ABOUT THE PLANT:

1. INTRODUCTION:

The genus *Urginea* was firstly proposed by Steinhill (1834) after Ben *Urginea* an Arabian tribe of the region. It is an important genus of the family Liliaceae and is represented by about 100 species. It forms an ideal material for class work in laboratories, especially for cytological, cytogenetical and embryological studies.

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 different workers have described nine species, however according to Deb and Dasgupta (1987) there are only five species of *Urginea* in India.

The genus is mainly represented by *Urginea indica* (Indian Squill or true squill) in India, and is commonly wide spread throughout India. It having funiculated bulb and is commonly called Kolkanda, Rankanda, Jangali piyaz etc.

In recent survey it is observed that European squill could be replaced by Indian squill to overcome shortage of European squill provided its cultivation methods and harvesting improved.

The genus shows wide range of polyploid forms with their distribution in Indian subcontinent and it is observed that polyploid has played important role in the adaptability and distribution of the genus.
2. DISTRIBUTION:

The genus *Urginea* is a bulbous perennial herb having wide distribution throughout the world. It grows in Savanna and semiarid vegetation zones of West Tropical Africa. It is a close relative of genus *Albuca* L. and members of two genera often occur together, especially in North Guinea and Sudan zones of this region. The temperate genus *Ornithogalum* L. occurs with *Urginea* in the subtropical and subtemperate regions of Africa and the Mediterranean (Oyewole, 1975).

*Urginea altissima* is wide spread in the tropics and subtropics of Africa and Asia as well as in the subtemperate regions of the Mediterranean and Southern Europe and South Africa (Dyer, 1898).

The species of *Urginea indica* is wide spread in the Old World tropics and subtropical areas, Africa, Southern India and further east (Thiselton – Dyer, 1898). In Nigeria it is widespread in the central segment of the country occurring between latitudes 7°N and 10°N. It occurs in open heavy soil with top layer of humus or in clay soil of seasonally flooded plains. It grows in various soils with different ecological niches within Savana region and shows variety of morphological forms.

In India though nine species has been reported (Hooker, 1892; Blatter and Mc Cann, 1928; Boraiah and Fatima, 1970, 1982; Ansari, 1978; Hemadri and Swahri, 1982), so far five species have been collected in present investigation from different provinces of India.
The distribution of Urginea in India is very specific. *Urginea indica* grows throughout India, but most of the other species are confined or located in Maharashtra. The distribution of genus *Urginea* in India and Maharashtra is shown in Fig. 1&2.

3. IMPORTANCE:

Family Liliaceae economically ranks very high for its different plants and their plant parts used for different purposes. There are number of ornamental plants which are belonging to the family Liliaceae. The genus *Urginea*, is used for different purposes from ancient time throughout the world. Red squill, whose bulb extract and dried powders used in rodent control since the 13th century (Chitty, 1954; Marsh and Howard 1975). The bulb and other plant parts contain scilliroside, a high toxicity bufadienolide glycoside. Scilliroside affects cardiovascular and central nervous systems causing convulsion and death. Red Squill preparations are emetic to humans (Belt, 1944) dogs and cats (Gold et al., 1950) and pigeons (Carbtree, 1947 and Marsh and Verbiscar, 1980). However, rats and mice are unable to vomit and they die within a few hours after ingesting lethal doses of Scilliroside or red squill formulated products.

The Indian squill also called Rankanda or Jangali piyaz also contains cardiac glycosides similar to those of *U. maritima* and possesses antiprotozoal, hypoglycemic and anticancer properties. Bulb powder is mucilaginous in nature and many times used extensively to check skin diseases. The powder has good adhesive properties and its 3% solution in water can be used as a paper paste.
Fig. 1. Distribution of Indian *Urginea* species.
Fig. 2 Distribution of Urginea species in Maharashtra.
4 TAXONOMY:

Almost all the species of Indian Urginea species have been reported from Maharashtra (Table. 1) and are under cultivation in Botanical Gardens of Botany Department, Shivaji University, Kolhapur. The species distribution of Urginea in India and particularly in Maharashtra is shown in figure 1 & 2. The genus Urginea, is highly polymorphic and most of the description of Indian species is based on herbarium specimens.

