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***Conoideocrella krungchingensis* sp. nov., an entomopathogenic fungus from Thailand**



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ABSTRACT

Conoideocrella krungchingensis, a fungal pathogen infecting armored scale insects (Diaspididae) on a dicotyledonous plant, is described and illustrated as a new species from Thailand. The new taxon morphologically resembled *C. luteoestrata* but could be distinguished from the latter using the sequences of the partial nuclear large subunit rRNA (LSU) and the elongation factor (EF-1 α) genes. Apart from it, asci and ascospores of *C. krungchingensis* were found notably shorter than those of *C. luteoestrata* and *C. tenuis*. All three species of *Conoideocrella* have been reported from Thailand, including *C. krungchingensis*.

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1. Introduction

Conoideocrella D. Johnson, G.H. Sung, Hywel-Jones & Spatafora was proposed to delimit two species of *Torrubiella sensu lato*, *T. luteoestrata* Zimm. and *T. tenuis* Petch, based on their phylogenetic placement in the Clavicipitaceae (Hypocreales) (Johnson et al. 2009). Both *Conoideocrella* species, *C. luteoestrata* (Zimm.) D. Johnson et al. and *C. tenuis* (Petch) D. Johnson et al., are pathogenic to soft (Coccidae) and armored (Diaspididae) scale insects and are characterized by elongated, conical perithecia, and planar stromata (Petch 1923; Hywel-Jones 1993; Johnson et al. 2009).

A fungal species was collected from the forests in the south of Thailand. The fungus developed elongated, conical

perithecia and pale yellow, orange to reddish brown stroma closely resembling *C. luteoestrata*. The objectives of this study are to identify this fungus based on morphology and molecular phylogenetic relationships based on the partial nuclear large subunit rRNA (LSU) and the elongation factor (EF-1 α) genes in comparison with related species. This fungus is described and proposed as a new species from Thailand.

2. Materials and methods**2.1. Fungal material and isolation**

Specimens of *C. krungchingensis* attached to the underside of leaves and to twigs of dicotyledonous plants were collected

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Table 1 – GenBank accession numbers of materials used in this study.

