



***Isaria poprawskii* sp. nov., A New Entomopathogenic Fungus and *Isaria*-specific Molecular Markers**

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and

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ARSEF

USDA, ARS Collection of Entomopathogenic Fungal Cultures

**Maintains ARSEF, the largest, most diverse and most
comprehensive culture collection of fungi pathogenic to insect
and other arthropods**

Website: <http://arsef.fpsnl.cornell.edu>

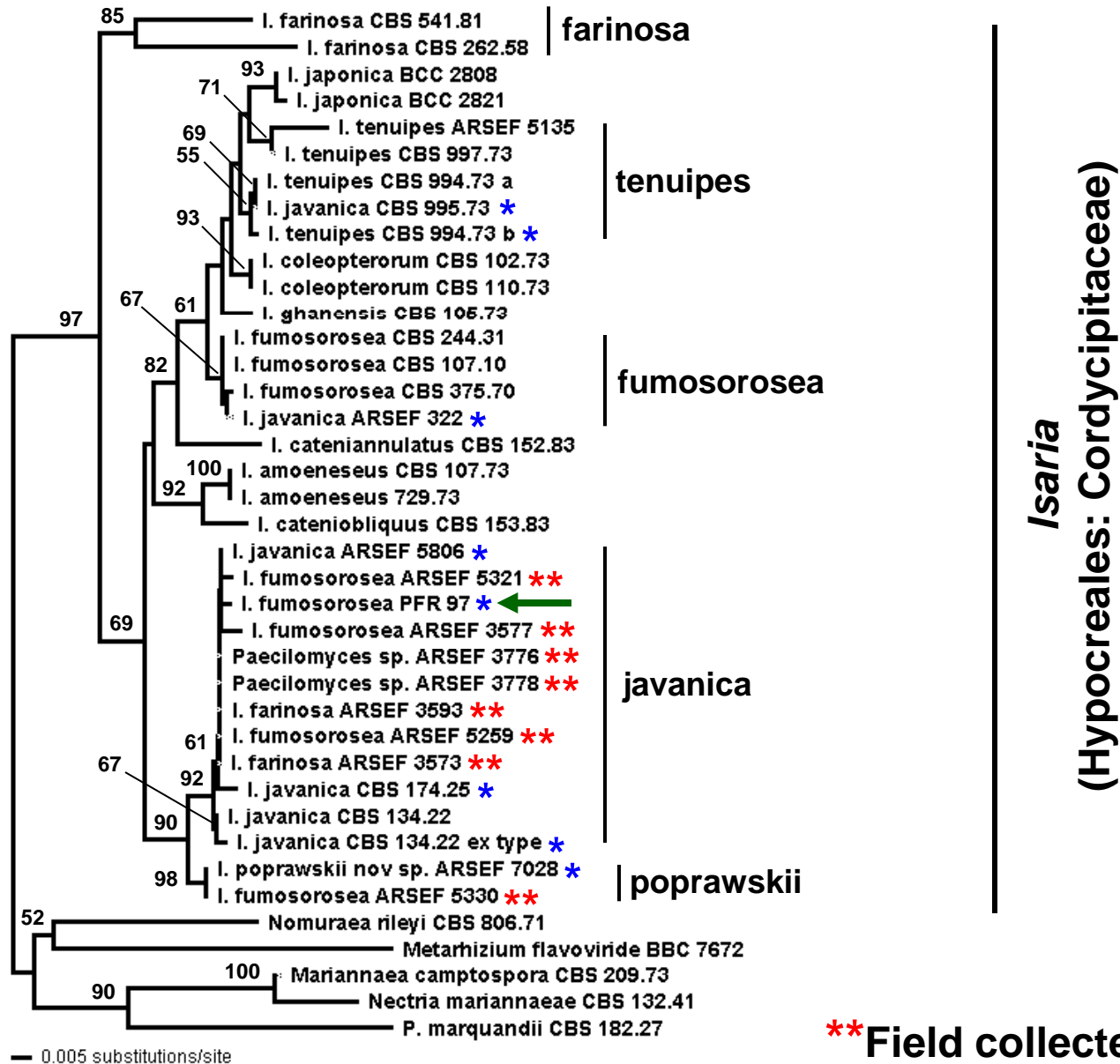


A new indigenous entomopathogenic fungus was found naturally causing epizootics in the sweet potato whitefly, *Bemisia tabaci* (Gennadius) biotype B (Hemiptera: Aleyrodidae) in a greenhouse at ARS-Weslaco