BRIEF DESCRIPTION OF FAMILY- LILIACEAE:

Mostly the Liliaceae members are perennial herbs, rarely shrubs or small trees with fibrous roots or with creeping rootstock or an underground bulbs, corms, tubers. Some are climbers and xerophytes. Leaves are simple, alternate or whorled and sharp pointed, mostly with parallel veins, some times basal cauline or radiate. In a few cases they are tendriferous functionally replaced by cladocles. Inflorescence scapose, racemose, paniculate, spicate, fascicle or umbellate, often few flowered, some times axillary or terminal solitary flowered. Bracts are usually small and scarious or spathe like when flowers are in umbels. Flowers mostly bisexual rarely unisexual, actinomorphic or slightly zygomorphic, perianths are generally six parted (rarely 4, 8 or 10), corolla like arranged in two series, the segments some times united, inferior, usually imbricate, rarely valvate in buds. Stamens usually six, rarely 3, 4 or more, opposite to the perianth lobes, filaments free, connate anthers, oblong or linear, dorsifixed or versatile, carpels three, united, ovary superior or semi-inferior, three or one celled with axile or
parietal placentation respectively. Ovules one to many, anatropus or hemianatropus, rarely orthotropus. Style one to three, rarely zero, simple, long or short, entire or divided, rarely free. Fruit loculicidal capsule, rarely berry. Seeds many, globose, elongated or flattened. Embryo straight or curved, or surrounded by abundant copious and fleshy endosperm.

There is no unanimity as to the genera and the species of the family Liliaceae. Krause (1930) included 233 genera; Randle (1959) reported 200 genera and 2,600; species; Lawrence (1959) reported 240; genera and 4,000 species, while Airy Show (1966) reported 250 genera and 3,700 species of worldwide distribution.

Economically the family ranks very high, invaluable plants that man uses for many purposes. Hundreds of species and varieties are being used as ornamentals, including well known forms of Tulipas, Lilies, Hycianthus, Scilla etc.

*Allium* and *Asparagus* are minor food plants. *Phormium*, *Yucca* and *Senseveria* yield fibers. Similarly *Urginea*, *Aloe*, *Colchicum*, *Verbatrum* etc. are medicinal, *Xanthorrhoea* and *Dracena* yields resins. *Chlorogallum* is used as soap. Juice from most of the *Aloe* species has more or less purgative action. *Colchicum autumnale* contains important alkaloid known as colchicine.

Recently the genus *Urginea* and its allies are incorporated in separate family *Hycianthaceae* by Dahlgren *et al.*, (1985) where, *Urginea, Scilla, Albuca* are included under this family.
BRIEF DESCRIPTION OF FAMILY: HYCIANTHACEAE

Mostly the Hycianthaceae members are glabrous, scapose, perennial herbs with bulbs. The bulbs generally have a membranous tunica and number of free or coalescent bulb scales. The roots are some time thick and generally contractile. The leaves are concentrated at the base, solitary to numerous, generally spirally set, flat and dorsiventral and generally linear to linear lanceolate, rarely elliptic to orbicular. Further, they are normally mesomorphic, sheathing at base, non petiolate and parallel veined. The stomata are anomocytic. Crystal raphides contained in mucilage cells or canals are widely distributed in the family. Vessels are present in the roots only and have scalariform and/ or simple perforation plates.

The leafless scape usually bears a simple or most rarely branched raceme or spike, its axis being elongated. The inflorescence has few to many flowers and is generally bracteate at least in the lower part.

The flowers are generally bisexual, hypogynous, trimerous and actinomorphic. The 3 + 3 tepals are free or more often connate, forming then a companulate, lanceolate or tubular perigone. The tepal colour varies considerably being white, blue or violate or more rarely yellow, red, brown or even nearly black. The tepals of the two whorls are generally similar in appearance, but may differ in size, shape and position (as in Albuca). In some cases the upper flowers are sterile and of different colour from the fertile having only the function of attracting insects.
There are 3+3 stamens inserted either at the base of tepals or in the tepal tube. The filaments as in Alliaceae are often broad and flat and in some genera each is produced in to two lobes, one on either side of the anther. The anthers are entrose, epipeltate and dehisce longitudinally dehisent.

The pistil is tricarpellary and trilocular and septal nectories. Its style is simple; terminating in a punctiform or some times distinctly trilobed stigma with either a wet or dry papillate surface. The ovules are two to numerous in each locule, anatropus and with axis straight or almost straight or in few genera curved. They are crassinucellate and a primary parietal cell is cut off from the archesporial cell and in addition the nucellar epidermis may divide periclinally to form further cell layers of a nucellar cap. Embryo sac formation confirms to the Polygonum or (rarely) Scilla or Allium type and endosperm formation is helobial or more rarely nuclear (nuclear in species of Scilla and Urginea).

The fruit is a loculicidal capsule with as a rule, two or more seeds per locule. The seeds are ovoid to pear shaped and vary from rounded to strongly angular in transection.

Hycianthaceae is characterised by producing steroidal saponins and chelidonic acid, which is known to occur in number of genera. Salicylic acid occurs in the scape and bulb scales of Hycinthus. The bulbs of Urginea maritima contain cardiotonic glycosides (belonging to the so called Bufadienolides), used as poison and also in medicine. The bulbs of Hycinthaceae contain fructans and also starch.
The Hycianthaceae is widely distributed but most richly represented in Southern Africa and in a region from the Mediterranean to South-West Asia. It is apparently best adopted to a fluctuating moist-arid climate. Withering done to the bulbs in the arid period. Many genera provide widely cultivated mainly spring-flowering ornamentals.

