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## Abstract

Strains of Aspergillus nidulans with chromosome duplications are unstable at mitosis. They produce sectors which are mainly of two types: improved sectors that result from partial or total loss of the duplication segment and deteriorated sectors having poor conidiation and dark brown mycelium. It is postulated that deteriorated variants carry additional duplications resulting from non-homologous sister-chromatid exchange within the duplicated segments. (Nga and Roper, 1968 Genetics 58: 193-209). Deteriorated sectors are unstable but can give more derivatives which probably are the result of transpositions of the tandem duplication segment to other regions of the genome (Azevedo and Roper, 1970 Genetical Research 16: 79-93). Crosses between these more stable deteriorated variants are not always successful due probably to incompatibility factors.

# Phenotypic reversion of Aspergillus nidulans morphological deteriorated variants in the presence of osmotic stabilisers

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Strains of Aspergillus nidulans with chromosome duplications are unstable at mitosis. They produce sectors which are mainly of two types: improved sectors that result from partial or total loss of the duplication segment and deteriorated sectors having poor conidiation and dark brown mycelium. It is postulated that deteriorated variants carry additional duplications resulting from non-homologous sister-chromatid exchange within the duplicated segments. (Nga and Roper, 1968 Genetics 58: 193-209). Deteriorated sectors are unstable but can give more derivatives which probably are the result of transpositions of the tandem duplication segment to other regions of the genome (Azevedo and Roper, 1970 Genetical Research 16: 79-93). Crosses between these more stable deteriorated variants are not always successful due probably to incompatibility factors. When protoplast fusion was attempted to cross some incompatible deteriorated variants, protoplasts were regenerated on medium with 0.6M KCl as osmotic stabilizer. All colonies on this medium had a normal phenotype but, when transferred to medium without the osmotic stabilizer, the deteriorated phenotype returned. It was then supposed that in the presence of the osmotic stabilizer deteriorated variants are phenocopies of a normal strain. Other osmotic stabilizers were tested (1M sucrose; 0.5M $MgSO_4$; 1.2M sorbitol) and in all cases normal or almost normal phenotypes were observed. The original duplication strain that gives rise to deteriorated variants (strain A), a non diplication strain arising as a sector from strain A, several deteriorated variants and one aneuploid strain, were tested in relation to the number of conidia produced on medium with and without 0.6M KCl. Table I shows that all strains produced more conidia on medium with 0.6M KCl. However, the increased conidiation observed with deteriorated variants was greater and resulted in colonies with normal or almost normal phenotypes. Growth rate was not significantly altered on medium with stabilizer when compared to the growth rate on medium without osmotic stabilizers. Media containing osmotic stabilizers are being used in our laboratory to distinguish deteriorated sectors emerging from duplication strains, from other types or sectors with altered morphology, mainly aneuploids. Deteriorated sectors with characteristic morphology - brown mycelium and poor conidiation - typically revert to normal morphology on high osmolarity medium. Other sectors such as color variants and aneuploids do not show reversion. In meiotic crosses, and mitotic analysis, osmotic stabilizers are also being added to the medium to make easier conidial color distinction of deteriorated segregants.

**Table I. Number of conidia from strains of *Aspergillus nidulans* growing on media with and without 0.6 M KCl.**

| Strain | Characteristics and Conidial colour | Number of Conidia ($x10^6$)** | | Increase in conidiation (Xs) | Increase in growth rate*** |
|---|---|---|---|---|---|
| | | CM* | CM+KCl | | |
| A | Duplication strain, green conidia | 5.12 | 13.70 | 2.7 | 4.7 |
| pp | Non duplication strain arising as a yellow sector from strain A | 4.10 | 12.10 | 2.9 | -0,1 |
| V5 | Deteriorated strain, poor green conidiation | 0.06 | 4.88 | 81.3 | 0.4 |
| V97 | Deteriorated strain, poor yellow conidiation | 0.13 | 4.65 | 35.8 | 4.1 |
| V98 | Deteriorated strain, poor yellow conidiation | 0.03 | 3.92 | 130.7 | -1.4 |
| V98.1 | Deteriorated sector from V98, poor yellow conidiation | 0.09 | 7.77 | 86.3 | -4.4 |
| A IV | Aneuploid, linkage group IV | 0.73 | 3.24 | 4.4 | -4.0 |

* CM = solid complete medium (Pontecorvo et al., 1953 Adv. Genetics 5: 141-238)

** The number of conidia was estimated by transfering pieces of colonies (three pieces of 0.7 cm diameter from each colony tested, to 2.5ml Tween 80 0.1% (v/v). Counts were made in a haemocytometer.

*** Measured in % in relation to the growth on CM.

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