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Abnormal ascus mutants

Abstract

Abnormal ascus mutants

Srb, A. M. and M. Basl. Abnormal ascus mutants.

As reported by Srb and Basl (1969 Genet. Res. 13:303) large numbers of colonial mutants of N. crassa that affect morphogenesis of the ascus have been isolated. By a "zygote complementation

test" the mutants so far analyzed have been shown to fall into seven functional groups. More recently, we have begun a search among colonial mutants obtained from the Fungal Genetics Stock Center to determine whether any of them affect ascus morphology and, if so, whether they correspond to mutants isolated by us. The following mutants have been found to have relevance to the purpose of our search:

(1) colonial-2 (VI R): Early developmental stages of ascus initiated by zygotes homoallelic for col-2 are abnormal in that immature ascospores frequently show nonlinear arrangements and that occasional ascus show dichotomization. Thus far, intact mature ascus have not been obtained. In crosses with wild type, col-2 gives linear ascus, the mutant therefore being recessive with reference to its effect on the ascus. The mutant recombines freely with representatives of each of the seven groups of abnormal ascus mutants reported by us.

(2) pile, colonial-10 (II L): Zygotes homoallelic for either of these mutants give rise to abnormal ascus morphologically similar to those produced by peak-2 (also called "biscuit") (Pincheira and Srb 1969 Am. J. Botany 56:846). Each mutant is recessive to wild type. By the zygote complementation test, col-10 and pi are functionally allelic. No wild type recombinants were found in a small number of progeny resulting from a cross between the two mutants. Both by recombination and complementation tests these mutants are distinct from members of the seven groups of abnormal ascus mutants reported by us.

(3) remicolonial-9 (IV R): After a cross of the rmco-9 stock with wild type, two visibly distinguishable kinds of colonial mutants were found among the progeny. One kind behaved as a recessive abnormal ascus mutant, and the other did not. Whether the two categories represent separate morphological mutants or modified and unmodified forms of the same mutant remains to be determined.

(4) spreading colonial-5 (VII): Mutant rpco-5 behaves as a recessive in determining abnormal ascus. Neither recombination nor complementation tests suggest allelism with mutants in the seven groups of abnormal ascus mutants reported by us.

(5) clock (V R): The first efforts to obtain ascus initiated by zygotes homoallelic for clock (culture c126, kindly provided by A. S. Sussman) were unfruitful. After two backcrosses to our wild type strains, interfertile cl cultures were obtained, giving abnormal ascus similar to those produced by pk-2. With reference to ascus morphology, the cl strains are recessive to wild type and functionally allelic with peak-2 and biscuit, the latter two mutants being members of functional group I of the abnormal ascus mutants reported by us. Wild type recombinants at a frequency of 0.06% were found in the progeny of a cross cl x pk-2.

Among other colonial mutants from the FGSC that have been examined by us, a substantial fraction appears not to affect ascus morphology in any obvious way. These mutants will be specified at a later date. Still other mutants remain to be solved, because of inability to obtain mature ascus from homoallelic zygotes, a difficulty also encountered with certain colonial mutants isolated by us. Nevertheless, a significant number of mutants, mopping to different sites in the genome, are found to intervene in the development of the ascus. (Work supported by grant GM 12953, National Institute of Health, USPHS.) - - - Section of Genetics, Development and Physiology, Cornell University, Ithaca, New York 14850.