**TAXONOMY OF THE GENUS **URGINEA**:

The genus, *Urginea* was proposed by Steinhill, (1834) after Ben Urgin (Bone) an Arabian tribe of the region. Steinhill (loc.cit.) distinguished this genus from allied ones for its sepal like petals being slightly larger and membranous seed. Accordingly he described seven species under this genus distinguishing them on the basis of leaves, bulbscales and scapes.

Lindley (1836) placed this genus under the tribe Scillae (Rechenbach, 1828) near *Scilla* L., *Bellevalia* Lap., *Barnardia* Lindl. etc. for its bulblets and similar flowers. Endlicher (1836) did not recognise Scillae and he placed this genus in the tribe Hyciantheae Endl. in between *Scilla* L. and *Ornithogalum* L. Kunth (1834) followed Endlicher (loc. cit.) in recognising the tribe but placed *Urginea* Steinh. in between the genera *Scilla* L. and *Ledbouria* Roth. Baker (1871, 1873) subdivided bulbous Liliaceae with racemose inflorescence into two groups, gamophyllus Hycianthaceae and polyphyllus Scilleae and placed this genus under the latter near *Elicomis* L. Herit. Baker (1873) further added some 12 species to this genus. Bentham (1883) did not recognise the gamophyllus and polyphyllus series and kept all the genera under Scillae, placing the genus *Urginea* near *Albuca* L. Engler and Prantl

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placed *Urginea* under the subfamily Scilloideae along with the allied genera. Hutchinson (1959) kept *Urginea* under Scillae in between *Albuca* L. and *Whiteheadia* Harv.

Deb and Dasgupta, (1974, 1981) studied the genus *Urginea* Steinh. (Liliaceae) in India. Jessop, (1977) in his studies on the bulbous Liliaceae in South Africa reduced *Urginea* to a synonym Drimia. Accordingly Ansari and Raghavan (1980) changed the name of Indian *Urginea* to *Drimia*. Ansari (1981) described a new species *Drimia razii*. Deb and Dasgupta (1983) reviewed the generic status of *Urginea* in course of which they upheld the distinction between *Urginea* and *Drimia* for which new combinations proposed by Ansari and Raghavan (loc.cit.) stands superfluous and illegitimate and suggested that the new species *Drimia razii* Ansari deserves a new combination.

Deb and Dasgupta (1983) merged *Urginea coromandeliana* and *U. wightiana* in *U. indica*. The species is nearly distributed throughout India from Gujarat and Maharashtra extending to West upto Bihar, Orissa and Burma in the East, Himalayan border of Uttar Pradesh and Nepal in the north and down to Tamilnadu in the South. It grows from the sea level to 2,600m in altitude, in dry habitat such as sandy gravel sandstone and soil derived from graniferous genesis and khondalite. It is found in the pine forest in the Western Himalayas and Dipterocarpous forest in Burma.

The Liliaceae have a large alliance of petalloid monocots with very wide distribution embracing various climates and geographical zones but abundance in warm temperate and tropical regions of the
world. Except some xerophytic representative members of lily family do not form dominant or climax vegetation over areas of appreciable extent. The morphology, cytology and taxonomy of family have attracted attention of research workers at all times in the history of Botany.

In India the genus is mainly represented by *Urginea indica* (Indian squill or true squill), commonly wide spread in sandy places near sea. Distribution of *Urginea species* is specific in India and all over the world. However, it has been observed that *U. indica* grows world wide, but most of the species of Indian *Urginea* are found in Maharashtra. Triploid of *U. indica* found in coastal regions while diploid populations are widely spread all over the Maharashtra. Diploid and tetraploid forms of *U. congesta* grows mainly in dry environmental conditions while, *U. coromandeliana* (2n=40) is found on Deccan plateau. *Urginea polyantha* is also showing wide spread distribution.

In India, the genus is represented by about nine species, but in Maharashtra only five species with polyploid forms of them are found (Plate I).

1. *Urginea indica* (2n=20, 30).
2. *U. polyantha* (2n=20).
5. *U. congesta* (2n=20, 40).

Species of *Urginea* are very much alike and show very few distinctive characters to differentiate them from each other, and therefore
<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Chromosome Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Urginea indica (2n=20)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Urginea indica (2n = 3x=30)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Urginea coromandeliana  (2n=4x=40)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Urginea polyantha (2n=20)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Urginea congesta (2n=4x=40)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Urginea razii (2n=20)</td>
<td></td>
</tr>
</tbody>
</table>

Plate - 1 Habit of the *Urginea* species.
it is needed to study them in detail with recent techniques in Botanical sciences.