Species	Specimen	Isolate	Origin	GenBank accession no.	
				LSU	EF-1 α
Related species					
<i>Aschersonia blumenaviensis</i>	P.C.597	CUP 067825	Mexico	AY986905	AY986930
<i>A. calendulina</i>	BBH 17325	BCC 20306	Thailand	GU552148	
<i>A. calendulina</i>	BBH 17344	BCC 20309	Thailand	GU552154	
<i>A. calendulina</i>		BCC 9483	Thailand	DQ384938	
<i>A. cf. paraphysata</i>	BBH 19388	BCC 1467	Thailand	DQ377987	DQ384967
<i>A. luteola</i>	BBH 14110	BCC 11738	Thailand	DQ384940	DQ384963
<i>A. luteola</i>	BBH 13011	BCC 19360	Thailand	GU552155	GU552147
<i>A. luteola</i>	BBH 14078	BCC 7865	Thailand	DQ384946	DQ384975
<i>A. luteola</i>	BBH 14277	BCC 9481	Thailand	DQ384945	DQ384974
<i>A. minutispora</i>	BBH 14143	BCC 7959	Thailand	GU552150	
<i>A. minutispora</i>	BBH 17487	BCC 17487	Thailand	GU552151	GU552144
<i>A. minutispora</i>	BBH 17373	BCC 20635	Thailand	GU552149	GU552143
<i>A. samoensis</i>		NHJ4093	Thailand	AF327381	
<i>A. samoensis</i>		BCC 8237	Thailand	DQ384937	DQ384977
<i>A. samoensis</i>		NHJ 2630	Thailand	AF327387	
<i>A. samoensis</i>	BBH 14540	BCC 8775	Thailand	DQ384944	DQ384972
<i>A. viridans</i>	P.C.635	CUP 067850	Honduras	EU392572	EU392651
<i>A. viridans</i>	P.C.670	CUP 067852	Honduras	EU392574	EU392652
<i>A. viridans</i>	P.C.632	CUP 067849	Honduras	EU392571	EU392650
<i>Conoideocrella luteorostrata</i>		NHJ 12516	Thailand	EF468849	EF468800
<i>C. luteorostrata</i>		NHJ 11343	Thailand	EF468850	EF468801
<i>C. tenuis</i>		NHJ 345.01	Thailand	EU369045	EU369030
<i>C. tenuis</i>		NHJ 6293	Thailand	EU369044	EU369029
<i>C. tenuis</i>		NHJ 6791	Thailand	EU369046	EU369028
<i>Hypocrella cf. discoidea</i>	I93-901d	ARSEF 7663	Côte D'Ivoire	EU392567	EU392646
<i>H. cf. discoidea</i>	I95-901d	ARSEF 7668	Côte D'Ivoire	EU392568	EU392647
<i>H. disciformis</i>	P.C.575	CUP 067831	Bolivia	EU392557	EU392641
<i>H. disciformis</i>	P.C.659	CUP 067835	Honduras	EU392561	EU392644
<i>H. disciformis</i>	M.L.202i	ARSEF 7695	Puerto Rico	AY986913	AY986939
<i>H. hirsuta</i>	P.C.543	CUP 067841	Bolivia	EU392569	EU393648
<i>H. hirsuta</i>	P.C.436.2	CUP 067848	Mexico	AY986922	AY986949
<i>Moelleriella africana</i>	P.C.736	ARSEF 7696	Ghana	AY986917	AY986943
<i>M. boliviensis</i>	P.C.603	CUP 067747	Bolivia	AY986923	AY986950
<i>M. libera</i>	P.C.672	CUP 067773	Honduras	EU392594	EU392665
<i>M. macrostroma</i>	P.C.605	CUP 067508	Bolivia	AY986919	AY986946
<i>M. macrostroma</i>	J.B.115	ARSEF 7748	Costa Rica	AY986920	AY986947
<i>M. madiensis</i>	P.C.594	CUP 067775	Bolivia	EU392595	EU392666
<i>M. phyllogena</i>	P.C.628	CUP 067790	Ecuador	AY986902	AY986927
<i>M. raciborskii</i>	I93-901b	ARSEF 7661	Côte D'Ivoire	EU392611	EU392676
<i>M. rhombispora</i>	P.C.467	CUP 067538	Costa Rica	AY986908	AY986933
<i>M. rhombispora</i>		CUP 067494	Guatemala	EU392612	EU392677
<i>M. umbospora</i>	P.C.457	CUP 067816	Mexico	AY986904	AY986929
<i>M. zhongdongii</i>	P.C.549	CUP 067818	Bolivia	EU392632	EU392690
<i>Samuelsia chalalensis</i>	P.C.560	CUP 067856	Bolivia	EU392637	EU392691
<i>S. geonomis</i>	P.C.614	CUP 067857	Bolivia	EU392638	EU392692
<i>S. mundiveteris</i>	BBH 22536	BCC 30560	Thailand	GU552156	GU552141
<i>S. mundiveteris</i>	BBH 24706	BCC 31750	Thailand	GU552157	GU552142
<i>S. mundiveteris</i>	BBH 26961	BCC 40021	Thailand	GU552152	GU552145
<i>S. mundiveteris</i>	BBH 26961	BCC 40022	Thailand	GU552153	GU552146
<i>S. rufobrunnea</i>	P.C.613	CUP 067858	Bolivia	AY986918	AY986944
<i>S. sheikhii</i>	P.C.686	CUP 067859	Honduras	EU392639	EU392693
<i>Orbiocrella patchii</i>		NHJ 6240	Thailand	EU369038	EU369022
<i>O. patchii</i>		NHJ 6209	Thailand	EU369039	EU369023
<i>O. patchii</i>		NHJ 5318	Thailand	EU369040	EU369021
Current study					
<i>Conoideocrella krungchingensis</i>	BBH27004	BCC 36101	Thailand	KJ435081	KJ435098
<i>C. krungchingensis</i>	BBH27004	BCC 36100	Thailand	KJ435080	KJ435097
<i>C. krungchingensis</i>	BBH32349	BCC 53666	Thailand	KJ435070	KJ435099
<i>C. krungchingensis</i>	BBH32349	BCC 53667	Thailand	KJ435071	KJ435100
<i>C. luteorostrata</i> ^a	BBH 32353	BCC 53671	Thailand	KJ435072	KJ435088
<i>C. luteorostrata</i> ^a	BBH 32354	BCC 53672	Thailand	KJ435073	KJ435089

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