

# Ergot alkaloids

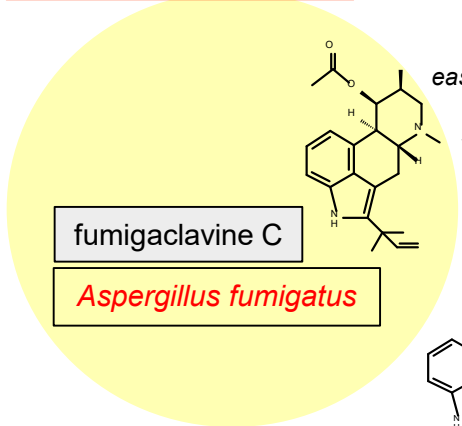
Daniel Panaccione

West Virginia University, USA

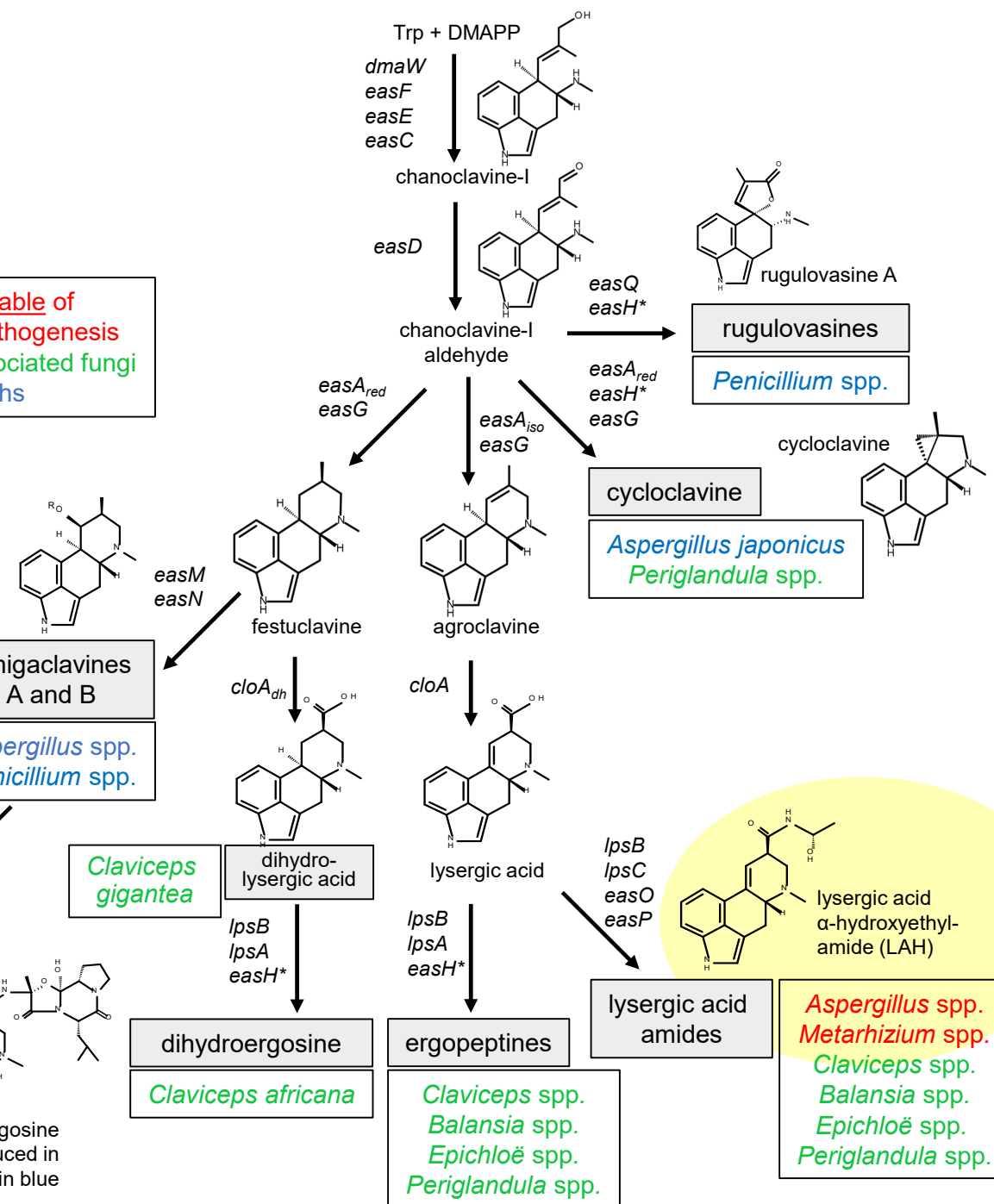
Fungi capable of animal pathogenesis  
Plant-associated fungi  
Saprotrophs