The genus *Urginea* following Jessop (1977) and Ansari and Raghavan (1980) have suggested new combination for the Indian species of the genus *Urginea* Steinh. under the genus *Drimia* Jacq. ex. Wild. Revision of the genus made by Deb and Dasgupta (1974) and *Drimia* was merged to *Urginea*.

**KEY TO THE SPECIES:**

1. Pedicels shorter than bracts: : *U. polyphylla.*

1. Pedicels longer than bracts:
   2. Pedicels 1.0-3.5cm long; racemes loose : *U. indica*
   2. Pedicels 0.4-0.8cm long, racemes dense
     3. Bracts evanescent:
        4. Perianth lobes longer, 0.8-0.9cm long: filaments longer than anthers : *U. razii.*

Baker (1873) arranged the family Liliaceae into two series characterised by a perianth with more or less completely united, i.e., gamophyllus and the other in which they are free down to the base i.e., polyphyllus. He studied 201 species from polyphyllus series.

Mitra (1965) had given a critical review on the importance of the order Liliflorae from phyllogenetic point of view. The embryology in relation to taxonomy of Liliaceae was studied by Cave (1953).
DIAGNOSTIC CHARACTERS OF THE GENUS URGINEA:

The genus Urginea is scapigerous herb with tunicated bulbs. Leaves hysteranthus or synanthus, radical lanceolate, lorate, sessile, parallel veined, glabrous. Scape narrow, long terete, glabrous (Plate I) and naked. Inflorescence racemose on usually long leafless scape. Flowers usually drooping, small, bisexual, hypogynous, companulate, bracteate, bracts minute, solitary, deltoid or lanceolate, acute, often spurred and evanescent, pedicels long or short, often filiform. Perianth 6 into two whorls of three each, petaliod, subequal, outspreading, free to the base. Perianth lobes lanceolate, oblong, obtuse or acute, scarious 1-3 nerved at the center and bearded at the apex. Stamens six, adnate at or near the base of the perianth lobes, filament filiform, straight, flattened at base, narrowed or thickened to the apex, anthers oblong or linear, bilocular, dorsifixed, introse, dehiscing longitudinally. Pollen grains oblong, monocolpate, reticulate. Pistil tricarpellary, syncarpous, superior, ovary ovate, ovate-oblong, sessile, trilocular. Ovules numerous in each cell on axile placentation, anatropus, bitegmic, crassinucellate, style long, straight, rarely bent, tapering towards base, stigma subglobose or flat, broad, obconic, bearded, trilobed, fruit oblong or globose, trilocular, trisepitate, triquentrous, loculicidal capsule. Seeds many in each locule, compressed, superposed, oblong, winged, shining, testa black, embryo large, albumen fleshy (Table 5).

1. *Urginea indica* Kunth. (2n=20):

Bulbous, scapigerous, hysteranthus herb (Plate I). Bulb 4.6 ± 0.95 cm in diameter, 5.7 ± 1.04 cm in height with neck 1.0 ± 0.69 cm in
Table 5. Comparative account of reproductive characters of *Urginea* species.