We characterized this new fungus at several levels to confirm it's species status

1. Biological (found to be very closely related to *Isaria javanica*)
2. Ecological
3. Morphological/morphometrics (have limitations in *Isaria* group)
4. Molecular
 - i. ISSR-PCR DNA fingerprinting (targeting microsatellites)
 - Method discriminates the ex-type cultures of *I. javanica* and *I. poprawskii*, thus making it a good diagnostic tool.
 - ii. Phylogenetically (β -tubulin partial gene)
 - Downloaded the standard *Isaria* β -tubulin sequences (Luangsa-ard et al. 2005) from GenBank
 - Included several field collected isolates from the LRGV, stored at ARSEF
 - iii. Developed molecular diagnostic assays (PCR-RFLP β -tubulin gene) for several important *Isaria* fungal species

Phylogenetic analysis (NJ tree) inferred from the β -tubulin partial gene



Clade-specific or diagnostic nucleotides identified in the β -tubulin partial gene fragment. **Correct names are now incorporated.**

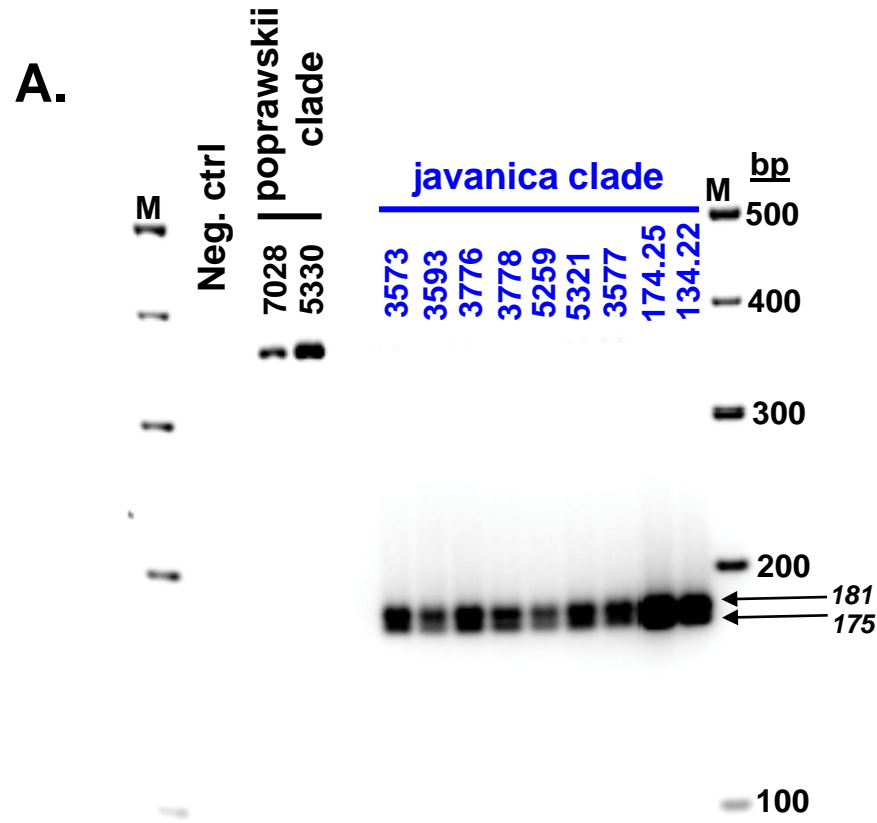
<i>Isaria</i> isolate	Nucleotide position			
	084	155	215	251
poprawskii clade (2)				
<i>I. poprawskii</i> ARSEF 7028 ex-type	C	T	T	C
<i>I. poprawskii</i> ARSEF 5330	C	T	T	C
javanica clade (1)				
<i>I. javanica</i> CBS 134.22 ex-type	T	A	C	T
<i>I. javanica</i> CBS CBS 174.25	T	A	C	T
<i>I. javanica</i> ARSEF 5806	T	A	C	T
<i>I. javanica</i> ARSEF 3776	T	A	C	T
<i>I. javanica</i> ARSEF 3778	T	A	C	T
<i>I. fumosorosea</i> (PFR-97) ARSEF 3682**	T	A	C	T
<i>I. javanica</i> ARSEF 5259	T	A	C	T
<i>I. javanica</i> ARSEF 5321	T	A	C	T
<i>I. javanica</i> ARSEF 3577	T	A	C	T
<i>I. javanica</i> ARSEF 3573	T	A	C	T
<i>I. javanica</i> ARSEF 3593	T	A	C	T