- in/on conidia (~2%)  
- inhibits TLR4 response

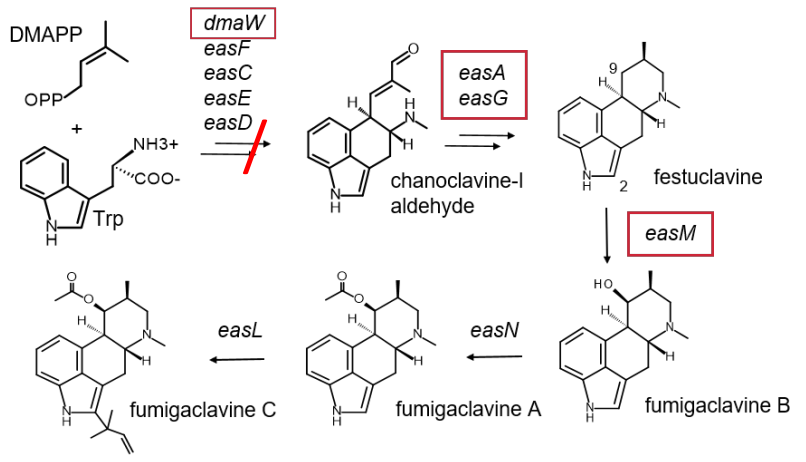
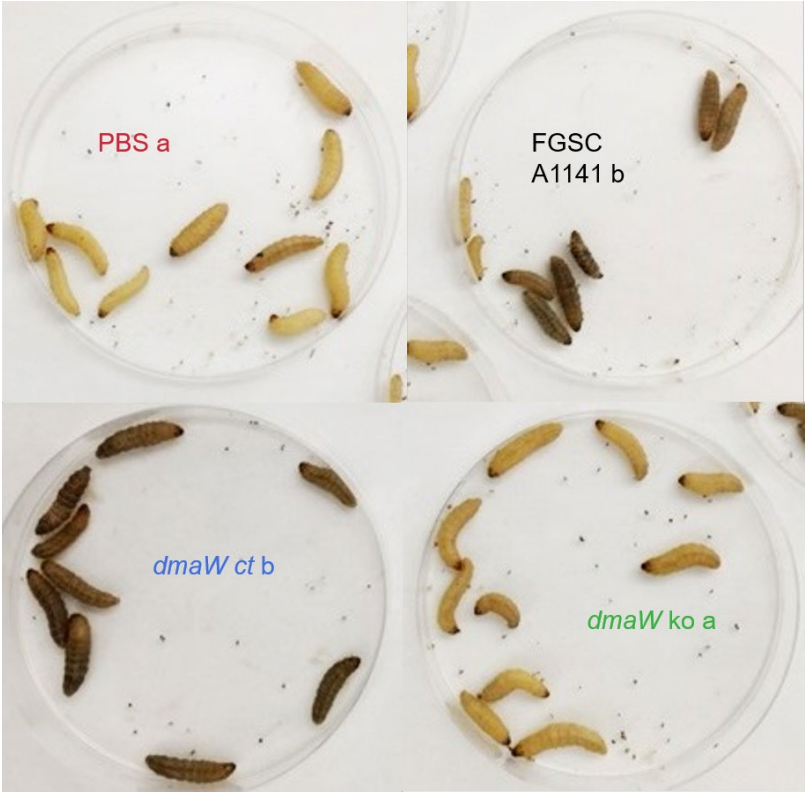
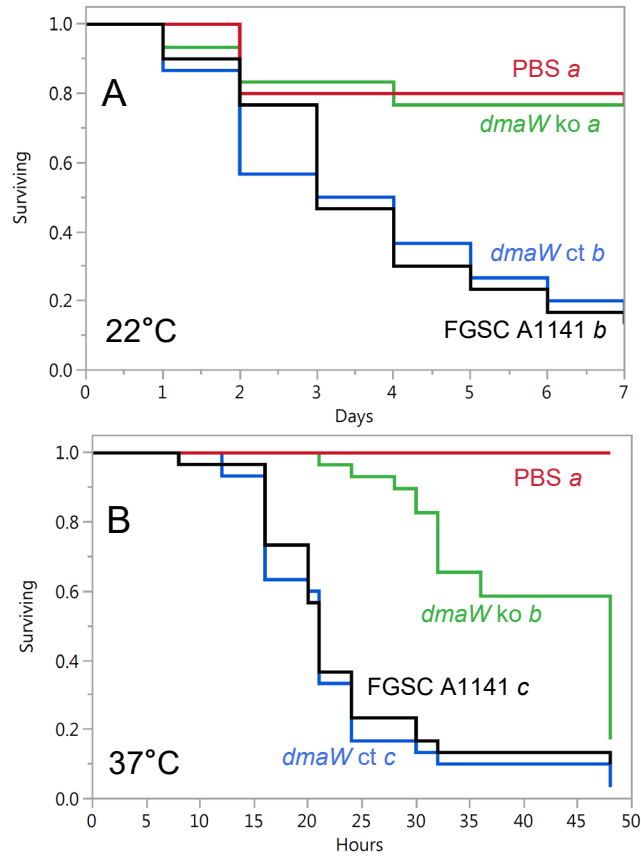
fumigaclavine C  
in *A. fumigatus*



