In addition to the above mentioned major block of dormancy, a second block appeared to be localized in the embryo. The dehulled dormant and non-dormant caryopses showed difference in speed of germination (17.0 and 26.6 respectively). The difference was narrow because dehulling itself removed the major block of dormancy\(^6\). The inhibitor and promoter ratio in the seeds is well-documented in many species. As shown in other species\(^7\) and in rice\(^8\), the higher level of IAA in the embryo (responsible for dormancy) gets oxidized with the available oxygen and thus breaking the dormancy.

The \(\alpha\)-amylase activity substantiated this fact in rice. The amylolytic activity of water-soaked dormant caryopses was very low as compared to the GA\(_3\) and KNO\(_3\), soaked dormant caryopses. In the non-dormant seeds, the soaking treatments (water, GA\(_3\) and KNO\(_3\)) as well as unsoaked seeds showed high activity of \(\alpha\)-amylase (table 1). With the reduction in the level of IAA, it is very likely that GA\(_3\) promoted germination by enhancing the \(\alpha\)-amylase activity.

It is likely that endogenous GA\(_3\) and IAA levels are responsible for dormancy in rice. With the reduction in IAA level, by high activity of oxidases with available oxygen, GA\(_3\) enhanced \(\alpha\)-amylase activity. Experiments to determine endogenous level of the hormones are in progress.

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HETEROTROPHIC NITRIFICATION BY FUSARIUM SPECIES ISOLATED FROM FIELDS WITH COTTON CROP

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The autotrophic nitrifying bacteria such as Nitrosomonas and Nitrooccus are believed to be largely responsible for the formation of nitrite and nitrate, respectively, from ammonium ions in many natural ecosystems\(^1\). However, in recent years, the involvement of a variety of heterotrophic bacteria, fungi and actinomycetes in nitrification has been established\(^2\).\(^3\). Among fungi, Aspergillus flavus was earlier considered to be the only heterotroph that can produce nitrite or large amounts of nitrate from ammonium\(^4,5\). Another species, A. carmese, isolated from benomyl amended soil, has been shown to be involved in nitrogen transformations\(^6\). Though many heterotrophic micro-organisms have since been reported to oxidize various nitrogen compounds in culture\(^7\), no information is available on the nitrifying ability of fusaria which are quite abundant in soils. The present study deals with the ability of six species of Fusarium, isolated from soils with cotton crop, in the oxidation of \(\text{NH}_2\text{–N}\), supplemented in mineral salts medium.

Mycelial discs from 7-day-old cultures of fusaria, viz. Fusarium culmorum, F. equiseti, F. moniliforme, F. oxysporum, F. semitectum and F. solani isolated from cotton field soils, were used to inoculate 50 ml aliquots of sterilized mineral salts medium containing sodium acetate and ammonium sulphate\(^2\). Uninoculated medium served as control. All the flasks were incubated at room temperature\((28 \pm 4°C)\) for 30 days. Three replicate flasks of
Table 1: Oxidation of ammonium to nitrate by soil fusaria

<table>
<thead>
<tr>
<th>Fungus</th>
<th>µg nitrate/50 ml medium</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10*</td>
</tr>
<tr>
<td>Fusarium culmorum</td>
<td>5.3 (0.9)</td>
</tr>
<tr>
<td>F. equesii</td>
<td>3.0 (1.2)</td>
</tr>
<tr>
<td>F. moniliforme</td>
<td>1.6 (0.6)</td>
</tr>
<tr>
<td>F. oxysporum</td>
<td>12.6 (3.7)</td>
</tr>
<tr>
<td>F. semitectum</td>
<td>2.3 (1.8)</td>
</tr>
<tr>
<td>F. solani</td>
<td>5.3 (2.4)</td>
</tr>
</tbody>
</table>

*Incubation time, in days; Figures in parentheses denote SD values (n=3).

Each culture were withdrawn at 10-day intervals for NO$_2^-$-N$^8$ and NO$_3^-$-N$^9$ determinations.

The formation of 25 µg of nitrite-nitrogen was recorded only after 10 days of incubation in the medium inoculated with F. oxysporum, but not in the subsequent samples withdrawn after 20 and 30 days of incubation. There was no nitrite in the samples inoculated with the other five fusaria. This observation clearly indicates that the heterotrophic nitrification mediated by F. oxysporum leads to the transient accumulation of nitrite in the medium.

Low quantities of nitrate-nitrogen were found in all the inoculated samples after 10 days of incubation (table 1). However, there was a progressive increase in the formation of nitrate with increasing period of incubation. By the end of 30 days after inoculation, fairly good amounts of nitrate (21 to 33 µg 50 ml$^{-1}$ medium) were detected in the cultures. Thus, the accumulation of more nitrate as a result of biological oxidation of ammonium is probably associated with the maximum growth of the fungal cultures as suggested by Schmidt$^{10}$. F. moniliforme and F. oxysporum produced larger quantities of NO$_3^-$-N when compared to the other species. The present results reveal that fusaria, the most abundant soil mycoflora, bring about nitrification, an ecologically important transformation of the major element nitrogen.

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**INTERSPECIFIC CROSS BETWEEN ATYLOSIA ALBICANS AND ATYLOSIA CAJANIFOLIA**

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An interspecific cross between *Atylosia albicans* (2n = 22), a perennial climber (figure 1) and *Atylosia cajanifolia* (2n = 22), an erect perennial shrub (figure 2) yielded hybrid progeny in 0.69% of the pollinations. The F$_1$ was semisertile and showed erect spreading habit with profuse branching and thick canopy (figure 3). In contrast to F$_1$, some of the F$_2$ plants were fertile.

Seeds of *A. albicans* (W. & A.) Benth. and *A. cajanifolia* Haines, were obtained from ICRISAT, Hyderabad. Meiotic studies were done using propioncarmine technique.

The shape of the first pair of leaves of *A. albicans* (seed parent) was ovate and that of *A. cajanifolia* (pollen parent) lanceolate. Dominance of lanceolate shape of first pair of leaves was noticed in the F$_1$ hybrid. Other characters of *A. cajanifolia* viz. red colour of standard petal, brown colour of pods, hairs on mature pods were dominant to those of *A. albicans* (table 1). The leaflets in *A. albicans* are abovate with an obtuse tip while those in *A. cajanifolia* are lanceolate with acute tip and the F$_1$ was intermediate for leaf shape (figure 4). F$_1$ showed vigour for some characters viz. size of leaflets, number of primary and secondary branches and size of the standard petal (table 1). F$_1$ had considerably low pod setting (10%) while it was 61.5% in the seed parent and 38% in pollen parent. Likewise, reduced ovule fertility was recorded in the F$_1$ in comparison to both the parents (table 1).