

A New Synonymy of *Coptotermes formosanus* (Isoptera: Rhinotermitidae)

by

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ABSTRACT

The taxonomy of the genus *Coptotermes* is far from settled in the world, especially in China. *Coptotermes formosanus* Shiraki had been described or misidentified as several different species in China based on measurement characteristics. In this paper, the synonyms of *C. formosanus* from China are listed, and it is proposed that *C. guizhouensis* is a new junior synonym of *C. formosanus*.

Key words: termites, *Coptotermes formosanus*, *Coptotermes guizhouensis*.

INTRODUCTION

The taxonomy of the genus *Coptotermes* lacks some careful revisions (Eggleton 1999; Vargo & Husseneder 2009). The Formosan subterranean termite (FST), *Coptotermes formosanus* Shiraki, 1909, which originated from China, is so far the most important and destructive invasive termite species (Evans 2011). The widespread and destructive species appears to be paraphyletic with respect to several other species in the *Coptotermes* genus (Gentz *et al.* 2008). The size of individuals of *C. formosanus* has been observed to increase with increasing age (Huang *et al.* 2000).

In the 1980s and 1990s, a substantial number of *Coptotermes* species in China were described, and the genus is in serious need of revision in China (Li *et al.* 2011). Even worse, the original descriptions of those *Coptotermes* species were described in Chinese, and they are often not reviewed by foreign taxonomists. A high degree of variation exists in the measurements of *C. formosanus* among different ages and different populations in China, and seven synonymies have been reported, including *C. hongkongensis* Oshima, 1914, *C. eucalyptus* Ping, 1984, *C. xiaoliangensis* Ping, 1984, *C. heteromorphus* Ping, 1985, *C. guangzhouensis* Ping, 1985, *C. communis* Xia *et* He, 1986,

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C. rectangularis Ping et Xu, 1986 (Snyder 1949; Huang *et al.* 2000). In this paper, a new junior synonym of *C. formosanus* is proposed.

MATERIALS AND METHODS

Based on the original description of the related species of *C. formosanus* regarding the Chinese termite literature, the characteristics and measurements of soldiers and imagoes were carefully compared with *C. formosanus* reported by Harris (1966), Xia & He (1986), Roonwal & Chhotani (1989), and Huang *et al.* (2000), especially the measurement characteristics of *C. formosanus* among different ages in a laboratory colony (Huang *et al.* 2000). The following acronyms are used in the paper: Guangdong Entomological Institute (GDEI); Shanghai Institute of Entomology, Academia Sinica (SIEC); Dipartimento di Entomologia, Italy (DDEI); Naturhistoriska Riksmuseet, Sweden (NRS).

SYNONYMY

Coptotermes guizhouensis He et Qiu, 1992 resembles *C. formosanus*, and soldiers of both species have two pairs of setae at the base of the fontanelle. He & Qiu (1992) originally described this species. He & Qiu (1992) indicated that the diagnostic characteristics for *C. guizhouensis* were that the widths of pronotum of soldiers were narrower compared with those of *C. formosanus*, and the number of antennal segments of *C. guizhouensis* imagoes was 19 segments. However, the range of measurements of *C. formosanus* has been extended, which showed that the measurement of *C. guizhouensis* fell within the overall range of the measurement characteristics of *C. formosanus* (Table 1).

Therefore, the diagnostic characteristics of *C. guizhouensis* according to He & Qiu (1992) are untenable, which implies that *C. guizhouensis* lacks obvious and reliable characteristics with which it can be distinguished from *C. formosanus*. *C. guizhouensis* is therefore a junior synonym for *C. formosanus*.

***Coptotermes formosanus* Skiraki, 1909**

Coptotermes formosanus Skiraki, 1909, *Japanses Trans. Entom.* 2: 239. Type: ?. Type locality: Taiwan.

Termes raffrayi Matsumura, 1910, *Die schädlichen und nützlichen Insekten vom Zuckerrohr Formosas* : 1.

Table 1. Measurements (in millimeters) of soldiers and imagos of *Coptotermes formosanus* and *Coptotermes guizhouensis*.

