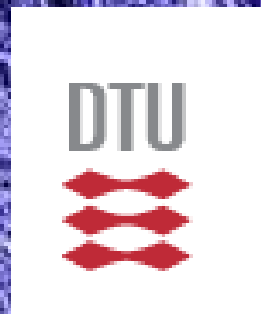
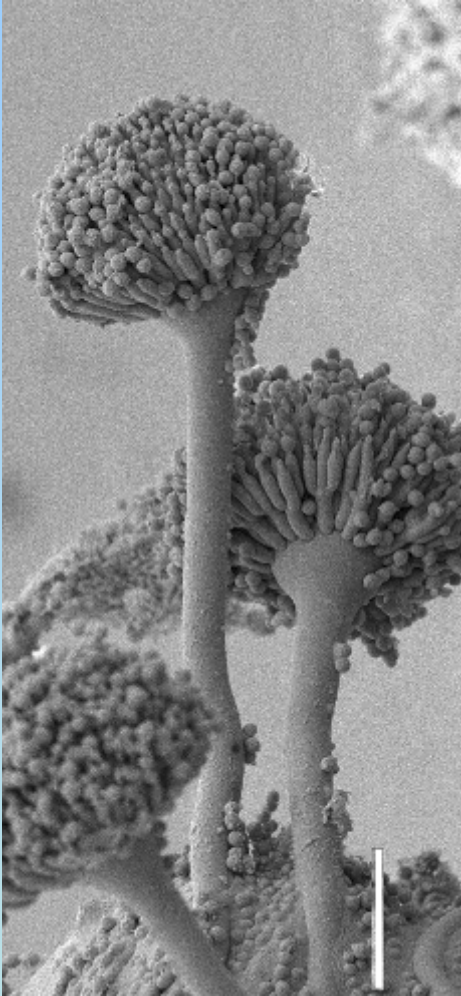


# New taxa in the *Aspergillus* genus

János Varga, Martin Meijer,  
Paramee Noonim, Jens C. Frisvad  
& Robert A. Samson



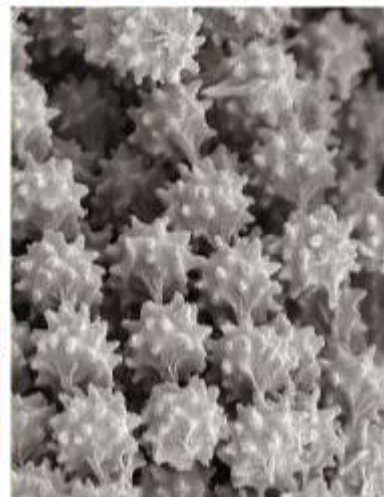
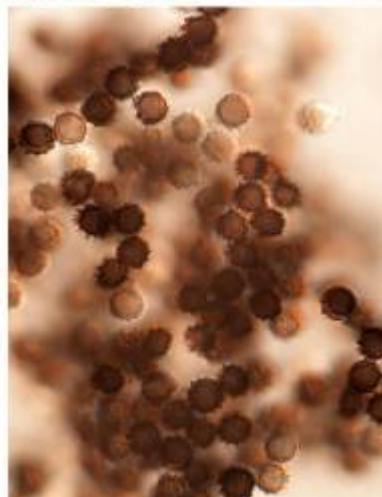
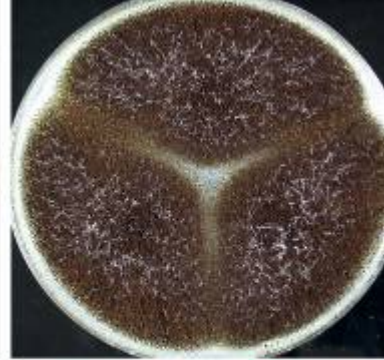
# Overview of the taxonomy of the *Aspergillus* genus



Subgenus	Section	Teleomorph
<i>Aspergillus</i>	<i>Aspergillus</i>	<i>Eurotium</i>
	<i>Restricti</i>	-
	<i>Cervini</i>	-
	<i>Terrei</i>	<i>Fennellia</i>
	<i>Flavipedes</i>	<i>Fennellia</i>
	<i>Nigri</i>	-
	<i>Circumdati</i>	<i>Neopetromyces</i>
	<i>Flavi</i>	<i>Petromyces</i>
	<i>Cremeri</i>	<i>Chaetosartorya</i>
	<i>Candidi</i>	-
<i>Fumigati</i>	<i>Fumigati</i>	<i>Neosartorya</i>
	<i>Clavati</i>	<i>Neocarpenteles</i>
<i>Nidulantes</i>	<i>Nidulantes</i>	<i>Emericella</i>
	<i>Usti</i>	-
	<i>Versicolores</i>	-
	<i>Ornati</i>	<i>Hemicarpenteles</i>

*Aspergillus  
brasiliensis*,  
a “new” species  
in *Aspergillus*  
section *Nigri*

