

CHAPTER IV

Summary and Conclusion

Germplasm is the basic need of crop improvement. Much work has been carried out on introduction of those wild species that have related to our major crops, However minor crops have attracted much attention and little improvement has been achieved in this respect. Plant introduction embodies the transposition of a genetic entity from an environment to which it is attuned to one in which it is untried (Frankel, 1957). It has two categories viz., ~~primary and secondary~~, primary category comprises introduction of new crops such as introduction of potato, tomato in India and ^{the} second category includes introduction and utilisation of variability for the improvement of existing crops. Exploitation of new environments in pasteur development has generally being a matter of introduction of new genera and / or species. It seems that the exploitation by tropic pasteur legumes has so far being largely by the introduction of new genera and species rather by selection or breeding (Jones, 1977).

It has been now shown that after harvest both grain legumes and fodder legumes cause a legume effect on subsequent crop (Day, 1980). The primary cause of the great increase in the interest has been that the oil crises and the world economic situation in general are causing complete reappraisal in regard to cost of fertilizers and soil amelioration of the poor types of marginal soils.

Among legumes, species of Crotalaria are promising for their fibres, green manuring, medicinal, ornamental and forage values. However Crotalaria juncea and its cultivars are mainly used on large scale for fibre green manuring and forage purposes. Utility of other species of Crotalaria for above purposes is very little known. This situation prompted us to undertake present study on introduction and characterisation of few Crotalaria species. Study comprised karyotype, meiosis and pollen fertility, growth performance, nitrogen content, nitrate content and nitrate reductase activity in few Crotalaria species. These studies can be summarised and concluded as follows :

Karyotype, Meiosis and Pollen fertility in Crotalaria

Species :

In the present study the diploid chromosome number of C. lieoloba $2n = 16$ reported for the first time while confirmation of earlier reports of chromosome number in C. falcata, C. maxillaris, C. ochroleuca and C. stipularia. No sharp specific chromosome differences in size were observed in C. lieoloba. Karyotype was of symmetrical nature with median and submedian primary constrictions of chromosome and indicated primitiveness in general. The basic chromosome number for this genus is $x = 8$ which is supported by many workers and the same view has been supported in present investigation also because in all species under investigation are showing $2n = 16$ and $n = 8$ except C. stipularia.

Meiotic studies have shown that a normal behaviour with 8 bivalents at diakinesis in all species of Crotalaria except C. stipularia which was further evidenced by high pollen fertility in the taxa. It was found that pollen fertility percentage was reduced in C. maxillaris to a certain extent and this change may be attributed to a process of acclimatization, which was considered as an intermediate step. From the present investigation it was evident that the Crotalaria species have shown cytogenetic stability under new environments.

Growth :

The growth performance of 5 Crotalaria species were studied under normal field conditions by using parameters like height of plant, length of shoot, length of root, leaf area and biomass, further it has been supported by computing RGR, NAR and LAR. It was evident from the studies that Crotalaria falcata has higher level of biomass production while it was lowest in Crotalaria stipularia. In C. lieoloba and C. maxillaris the highest rate of growth and biomass was observed after 40 days of growth period. On the basis of their growth pattern and life duration it was concluded that it is customary to introduce species like C. lieoloba and C. maxillaris as a green manure or forage crop species, provided they have other desirable attributes.

Total Nitrogen and Crude Protein Content :

Higher percentage of nitrogen content was recorded in young leaves of all Crotalaria species under study. Being a legume higher amount of nitrogen was also found in root parts in all species of Crotalaria except that of C. lieoloba. It is concluded from the data obtained in the present investigation that C. falcata and C. lieoloba are likely help in improvement programme of this legume crop.

Nitrate Content and Nitrate Reductase Activity :

Nitrate content and nitrate reductase activities in various parts of Crotalaria species has shown a clear interspecific variation. Maximum activity of NR was observed in young leaves of Crotalaria species while lowest activity was recorded in root tissue of all Crotalaria species. The association of higher NR activity with higher dry matter production suggest us to utilize this criterion for selection of desirable Crotalaria species.

Finally it is evident from present investigation that species which are exotic in nature have acclimatized within a short duration of time (3 cycles). It is further concluded that there is a great variability in interspecific level in respect of growth, Nitrogen content and NR activity in all Crotalaria species. These variation can be exploited

for improvement of Crotalaria as a green manure and/or as a forage crop for this region. However other attributes, for example palatability, Nitrogen content, fibre content are to be studied in detail before introducing any species directly as a crop. Further, it is also necessary to have field trials on large scale to assess the performance of introduced species.
