Chapter I

INTRODUCTION

The genus *Crotalaria*, Linn. is a very large dicotyledonous group, belonging to the tribe Genistae of the family Leguminosae and comprises nearly 550 species, distributed more commonly in the tropics and sub-tropics of the southern hemisphere (Rani Gupta, 1974). More than 400 species of the genus have been recorded from Africa, whereas in India the genus is represented by more than 77 species (Hooker 1879, Patil 1970, Boissier 1872).

Species of *Crotalaria* have considerable utilitarian value in the field of agriculture, as forage, silage, and green manure as well as a source of fiber. Species like *C. bifaria* are grown as a soil binder in erosion control, especially in coffee and tea estates of slopy mountain regions. Recently, its seed constituents have been analysed and found to contain large amounts of water soluble gums, mucilages and proteins. Some species like *C. spectabilis*, are known to be toxic to animals and fowls.

The genus *Crotalaria* has been identified by Baker (1914) by the presence of calyx lobes, rostrate carina,
monadelphous stamens and inflated pods. It was, however, realised that these characters do not adequately define the genus. Polhill (1968), while making an extensive study of the African species of Crotalaria, listed eight characters which included additional well defined floral characters. However, he accepted that all these characters are not invariably found in a single species, thus indicating some difficulty in the delimitation of the genus. Despite this difficulty, a study of the gross morphological characters suggest that Crotalaria is a very natural genus with many small groups of closely allied species. These various groups are interlinked by various characters recombined in such a reticulate manner that generic sub-divisions are not very easy (Rani Gupta, 1974). It was, therefore, realised that additional information from source other than taxonomical characters may illustrate, more closely, the relationship between different groups of species in the genus.

In many groups of plants, where gross morphology is not adequate for taxonomic purposes, cytological data, particularly the chromosome numbers have been found to be very useful (Patil and Channaveeraiah, 1973). The available cytological information in the genus Crotalaria demonstrates a remarkable uniformity in chromosome number (Rani Gupta, 1974). The genus is represented by a somatic number $2n = 16$ in all the species, except a few species where either $2n = 14$ (e.g., C. incana) or $2n = 32$ is reported (Channaveeraiah and Patil 1972).
It is obvious, therefore, that the chromosome number does not give a very useful information for taxonomic purpose in the genus. Studies on chromosome morphology i.e. karyotypes were also undertaken by some workers (Patil 1973, Rani Gupta 1974). It should, however, be realised that since the chromosomes in this genus are fairly small in size, minor structural differences cannot be identified through mitotic preparations. Under such conditions, one would consider that meiotic studies in the interspecific hybrids to acquire more useful information on the interrelationships between different groups of species. Unfortunately, no reports on interspecific hybrids in the genus are available. Attempts to evolve interspecific hybrids through successful crosses between related and unrelated species in different combinations have been futile.

In view of the above circumstances newer techniques will have to be utilised to examine the interrelationships between species as well as the phylogenetic aspects of the genus. In the present study, the utility of multivariate $D^2$ and canonical variate analyses have been examined to find out genetic diversity among 25 entries representing 23 species of Crotalaria from the phylogeny point of view.