Davis, Freitas, Aowphol, Termprayoon & Grismer, 2018	T

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TABLE 1. (Continued)

Taxon	Author(s)	Designation
Scincella melanosticta	(Boulenger, 1887)	R
Sphenomorphus anomalopus	(Boulenger, 1890)	
Sphenomorphus cameronicus	Smith, 1924	
Sphenomorphus cyanolaemus	Inger & Hosmer, 1965	
Sphenomorphus indicus	(Gray, 1853)	
Sphenomorphus maculatus	(Blyth, 1853)	
Sphenomorphus praesignis	(Boulenger, 1900)	
Sphenomorphus scotophilus	(Boulenger, 1900)	
Sphenomorphus senja	Grismer & Quah, 2015	N, T
Sphenomorphus stellatus	(Boulenger, 1900)	
Sphenomorphus sungaicolus	Sumarli, Grismer, Wood, Ahmad, Rizal, Ismail, Izam, Ahmad & Linkem 2016	N
Sphenomorphus tersus	(Smith, 1916)	
Toenayar novemcarinata	(Anderson, 1871)	N,T
Tytthoscincus bukitensis	Grismer, 2007	
Tytthoscincus butleri	(Boulenger, 1912)	
Tytthoscincus copias	(Boulenger, 1909)	T
Tytthoscincus ishaki	Grismer, 2006	
Tytthoscincus jaripendek	Grismer, Wood, Quah, Anuar, Ngadi, Izam, & Norhayati 2017	N
Tytthoscincus kakikecil	Grismer, Wood, Quah, Anuar, Ngadi, Izam, &Norhayati 2017	N
Tytthoscincus keciktuek	Grismer, Wood, Ahmad, Baizul-Hafasyam, Afiq-Shuhaim, Rizal & Quah 2018	N
Tytthoscincus martae	Grismer, Wood, Quah, Anuar, Ngadi, Izam, & Norhayati 2017	N
Tytthoscincus monticolus	Grismer, Wood, Ahmad, Baizul-Hafasyam, Afiq-Shuhaim, Rizal & Quah 2018	N
Tytthoscincus panchorensis	Grismer, Muin, Wood, Anuar & Linkem, 2016	N
Tytthoscincus perhentianensis	Grismer, Wood & Grismer 2009	
Tytthoscincus sibuensis	Grismer, 2006	
Tytthoscincus temasekensis	Grismer, Wood, Lim, & Liang 2017	N
Tytthoscincus temengorensis	Grismer, Ahmad & Chan, 2009	
VARANIDAE		
Varanus dumerilii	Schlegel, 1839	
Varanus nebulosus	(Gray, 1831)	
Varanus rudicollis	(Gray, 1845)	
Varanus salvator	(Laurenti, 1768)	

Material and methods

The species listed below have been added to the lizard fauna of Peninsular Malaysia since 2011 either by being newly described or being a newly discovered southern range extensions from Thailand into Peninsular Malaysia. Other species discussed have undergone taxonomic changes or their distributions have been augmented by new discoveries. Type specimen information is provided for all species described since 2011. An up to date checklist of all lizards of Peninsular Malaysia and Singapore is presented in Table 1. Museum and photographic acronyms for specimens serving as vouchers are as follows: LSUHC refers to the La Sierra University Herpetological Collection,

Riverside, California, USA; LSUDPC refers to the La Sierra University Digital Photo Collection, Riverside, California, USA; and ZRC refers to the Zoological Reference Collection housed in the Lee Kong Chiang Natural History Museum, National University of Singapore, Singapore.

Species Accounts

Family Agamidae Gray

***Bronchocela rayaensis* Grismer, Wood, Lee, Quah, Anuar, Ngadi & Sites, 2015**

Holotype and type locality: Adult male (LSUHC 7535) from "834 m a.s.l. from Gunung Raya, Pulau Langkawi, Kedah, Peninsular Malaysia (06°22.096 N; 99°49.004 E)."

Distribution: Known from Pulau Langkawi Malaysia, northward to at least Phuket Island and Khura Buri District, Phang-nga Province,Thailand (Grismer *et al.* 2016a).

***Bronchocela shenlong* Grismer, Wood, Lee, Quah, Anuar, Ngadi & Sites, 2015**

Holotype and type locality: Adult male (LSUHC 9017) from "1100 m a.s.l. from Bukit Larut, Perak, Peninsular Malaysia (04°51.715 N, 100°47.933 E)."

Distribution: Known from Bukit Larut, Perak and Cameron Highlands, Pahang.

***Draco fimbriatus* Kuhl, 1820**

Taxonomy: New species allocation from *D. abbreviatus* to *D. fimbriatus* (McGuire *et al.* 2018).

***Draco punctatus* Boulenger, 1900**

Taxonomy: New species allocation from *D. fimbriatus* to *D. punctatus* (McGuire *et al.* 2018).

***Malayodracon robinsonii* (Boulenger, 1908)**

Taxonomy: New generic allocation from *Gonocephalus* (Denzer *et al.* 2015)

***Pseudocalotes drogon* Grismer, Quah, Wood, Anuar, Muin, Davis, Murdoch, Grismer & Cota, 2016**

Holotype and type locality: Adult male (LSUHC 12223) from "1 km south of Air Terjun Jeriau, Fraser's Hill, Pahang, Peninsular Malaysia (3° 43.283 N 101° 43.035 E; 1066 m in elevation)."