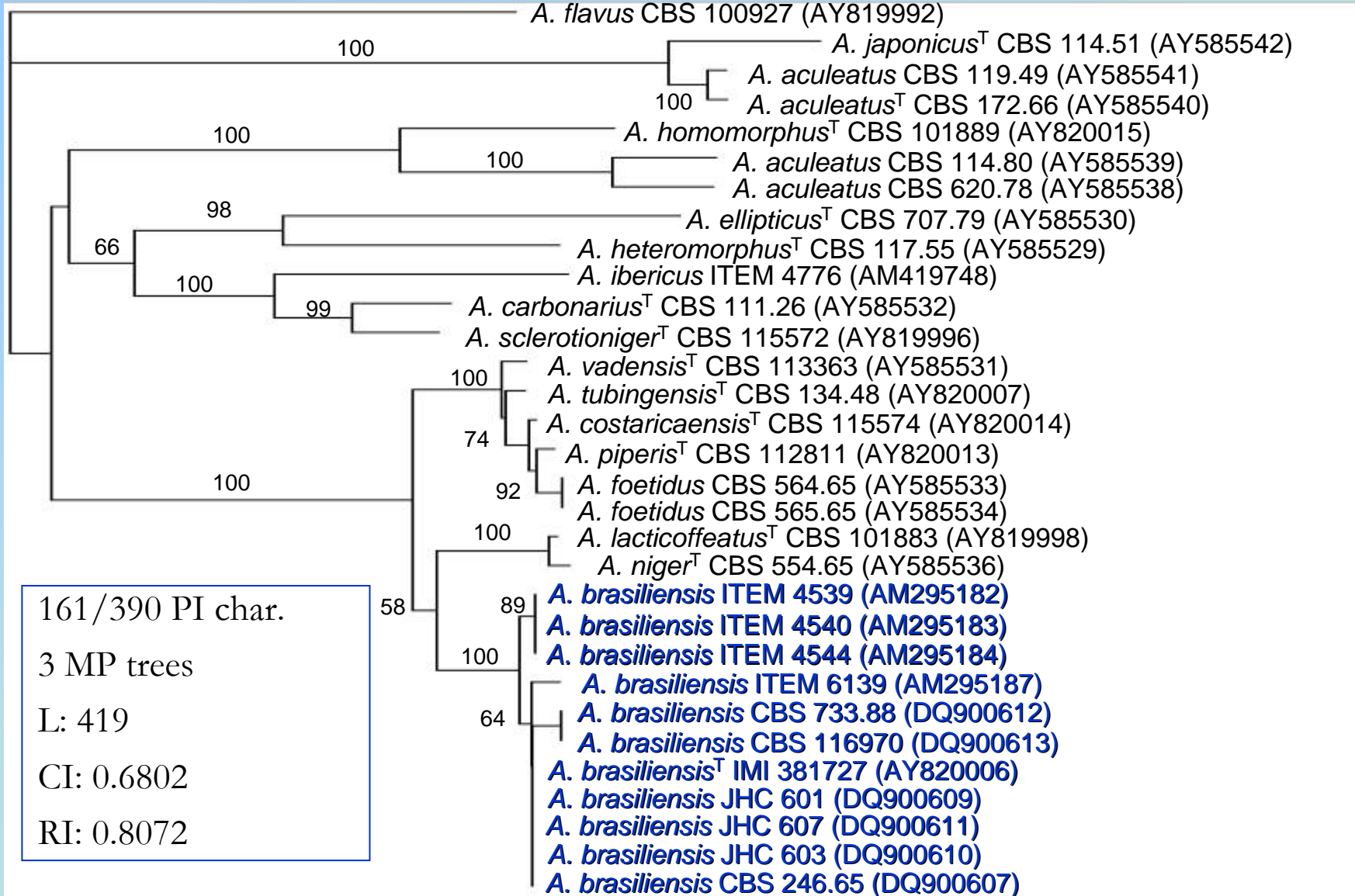
*Aspergillus brasiliensis*  
sp. nov. CBS 101740<sup>T</sup>



# Distinguishing features of *A. brasiliensis* sp. nov.

- mtDNA and rDNA RFLP profiles (Varga & Croft, 1988)
- ITS, calmodulin and  $\beta$ -tubulin sequence data
- Extrolite profiles (J. Frisvad)
- Ability to utilize D-galactose (M. Meijer, R. de Vries)
- AFLP analysis (G. Perrone)
  
- **Distribution:**
  - Soil, Brazil (J. Varga, J.H. Croft, 1988)
  - Soil, Australia, USA, Netherlands (M. Meijer, 2006)
  - Grape, Portugal (G. Perrone, 2006)

# Neighbor-joining tree based on $\beta$ -tubulin sequence data of *Aspergillus* section *Nigri*

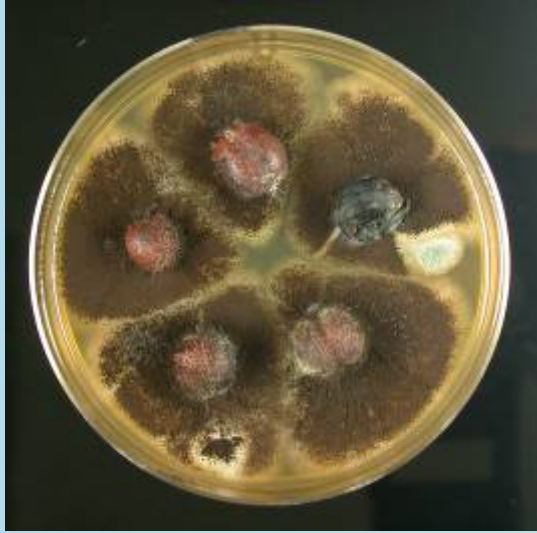


# Morphological characteristics and extrolite production of species belonging to the *A. niger* species complex

Species	Conidia ( $\mu\text{m}$ )	Vesicles ( $\mu\text{m}$ )	Sclerotia (mm)	Extrolites produced
<i>A. brasiliensis</i>	3.5-4.5	30-45	in some strains, white, 1-1.5	Naphtho- $\gamma$ -pyrones (incl. aurasperone B), cf. tensidol A
<i>A. costaricensis</i>	3.1-4.5	40-80	Pink to yellow, 1.2-1.8	Naphtho- $\gamma$ -pyrones, aflavinines, corymbiferan lactones
<i>A. foetidus</i>	3.5-4.5	50-80	-	Pyranonigrin A, naphtho- $\gamma$ -pyrones, asperazine, antafumicins
<i>A. lacticoffeatus</i>	3.4-4.1	40-65	-	Ochratoxin A, pyranonigrin A, kotanins
<i>A. niger</i>	3.5-5	45-80	Vinaceous buff, 0.8-1.2	(Ochratoxin A), pyranonigrin A, naphtho- $\gamma$ -pyrones, (kotanins)
<i>A. piperis</i>	2.8-3.6	40-55	Yellow to pink, 1.0-1.7	Pyranonigrin A, naphtho- $\gamma$ -pyrones, aflavinines (see above)
<i>A. tubingensis</i>	3-5	40-80	White to pink, 0.5-0.8	Pyranonigrin A, naphtho- $\gamma$ -pyrones, asperazine
<i>A. vadensis</i>	3-4	25-35	-	Naphtho- $\gamma$ -pyrones, asperazine, nigragillin, polar kotanin-like compound

