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Advantages of Sexual Reproduction in Aspergillus nidulans

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Abstract : Aspergillus nidulans can reproduce by asexual or sexual means, producing green conidiospores or red-purple ascospores respectively. The latter one is produced in dark-purple globose 'cleistothecia' which are surrounded by Hülle cells. The species has a homothallic (self fertile) sexual breeding system. Given the extra metabolic costs associated with sexual compared to asexual reproduction it would be predicted that ascospore production would confer evolutionary benefits. However, due to the homothallic breeding system there is very rarely any increased genetic variation in ascospore offspring and traditionally conidia and ascospores are considered to be equally environmental resistant. We therefore examined in detail whether conidia and ascospores might exhibit as yet undetected differences in spore viability when subjected to certain environmental stressors. Spores from two strains of A. nidulans (comprising wild-type and KU mutants) were exposed to various levels of temperature (50-70°C for 30 min) and UV (350 nm for 10-60 min) stress. Results of experiments will be presented, including comparison of 'D' (decimal point reduction) values of conidia versus ascospores of A. nidulans. We detected that under certain exposure levels ascospores have significantly increased resistance compared to conidia. The increased environmental resistance of ascospores might be a key factor explaining the persistence of sexuality in this homothallic species, and reasons for differential survival are suggested.

Keywords : Aspergillus nidulans, asexual reproduction, conidia, ascospores, cleistothecia, d-value
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