Measurement	<i>Coptotermes formosanus</i>				<i>C. guizhouensis</i>
	Harris (1966)	Xia & He (1986)	Roonwal & Chhotani (1989)	Huang <i>et al.</i> (2000)	He & Qiu (1992)
Soldier					
Length of head to lateral base of mandibles	1.36-1.59	1.50-1.60	1.43-1.65	1.43-1.68	1.42-1.51
Max width of head	1.14-1.28	1.13-1.15	1.05-1.30	1.07-1.25	1.20-1.27
Left mandible length	0.95-1.00	0.95-1.08	0.95-1.03	0.90-1.05	0.91
Max length of postmentum	---	0.90-0.93	0.88-1.08	0.93-1.00	0.96-1.03
Max width of postmentum	---	0.40-0.43	0.40-0.43	0.37-0.43	0.41-0.43
Min width of postmentum	---	0.23-0.28	---	0.21-0.26	0.24-0.26
Max width of pronotum	0.77-0.86	0.78-0.88	0.75-0.93	0.80-0.94	0.77-0.79
Max length of pronotum	---	0.45-0.53	0.40-0.53	0.38-0.50	0.41-0.46
Length of hind tibia	1.04-1.14	1.08-1.15	---	0.90-1.05	1.01-1.08
Imago					
Max width of head with eyes	1.53-1.63	1.45-1.53	1.50-1.71	1.42-1.63	1.37-1.39
Max diameter of eye	0.43-0.45	0.37-0.40	0.43-0.45	0.37-0.45	0.37-0.39
Min diameter of eye	---	0.38-0.38	---	0.32-0.37	0.32
Min distance of eye-lower margin of head	---	0.12-0.18	---	0.16-0.18	0.14
Min eye-ocellus distance	0.03-0.05	0.02-0.04	0.03-0.05	0.03-0.07	0.02
Max diameter of ocellus	0.16-0.20	0.20-0.23	0.16-0.20	0.16-0.22	0.17-0.18
Min diameter of ocellus	---	0.15-0.18	---	0.13-0.15	0.13
Max width of pronotum	1.30-1.43	1.33-1.35	1.30-1.52	1.21-1.46	1.27
Max length of pronotum	---	0.88-0.90	0.80-0.93	0.77-0.87	0.77
Length of forewing sacle	---	1.13-1.15	1.00-1.28	1.10-1.16	0.96
Length of hindwing sacle	---	0.75-0.75	0.60-0.80	0.68-0.74	0.60
Length of hind tibia	---	1.38-1.50	---	1.32-1.53	1.37-1.37
Number of antennal segments	---	19-20	20-21	19-21	19

Coptotermes formosae Holmgren, 1911:192. Syntypes: [NRS]. Type locality: Taiwan.

Coptotermes hongkongensis Oshima, 1914, *Annotationes Zoologicae Japonenses* 8:559. Type: ?. Type locality: Hongkong.

Coptotermes intrudens Oshima, 1920, *Proc. Hawaiian Entomol. Soc.* 4:262. Type: ?. Type locality: Hawaii.

Cryptotermes hongkongensis Campbell, 1922:82.

Coptotermes remotes Silvestri, 1928, *Bollettino del Laboratorio di Zoologia General e Agraria* 21:93. Syntypes: [DDEI]. Type locality: South Africa.

Coptotermes communis Xia *et al.*, 1986, *Contr. Shanghai Inst. Entomol.*

6:166. Holotype: soldier, imago, work [SIEC]. Type locality: Jinhua [China, Zhejiang].

Coptotermes eucalyptus Ping, 1984, *Ecol. Syst. Trop. Subt. Fore. Res.* 2:186. Holotype: soldier [GDEI]. Type locality: Xiaoling [China, Guangdong].

Coptotermes guangzhouensis Ping, 1985, *Entomotaxonomia* 7:137. Holotype: soldier [GDEI]. Type locality: Guangzhou [China, Guangdong].

Coptotermes heteromorphus Ping, 1985, *Entomotaxonomia* 7: 320. Holotype: soldier [GDEI]. Type locality: Guangzhou [China, Guangdong].

Coptotermes rectangularis Ping et Xu, 1986, *Sci. Silv. Sin.* 22: 157. Holotype: soldier [GDEI]. Type locality: Congjiang county [China, Guizhou].

Coptotermes xiaoliangensis Ping, 1984, *Ecol. Syst. Trop. Subt. Fore. Res.* 2:184. Holotype: soldier [GDEI]. Type locality: Xiaoling [China, Guangdong].

Coptotermes guizhouensis He et Qiu, 1992, *Science and Technology of Termites* 9:1. Holotype: soldier, [SIEC]. Type locality: Conjiang county [China, Guizhou]. **NEW SYNONYMY.**

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