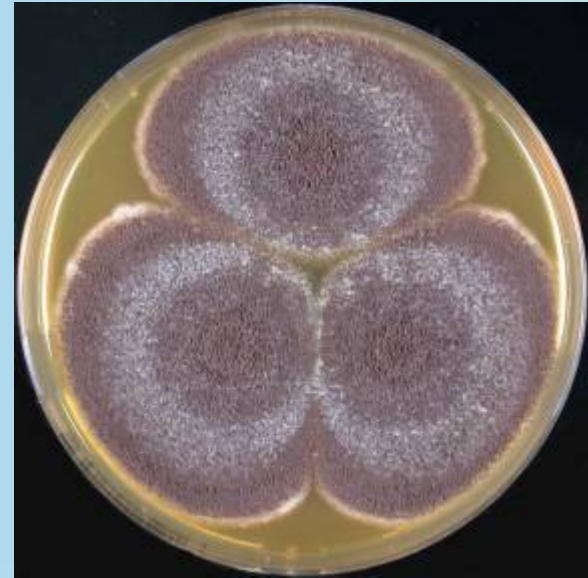
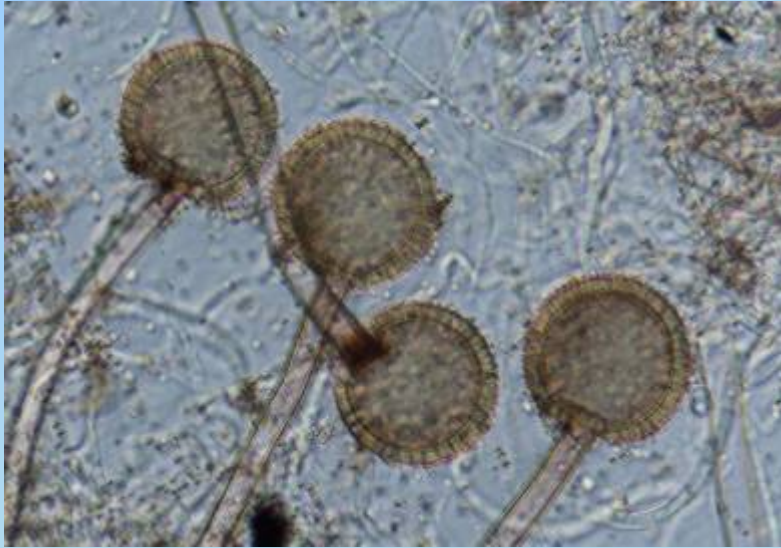
# New black *Aspergillus* species from Thai coffee





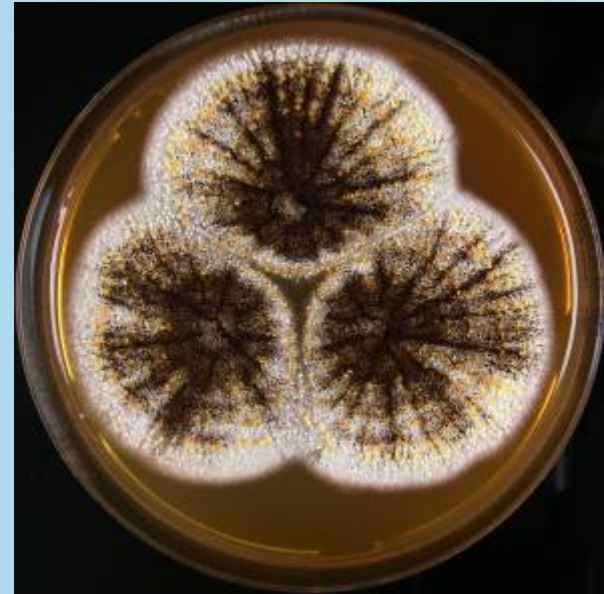
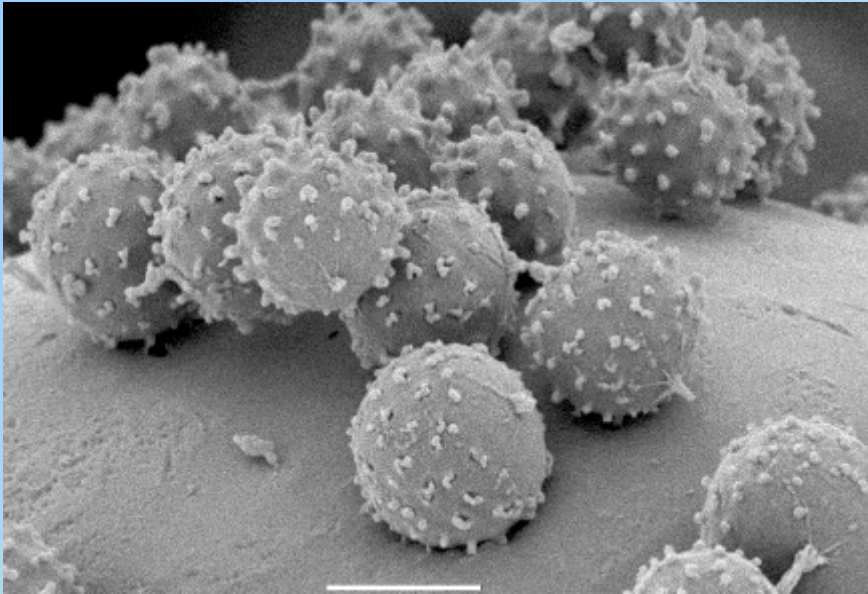


# *Aspergillus* sp. nov. 1



- Uniseriate species related to *A. aculeatus*
- Conidia smaller than in *A. aculeatus* or *A. japonicus*
- Produces neoxaline, aculeasins, secalonic acid D & F
- Occurrence: coffee beans, Thailand; soil, Japan; canvas, New Guinea