Distribution: Known only from the type locality.

***Pseudocalotes rhaegal* Grismer, Quah, Wood, Anuar, Muin, Davis, Murdoch, Grismer & Cota, 2016**

Holotype and type locality: Adult female (LSUHC 12178) from "Robinson Falls, Cameron Highlands, Pahang, Peninsular Malaysia (04° 43.283 N 101° 23.129 E; 1411 m in elevation)."

Distribution: Known only from the type locality.

***Pseudocalotes viserion* Grismer, Quah, Wood, Anuar, Muin, Davis, Murdoch, Grismer & Cota, 2016**

Holotype and type locality: Adult female (LSUHC 12227) from "the radar tower road at Ulu Kali at Genting Highlands, Pahang, Peninsular Malaysia (03° 26.166 N 101° 47.021 E; 1754 m in elevation)."

Distribution: Known only from the type locality.

Family Dibamidae Boulenger

***Dibamus floweri* Quah, Anuar, Grismer, & Grassby-Lewis, 2017**

Holotype and type locality: Adult male (LSUHC 12481) from "Fraser's Hill, Pahang, Peninsular Malaysia at approximately 2100 hrs at (3°42′53.0″N 101°44′58.6″E), approximately 1,500 m above sea level."

Distribution: Known from the type locality and along the Gap road below Fraser's Hill at 3°41.912′N, 101°43.920′E and 1,207 m above sea level.

Family Gekkonidae Gray

***Cnemaspis bidongensis* Grismer, Wood, Ahmad, Sumarli, Vazquez, Ismail, Nance, Mohd-Amin, Othman, Rizaijesika, Kuss, Murdoch & Cobos, 2014**

Holotype and type locality: Adult female (LSUHC 11455) from "Pulau Bidong, Terengganu, Peninsular Malaysia (5°37.201 N 103°03.244 E) at 49 m in elevation."

Distribution: Known only from the type locality.

***Cnemaspis grismeri* Wood, Quah, Anaur & Muin, 2013**

Holotype and type locality: Adult male (ZRC 2.6989) from "Gua Asar, Bukit Kepala Gajah limestone massif, Lenggong, Perak, Malaysia (5°07.53'N, 100°58.82'E) at 78 m a.s.l."

Distribution: Known only from the type locality.

***Cnemaspis hangus* Grismer, Wood, Anuar, Riyanto, Ahmad, Muin, Sumontha, Grismer, Chan, Quah & Pauwels, 2014**

Holotype and type locality: Adult male (HC 00227) from "Bukit Hangus, Pahang, Peninsular Malaysia (04°16.142'N, 102°13.370'E) at 10 m in elevation."

Distribution: Known from the type locality and a new record from Chiku, Kelantan (5° 03.318" N 102° 08.573" E; 110 m elevation).

***Cnemaspis mahsuriae* Grismer, Wood, Quah, Anaur, Ngadi & Ahmad, 2015**

Holotype and type locality: Adult male (LSUHC 11828) from "400 m in elevation from a northwest facing slope on Gunung Raya, Pulau Langkawi, Kedah, Peninsular Malaysia (0451.715 N, 10047.993 E)."

Distribution: Known only from the type locality.

***Cnemaspis narathiwatensis* Grismer, Sumontha, Grismer, Cota, Wood, Pauwels & Kunya, 2010**

Distribution: This is a southern Thai species that was confirmed for Peninsular Malaysia by its discovery in the Temengor-Belum Region, Perak (Grismer *et al.* 2014).

***Cnemaspis omari* Grismer, Wood, Anuar, Riyanto, Ahmad, Muin, Sumontha, Grismer, Chan, Quah & Pauwels, 2014**

Holotype and type locality: Adult male (LSUHC 9978) from "Wang Kelian, Perlis, Peninsular Malaysia (06°41.805 N, 100°10.751 E) at 150 meters above sea level."

Distribution: Known from the type locality and southern Thailand.

***Cnemaspis peninsularis* Grismer, Wood, Anuar, Riyanto, Ahmad, Muin, Sumontha, Grismer, Chan, Quah & Pauwels, 2014**

Holotype and type locality: Adult female (LSUHC 8965) from "the base of Gunung Ledang Johor, Peninsular Malaysia (02°20.25' N, 102°37.11' E) at 100 m in elevation."

Taxonomy: Previously considered *Cnemaspis kendallii.*

Distribution: *Cnemaspis peninsularis* ranges as far north as Bukit Hangus, Pahang on the peninsula and to Pulau Tenggol off the east coast, and southward to Singapore. In the Seribuat Archipelago, it occurs on the islands of Aceh, Babi Besar, Babi Hujung, Ibol, Sembilang, Seribuat, Sibu, Sibu Tenggah, Tinggi, Tioman, and Tulai.

***Cnemaspis selamatkanmerapoh* Grismer, Wood, Mohamed, Chan, Heinz, Sumarli, Chan & Loredo, 2013**

Holotype and type locality: Adult male (LSUHC 11016) from "Gua Gunting, Merapoh, Pahang, Peninsular Malaysia (4°42.069 N 101°58.512 E; at 257 m elevation)."

