
INTRODUCTION

The genus Urginea was first proposed by Steinhill (1834) after Ben Urgan an Arabian tribe of the region. It is an extremely interesting polytypic genus of family Liliaceae which is represented by about 100 species (Airy-Shaw, 1966). Various species of the genus are distributed in Spain, France, Italy, Sicily, Malta, Greece, Algeria, Morocco, Europe, India, Tropical and South Africa. The species of the genus are mostly distributed along sandy coasts bordering the countries, however, inland species are not uncommon. It forms an ideal material for class-work in laboratories especially for cytological, cytogenetical and embryological studies. Some species of Urginea Steinh. are valued for their medicinal properties.

Various species of the genus show significant morphological variations in different populations growing at different localities and there is great confusion about the total number of species and their delimitation. In India, so far 9 species have been described by different workers, however, according to Deb and Dasgupta (1987) there are only 5 species of Urginea in India.

Deb and Dasgupta's (1974, 1981) revision of the genus Urginea seems to be based mainly on herbarium specimens which lacks important field observations on distribution, anthesis, time of flowering and flower opening etc. Hooker (1892), Gamble (1928) and Deb and Dasgupta (1974, 1981) placed U.congesta Wt.

under *synanthus* group however the species belongs to *hysteranthus* group (Rajagopal and Reddy, 1985; and authors own observations). Similarly *U. polyphylla* Hook. which belongs to *synanthus* group has not been collected by any worker after Heyne and Wall and its existence at present seems to be doubtful.

The different species of *Urginea* are commonly called as squill which has ancient and more or less honourable history as medicinal plant. Some of the species of *Urginea* form a potential source of cardiotoxic glycosides used as expectorant cardiac stimulant in low doses. There are two varieties of European squill (*U. maritima* Bak.) used medicinally. The red squill is especially used as a rodenticide. *U. altissima* Bak. is considered to be dangerous to livestock in South Africa. It is related to *U. maritima* and has apparently the same properties. The starch from the bulbs of *U. micrantha* Solms. is used by the Hadendowas of Sudan to stiffen the hairs (Uphoff, 1959). *U. brachystachys* is used to make arrow poison. Decoction of *U. burkei* Bak. is used to induce abortion in South Africa.

In India, Indian squill (*U. indica*, Kunth.) most common and wide spread in coastal regions is mainly exploited and used commercially. It contains cardiac glycosides similar to that of *U. maritima* which is in no way inferior to European squill (De, 1927). In fact, it is used in medicine as a substitute to European squill. It possesses antiprotozoal, hypoglycaemic and anticancer properties (Dhar *et al.*, 1968). The bulbs are pungent,

healing, anthelmintic, alexiteric, useful in vomiting (Ayurveda) stomachic, diuretic, useful in paralysis, bronchitis, asthma, dropsy, renal calculi, rheumatism, skin diseases, diseases of nose, internal pains, (Yunani). The Indian squill is mainly used as expectorant, cardiac, stimulant, and diuretic. The bulb powder possesses good adhesive properties and its 3% solution in water can be used as a paper paste. This paste is used in Calico - Printing as a thickening agent for colors to be used in screen printing of textiles. It also contains considerable amount of sizing-gum used in the textile industries (Seth, 1949). The phytochemical analysis, properties and uses of other Indian species have received least attention probably due to their rare occurrence and difficult collection and needs investigation.

Literature survey shows that most of the work has been done on U.indica and U.maritima, other species have received little attention. Fairly good amount of cytological work has been done on U.indica and U.maritima. Karyomorphology of U.polyantha Blatt. and Mc Cann. (Kamble and Ansari, 1976) and U.govindappae (Boraiah et. Fatima, 1970) has been studied however no cytological work on other Indian species such as U.congesta Wt. and U.razii (Ans.) Deb and Dasgupta has been done. On the basis of chromosome morphology, meiotic behaviour and pollen fertility Naik (1973, 76) suggests that U.coromandeliana Wight as a autotetraploid of U.indica and should be reduced to latter species.

Palynology is one of the important tools to study taxono-

mical problems and in understanding of relationships among different taxa. Palynological studies of Indian Liliaceae members have been done by Nair and Sharma (1965), however, comparative account of pollen characters, pollen fertility of different species of Urginea is lacking. Kamble and Ansari (1977) have given a brief account of scape and leaf anatomy of 4 species of Urginea, however, detailed anatomy of scape, leaf and cuticular studies of different species of Urginea and their cytotypes is lacking. Out of 100 species of Urginea, the embryology of U.indica is only known to us (Maheshwari, 1932; Kapoor, 1937).

In present investigation, therefore, attempts have been made to study external morphology, cytology, palynology, scape and leaf anatomy and cuticle of U.congesta, U.razii, U.polyantha and diploid, triploid and tetraploid forms of U.indica. Embryology of U.razii and U.polyantha have been investigated. The thesis is divided into five chapters.

The Introductory Chapter-I incorporates the introduction to the subject.

Chapter-II deals with review of literature in which extensive survey of literature on the genus Urginea and relevant information has been summarised.

Materials and Methods are described in Chapter-III.

Chapter-IV forms a main part of the thesis which incorporates data on detailed field observations, morphology, distribution

of different species in Maharashtra, cytological status, pollen characters and pollen fertility, scape and leaf anatomy, cuticular studies and embryology of two species.

In Chapter-V the results are discussed with reference to relevant and pertaining literature. Finally summary and conclusions are given at the end of discussion.

References are cited in Bibliography at the end of thesis.