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The genetic production of small, homokaryotic spores in Neurospora tetrasperma.

When the colonial mutant pk-2 of Neurospora crassa is crossed into N. tetrasperma, small, homokaryotic ascospores are formed with high frequency. These smaller, homokaryotic spores are easily distinguishable from the large, heterokaryotic, bisexual spores normally formed when N. tetrasperma reproduces sexually. Isolation of the exceptional spores provides a population genetically comparable to random ascospore isolates after crosses in N. crassa or N. sitophila. Consequently, certain kinds of genetic work with N. tetrasperma are greatly facilitated if one parent in a cross includes the peak gene.

Table I shows the frequency of asci containing small, homokaryotic spores in a series of 12th and 13th generation backcrosses of pk to wild-type N. tetrasperma.

Table 1

| <u>Parents</u>                         | <u>No. of asci<br/>observed</u> | <u>% of asci with<br/>more than 4 spores</u> | <u>Small spores as<br/>% of total spores</u> |
|----------------------------------------|---------------------------------|----------------------------------------------|----------------------------------------------|
| 1. +, A x +, a                         | 1,165                           | 0.86                                         | 0.43                                         |
| 2. +, A x <u>pk</u> , a                | 1,013                           | 21.72                                        | 14.62                                        |
| 3. +, a x <u>pk</u> , A                | 918                             | 32.90                                        | 22.81                                        |
| 4. +, +, A x <u>pk</u> , <u>ad</u> , a | 1,011                           | 49.55                                        | 41.00                                        |
| 5. +, +, A x +, <u>ad</u> , a          | 214                             | 0.46                                         | 0.23                                         |

In the crosses designated 4 and 5, one of the parents includes a purple-adenine requiring gene originating in N. crassa and the mating type allele a from N. sitophila. The marker genes from N. crassa were first transferred to N. sitophila by an interspecific cross followed by back-crossing, and were then crossed into N. tetrasperma. ---Department of Plant Breeding, Cornell University, Ithaca, New York.