Distribution: Known only from the type locality.

***Cnemaspis stongensis* Grismer, Wood, Anuar, Riyanto, Ahmad, Muin, Sumontha, Grismer, Chan, Quah & Pauwels, 2014**

Holotype and type locality: Adult male (LSUHC 11089) from "Kem Baha, Gunung Stong, Kelantan, Peninsular Malaysia (5°20.465 N, 101°58.001 E) at 461 m elevation."

Distribution: Known only from the type locality.

***Cnemaspis temiah* Grismer, Wood, Anuar, Riyanto, Ahmad, Muin, Sumontha, Grismer, Chan, Quah & Pauwels, 2014**

Holotype and type locality: Adult female (LSUHC 9110) from "trail 11, Tanah Rata, Cameron Highlands, Pahang, Peninsular Malaysia (03°09.01 N, 106°14.03 E) at approximately 1600 m in elevation."

Distribution: Known only from the type locality.

***Cyrtodactylus astrum* Grismer, Wood, Quah, Anuar, Muin, Sumontha, Ahmad, Bauer, Wangkulangkul, Grismer & Pauwels, 2012**

Holotype and type locality: Adult male (ZRC 2.6962) from "Wang Kelian, Perlis, Peninsular Malaysia (06°41.805 N, 100°10.751 E) at 150 meters above sea level."

Distribution: *Cyrtodactylus astrum* ranges from at least La-ngu District, Satun Province, Thailand in the north, southward to Kuala Perlis, Perlis, Peninsular Malaysia.

***Cyrtodactylus australotitiwangsaensis* Grismer, Wood, Quah, Anuar, Muin, Sumontha, Ahmad, Bauer, Wangkulangkul, Grismer & Pauwels, 2012**

Holotype and type locality: Adult male (ZRC 2.6979) from the "back road up to Fraser's Hill, Pahang, Peninsular Malaysia (03° 43.1699 N, 101° 45.4789 E) at 1059 meters above sea level."

Distribution: *Cyrtodactylus australotitiwangsaensis* ranges along the upland areas of the southern portion of the Titiwangsa Mountains from at least Fraser's Hill, Pahang in the north to Gunung Angsi, Negeri Sembilan in the south. Based on the relatively contiguous topography of the Titiwangsa Mountains, it presumably it ranges farther to the north and as far south as Gunung Ledang, Johor.

***Cyrtodactylus bintangrendah* Grismer, Wood, Quah, Anuar, Muin, Sumontha, Ahmad, Bauer, Wangkulangkul, Grismer & Pauwels, 2012**

Holotype and type locality: Adult male (ZRC 2.6973) from "Bukit Mertajam, Seberang Perai, Penang, Peninsular Malaysia (05°35.698 N, 100°49.253 E) at 451 meters above sea level."

Distribution: Along the west side of the Banjarang Bintang, *Cyrtodactylus bintangrendah* ranges from at least Bukit Mertajam, Seberang Perai, Penang in the south to Belum-Temengor, Perak in the north. Because of the continuity of habitat, it is presumed to range throughout lowland forests up to 450 meters in elevation through the foothills and lower slopes associated with the eastern flanks of the Bintang Mountains as well.

***Cyrtodactylus bintangtinggi* Grismer, Wood, Quah, Anuar, Muin, Sumontha, Ahmad, Bauer, Wangkulangkul, Grismer & Pauwels, 2012**

Holotype and type locality: Adult male (ZRC 2.6970) from "Bukit Larut, Peninsular Malaysia (04°51.715 N, 100°47.993) at 1151 meters above sea level."

Distribution: *Cyrtodactylus bintangtinggi* is known from the type locality and Gunung Bubu, Perak 20 km to the southwest. It likely, however, ranges throughout the Banjaran Bintang farther north into Thailand owing to a continuity of habitat.

***Cyrtodactylus brevipalmatus* (Smith, 1923)**

Distribution: This species was first confirmed for Peninsular Malaysia by its discovery on Pulau Langkawi, Kedah by Grismer *et al.* (2015b).

***Cyrtodactylus durio* Grismer, Anuar, Quah, Muin, Chan, Grismer & Ahmad, 2010**

Distribution: *Cyrtodactylus durio* is known from the type locality and Parit Buntar, Perak newly reported here.

***Cyrtodactylus guakanthanensis* Grismer, Belabut, Quah, Chan, Wood & Hasim, 2014**

Holotype and type locality: Adult male (LSUHC 11322) from "Gua Kanthan, Perak, Peninsular Malaysia (4°45.685'N, 101°07.322'E; 45 m)."

Distribution: Known only from the type locality.

***Cyrtodactylus gunungsenyumensis* Grismer, Wood, Anuar, Davis, Cobos & Murdoch, 2016**

Holotype and type locality: Adult female (LSUHC 12209) from "Gunung Senyum, Hutan Lipur Gunung Senyum, Pahang, Peninsular Malaysia (3°41.530'N, 102°26.005'E; 75 m)."

Distribution: Known only from the type locality.