# *Aspergillus* sp. nov. 2

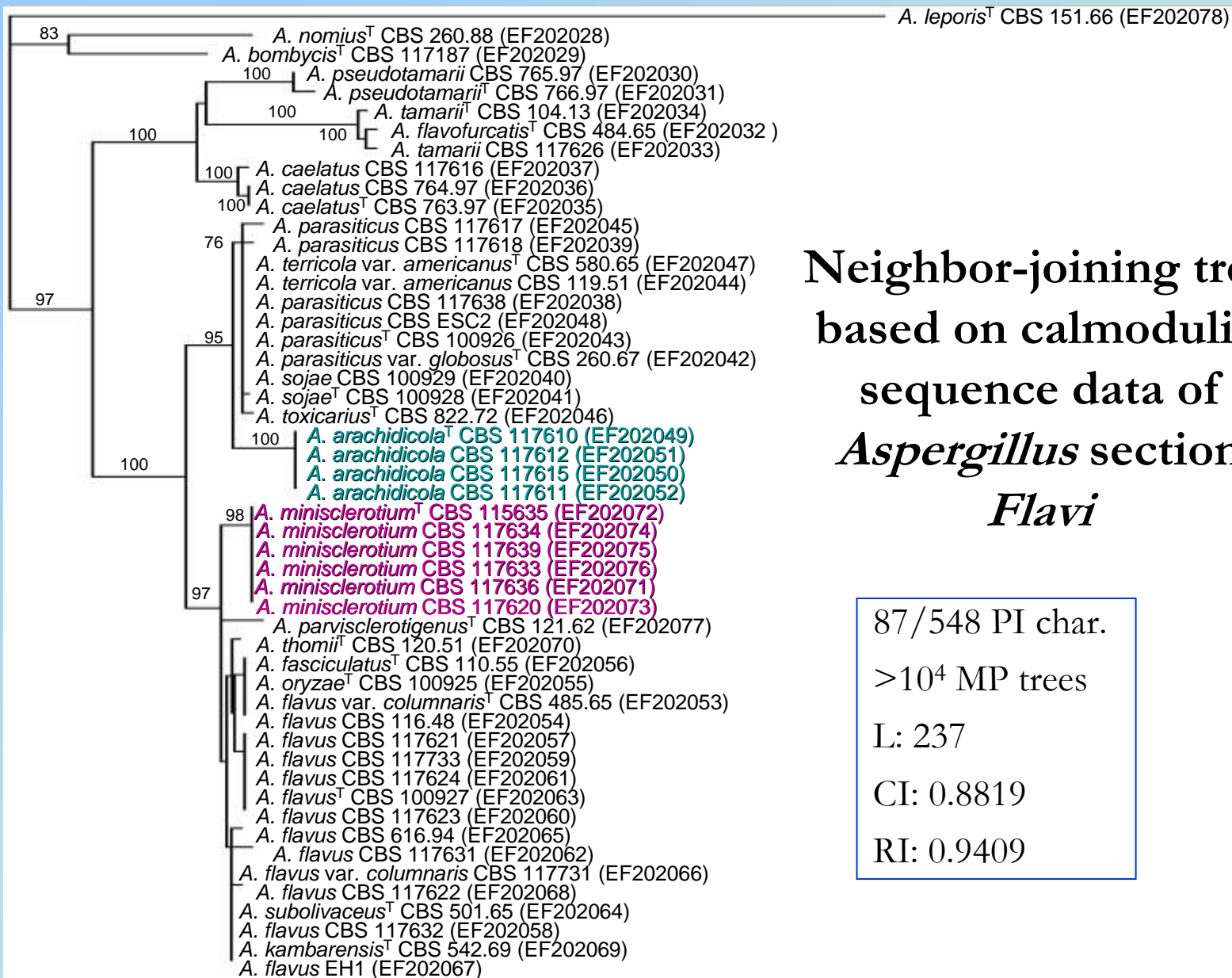


- White to orange sclerotia
- Does not grow at 37°C and on CREA
- Closely related to, but distinguishable from *A. carbonarius* or *A. ibericus* (even by ITS sequence data)
- Produces several unique indol metabolites, but does not produce ochratoxin A
- Occurrence: coffee beans, Southern Thailand

