

High back mutation rate in homo-allelic crosses of asco

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Abstract

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Klingmüller 1972 Z. Naturforschg. 27b:68; Klingmüller 1973 Naturwissenschaften 60:71) with the assumption that asci with nonreciprocal spore color distribution in crosses of this mutant with the wild type are a consequence of conversion events. However, reversion events, if any, from asco to wild type would contribute to the number of scored nonreciprocal asci. Therefore, in our recent experiments, we have tried to obtain data on the incidence of the reversion from asco to wild type.

For a valid comparison with our earlier studies, reversion rates were determined either (a) in the vegetative state of the organism i.e., by checking conidial populations grown from single colonies, or (b) during sexual reproduction, using crosses of the type asco, a x asco, A and checking their ascospore progeny. Strains were mutants 37402, a, asco (lys-5) and 37402, A, asco (lys-5); 75001 (tryp-2). Both strains were obtained from the FGSC and are homo-allelic with respect to asco, as indicated by their allele designation. Wild types used were 74-OR23-1A and 74-OR8-1a.

Our results were as follows: 1. In the vegetative state, reversion rates were $<10^{-9}$ in the asco, a strain and approximately 10^{-8} in the asco, A strain. Reversion rates were not stimulated by UV, HNO_2 or ICR-170 treatment. This seems to point to a large deletion or inversion underlying the asco mutation. 2. On crossing asco, a with asco, A reversion rate was remarkably high. Random spores ejected from ripe perithecia were approximately 50% black. Their genotype was checked in crosses with wild type and the asco mutant and verified as wild type. Analysis of ordered octads gave two types of asci; namely, asci with 4 black and 4 white spores and asci with 8 white spores, the average number of black spores being approximately 33%. About 12% asci with irregular distributions were observed.

The occurrence of wild-type spores in such high numbers is completely unexpected. D. Perkins confirmed by letter that both asco strains were homo-allelic. Suggestions as to how to interpret these results are invited. Details of our procedure can be found in the Diplomarbeit of Paul Rapp.

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