<table>
<thead>
<tr>
<th>No.</th>
<th>Morphological character</th>
<th><em>U. indica</em> (2n)</th>
<th><em>U. indica</em> (3n)</th>
<th><em>U. polyantha</em></th>
<th><em>U. coronandiana</em></th>
<th><em>U. razi</em></th>
<th><em>U. congesta</em> (2n)</th>
<th><em>U. congesta</em> (4n)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Height of inflo. (cm)</td>
<td>95±0.83</td>
<td>95±0.162</td>
<td>29.2±2</td>
<td>42.5±1.46</td>
<td>15.7±3.3</td>
<td>6.4±1.02</td>
<td>6.8±1.2</td>
</tr>
<tr>
<td>2</td>
<td>Basal diameter of scape (cm)</td>
<td>3.9±0.12</td>
<td>4.6±0.98</td>
<td>2.8±0.49</td>
<td>2.8±0.6</td>
<td>1.6±0.2</td>
<td>2.3±0.41</td>
<td>2.7±0.68</td>
</tr>
<tr>
<td>3</td>
<td>Pedicel length of flower (cm)</td>
<td>3.7±0.84</td>
<td>3.5±0.6</td>
<td>0.83±0.13</td>
<td>2.76±0.6</td>
<td>0.62±0.22</td>
<td>0.36±0.15</td>
<td>0.42±0.1</td>
</tr>
<tr>
<td>4</td>
<td>Diameter of flower (cm)</td>
<td>2.09±0.25</td>
<td>2.25±0.21</td>
<td>1.42±0.12</td>
<td>2.11±0.2</td>
<td>1.46±0.2</td>
<td>1.57±0.26</td>
<td>1.69±0.2</td>
</tr>
<tr>
<td>5</td>
<td>Length of outer petal (cm)</td>
<td>10.1±2.02</td>
<td>10.8±1.4</td>
<td>6.41±0.56</td>
<td>9.31±0.75</td>
<td>6.58±0.81</td>
<td>7.2±0.7</td>
<td>7.8±0.14</td>
</tr>
<tr>
<td>6</td>
<td>Breadth of outer petal (cm)</td>
<td>3.39±0.3</td>
<td>4.4±0.48</td>
<td>2.95±0.26</td>
<td>2.95±0.29</td>
<td>2.66±0.35</td>
<td>3.3±0.6</td>
<td>3.6±0.3</td>
</tr>
<tr>
<td>7</td>
<td>Length of inner petal (cm)</td>
<td>34.24</td>
<td>47.52</td>
<td>18.91</td>
<td>27.46</td>
<td>17.50</td>
<td>23.76</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Breadth of inner petal (cm)</td>
<td>26.41</td>
<td>35.64</td>
<td>14.25</td>
<td>20.88</td>
<td>12.85</td>
<td>20.7</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Length of Stamen (mm)</td>
<td>7.6±0.86</td>
<td>8.8±0.14</td>
<td>4.2±0.5</td>
<td>7.4±0.79</td>
<td>5.2±0.38</td>
<td>5.2±0.8</td>
<td>5.3±0.2</td>
</tr>
<tr>
<td>10</td>
<td>Length of filament (mm)</td>
<td>5.6±0.46</td>
<td>5.7±0.35</td>
<td>2.9±0.2</td>
<td>5.2±0.54</td>
<td>3.59±0.36</td>
<td>3.5±0.5</td>
<td>3.5±0.5</td>
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<tr>
<td>11</td>
<td>Length of Anther (mm) (L)</td>
<td>3.37±0.39</td>
<td>3.7±0.63</td>
<td>2.62±0.31</td>
<td>3.33±0.46</td>
<td>2.8±0.46</td>
<td>3.5±0.4</td>
<td>3.6±0.3</td>
</tr>
<tr>
<td>12</td>
<td>Breadth of Anther (mm) (B)</td>
<td>1.63±0.13</td>
<td>1.59±0.18</td>
<td>1.33±0.11</td>
<td>1.50±0.63</td>
<td>1.24±0.63</td>
<td>1.4±0.2</td>
<td>1.6±0.1</td>
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<tr>
<td>13</td>
<td>Length of Gynocoeum (mm)</td>
<td>5.49±0.4</td>
<td>5.93±0.5</td>
<td>3.48±5</td>
<td>4.995</td>
<td>3.47</td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Length of ovary (L) (mm)</td>
<td>8.8±0.87</td>
<td>9.9±0.82</td>
<td>5.07±0.42</td>
<td>8.66±0.55</td>
<td>6.09±0.49</td>
<td>6.7±0.7</td>
<td>7.2±0.8</td>
</tr>
<tr>
<td>15</td>
<td>Breadth of ovary (B) (mm)</td>
<td>5.22±0.67</td>
<td>5.9±0.79</td>
<td>3.06±0.31</td>
<td>5.32±0.35</td>
<td>3.0±0.24</td>
<td>3.2±0.4</td>
<td>3.5±0.3</td>
</tr>
<tr>
<td>16</td>
<td>Length of style (mm)</td>
<td>2.83±0.23</td>
<td>3.08±0.26</td>
<td>1.93±0.6</td>
<td>2.97±0.28</td>
<td>2.02±0.24</td>
<td>2.1±0.2</td>
<td>2.2±0.21</td>
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<tr>
<td>17</td>
<td>Diameter of style (mm)</td>
<td>14.77</td>
<td>18.17</td>
<td>5.91</td>
<td>15.80</td>
<td>6.06</td>
<td>6.72</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Diameter of stigma (mm)</td>
<td>3.28±0.35</td>
<td>3.98±0.51</td>
<td>2.42±0.34</td>
<td>3.49±0.33</td>
<td>3.02±0.4</td>
<td>3.6±0.6</td>
<td>3.7±0.4</td>
</tr>
<tr>
<td>19</td>
<td>Length of pedicel in fruiting</td>
<td>0.79±0.15</td>
<td>1.02±0.0</td>
<td>0.58±0.04</td>
<td>1.05±0.71</td>
<td>0.52±0.04</td>
<td>0.6±0.1</td>
<td>0.72±0.2</td>
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<tr>
<td>20</td>
<td>Length of fruit (L) (mm)</td>
<td>1.21±0.16</td>
<td>1.63±0.17</td>
<td>0.96±0.15</td>
<td>1.86±0.17</td>
<td>0.85±0.14</td>
<td>0.8±0.2</td>
<td>0.9±0.11</td>
</tr>
<tr>
<td>21</td>
<td>Length of seed (L) (mm)</td>
<td>4.3±0.74</td>
<td>1.02±0.27</td>