ergosine  
(an ergopeptine); bond reduced in dihydroergosine shown in blue

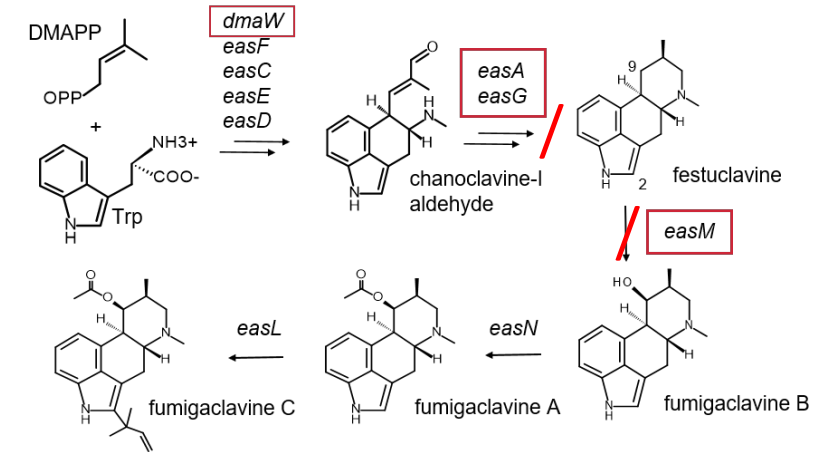
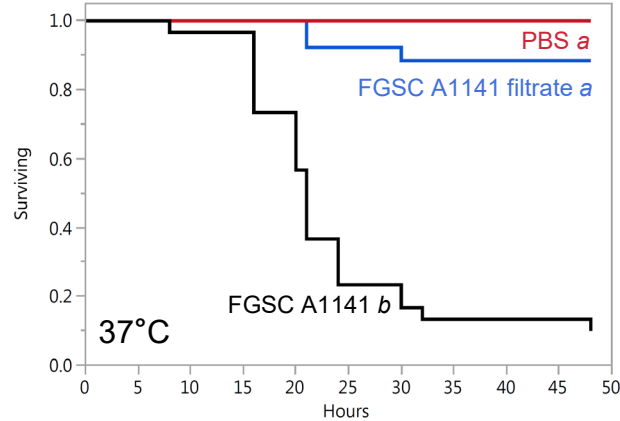
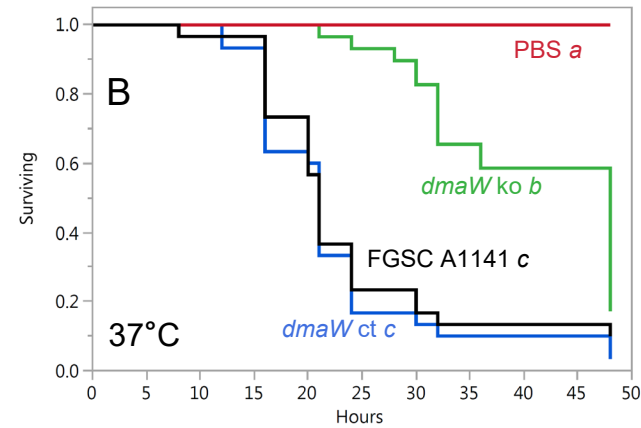
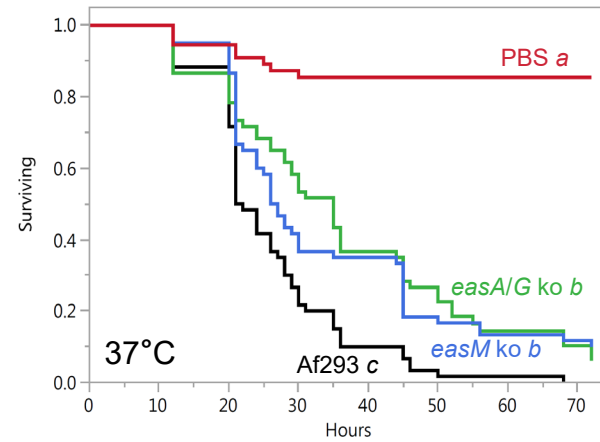
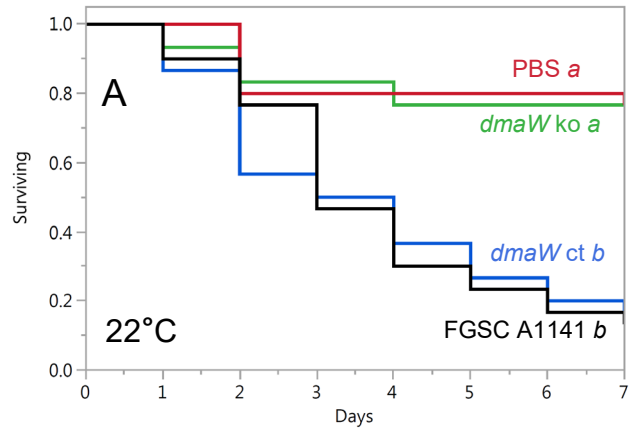


lysergic acid  
 $\alpha$ -hydroxyethylamide  
(LAH) in *A. leporis*  
and relatives