***Cyrtodactylus hidupselamanya* Grismer, Wood, Anuar, Grismer, Quah, Murdoch, Muin, Davis, Aguilar, Klabacka, Cobos, Aowphol & Sites, 2016**

Holotype and type locality: Adult male, LSUHC 12163 from "Felda Chiku 7, Kelantan, Peninsular Malaysia (5° 03.318" N 102° 08.573" E; 110 m elevation)."

Distribution: Known only from the type locality.

***Cyrtodactylus jelawangensis* Grismer, Wood, Anuar, Quah, Muin, Mohamed, Chan, Sumarli, Loredo & Heinz, 2014**

Holotype and type locality: Adult male (LSUHC 11062) from "Kem Baha, Gunung Stong, Kelantan, Peninsular Malaysia (5° 20.465 N 101° 58.001 E; at 461 m elevation)."

Distribution: Known only from the type locality.

***Cyrtodactylus langkawiensis* Grismer, Wood, Quah, Anuar, Muin, Sumontha, Ahmad, Bauer, Wangkulangkul, Grismer & Pauwels, 2012**

Holotype and type locality: Adult male (ZRC 2.6966) from "Wat Wanaram, Pulau Langkawi, Kedah, Peninsular Malaysia (06°20.275 N, 99°52.507 E) at 35 meters above sea level."

Distribution: Known only from the type locality.

***Cyrtodactylus leegrismeri* Chan & Norhayati, 2010**

Distribution: Known from the type locality and the islands of Hon Khoai, Hon Chu, and Tho Chu, off the southern coast of Vietnam (Grismer & Grismer 2017).

***Cyrtodactylus lenggongensis* Grismer, Wood, Anuar, Grismer, Quah, Murdoch, Muin, Davis, Aguilar, Klabacka, Cobos, Aowphol & Sites, 2016**

Holotype and type locality: Adult male (LSUHC 9974) from "Lenggong Valley, Perak, Peninsular Malaysia (5°06.431" N 100°58.322" E; at 104 m elevation)."

Distribution: Known from the type locality.

***Cyrtodactylus metropolis* Grismer, Wood, Chan, Anuar & Muin, 2014**

Holotype and type locality: Adult male (LSUHC 11347) from base of the Batu Caves massif east of Temple Cave, Gombak District, Selangor, Peninsular Malaysia (3°14'.54" N 101°41'02.24" E; 75 m)."

Distribution: Known from the type locality.

***Cyrtodactylus payacola* Johnson, Quah, Anuar, Muin, Wood, Grismer, Greer, Chan, Ahmad, Bauer & Grismer, 2012**

Holotype and type locality: Adult male (LSUHC 10074) from "Bukit Panchor State Park, Penang, West Malaysia 05°09.465' N, 100°32.885' E at an elevation of 47 m a.s.l."

Distribution: *Cyrtodactylus payacola* is known from the Bukit Panchor State Park, Penang; the Sungai Chikus Forest Reserve, Perak; and Shah Alam, Selangor, Peninsular Malaysia and most likely ranges throughout all lowland coastal areas west of the Banjaran Bintang and Titiwangsa to as far south perhaps as Melaka. To the north, it may not range beyond the Thai–Malaysian border owing to the potential dispersal barrier of the Banjaran Nakawan.

***Cyrtodactylus sharkari* Grismer, Wood, Anuar, Quah, Muin, Mohamed, Chan, Sumarli, Loredo & Heinz, 2014**

Holotype and type locality: Adult male (LSUHC 11022) from "Gua Gunting, Merapoh, Pahang, Peninsular Malaysia (4° 42.069 N 101° 58.512 E; at 257 m elevation)."

Distribution: Known from the type locality.

***Cyrtodactylus stresemanni* Rösler & Glaw, 2008**

Distribution: Harvey *et al.* (2016) presented evidence showing the specimen from which this species was described most likely came from the Moluccas and is not part of the Peninsular Malaysian herpetofauna and thus is not included here.

***Cyrtodactylus tebuensis* Grismer, Anuar, Muin, Quah & Wood, 2013**

Holotype and type locality: Adult male (ZRC 2.6997) from "Gunung Tebu, Terengganu, Malaysia (05°36.11' N 102°36.19' E; 650 m)."

Distribution: Known from the type locality.

***Cyrtodactylus timur* Grismer, Wood, Anuar, Quah, Muin, Mohamed, Chan, Sumarli, Loredo & Heinz, 2014**

Holotype and type locality: Adult male (LSUHC 11207) from "Punca Air, Gunung Tebu, Terengganu, Peninsular Malaysia (5° 36.11 N 102° 36.19 E; at 650 m elevation)."

Distribution: Known from the type locality.

***Cyrtodactylus trilatofasciatus* Grismer, Wood, Quah, Anuar, Muin, Sumontha, Ahmad, Bauer, Wangkulangkul, Grismer & Pauwels, 2012**

Holotype and type locality: Adult male (ZRC 2.6976) from "Ringlet, Cameron Highlands, Pahang, Peninsular Malaysia (04°24.516 N, 100°22.591 E) at 1109 meters above sea level."