# New species in *Aspergillus* section *Flavi*

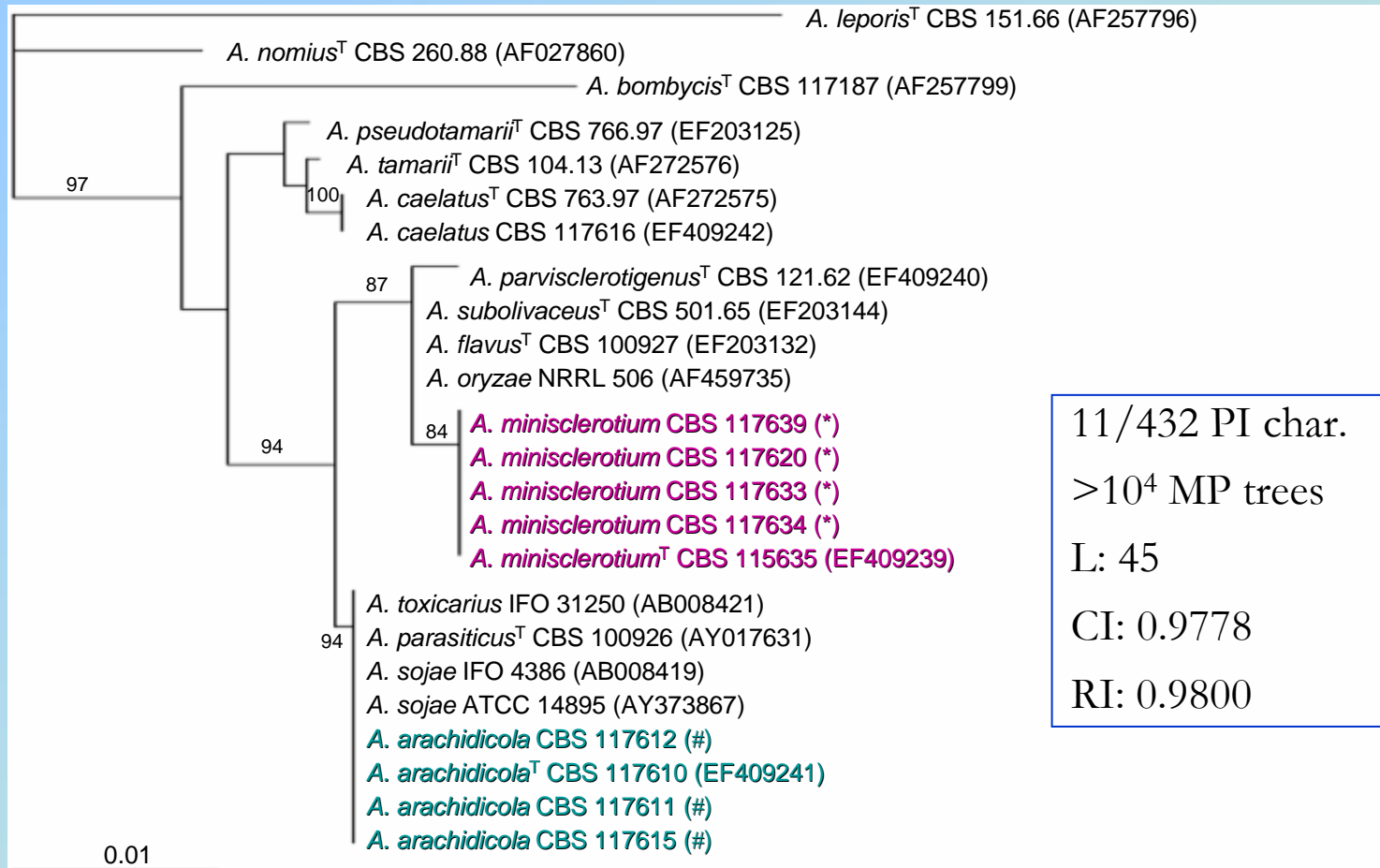
- Survey of peanut plants (*Arachis hypogea*, *A. glabrata*) and plantations in Argentina





Neighbor-joining tree  
based on calmodulin  
sequence data of  
*Aspergillus* section  
*Flavi*

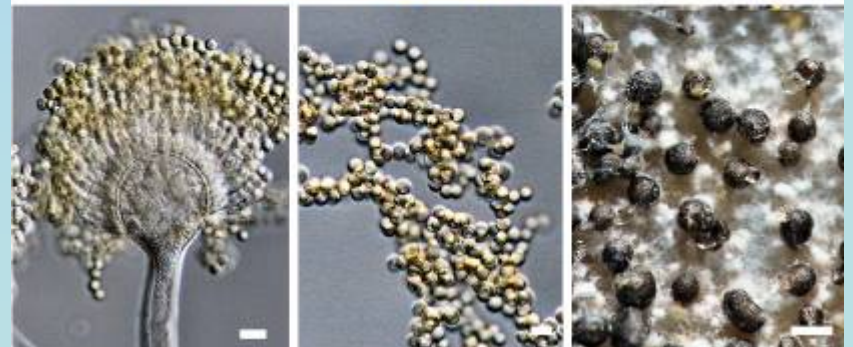
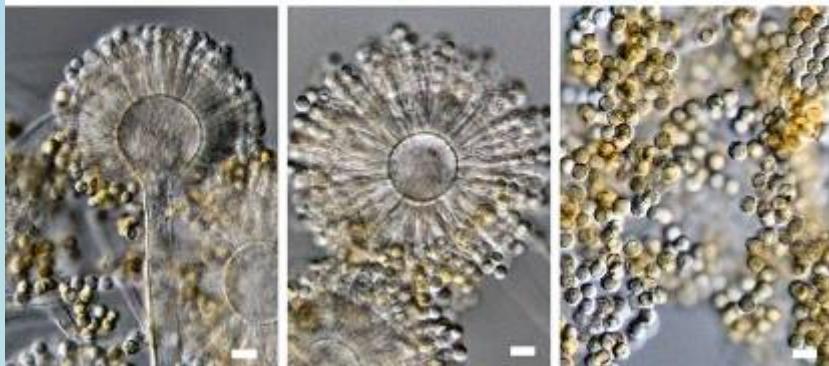
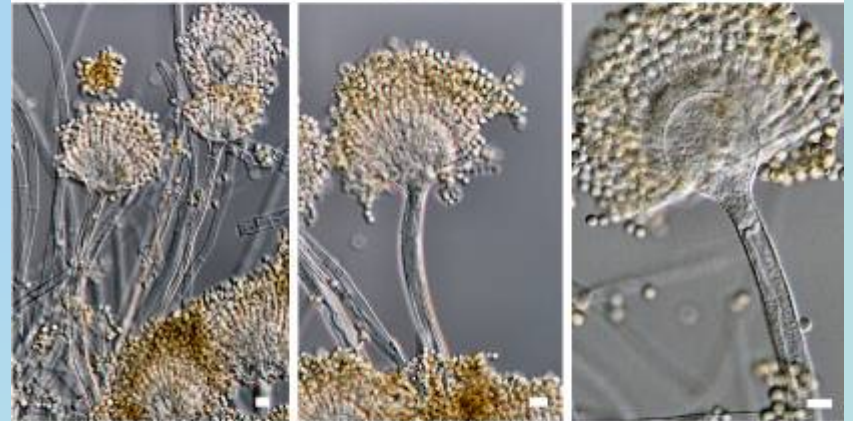
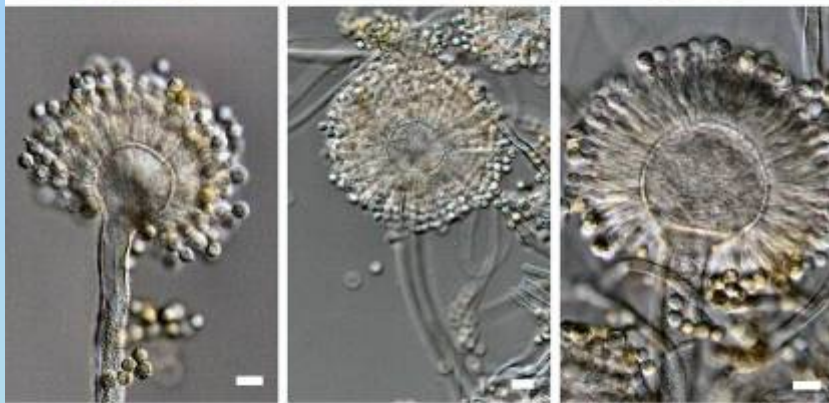
87/548 PI char.  
>10<sup>4</sup> MP trees  
L: 237  
CI: 0.8819  
RI: 0.9409



**Neighbor-joining tree based on ITS  
sequence data of *Aspergillus* section *Flavi***

# *A. arachidicola*

# *A. miniscletorium*



*A. arachidicola* sp. nov.

