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DISSERTATION SUMMARY

Role of mobile introns in mtDNA polymorphisms of imperfect black *Aspergilli*

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Aspergillus niger and *Aspergillus tubingensis* belong to an imperfect group of genus *Aspergillus*, section *Nigri* (Gams et al. 1985). Both species exhibit intraspecific polymorphism especially regard to their mtDNA RFLP patterns. *A. niger* and *A. tubingensis* consist of several mtDNA RFLP groups (1a-1e groups of *A. niger*, and 2a-2f groups of *A. tubingensis*; Varga et al. 1994). The physical maps of the *A. niger* strain representing mtDNA RFLP type 1a and the *A. tubingensis* harbouring mtDNA RFLP type 2b were constructed by *Eco*RV, *Eco*RI, *Bgl*II and *Hind*III restriction enzymes. The sizes of the mtDNAs of 1a and 2b strains were 31.26 kb, and 33.09 kb, respectively. The 1.5 kb size difference observed between mtDNAs of *A. niger* and *A. tubingensis* were principally attributed to the altered intron content of their *cox*1 gene. The 2728 bp *cox*1 gene of the *A. niger* harbours one group I intron (1025 bp), its ORF codes a LAGLIDADG type endonuclease. The 5058 bp *cox*1 gene of the *A. tubingensis* possesses three group I introns (1148 bp, 1126 bp and 1084 bp, respectively) their ORFs coding for LAGLIDADG type endonucleases, too. The second intron of *A. tubingensis* is identical with the intron of *A. niger* in their sequences and insertion sites, however intron-flanking exonal sequences differ in some nucleotides. The first intron of *cox*1 of *A. tubingensis* exhibits high homology to the second intron of *cox*1 of the *A. nidulans*, however, the third *cox*1 intron of the *A. tubingensis* does not show homology to any known mitochondrial intron. To study the mobility of the first and the third *cox*1 introns of *A. tubingensis*, interspecific mitochondrial transmission experiments were performed by protoplast fusion between a mitochondrial oligomycin resistant, *A. niger* 1a strain and an oligomycin sensitive *A. tubingensis* 2b strain with selectable nuclear markers (Kevei et al. 1997). Following protoplast fusion the progeny were recovered selecting for the *A. tubingensis* nuclei and for the oligomycin resistant *A. niger* mitochondria. The 50 recovered resistant progeny were analysed, they represented six RFLP types differed from those of the parents. To study of the rearrangements of the mtDNA all types of these recombinant and the parental mtDNAs were mapped with four restriction enzymes and compared. Arrangement of the restriction sites of the two parental mtDNAs showed some differences (1.5 kb in their sizes). The most of the different restriction sites did not result in detectable size-differences except the ones situated in *cox*1 gene. Sequence analysis of the *cox*1 revealed that two additional group I introns were present in the *cox*1 of the recipient as compared to the donor. Using intron specific primers we proved, that all types of recombinant-like mtDNAs contain the same introns in the same positions as those of in the recipient. All progeny inherited the resistant mtDNA of the *A. niger*, but the *cox*1 gene was always invaded by the first and the third *cox*1 introns of *A. tubingensis*.

References

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