ELABORATION OF MYCOTOXINS BY FUNGI ASSOCIATED WITH TIL (SESAMUM INDICUM L.)

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Since the initial report of mass death of turkeys due to feeding of peanut imported from Brazil, several surveys have been conducted in different parts of the world for mycotoxins. Uraguchi and Yamazaki reported the occurrence of aflatoxins in almost all the food commodities and commercial feeds. In India except for aflatoxins, there has been practically no systematic survey on the occurrence of other mycotoxins. In the present investigation the toxigenic potential of fungi, associated with seeds of til (Sesamum indicum) was investigated and the results discussed.

Thirty six fungal species were obtained from 105 seed samples of til. The fungi were screened for their toxigenic potentials. The methods of extraction and detection of mycotoxins were similar to those described in AOAC. The results are presented in Table 1.

It is evident that several species of Aspergillus, Fusarium, as well as Penicillium citrinum are capable of elaborating a very wide range of mycotoxins. Similarly Bilgrami et al. also reported large number of fungi associated with maize to synthesize different mycotoxins.

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**Table 1**

<table>
<thead>
<tr>
<th>Name of the fungi</th>
<th>Solvent System</th>
<th>Fluorescence under U.V.</th>
<th>Rf Value</th>
<th>Chemical Confirmation</th>
<th>Mycotoxin</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. flavus</td>
<td>C:A</td>
<td>Green</td>
<td></td>
<td></td>
<td>G₁</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue</td>
<td></td>
<td></td>
<td>B₁</td>
</tr>
<tr>
<td>A. fumigatus</td>
<td>T:Ec:F</td>
<td>Bright blue</td>
<td>0.55</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>A. nidulans</td>
<td>C:M:A</td>
<td>Dull Brick red</td>
<td>0.90</td>
<td>AlCl₃/KOH</td>
<td>Sterigmatocystin</td>
</tr>
<tr>
<td>A. ochraceus</td>
<td>T:Ea:F</td>
<td>Greenish blue</td>
<td>0.65</td>
<td>AlCl₃/NaOH</td>
<td>Ochratoxin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bright blue</td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>A. terreus</td>
<td>T:Ea:F</td>
<td>Dark spot</td>
<td>0.45</td>
<td></td>
<td>Patulin</td>
</tr>
<tr>
<td>F. oxysporum</td>
<td>T:Ea:F</td>
<td>Light pinkish</td>
<td>0.15</td>
<td>H₂SO₄</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dark brown</td>
<td>0.83</td>
<td></td>
<td>Fusarenone-x</td>
</tr>
<tr>
<td>F. scirpi</td>
<td>T:Ea:F</td>
<td>Bright blue</td>
<td>0.47</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue green</td>
<td>0.75</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue green</td>
<td>0.90</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>F. semitectum</td>
<td>T:Ea:F</td>
<td>Sky blue</td>
<td>0.81</td>
<td>H₂SO₄</td>
<td>diacetoxyscirpinol</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Still more bright</td>
<td>0.075</td>
<td>H₂SO₄</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue green</td>
<td>0.73</td>
<td></td>
<td>Zearalenone</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue green</td>
<td>0.87</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sky blue</td>
<td>0.88</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>F. solani</td>
<td>B:A</td>
<td>Red purple</td>
<td>0.14</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Red</td>
<td>0.45</td>
<td></td>
<td>Fusarubin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Red</td>
<td>0.63</td>
<td></td>
<td>Javanicin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Purple</td>
<td>0.73</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>P. citrinum</td>
<td>E:Ea:A</td>
<td>Lemon yellow</td>
<td>0.95</td>
<td>AlCl₃</td>
<td>Citrinin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue green</td>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

A = acetone, B = benzene, C = chloroform, Ea = ethyl acetate, F = formic acid, M = methanol, T = toluene.
OCCURRENCE OF PENTASOMIC AND HEXASOMIC PLANTS IN WILD POPULATION OF COIX GIGANTEA

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Chromosomal deviation from the normal, resulting in nullisomics (2n-2) on the minus side and double trisomics (2n+1+1) and tetrasomics (2n+2) on the plus side have been reported in several plants. Further reduction and/or increase in the chromosome number in individuals possessing less than 2n-2 i.e. 2n-3, 2n-4 etc.) or more than 2n+2 (i.e. 2n+1+3, 2n+4 etc.) are extremely rare situations and occur only exceptionally, if at all. Higher polysomics involving sex chromosomes have been reported so far only in human abortuses. However, in a population of *Coix gigantea* (2n=20), a pentasomic (2n+3, i.e. 2n=23) and a hexasomic (2n+4, i.e. 2n=24) plant have been isolated and are being reported here for the first time. In addition, several other common aneuploids were also isolated from this population.

Plants of *C. gigantea* (tribe Maydeae, family Poaceae) were collected from a wild population growing in the Western Ghats the mountain ranges on the west coast of Peninsuar India. Single plant cytological study was carried out in the plants of this population which on preliminary screening was suspected to comprise of a mixture of cytotypes. Young male racemes were fixed in acetic-alcohol (1:3), mordanted with ferric chloride and the anthers were squashed in acetocarmine (1%). Squashes were made permanent using the liquid carbon dioxide freezing technique and the slides were deposited in the Cytogenetics Unit of this Department.

*C. gigantea* occurs in two cytological forms, 2n=20 and 2n=40*++. The present population comprises plants mostly with 2n=20 chromosomes. Among a total of 96 chromosomal variants screened from this population, the various aneuploids appeared as: 68 nullisomics (2n=18), 13 monosomes (2n=19), 12 trisomics (2n=21) and one each a tetrasomic (2n=22), pentasomic (2n=23) and hexasomic (2n=24). Chromosomal variants in *C. gigantea* from 2n=18 to 22 have been reported earlier by Venkateswarlu et al. However, the pentasomic and hexasomic plants are being reported for the first time in the plants in general, and particularly in the genus Coix.

The five homologous chromosomes in the pentasomic plant formed a pentavalent (in addition to other nine bivalents) in the majority of PMCs at diakinesis (figure 1). The other chromosomal configuration involving the five homologous chromosomes appeared as: III+II, IV+I, and II+II+I in decreasing frequency (table 1). Similarly, the six homologous chromosomes in the hexasomic plant formed a hexavalent in most of the PMCs at diakinesis (figure 2). The other associations involving the six homologous chromosomes appeared as: IV+II, IIII+II, III+II+I, 3II, III+III, V+I, III+II, II+II and IV+II in decreasing order (table 2).

![Figure 1&2 1-Diakinesis in a pentasomic showing V+I, II+II. 2-Diakinesis in a hexasomic showing VI+II.](image)

(Note: Arrow in each, points pentavalent and hexavalent respectively. Magnification - X 3,000)

<p>| Chromosomal valency involving five homologues at diakinesis in a pentasomic plant. |
|----------------------------------------|------|------|------|------|</p>
<table>
<thead>
<tr>
<th>Total number of PMCs scored</th>
<th>V</th>
<th>III+II</th>
<th>IV+I</th>
<th>II+II+I</th>
</tr>
</thead>
<tbody>
<tr>
<td>248</td>
<td>122</td>
<td>68</td>
<td>38</td>
<td>30</td>
</tr>
</tbody>
</table>

Generally, reduction or addition of chromosome(s) to the diploid constitution leads to weaker aneuploid