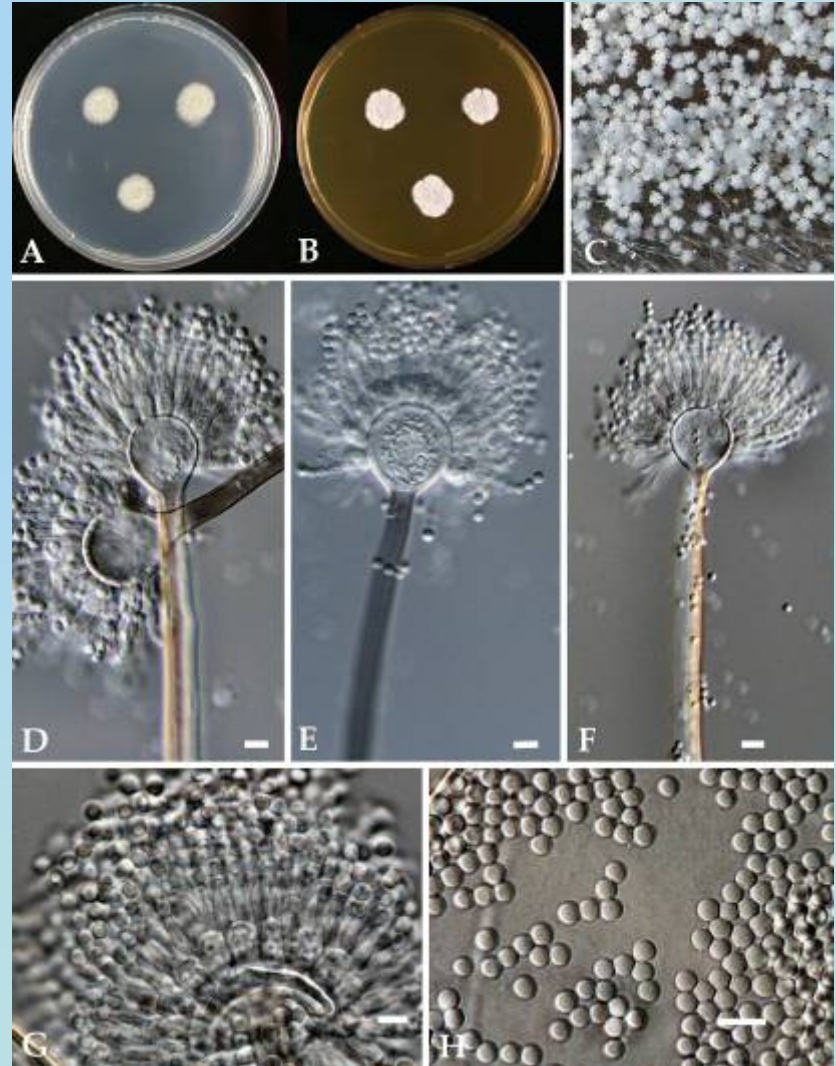
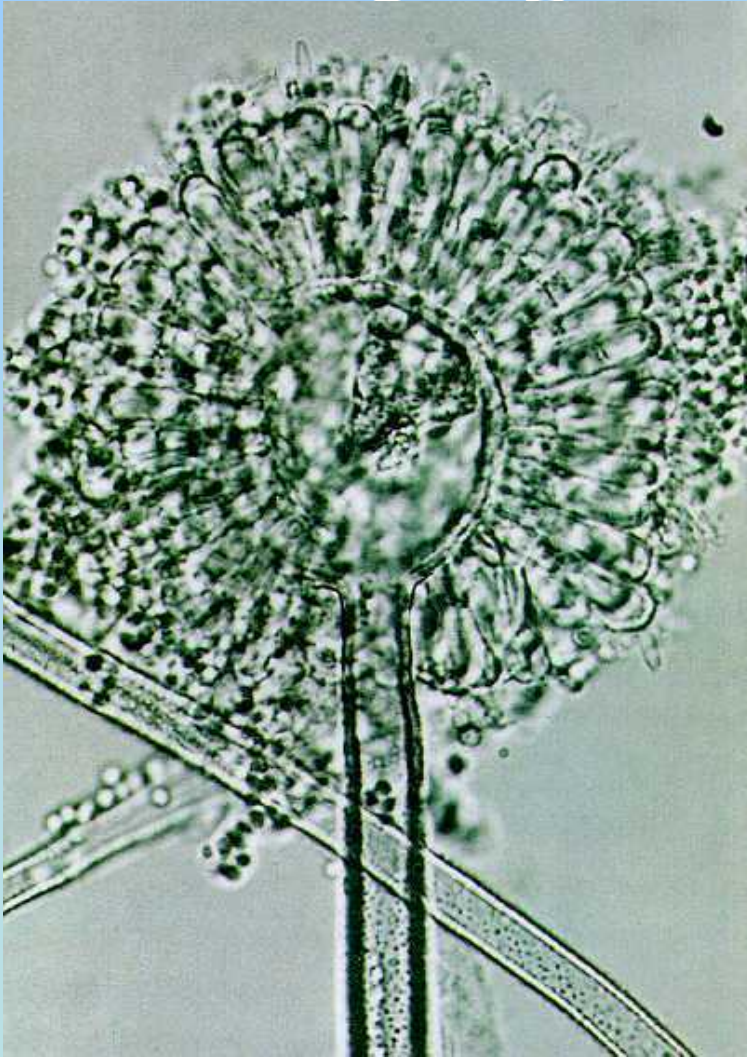


*A. minisclerotium* sp. nov.