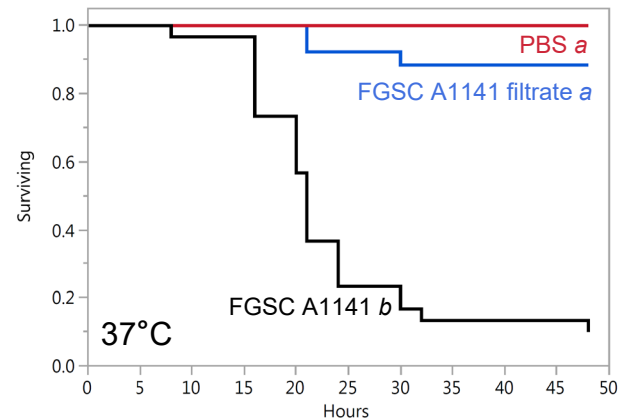
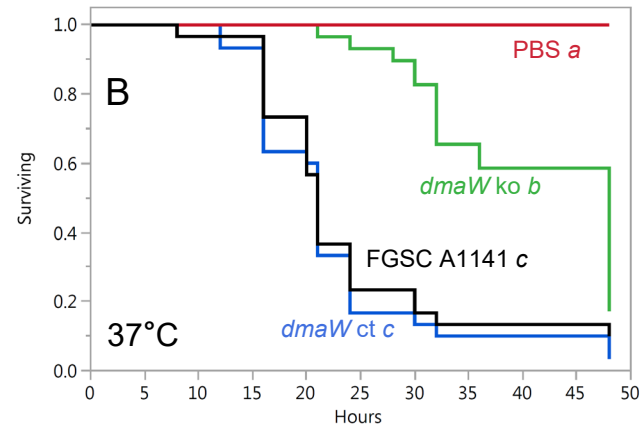
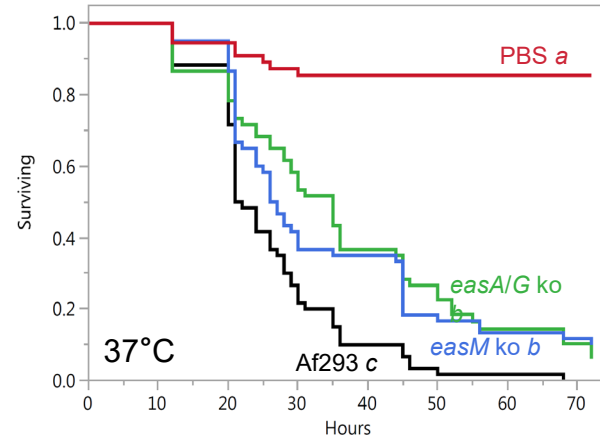
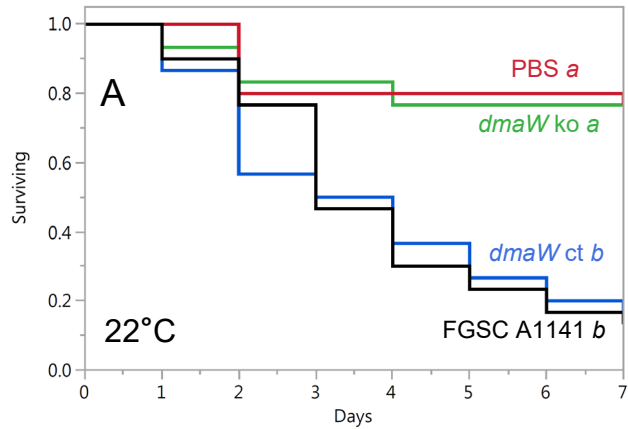
*Aspergillus fumigatus* knockout lacking ergot alkaloids is less virulent to *Galleria mellonella*

- fumigaclavine C in/on conidia
- no accumulation detected during disease



*Aspergillus fumigatus* knockout lacking ergot alkaloids is less virulent to *Galleria mellonella*