<td>3.15±0.65</td>
<td>0.91±0.3</td>
<td>0.51±0.12</td>
<td>0.69±0.12</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Length of seed (B) (mm)</td>
<td>18.8±2.8</td>
<td>10.9±1.26</td>
<td>16.2±27</td>
<td>7.8±0.69</td>
<td>9.5±2.1</td>
<td>10.1±2.1</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Breadth of fruit (B) (mm)</td>
<td>114.68</td>
<td>59.7</td>
<td>100.44</td>
<td>38.2</td>
<td>74.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Seed index (L x B)</td>
<td>7.5±1.56</td>
<td>5.8±0.64</td>
<td>7.56±0.85</td>
<td>5.9±0.57</td>
<td>7.7±0.13</td>
<td>7.8±0.12</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Flower/Inflorescence</td>
<td>4.69±0.53</td>
<td>5.05±0.48</td>
<td>4.78±0.48</td>
<td>3.7±0.34</td>
<td>6.2±0.7</td>
<td>6.7±0.4</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Capsules per plant</td>
<td>35.15</td>
<td>35.15</td>
<td>36.1</td>
<td>21.83</td>
<td>4.805</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Seeds per capsule</td>
<td>20.2±2.0</td>
<td>23.2±0.7</td>
<td>7.57±3.0</td>
<td>14.8±5.0</td>
<td>8.9±3.0</td>
<td>12.4±3.0</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Seed out put per plant</td>
<td>14.5±0.5</td>
<td>14.55±0.91</td>
<td>13.71±0.91</td>
<td>9.08±4.5</td>
<td>12.0±4.6</td>
<td>15.7±4.6</td>
<td></td>
</tr>
</tbody>
</table>
Table 5. Comparative account of morphological characters of *Urginea* species. (Cont.)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Morphological character</th>
<th>Name and cytological status of the species</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><em>U. indica</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2n=20)</td>
</tr>
<tr>
<td>29.</td>
<td>Diameter of Bulb (cm)</td>
<td>4.6±0.95</td>
</tr>
<tr>
<td>30.</td>
<td>Height of the bulb (cm)</td>
<td>5.7±1.04</td>
</tr>
<tr>
<td>31.</td>
<td>Length of neck bulb (cm)</td>
<td>1.0±0.69</td>
</tr>
<tr>
<td>32.</td>
<td>Total length of the plant (cm)</td>
<td>37.3±8.4</td>
</tr>
<tr>
<td>33.</td>
<td>Total leaves/plant</td>
<td>8.9±3.5</td>
</tr>
<tr>
<td>34.</td>
<td>Length of leaf (cm)</td>
<td>26.9±7.5</td>
</tr>
<tr>
<td>35.</td>
<td>Breadth of leaf (cm)</td>
<td>3.10±0.5</td>
</tr>
<tr>
<td>36.</td>
<td>Diameter of disc of bulb (mm)</td>
<td>2.4±0.4</td>
</tr>
<tr>
<td>37.</td>
<td>Roots per plant</td>
<td>8.8±4.5</td>
</tr>
</tbody>
</table>
length, globose, conical ovoid, tunicated, scales white, basal rooting disc 2.4 ± 0.4 cm in diameter with strong ability to produce roots. Leaves 8.9 ± 3.5 per plant, erect or ascending, 26.9 ± 7.5 × 3.1 ± 0.54 cm, green linear lanceolate or lorate, ensiform, narrowed towards base, glabrous, acute at apex. Scape solitary (Plate II Fig.1) 95.5 ± 8.3 cm in length with 3.93 ± 0.12 mm basal diameter, slender purplish glabrous. Inflorescence simple, long loose raceme, 18.82 ± 6.5 flowered. Flowers loosely arranged, long pediceled, opening at evening at about 6 O'clock and closing at about 6 O'clock in morning. Pedicels long 3.7 ± 0.84 cm long, outspreading or drooping, slender, filiform, bracts 1-2 mm long, deltoid, acute, evanescent, often spurred, falling before flower maturation. Perianth segments 6, connate at base in two whorls, acute or obtuse at apex, oblong-lanceolate. Perianth segments of outer whorl larger, 10.1 ± 0.02 × 3.39 ± 0.3 mm of inner whorl 9.57 ± 1.6 × 2.76 ± 0.31 mm, both one nerved, bearded at apex, reflexed in open flower. Stamens 6, 7.69 ± 0.86 mm long, adnate to perianth lobes at base, filaments flat at base, tapering and cylindrical upwards, 5.68 ± 0.46 mm long; anthers versatile, introse, dorsifixed, greenish yellow or yellow, 3.37 ± 0.39 × 1.63 ± 0.13 mm. Pollen grains 80 × 78 µm macroreticulate, monocolpate. Pistil tricarpellary, syncarpous, superior, 8.06 ± 0.87 mm in length. Ovary trilocule, 5.22 ± 0.67 × 2.83 ± 0.23 mm, 52.5 ± 7.9 ovuled, style slender 3.28 ± 0.35 mm long, stigma swollen, trilobed 1.21 ± 0.16 mm in diameter. Capsule 18.8 ± 2.8 × 6.1 ± 0.83 mm oblong or ellipsoid (Plate II Fig. 2), trilocular, loculicidal, 22.00 ± 6.00 seeded, pericarp stiff, brittle brownish yellow, seeds 7.5 ± 1.56 × 4.69 ± 0.53 mm oblong or
Plate - II Inflorescence, fruit and seed details in *Urginea* spp.

