



General Introduction

Amaryllidaceae is one of the largest families of monocotyledons consisting 85 genera and 1300 species which are mainly distributed in tropical and subtropical region of the world (Willis 1973). Carolus Linnaeus was established the genus *Crinum* L. in 1753. In India, the first detailed taxonomical workout of *Crinum* L. was done by William Roxburgh and that also embedded in the Flora of India (1832), in which he recorded 14 species from British India. Subsequently, Herbert (1837) in his classical work on Amaryllidaceae included six species and four varieties of *Crinum* L. from British India. Baker in 1881, further divided the genus into three subgenera like as *Stenaster*- with salver form, actinomorphic perianths, straight floral tubes and linear segments; *Platyaster*- similar to the former but with lanceolate segments and *Codonocrinum*- with funnel-form, zygomorphic flowers and curved tubes. He later (1888) in the Handbook of the Amaryllidaceae gave detailed about the genus, where, out of 79 species of *Crinum* L. listed by him, 12 species and 2 varieties were from British India. This pan-tropical genus *Crinum* L. comprises about 112 species distributed in tropical Africa, America, Asia and Australia (Govaerts et al. 2012). The genus is most diverse in Southern Africa (Meerow & Snijman 1998, Meerow et al. 2003, Sebsebe et al. 2003, Kwembeya et al. 2007). The total number of species of the genus for India raises to 13, of which 8 species belong to subgenus *Platyaster* or *Codonocrinum* (having funnel-shaped perianth) and 5 species are subgenera *Stenaster* (having star-shaped perianth). Out of five *Stenaster* species: *C. asiaticum*, *C. latifolium*, *C. malabaricum* and *C. viviparum* var. *viviparum* occur in Peninsular India whereas *C. wattii* Baker is known from Assam in India and Thailand.

The genus *Crinum* L. is belonging in geophytes group of plants, because of their perennial organs like bulbs, corms, tubers or rhizomes. These organs are helps to survive them in adverse environmental condition. Therefore, the genus *Crinum* L. is mainly propagated through vegetative means. Some species of the genus are habited in terrestrial and semi terrestrial both types. The species of the genus are shows various morphological diversities in respect of the flower, bulbs, corms etc. Many *Crinum* L. species are treated as horticultural plants due to their large spectacular and gorgeous flowers. Besides of its popularity as ornamental garden plants with beautiful blossoms, the plant attracts considerable attention due to various medicinal properties as antitumor, immunostimulating, analgesic, antiviral, antibacterial, antifungal etc. The species have not only been used in pharmaceutical industries, but also used extensively as folk herbal medicines against various diseases in many countries. The different *Crinum* L. species have been used in different parts of the world to treat various health problems like tonics, laxatives and expectorants, kidney pains and in urinary troubles etc. The bulbs of *C. asiaticum* L. are used in India as tonics, laxatives and expectorants and in urinary troubles. Its fresh roots cause nausea and vomiting, the seeds were applied for purgatives, diuretics and tonics, leaves were used as expectorants, against skin diseases and inflammation processes (Chopra et al. 1956). The Indian species *C. latifolium* L. are applied to treat rheumatism, abscesses, earaches and as a tonic (Chopra et al. 1956, Kirtikar and Basu 1987, Ghosal et al. 1983). The roots of some *Crinum* L. species are used in Africa to treat urinary infections, coughs and colds, renal and hepatic disorders, sores, sexually transmitted diseases and backache, as well as to increase lactation in animal and human mothers (Watt and Breyer-Brandwijk 1962 and Duri et al. 1994).

The species of the genus contained several natural products like -carbohydrates, alkaloids, phenolic compounds, flavonoids, glycosides, phytosterols, tannins, mucilage's, fats and fixed oils etc. The species are highly valuable in the pharmaceutical industries due to presence of different types of alkaloids in it. Approximately 180 types of alkaloids have been isolated and identified from *Crinum* sp. about them 120 bases belong to crinine and lycorine-types, such as caranine, crinamine, crinine, galanthamine, galanthine, haemanthamine, hippestrine, lycorine, narciclasine, augustamine etc.

Cytological work out revealed that the genus *Crinum* L. has contained the basic chromosome numbers $x = 11$. However, Jones and Smith (1967) were reported widespread chromosomal discontinuity within species in euploid series and have shown that polyploids and B-chromosomes are common in the genus from different geographical locations. Cytological studies in *Crinum* L. are mainly restricted to somatic chromosome counts because of unavailability of proper juvenile flower buds, that's are still within the underground part of the bulbs, which make them inaccessible and relatively difficult to study. Large well organized chromosomes of *Crinum* L. are stimulated the interest in karyotype analysis of a number of species (Sharma and Bhattacharya 1956, Bose 1965, Khoshoo and Raina 1968, Jones and Smith 1967, Raina and Khoshoo 1971, Patwary and Zaman 1975 and Zaman et al. 1977).

Plants growing as different populations in different locations develop variation both at the morphological level and anatomical often having a sound basis for that due to variation at the very genetic level such variation in population provides an useful source for selection of better performing individual. Many works have been

done for different plant species by different workers. But such work is hardly met for the species of *Crinum* L. So, a search for such variation may be worthwhile.

Objective of the Study:

- ⇒ To work out morphological and anatomical diversity of the plants of different populations of the species.
- ⇒ Diversity will also be searched with respect to the chromosomal characters studied for the individuals from different populations collected.
- ⇒ Phenological differences, if any, amongst populations of different sites will also be taken into account.
- ⇒ Diversity with respect to the quantity of any one of the major active principles will also be investigated in an attempt to find out population having better productivity.
- ⇒ Searching out any character, amongst the studied ones, which might have an association with the better productivity and can serve as an easy index to foretell about the productivity.



Figure 1.1: *Crinum latifolium* L. in the Departmental garden.