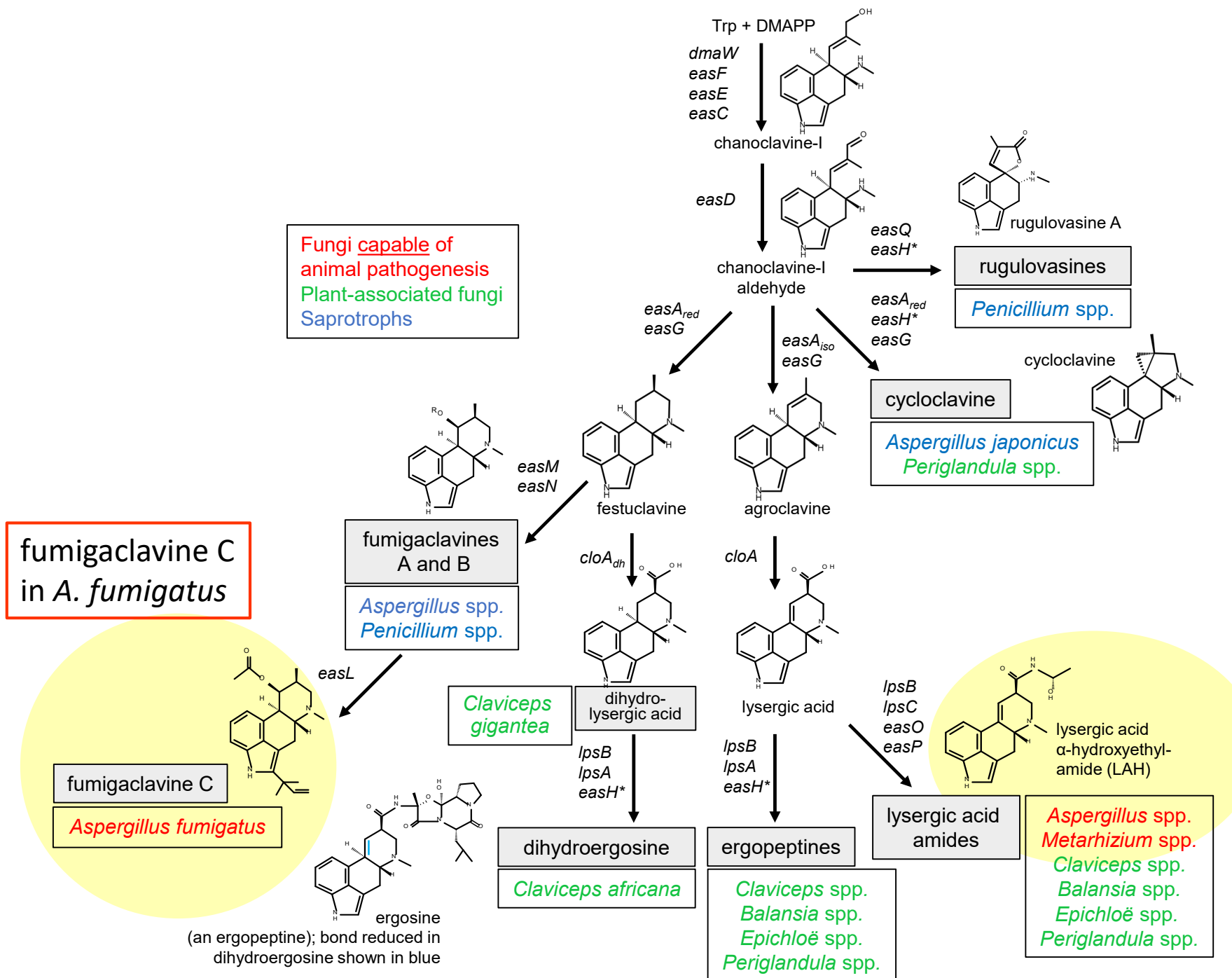
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*Aspergillus fumigatus* mutants lacking fumigaclavine C are less virulent to *Galleria mellonella*

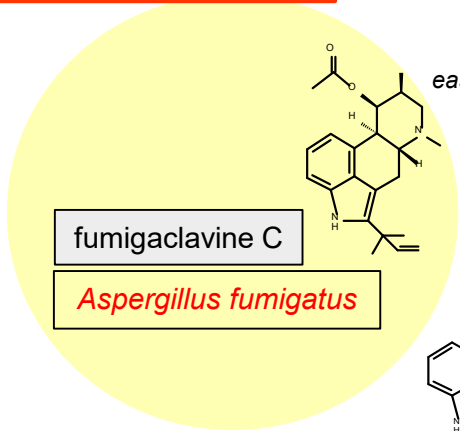