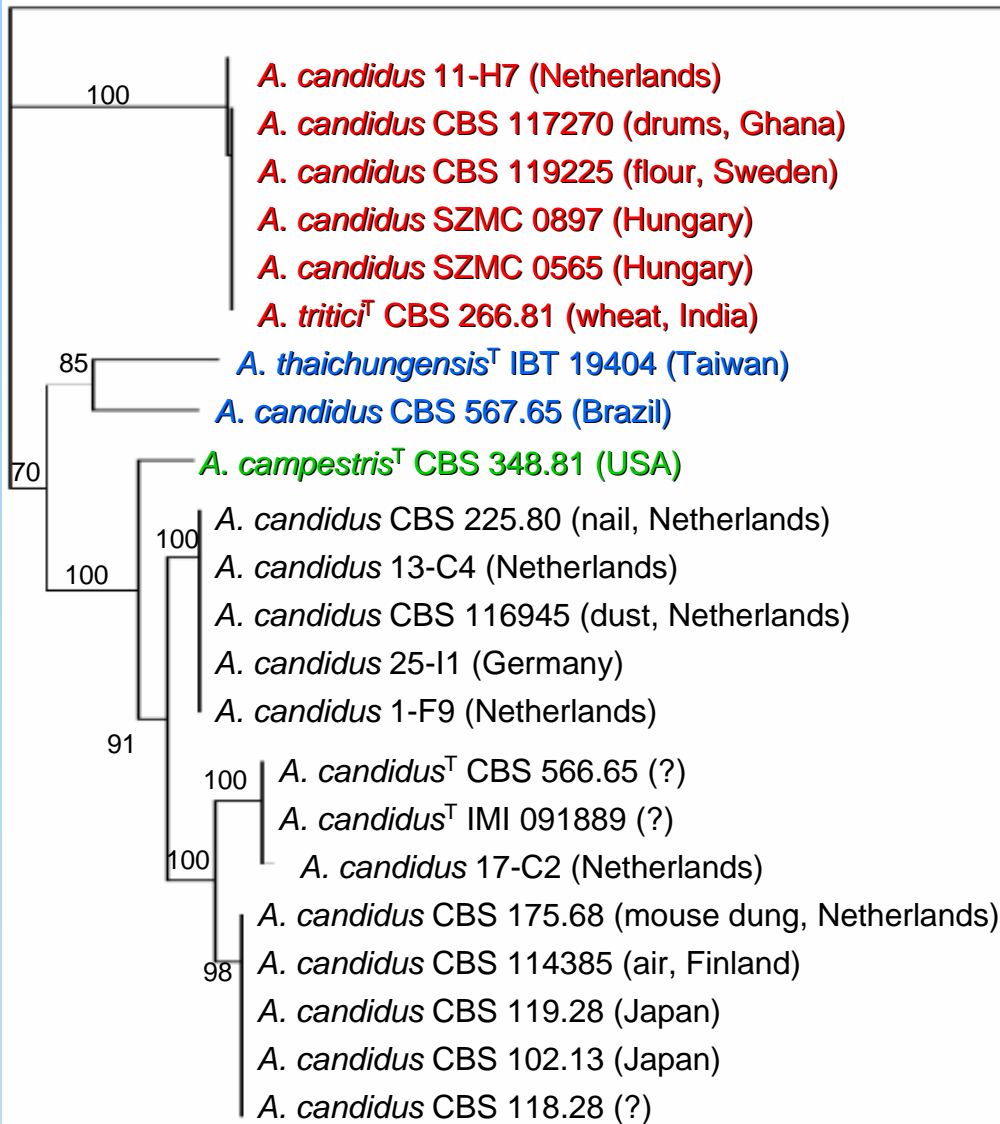
- Occurrence: leaves and seed of *Arachis* sp., Argentina
- Importance: aflatoxin producers
  - *A. minisclerotium*: AFB<sub>1</sub>, AFB<sub>2</sub>, AFG<sub>1</sub>, AFG<sub>2</sub>, CPA, aflavinin, aflatrem
  - *A. arachidicola*: AFB<sub>1</sub>, AFG<sub>1</sub>, AFG<sub>2</sub>, parasiticolid, chrysogin

# Revalidation of *A. tritici* in *Aspergillus* section *Candidi*



# Neighbor-joining tree based on $\beta$ -tubulin sequence data of *Aspergillus* section *Candidi*

*A. flavus* CBS 100927 ( EF203132)



63/497 PI char.

4 MP trees

L: 218

CI: 0.8853

RI: 0.9178

# *Aspergillus tritici*

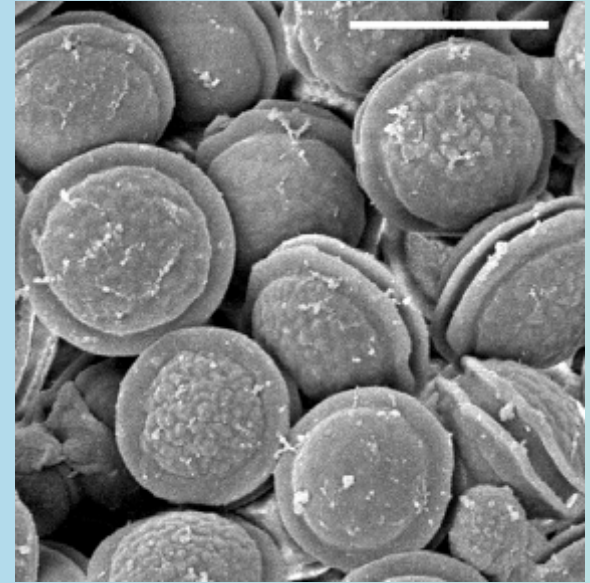


- Originally described as “*A. triticus*” by Mehrotra & Basu (1976)
- Isolates grow well at 37°C
- More yellowish than *A. candidus*
- Some of them produce purple sclerotia
- Conidial heads radiate, wet (“slimy”), conidia roughened