Distribution: *Cyrtodactylus trilatofasciatus* is known only from the type locality at Ringlet and east of Habu, Cameron Highlands, Pahang, but most certainly occurs in other localities throughout the upland regions of Cameron Highlands plateau and to the north where granite rocks are present.

***Hemidactylus brookii* Gray, 1845**

Taxonomy: Based on molecular evidence from a specimen from Penang Island, Penang, Lajmi *et al.* (2016) considered this population to be *Hemidactylus murrayi* Gleadow, 1887 from India. This taxonomy is not followed here.

***Hemiphyllodactylus bintik* Grismer, Wood, Anuar, Quah, Muin, Chan, Sumarli & Loredo, 2015c**

Holotype and type locality: Adult male (LSUHC 11216) from "800 m a.s.l. on Gunung Tebu, Terengganu, Peninsular Malaysia (05°36.11′N, 102°36.19′S)."

Distribution: Known from the type locality.

***Hemiphyllodactylus cicak* Cobos, Grismer, Wood, Quah, Anuar & Muin, 2016**

Holotype and type locality: Adult male (LSUCH 11762) from "the old Ban Hin Lee Guest House on Penang Hill, Pulau Pinang, Peninsular Malaysia (5°25'23.14" N, 100°16'19.79" E)."

Distribution: Known from the type locality.

***Hemiphyllodactylus tehtarik* Grismer, Wood, Anuar, Muin, Quah, McGuire, Brown, Ngo & Phan, 2013**

Holotype and type locality: Adult female (ZRC LSUHC 10904) from "Gunung Tebu, Terengganu, Malaysia (05°36.11′ N, 102°36.19′ E; 600 m a.sl.)."

Distribution: Known from the type locality.

***Hemiphyllodactylus titiwangsaensis* Zug, 2010**

Taxonomy: Cobos *et al.* (2016) noted that populations from Fraser's Hill and Genting Highlands, Pahang are genetically but not morphological divergent from the Cameron Highlands population and thus may represent an unnamed cryptic species.

Family Scincidae Gray

***Lipinia sekayuensis* Grismer, Ismail, Awang, Rizal & Ahmad, 2014**

Holotype and type locality: Adult male (LSUHC 11593) from "Hutan Lipur Sekayu, Terengganu, Peninsular Malaysia (4°58.127 N, 102°57.433 E at 33 m asl)."

Distribution: Known from Hutan Lipur Sekayu, Sungai Bubu and Sungai Pur, Terengganu (Grismer *et al.* 2016b).

***Lygosoma herberti* Smith, 1916**

Distribution: First reported from Peninsular Malaysia from Sungai Menora, Perak by Sworder (1933) and followed by Grismer (2011). Populations are newly reported here from Teluk Rubiah, Perak (LSUDPC 6950), Bukit Panchor, Penang (LSUHC 12098, 12493, 12509), and Perlis State Park, Perlis (LSUHC 11803).

***Lygosoma peninsulare* Grismer, Quah, Duzulkafly & Yambun 2018**

Holotype and type locality: Adult male (LSUHC 13857) from "13.5 km east of Jeli, Kelantan, Peninsular Malaysia (5° 44' 31" N; 101° 57' 39" E; about 440 m ASL)."

Taxonomy: Previously considered *L. bampfyldei.*

Distribution: Known only from Peninsular Malaysia at the type locality 13.5 km east of Jeli, Kelantan and from Bukit Larut, Perak.

***Lygosoma siamensis* Siler, Heitz, Davis, Freitas, Aowphol, Termprayoon & Grismer, 2018**

Holotype and type locality: Adult male (FMNH 177496 [field no. EHT 1390]) from "
Pattani Province", Thailand.

Taxonomy: Previously considered *L. quadrupes.*

Distribution: Ranges across Indochina from Vietnam to Peninsular Malaysia.

***Scincella melanosticta* (Boulenger, 1887)**

Distribution: First reported from Peninsular Malaysia by its discovery on Gunung Raya, Pulau Langkawi, Kedah by Grismer *et al.* (2015b).

***Sphenomorphus senja* Grismer & Quah, 2015**

Holotype and type locality: Adult male (LSUHC 11688) from "from Gunung Brinchang, Cameron Highlands, Pahang, West Malaysia (04°31.105 N 101°22.571 E; at 1811m)."

Taxonomy: Previously considered *S. malayanus.*

Distribution: Known only from Gunung Gerah, Perak and Gunung Brinchang, Pahang in the Titiwangsa Mountain Range. However, it is likely to range further to the north and south along this upland corridor.

***Sphenomorphus cameronicus* Smith, 1924**

Holotype and type locality: BMNH 1946.8.3.27 from "Cameron Highlands, Lipis District, 4800 ft., Pahang", Peninsular Malaysia.

Distribution: Reported here from Air Terjun Jeriau, Farser's Hill, Pahang (LSUDPC 10130).

***Sphenomorphus sungaicolus* Sumarli, Grismer, Wood, Ahmad, Rizal, Ismail, Izam, Ahmad & Linkem, 2016**

Holotype and type locality: Adult male (LSUHC 11722) from "Hutan Lipur Sekayu, Hulu Terengganu, Peninsular Malaysia (4°59'N, 102°55'E)."