- wild-type fungus poorly adapted to completing life cycle on host

# Ergot alkaloids



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Plant-associated fungi  
Saprotrophs

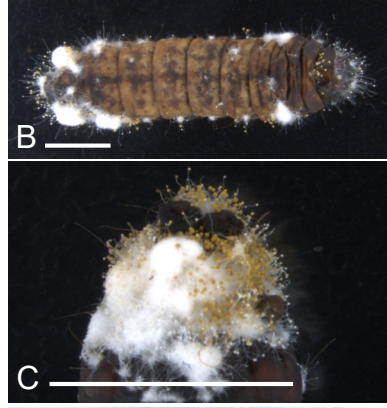
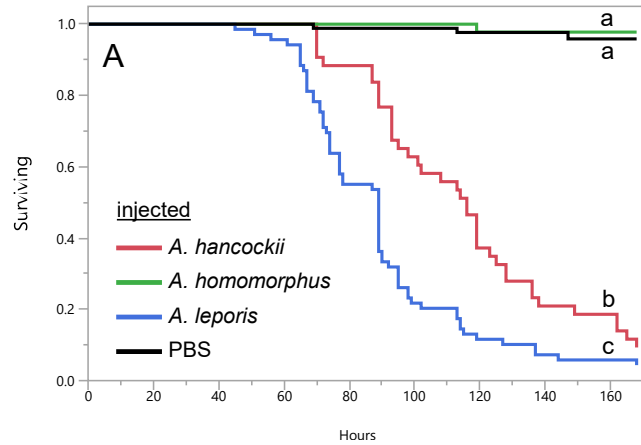
fumigaclavine C  
in *A. fumigatus*