# Extrolites in *Aspergillus* section *Candidi*

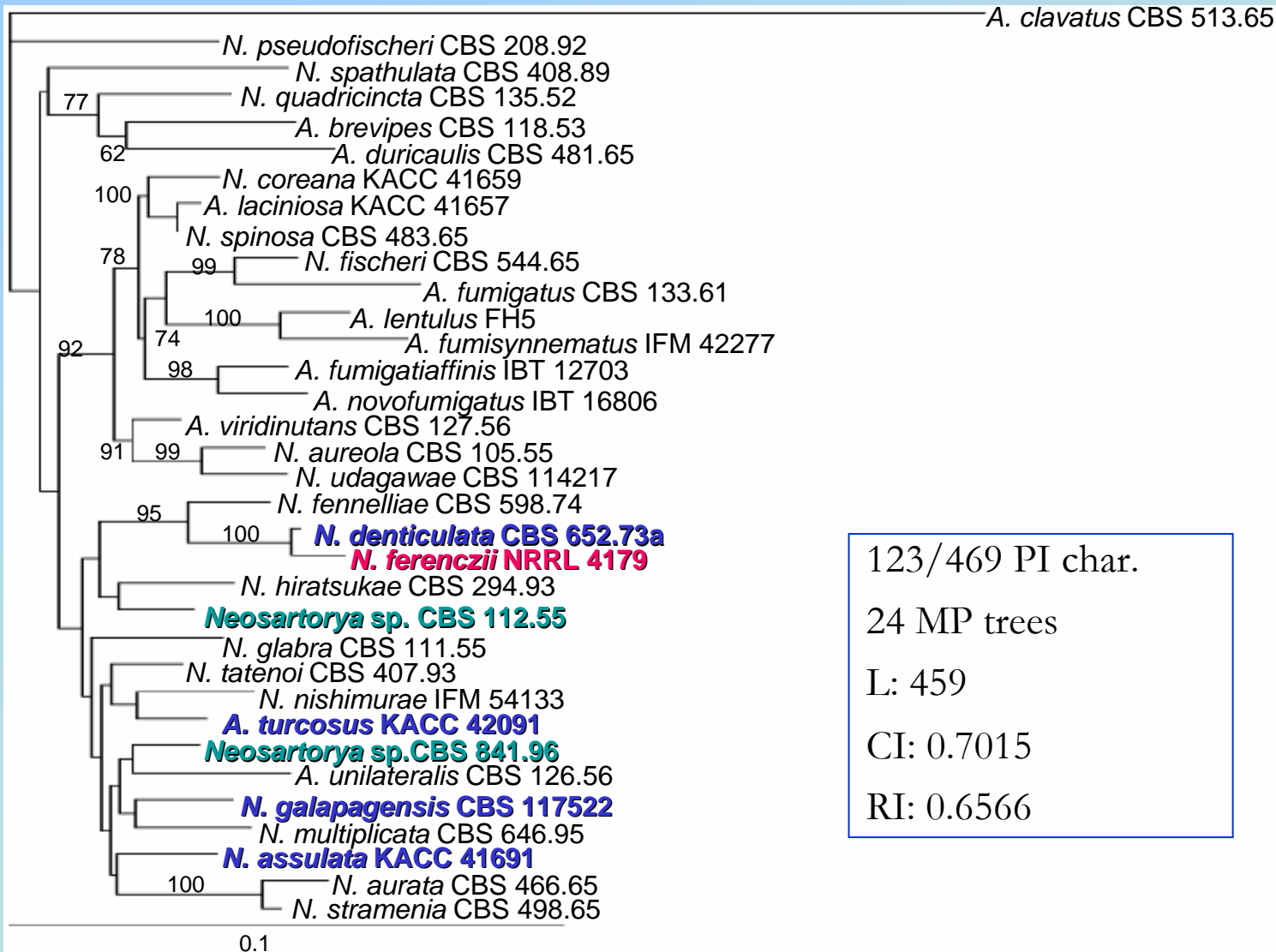
Species	Extrolites produced
<i>A. candidus</i>	<b>Candidusin A&amp;B</b> , terphenyllin, 3-hydroxyterphenyllin, chlorflavonin, chlorflavonins analogue
<i>A. campestris</i>	<b>Candidusin C</b> , terphenyllins, chlorflavonin
<i>A. taichungensis</i>	<b>Candidusin C</b> , terphenyllin, 3-hydroxyterphenyllin
<i>A. tritici</i> <sup>T</sup> CBS 266.81	<b>Candidusin B</b> , candidusin analogue, terphenyllin, 3-hydroxyterphenyllin, chlorflavonin

# New species in *Aspergillus* section *Fumigati*



- *Neosartorya ferenczii* sp. nov.
- Homothallic species closely related to the heterothallic *N. fennelliae* and to the homothallic *N. denticulata*
- Previously classified as *N. glabra*
- Extrolites:
  - *N. ferenczii*: asperfuran, aszonalenin, fumigaclavine, fumigatin, **gliotoxin** (Gne, Met Y, NEPS, Rubrat, alk-950, alk-908, alk-1070, DIL)
  - *N. fennelliae*: asperfuran, aszonalenin, fumigaclavine, viridicatumtoxin (Gne, Met Y, NEPS, Rubrat, met kko, Mrif, SCYT, SKAR, HERY, SOSM, STOK, VIRN, Vos) asperfuran, cf. gliotoxin, fumigatins, and cf. aszonalenin
  - *N. denticulata*: **gliotoxin**, viriditoxin
  - *N. glabra*: asperpentyn, wortmannin, avenaciolide (FEN, NEPS, GNB, GLF, SCA, gol)

# Neighbor-joining tree based on $\beta$ -tubulin sequences of *Aspergillus* section *Fumigati*



# Neighbor-joining tree based on calmodulin sequences of *Aspergillus* section *Fumigati*

*A. clavatus* CBS 514.65