Distribution: Known from Hutan Lipur Sekayu, Hutan Lipur Chemerong, and the Tembat Forest Reserve, Hulu Terengganu, Terengganu, Peninsular Malaysia—localities east of the Banjaran Titiwangsa. Localities on the western side of the Banjaran Titiwangsa are FRIM and Ulu Gombak, Selangor and the Korbu Forest Reserve, Perak in the north. Populations newly reported here come from Ulu Galas Forest Reserve Kelantan (LSUDPC 10840).

***Toenayar novemcarianata* (Anderson, 1871)**

Taxonomy: Previously recognized as *Eutropis novemcarinata* until placed in the genus *Toenayar* (Karin *et al.* 2016).

Distribution: Previously known only from Penang Island, Gunung Jerai, Kedah (Grismer 2011), and Pulau Langkawi (Grismer *et al.* 2015b) but new populations are reported here from the Lenggong Valley, Perak (LSUHC 13482).

***Tytthoscincus butleri* (Boulenger, 1912)**

Distribution: This species was previouls known only from Bukit Larut, Perak and Langkawi Island, Kedah but has now been reported from Penang Island (Grismer *et al.* 2017a) and Bukit Mertajam (Grismer *et al.* 2018a).

***Tytthoscincus copias* (Boulenger, 1908)**

Taxonomy: Previously recognized as *Sphenomorphus copias* but was transferred to the genus *Tytthoscincus* by Grismer *et al.* (2017a).

***Tytthoscincus jaripendek* Grismer, Wood, Quah, Anuar, Ngadi, Izam, Norhayati, 2017a**

Holotype and type locality: Adult male (LSUHC 11680) from "Robinson's Falls, Cameron Highlands, Pahang, Peninsular Malaysia (N 04°27.959′, E 101°23.129′; 1411 m in elevation)."

Distribution: Known only from the type locality at Robinson's Falls, Cameron Highlands, Pahang, Peninsular Malaysia but is likely to range more widely across the Cameron Highlands plateau.

***Tytthoscincus kakikecil* Grismer, Wood, Quah, Anuar, Ngadi, Izam, Norhayati, 2017**

Holotype and type locality: Adult male (LSUHC 11769) from "along Richmond Road, Frasers's Hill, Pahang, Peninsular Malaysia (N 03°42.590′, E 101°44.236′; 1271 m in elevation)."

Distribution: Known from the town of Fraser's Hill at Richmond Road, the Telecom Loop road, and the upper elevations of Genting Highlands at Ulu Kali, Pahang (Grismer *et al.* 2017a).

***Tytthoscincus keciktuek* Grismer, Wood, Ahmad, Baizul-Hafasyam, Afiq-Shuhaim, Rizal & Quah, 2018**

Holotype and type locality: Adult female (LSUHC 13859) from "along a small tributary of the Sungai Peres, Sekayu, Hulu Terengganu, Terengganu State, Peninsular Malaysia (4.9596° N, 102.9596° E; 74 m in elevation)."

Distribution: Known only from the type locality however, it is likely to range throughout the entire riparian system of the Sekayu region (Grismer *et al.* 2018a).

***Tytthoscincus langkawiensis* Grismer, 2008**

Taxonomy: This species is considered a junior synonym of *Tytthoscincus butleri* based on molecular and morphological data (Grismer *et al.* 2017a).

***Tytthoscincus martae* Grismer, Wood, Quah, Anuar, Ngadi, Izam, Norhayati, 2017a**

Holotype and type locality: Adult male (LSUHC 12688) from "the Hindu Temple 1.2 km south of the town of Fraser's Hill on the road to the Gap, Pahang, Peninsular Malaysia (N 03°42.099′, E 101°44.090′; 1078 m in elevation)."

Distribution: Known from the type locality and Awana Road at Genting Highlands, Pahang, Peninsular Malaysia. It is likely to range further north of Fraser' Hill and south of Genting Highlands, Pahang.

***Tytthoscincus monticolus* Grismer, Wood, Ahmad, Baizul-Hafasyam, Afiq-Shuhaim, Rizal & Quah, 2018**

Holotype and type locality: Adult male (LSUHC 13858) from "a hilly area near Sungai Bubu, Sekayu, Hulu Terengganu, Terengganu State, Peninsular Malaysia (4.9710° N, 102.9531° E; 174 m in elevation)."

Distribution: Known only from the type locality however, it is likely to range throughout the entire lowland system of the Sekayu region (Grismer *et al.* 2018a).

***Tytthoscincus panchorensis* Grismer, Muin, Wood, Anuar & Linkem, 2016**

Holotype and type locality: Adult male (LSUHC 12511) from "Bukit Panchor, State Park, Pulau Pinang, Peninsular Malaysia (N 05°09'13.6", E 100°32'46.6"; 79 m elev.)."

Distribution: Known only from the type locality.

***Tytthoscincus temasekensis* Grismer, Wood, Lim, Liang 2017**

Holotype and type locality: Adult female (ZRC 2.6490) from "Pasir Laba Road, Singapore (N 01°19.526′, E 103°40.212′; 24 m elevation)."

Distribution: Known from the type locality, lowland areas in Singapore, and near Tanjung Malim, Perak, Peninsular Malaysia (Grismer *et al.* 2017b).