%D 1.5-2.1

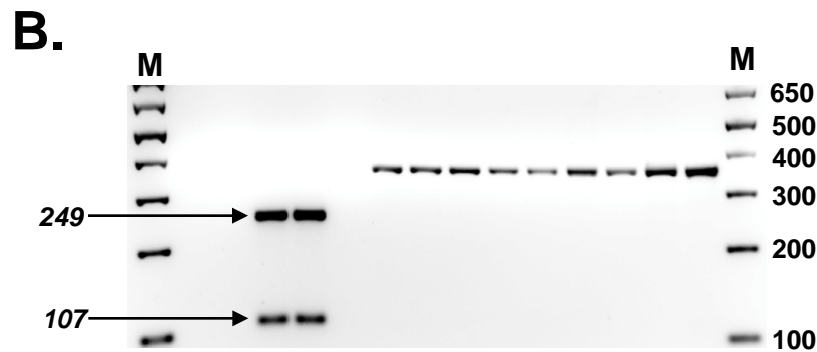
**No name change suggested yet, Certis Co., USA sending their line of isolate

Polymerase chain reaction-restriction fragment length polypmorphism (PCR-RFLP) diagnostic assays

I. javanica-specific
restriction enzyme



I. poprawskii-specific
restriction enzyme



Summary

Fungal isolates	Insect host (order)	Geographic origin
<u>Isaria fumosorosea</u> Wize [= <i>P. fumosoroseus</i> (Wize) Brown & Smith]		
ARSEF 3682 [= PFR-97]**	Aphididae (Hemiptera)	Apopka, Florida, USA
ARSEF 322 [<i>I. javanica</i>]	<i>Litodactylus leucogaster</i> (Coleoptera)	Gainesville, Florida, USA
<u>Isaria javanica</u> (Friederichs & Bally) Samson & Hywel-Jones [= <i>P. javanicus</i> (Frieder & Bally) AHS Brown & G Smith]		
CBS 134.22 (ex-type)	<i>Hypothenemus hampei</i> (Coleoptera)	Java, Indonesia
CBS 174.25	<i>Brachartona</i> sp. (Lepidoptera)	Unknown
ARSEF 5806	<i>Panoquina</i> sp. (Lepidoptera)	Colombia
ARSEF 3573 [<i>I. farinosa</i>]	<i>Bemisia tabaci</i> ^a (Hemiptera)	McAllen, Texas, USA
ARSEF 3593 [<i>I. farinosa</i>]	<i>Bemisia tabaci</i> ^a (Hemiptera)	McAllen, Texas, USA
ARSEF 3577 [<i>I. fumosorosea</i>]	<i>Bemisia tabaci</i> ^a (Hemiptera)	McAllen, Texas, USA
ARSEF 5259 [<i>I. fumosorosea</i>]	<i>Bemisia tabaci</i> ^a (Hemiptera)	Santa Maria, Texas, USA
ARSEF 5321 [<i>I. fumosorosea</i>]	<i>Bemisia tabaci</i> ^a (Hemiptera)	Weslaco, Texas, USA
ARSEF 3776 [<i>Paecilomyces</i> sp.]	<i>Bemisia tabaci</i> ^a (Hemiptera)	Weslaco, Texas, USA
ARSEF 3778 [<i>Paecilomyces</i> sp.]	<i>Bemisia tabaci</i> ^a (Hemiptera)	Mission, Texas, USA
<u>Isaria poprawskii</u> sp. nov. Cabanillas, de León, Humber, Murray & Jones		
ARSEF 7028 (ex-type)	<i>Bemisia tabaci</i> biotype B (Hemiptera)	Weslaco, Texas, USA
ARSEF 5330 [<i>I. fumosorosea</i>]	<i>Bemisia tabaci</i> ^a (Hemiptera)	Harlingen, Texas, USA
<u>Isaria tenuipes</u> Peck [= <i>P. tenuipes</i> (Peck) Samson]		
CBS 994.73	(Lepidoptera)	Tafo, Ghana
CBS 995.73 [in CBS as <i>I. javanica</i>]	(Lepidoptera)	Tafo, Ghana

^aHost possibly *Bemisia tabaci* biotype 'B', which was segregated from *B. tabaci* after the collection of these strains

** Name change not yet suggested until more detailed studies are complete, Certis Co. sending their PFR-97 isolate line
 Names in brackets [] are previous identifications as species of *Paecilomyces* in ARSEF



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