Isozyme variation in natural populations

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Abstract
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In order to investigate whether the modifiers might act in an additive manner or not, double modifier strains were set up and these were tested against 17-088, as shown in Table 2. A comparison of the figures for the double modifiers with those of the modifiers crossed singly with 17-088 (see Table 1) indicates that there is no significant difference in the modification.

It was then considered that a modifier might have an effect if it were in the homozygous condition. Crosses of the type (pk-mod-l; pk/kp-mod-l; pk+), with the modifiers scored for linear versus non-linear ascospores. With dominant pk (17-088) the results showed 175 linears out of a total of 2731 ascospores; that is, 6.4% linears, indicating a decrease over the effect of the modifier in the heterozygous condition.

Further experiments are under way to test whether or not any of the modifiers are allelic, and to amplify existing results. (This work was supported by grant GM-12953, National Institutes of Health, USPHS). (see Table 2.)

In order to see whether or not any of the modifiers are allelic, and to amplify existing results. (This work was supported by grant GM-12953, National Institutes of Health, USPHS). (see Table 1.)

Ahmad and Rahman (1969) have reported on the use of mammalian sex hormones to improve fertility in lys-5 mutants of N. crassa. Their results indicate that 6 drops of a solution containing 25 ppm each of testosterone and progesterone, when added to a cross of lys-5 mutants, resulted in a significant improvement in fertility. This was manifested by an increase in the size of the perithecia, on increase in the number of ascospores shed, and a reduction in the number of days required for maturation.

The work in this laboratory centers around the study of sterile and semi-sterile mutants of N. crassa, each of which appears to block a specific stage of sexual development when employed as the male strain in a cross with a wild type fertile strain. Tests have been conducted to determine whether or not the addition of these two hormones would effect an improvement in fertility in any of these strains. Progesterone and testosterone were dissolved in ethanol (0.5 g/100 ml) and subsequently diluted in water to obtain a solution containing 5 ppm of each of the two hormones. One ml of this solution was then added to each plate (containing a 2-3 day culture of the wild type protoperitheciol strain) at the same time as the conidia spermatia were added. Control plates were also prepared for each strain (1) with no additive and (2) with water-alcohol solution without hormone. After 14 days incubation at 25°C, the plates were examined to determine relative fertility. None of the 20 strains tested displayed any significant improvement in fertility over the controls when treated with the hormones.

In addition to the male sterile trosnir, there are three strains in our possession which exhibit a different phenotype, in that they arc completely sterile when used as female trosnir in crosses with wild type fertile trosnir. Each of these was also tested with the hormone solution. For each mutant strain a series of crossing plates was inoculated with the female sterile (protoperitheciol) strain. These were then divided into 3 lots with 1.0 ml of the hormone solution added (1) at the time of inoculation, (2) after 24 hours of incubation, and (3) after 72 hours of incubation. At 72 hours, conidia from the wild type (spermatial) strain were added. After 14 days of incubation at 25°C no significant improvement in fertility was noted in any of the strains treated with the hormone solution, as compared to the controls. (see Table 1.)


Eight heterothallic (P384, P385, P406, P407, P413, P419, P438, P439) and three homothallic strains (P388, P404, P435) of Neurospora were obtained from D. D. Perkins' Florida collection. Mycelial extracts from these trosnir were subjected to acrylamide and starch gel electrophoresis. Out of ten enzymes examined, electrophoretic variation was observed only for esterases. The sites of esterase activity were numbered from 1 to 4 in order of rate of movement towards the anode, with site 1 being the fastest.

Eight heterothallic (P384, P385, P406, P407, P413, P419, P438, P439) and three homothallic strains (P388, P404, P435) of Neurospora were obtained from D. D. Perkins' Florida collection. Mycelial extracts from these trosnir were subjected to acrylamide and starch gel electrophoresis. Out of ten enzymes examined, electrophoretic variation was observed only for esterases. The sites of esterase activity were numbered from 1 to 4 in order of rate of movement towards the anode, with site 1 being the fastest.

Of the eight heterothallic strains, six (P384, P385, P406, P407, P413, P419) had esterase site 1 and two strains (P438, P439) had both esterase sites 1 and 2. Of the three homothallic strains, two (P388, P436) had esterase sites 3 and 4 and the third (P404) had esterase site 2. Amylase, aminopeptidase, α-glycerophosphate dehydrogenase, 6-phosphogluconate dehydrogenase and inorganic pyrophosphatase showed one site of activity. Acid phosphatase showed activity at two sites and lactate dehydrogenase, peroxidase and glucose-6-phosphate dehydrogenase showed activity at all three sites for all the strains. The absence of electrophoretic variation for these enzymes suggests that selection may have been operating against enzyme variants resulting in stabilization of the enzyme genotype of isolated populations in nature.

We would like to thank D. D. Perkins for kindly providing the strains. (see Table 2.)

Table 2.

<table>
<thead>
<tr>
<th>Strain</th>
<th>Dominant Pk (17-088) L/T</th>
<th>%L</th>
</tr>
</thead>
<tbody>
<tr>
<td>pk-mod-l; pk-mod-3</td>
<td>102/822</td>
<td>12.41</td>
</tr>
<tr>
<td>pk-mod-3; pk-mod-3</td>
<td>30/822</td>
<td>12.88</td>
</tr>
</tbody>
</table>