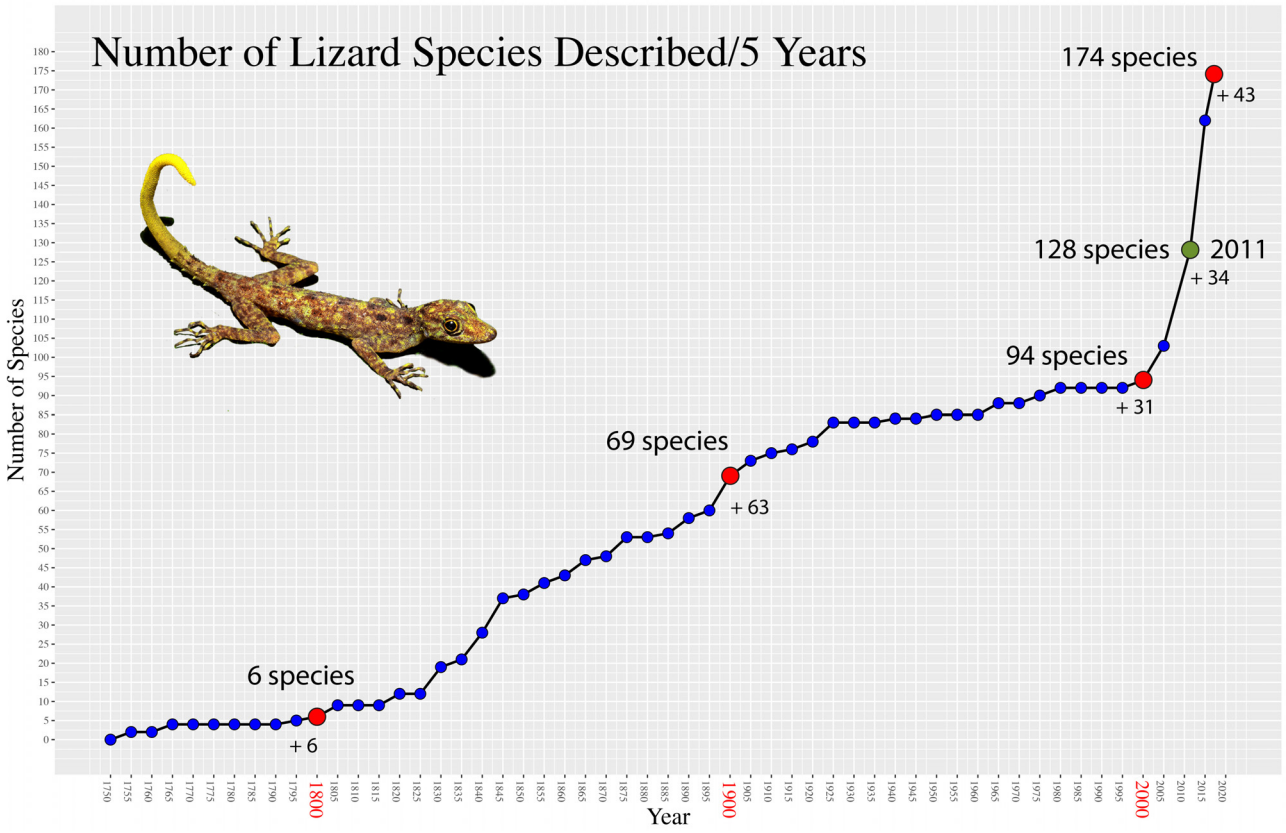

FIGURE 1. Number of lizard species described per five year intervals now known to occur in Peninsular Malaysia, Singapore and their adjacent archipelagos.

Discussion

From the years 1801 to 1900, 63 newly described species of lizards were added to the herpetofauna of Peninsular Malaysia and Singapore. As would be expected, fewer species (essentially one-half, 31) were added during the next century and the rate of newly added species naturally began to level off around the year 2000 (Fig. 1). In 2002, however, our international team from Malaysia and the United States began working in earnest on the herpetofauna of this region and by 2011, had added more species (34) in nine years than had been added in the previous century. This trajectory continued from 2012 to the time of this writing, with an additional 46 species having been added (Fig. 1). During this latter period, the majority of new species described were from the families Gekkonide (30 species), followed by the Scincidae (11 species), Agamidae (five species), and Dibamidae (one species). A generic break-down of these newly described species by family is presented in Figure 2. Given the nearly vertical slope of the species curve at present, we cannot logically estimate the number of lizard species in this region—and this publication is just another stopping point as was that of Grismer (2011). Furthermore, we currently have 10–15 more descriptions in various stages of completion.