1. Range of inflorescence in *Urginea* species

2. Fruit size and shape variation in *Urginea* species

3. Seed size and shape in *Urginea* species.

*Ul*: *Urginea indica* (2n=Diploid and 3n= triploid)
*UP*: *U.polyantha*
*UR*: *U. razil.*
*UCOR*: *U. coromandeliana*
*UC*: *U. congesta* (2n)
obovate- oblong, compressed winged, testa black, shining (Plate II Fig. 3).

**Distribution:**

It is distributed throughout India along coastal sandy regions (Fig. 1). In Maharashtra at Ganpatipule, Ratnagiri, Amba Ghat, Pune, Alibagh, Goa etc (Fig 2).

**Phenology:**

It starts flowering and fruiting from February and is continued up to April end. After first rains in the month of June, the bulbs sprout and vegetative growth is continued up to October when leaves die off and bulbs remain in dormant phase in the months of November to February. In February bulbs again start flowering.

**Ecological Note:**

In this species the flowers remain opened during night. It generally grows along seacoast in sandy soils. It is also found growing in Western Ghat regions of Amba, also at Pune but not found in eastern regions of the state by the author. It is the robust form in Indian species.

**2. Urginea indica Kunth. (2n=30):**

A bulbous, scapigerous, hysteranthus herb (Plate I). Bulb 5.7 ± 2.4mm in diameter, 5.6 ± 1.5cm in height with neck 0.9 ± 0.82cm in length, globose, conical, tunicated with strong ability to propagate by means of daughter bulbs, scales white, basal rooting disc 2.2 ± 0.19cm in
diameter with prominent rooting ability. Leaves 10 ± 3.0 per plant, erect or ascending, sub-bifarious, linear lanceolate or acute at apex, green, 50.3 ± 7.5 × 2.52 ± 0.89 cm. Scape solitary, robust, 95.2 ± 16.2 cm in length with 4.64 ± 0.98 mm basal diameter, purplish white, glabrous.

Inflorescence long, simple, loose raceme, 21.5 ± 6.0. Flowers loosely arranged, long pedicelled, drooping or spreading, bracteate, companulate, brown purplish, 2.25 ± 0.21 cm in diameter opening at about 6 O’clock in evening and closing by morning, bracts 1-3 mm long, deltoid, acute, evanescent, often spurred, falling before the flower maturation. Pedicels 3.54 ± 0.6 cm long slender filiform, outspreading or drooping. Perianth segments six, connate at base in two whorls, acute or obtuse at apex, oblong, lanceolate. Perianth segments of outer whorl 10.8 ± 0.14 × 4.4 ± 0.48 mm, that of inner whorl smaller, 10.4 ± 0.11 × 3.55 ± 0.4 mm, both one nerved, bearded at apex, reflexed in open flower. Stamens six, 8.88 ± 0.15 cm long, adnate to perianth lobes at base, filaments flat at base, swollen cylindrical in middle and tapering upwards 5.7 ± 0.35 mm long, anthers versatile, introse, dorsifixed, greenish yellow or yellow, 3.73 ± 0.63 × 1.59 ± 0.1 mm long. Pollen grains 66 × 56 μm, micro to macroreticulate, monocolpate with high pollen sterility and size variation. Pistil tricarpellary, syncarpous, superior, 9.9 ± 8.82 mm in length. Ovary triloculated 5.9 ± 0.79 × 3.08 ± 0.26 mm, 52.4 ± 7.8 ovuled, style slender, 3.98 ± 0.51 mm long, stigma swollen, trilobed, 1.63 ± 0.17 mm in diameter. No fruiting was observed.
Distribution:

Triploid form of Urginea indica is mostly distributed (Fig. 1) along coastal line of India and in Maharashtra especially at Alibagh, Ganpatipule, Vengurla and Goa (Fig 2).

Phenology:

It starts flowering in the month of February and continues up to April. However, due to triploid nature no fruit setting was observed. In the month of June the bulbs sprout out and vegetative growth continue up to October and then leaves die off. Bulbs remain dormant from November to February and starts flowering in February.

