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 ot germination (17.0 and 26.6 respectively). The difference was narrow because dehulling itself removed the major block of dormancy[6–9]. The inhibitor and promotor ratio in the seeds is well-documented in many species. As shown in other species[16] and in rice[5], the higher level of IAA in the embryo (responsible for dormancy) gets oxidized with the available oxygen and thus breaking the dormancy.

The α-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 α-amylase (table 1). With the reduction in the level of IAA, it is very likely that GA_3 promoted germination by enhancing the α-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 α-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 *Nitrobacter* 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. carneus*, 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 NH_4^+–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 ± 4°C) for 30 days. Three replicate flasks of

Table 1 *Oxidation of ammonium to nitrate by soil fusaria*

Fungus	µg nitrate/50 ml medium		
	10*	20	30
Fusarium culmorum	5.3 (0.9)	16.6 (3.2)	21.3 (2.6)
F. equiseti	3.0 (1.2)	19.3 (6.1)	21.3 (2.6)
F. moniliforme	1.6 (0.6)	28 6 (0.5)	33.0 (1.6)
F. oxysporum	12.6 (3.7)	23.0 (2.8)	32.9 (0.9)
F. semitectum	2.3 (1.8)	25.0 (0.1)	24.6 (3.7)
F. solani	5.3 (2.4)	14.0 (1.6)	22.3 (2.0)

*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 semifertile 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 propionocarmine 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).