Comparing the Morphological Differences of Conidiophore Development in the *Aspergilli*

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Abstract

Conidiation is a unique characteristic of asexual reproduction that occurs primarily in Ascomycota. In particular the shape and form of conidiophores in the *Aspergilli* were used in this study. Understanding conidiation is important because these spores are always present in the air aiding in disease initiation and allergic reactions. In order to generate the findings, several strains of *Aspergillus* were allowed to conidiate on Riddell mounts and viewed on the microscope. Each of these mounts were observed and images were captured with the microscope. There was no relationship between morphological and phylogenetic differences. The morphological traits in some strains were similar, however, the evolution of genus *Aspergillus* , as indicated by the phylogeny, shows that physical characters evolved independently.

Introduction and Objectives

- Conidia are present in the air everywhere and these spores are important in disease initiation and allergy development
- Study conidia development in different *Aspergillus* spp. to help improve knowledge of conidiation
- Compare physical traits for commonalities and differences
- This study is part of a worldwide comparative genomics projected funded by JGI (Joint Genome Institute) and led by Ronald de Vries to study more than twenty *Aspergillus* spp.
- **Hypothesis:** Distinct morphological traits associated with conidiation in *Aspergillus* correlate with the evolutionary history of the genus

Methods

•Strains received from CBS-KNAW Fungal Biodiversity Centre

•All strains were grown on Vishniac minimal medium

•Riddell Mounts for production and imaging of conidiophores

•Germination

•Imaging used Olympus microscope with 60x lens and Hamamatsu camera

•Took images with SlideBook software

•Image prepared with Photoshop CS5

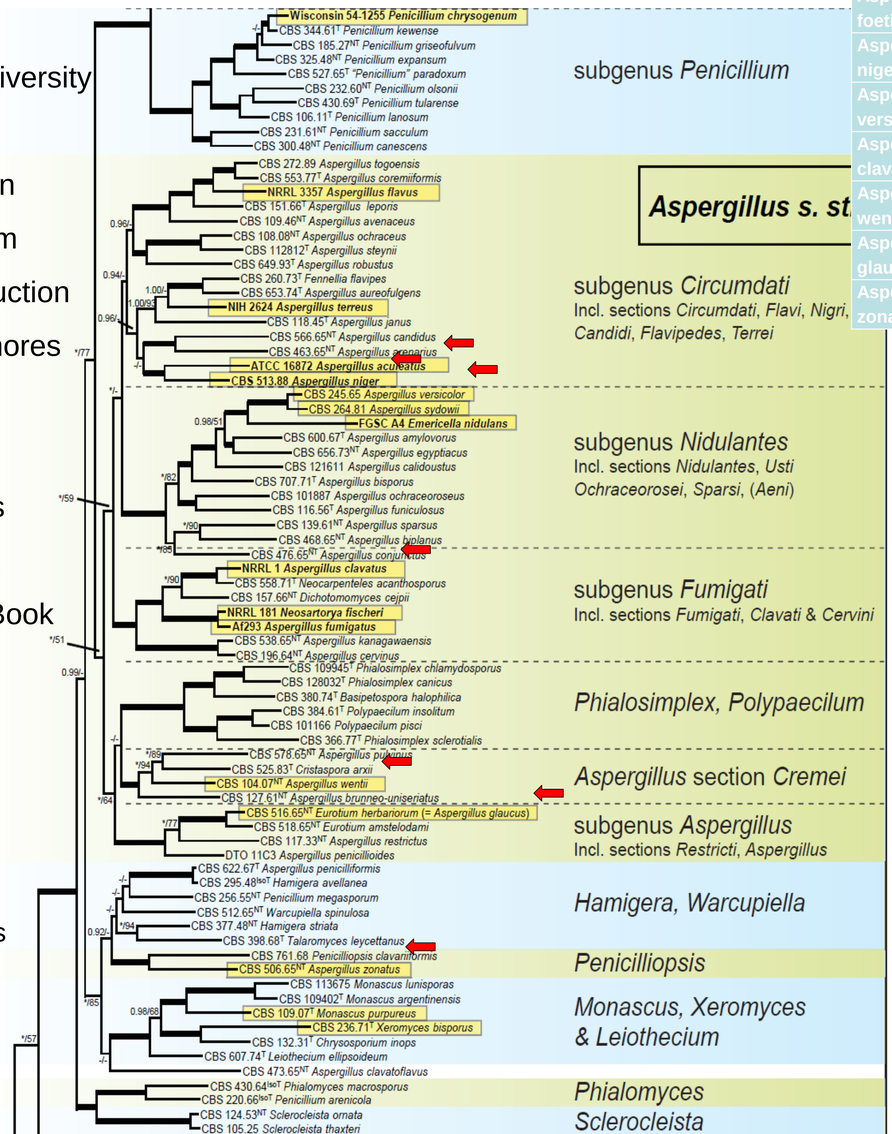

Fig. 1. Phylogeny of various Aspergillus species.

