

Johnson, T. E. Some mutations affecting perithecial and spore pigmentation.

We have isolated seven mutants which fail to make normal, black pigmented perithecia and instead make light yellow perithecia. Perithecial development proceeds normally except for the lack of pigment. Fertile ascospores are produced when either wild type or a mutant is used as the male parent. The genotypically mutant ascospores are unpigmented; they germinate without heat shock a few days after they are shot. A heat shock at this time kills the mutant ascospores. These mutants may be allelic with the *per-1* mutation of H. Branch Howe, which maps proximal to *ilv*(?6201) on the right arm of linkage group V; however, the tests of allelism are not entirely unambiguous at this point. *per-1* causes the production of perithecia which are light yellow in all their tissues except for the ostiole and the spores. The isolation numbers of our mutants are: *per*(PBE1), *per*(PBJ1), *per*(ABI1), *per*(PBP1), *per*(PBT4), *per*(PBT5), and *per*(ABT8).

These mutants could be of general use in two different ways: 1) as male parents in test crosses to putative female steriles or in any cross where the identity of the female parent is important; 2) as genetically marked helper nuclei used to correct the female sterile defect in female sterile mutants. We have tested these mutants in both capacities.

In testing putative female sterile strains, it sometimes happens that the supposed male parent itself grows and forms the protoperithecia which are then fertilized by the putative female. This can obscure the tests for female fertility which might otherwise be relatively clear. One way to get around this problem is by using female sterile strains as the fertilizing parent in a cross. However, a few female sterile strains have been tested here for use as male parents in test crosses. All were found to give lower levels of fertilization than wild type. The per mutants described here show no lowered level of ability to function as the male parent in a cross. If the per parent functions as the female this can be immediately seen because the perithecia are yellow instead of black. Thus the genetic identity of the male and female parents can be determined by inspection.

Many female sterile strains can be helped through a cross as the female parent if they are put into a heterokaryon with a female fertile strain. This heterokaryon is then used as the female parent. A number of investigators have used this method of crossing female sterile strains. per female fertile/per⁺ female sterile heterokaryons offer an additional convenience if ascus dissection is desired. The asci in which the per⁺ nuclei of interest are participating can be recognized because they segregate 8:0 instead of the 4:4 spore color pattern of per. By coupling appropriate biochemical markers to the per nucleus and/or by using the per as the male parent in the cross also, random spores from the desired mating can be isolated from the same cross.

per might also be convenient for studies of interallelic recombination. Apparent interallelic recombination has been observed in crosses of various per alleles. The black ascospores provide a very easy means of detecting recombination which could be used either with random spores or with intact asci. The inability of per spores to withstand heat shock would serve as an additional means of recombinant selection.