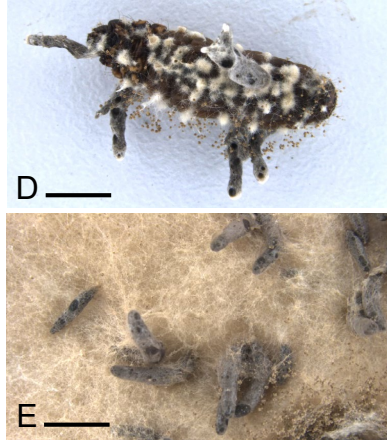
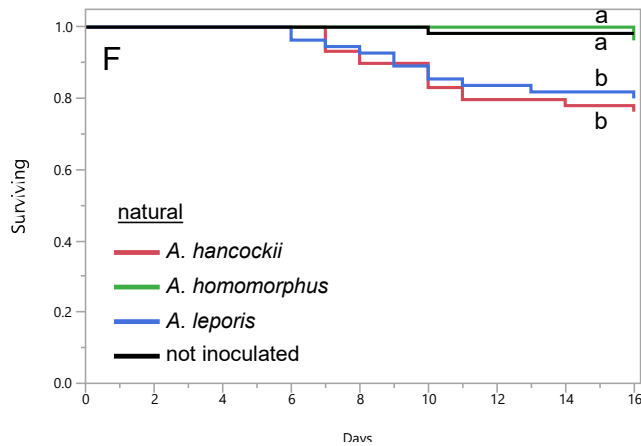
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(LAH) in *A. leporis*  
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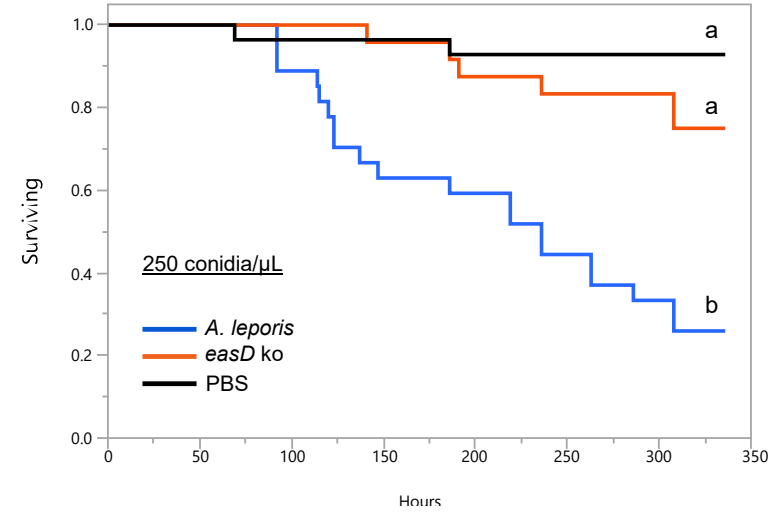
*Aspergillus* spp.  
*Metarhizium* spp.  
*Claviceps* spp.  
*Balansia* spp.  
*Epichloë* spp.  
*Periglandula* spp.



*A. leporis*



*A. hancockii*



*Aspergillus leporis* mutants lacking LAH are less virulent to *Galleria mellonella*

### LAH-producing *Aspergillus* species adapted for pathogenesis

- LAH produced abundantly in infected animals
- fungus emerges well and sporulates on corpses
- temperature optimum 30°C; not well adapted to 37°C



## Conclusions

Ergot alkaloids from two branches of the ergot alkaloid pathway pre-adapt different *Aspergillus* species for insect virulence

Nature of interaction of fungi and ergot alkaloids with host varies by species

## Acknowledgments

Abigail Jones; Stephanie Arnold; US National Institute of General Medicine grant R15-114774