Results

Fig. 2 Variation of Conidiophore Development in the *Aspergilli*

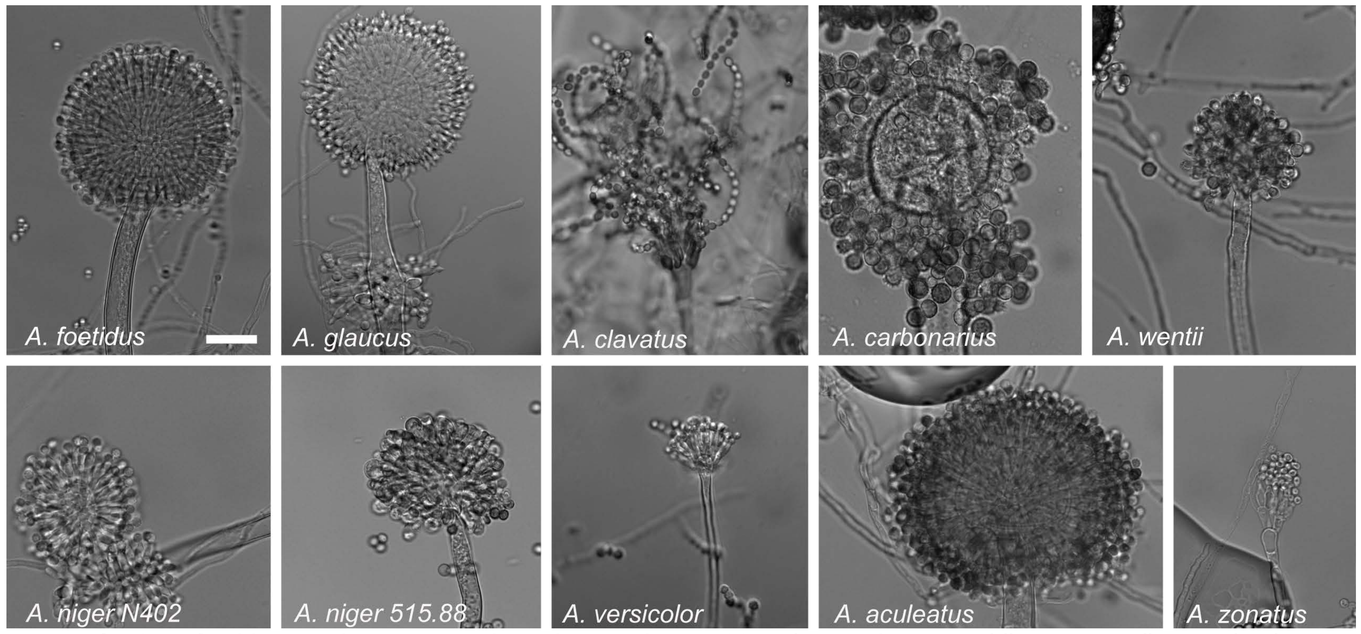

Fig. 2. *A. foetidus*, *A. glaucus*, *A. carbonarius*, *A. niger* N402 and *A. aculeatus* conidiogenous cells completely surround the vesicle. *A clavatus*, *A. versicolor*, and *A. zonatus* also have similarities with conidiogenous development across the top portion of the vesicle. *A. niger* 515.88 and *A. wentii* are morphological similar. Variation in conidium size ranged from 2.4 µm in *A. glaucus* to 7.6 µm in *A . carbonarius*. Some conidiophores are uniseriate like *A. clavatus* while others were biseriate, for example *A. zonatus*. Scale bar =20 µm.

Table 1. Variation of Physical Characters from Published Species Descriptions

Name	subgenus	Spore Surface	Spore Color	Spore Size	Spore Shape	Vesicle Shape	Unisereate/Biseriate	Source
Aspergillus aculeatus	circumdati	smooth/granular (occasionally)	uncolored/slightly brownish	1.0-2.0µm	elliptical/globose	globose/elongate	unisereate	Raper
Aspergillus carbonarius	circumdati	smooth/finely roughened	uncolored/brownish	6-11µm	nearly spherical	nearly spherical	bisereate	Klich
Aspergillus foetidus	circumdati	smooth/delicately roughened	dark brown/black	4.0-4.5µm	spherical	globose/slightly elongate	biseriate	Klich
Aspergillus niger	circumdati	rough	dark brown/black	3.5-4.5µm	globose	spherical	biseriate	Klich
Aspergillus versicolor	nidulantes	smooth walled	colorless	2.0-3.5µm	subglobose/globose	spathulate/pyriform	bisereate	Klich
Aspergillus clavatus	fumigati	smooth	blue/green	1.5-3.0µm	clavate	clavate	unisereate	Raper
Aspergillus wentii	cremei	smooth/very rough	yellow/brown	3.5-6.0µm	globose/broadly ellipsoidal	elongate/globose	biseriate	Klich, Thom & Raper
Aspergillus glaucus	aspergillus	smooth/rough	pale blue/green	6.0-7.5µm	ellipsoidal/spherical/apiculate/spinose	subglobose/pyriform	uniseriate	Klich, Thom & Raper
Aspergillus zonatus	penicilliopsis	smooth/rough in fluid mounts	greenish yellow	2.8-3.4µm	oval	subglobose	biseriate	Thom & Raper

Table 1. variation of physical characteristics

Conclusion

The hypothesis was nullified, the evidence shown here suggests physical characteristic evolved independently.

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