

B-31 : COMPARATIVE ONTOGENY OF N₂ FIXATION OF SOME GRAIN LEGUMES

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Hitherto no quantitative information is available as to the ontogenic variation in N₂ fixation and accumulation of N by mungbean (*Vigna radiata* (L.) Wilczek), blackgram (*Vigna mungo* (L.) Hepper), cowpea (*Vigna unguiculata* (L.) Walp.) and groundnut (*Arachis hypogaea* L.) Hence, ¹⁵N-aided studies were done in pots to ascertain the above through sequential sampling i.e. on 20, 40, 60 and 80 days after emergence (DAE) which approximately corresponded to pre-flowering, flowering, mid-pod filling and late pod filling stages respectively. Groundnut established early symbiosis compared to other legumes and derived over 75% of its N content from the atmosphere even 20 DAE, whereas the corresponding figure was 48% for blackgram and 42% for cowpea and mungbean. From 40 to 60 DAE, there was a rapid increase in N₂ fixation in all legumes except in groundnut which showed highest fixation from 60-80 DAE. In mungbean, N₂ fixation and uptake of N from soil ceased completely following 60 DAE, while in cowpea and blackgram they continued upto 80 DAE, though at a much reduced rate. In groundnut, the assimilation of N from soil as well as from atmosphere increased steadily till 80 DAE.

The percent N₂ derived from atmosphere at 80 DAE was about 90% for all legumes. However, due to considerable inter-species differences in dry matter accumulation and time course of N₂ fixation, the final amount of N₂ fixed, showed an appreciable variation among legumes. It was highest in groundnut (443 mg/plant) followed by cowpea (385), blackgram (273) and mungbean (145) respectively. During pod filling stage, mobilization of N from vegetative tissues to developing pods occurred in mungbean which amounted to about 20% of N in seeds. Such a mobilization was not clearly evident in other legumes. The late establishment and early cessation of symbiotic activity in mungbean have apparently contributed to greater mobilization of N in vegetative tissues to sustain pod development. It appears that there is scope

for productivity enhancement in mungbean through early establishment of symbiosis and extending it into late stages of pod development.