The unprecedented rate of increase in newly described species of lizards from this region was not just the result of field work in new areas. In fact, most of these species came from the most well-surveyed areas in Peninsular Malaysia—Cameron Highlands, Bukit Larut, Fraser's Hill, Genting Highlands, Pulau Langkawi, Pulau Tioman, Penang Island, etc. However, working repeatedly and systematically at these localities during different months over the years resulted in uncovering the ecological complexity and the surprisingly high species richness within these areas (*e.g.* Grismer & Quah 2015, Grismer *et al.* 2015a,c). Additionally, this rate of increase was not due to the use of molecular data either. All new descriptions (33) except one from 2002 to 2011 were based only on morphological data. From 2012 to the time of this writing (8 August 2018), all new species described (42) except for one were based on an integrative analysis. The rate of increase observed between 2002 and present was simply

the result of our field work being expeditiously followed up with taxonomic analyses which began to reveal an unexpected amount of unrealized diversity and endemism. The point here is that Peninsular Malaysia and Singapore do not exist in a vacuum and similar curves could be constructed for any of the biologically megadiverse Southeast Asian nations with the same analytical intensity following field work. If newly collected undescribed species are going sit on museum shelves for years at a time rather than being described in a timely matter, this does not advance their conservation status or that of the regions from which they originate. An argument could be made that these specimens better serve their ecosystems by being left in the wild. Describing new species after they have been extirpated from their type locality or their habitat has become imperiled—or worse yet, destroyed—does not serve the best interests of biodiversity conservation.

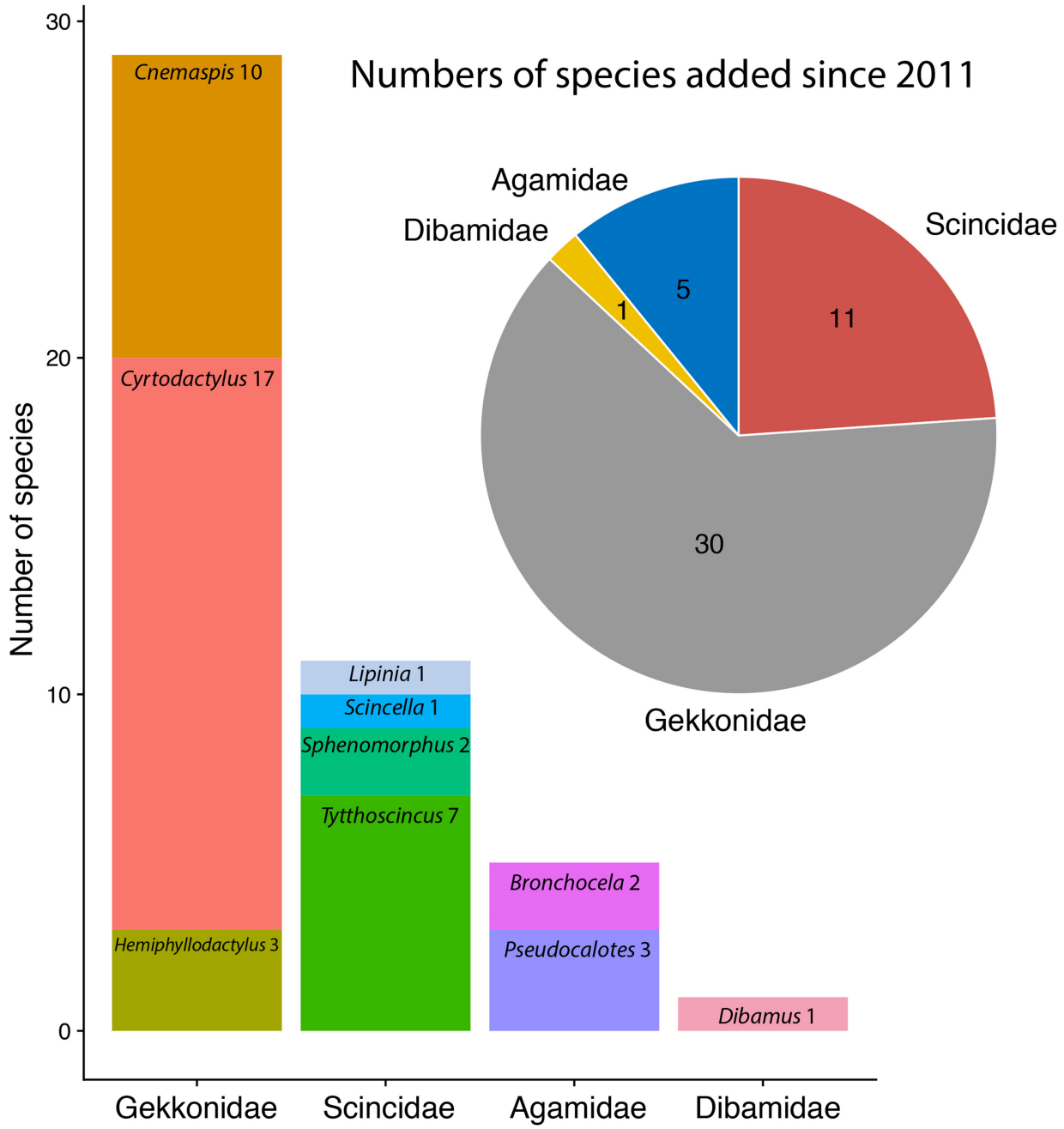

FIGURE 2. Numbers of new species of lizards described from Peninsular Malaysia, Singapore, and their adjacent archipelagos broken down by family and genera.

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The references listed below are for new species described subsequent to 2011 or are associated with the annotations of the species listed above. References for the non-annotated species in Table 1 can be found in Grismer (2011) or the Reptile Database at http://www.reptile-database.org

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