Ecological Note:

It grows along coastal region in sandy soils. It is well adapted to saline habitat. As there is no seed setting, it propagates through production of daughter bulbs, which are exposed due to sand erosion and dispersed by various agencies.

3. Urginea polyantha Blatt. (2n=30):

Bulbous, scapigerous, hysteranthus herb (Plate I). Bulb 3.9 ± 0.85cm in diameter, 4.1 ± 0.9cm in height with 1.7 ± 092cm long neck, ovoid, subglobose or globose, scales white, basal rooting disc 1.6 ± 0.34mm in diameter with median ability to produce roots. Leaves 6.2 ± 2.0 per plant, usually spreading on ground often twisted, 20.11 ± 5.8 x 1.4 ± 0.57cm green. Scape(Plate II, Fig.) 29.6 ± 8.2cm in length with 2.8 ±
0.49mm in diameter at base, slender, grayish-green, glabrous. Inflorescence simple raceme 23.3 ± 8.03 flowered. Flowers dense, bracteate, pedicelled, brownish 1.42 ± 0.12cm in diameter, opening with sunrise and closing by 4 in evening. Pedicels 8.3 ± 1.3cm long, filiform, spreading ascending, bracts deltoid, 1mm long, persistent. Perianth segments six joined at base in two whorls, perianth lobes of outer whorl slightly smaller, 6.25 ± 0.62 × 2.28 ± 0.31mm oblong, both one nerved, brownish, bearded, reflexed at apex in open flower. Stamens six, 42 × 0.52mm long, adnate to perianth at base, filaments flat at base, cylindrical and narrowed at apex 2.9 ± 0.29mm long, anthers versatile, introrse, dorsifixed, greenish yellow, 2.62 ± 0.31 × 1.33 ± 0.11mm. Pollen grains 68 × 64μm, microreticulate and monocolpate. Pistil tricarpellary, syncarpous, superior, 5.07 ± 0.42mm long. Ovary triloculed 3.06 ± 0.31 × 1.93 ± 0.16mm, 26.4 ± 3.78 ovuled, style slender, straight or sometimes knee shaped, 2.42 ± 0.34mm long, stigma swollen, trilobed, 0.96 ± 0.15mm in diameter. Capsule 10.0 ± 1.26 × 5.67 ± 0.067mm ovoid-oblong (Plate II Fig. 2) or ellipsoid, triquetrous, triloculed, loculicidal, 15 ± 6.00 seeded. Seed 5.8 ± 0.64 × 4.05 ± 0.48 mm broadly ellipsoid, much compressed, winged, testa black, shining (Plate II Fig. 3)

**Distribution:**

*Urginea polyantha* is distributed in different parts of the country. In Maharashtra it grows at Pune, Pachgani plateau, Kolhapur, Nesari, Panhala, Aurangabad and Shingnapur.
Phenology:

It starts flowering and fruiting from February to March. After reproductive phase, bulbs sprout in the month of June after rains and vegetative growth continues up to September – October when leaves die off and bulbs remain in dormant phase till February.

Ecological Note:

It grows in rocky grounds where the leaves spread on ground however, the plants growing in mountain areas, the leaves are erect or ascending. It shows good reproductive capacity. It resembles to Urginea indica in morphology, but is smaller in characters including pollen grains, scape length, pedicel length, flower and fruit size. Urginea polyantha seems to be widespread in Maharashtra.

4. *Urginea coromandeliana* Wight. (2n=40):

Bulbous, scapigerous, hysteranthus herb (Plate I). Bulb $4.1 \pm 1.08$cm in diameter, $4.7 \pm 1.04$cm in height with neck $1.7 \pm 1.3$cm in length, globose, conical, ovoid, tunicated, scales white, basal rooting disc $1.6 \pm 0.39$cm in diameter with good ability to produce roots. Leaves $20.2 \pm 11.2 \times 1.39 \pm 0.52$ cm, erect or ascending or spreading on ground, green, linear, lanceolate or lorate, ensiform, narrowed at base, glabrous, acute at apex. Scape solitary $42.5 \pm 14.6$cm in length with $2.82 \pm 0.61$mm basal diameter, slender, greenish red, glabrous (Plate II Fig 1). Inflorescence simple, loose raceme $6.57 \pm 2.8$ flowered. Flowers loosely arranged, long pediceled, drooping, bractiate, companulate, $2.11 \pm 0.2$cm
in diameter, opening at evening at about 6 O'clock and closing by morning. Pedicels long, 2.76 ± 0.6cm, outspreading or drooping, slender, filiform, bracts 1-3mm long, deltoid, acute, evanescent, often spurred. Perianth segments six, in two whorls, three in each whorl, connate at base, perianth segments of outer whorl larger 9.31 ± 0.75 × 2.95 ± 0.29mm, inner whorl smaller, 8.96 ± 0.66 × 2.33 ± 0.24mm, both one-nerved, acute or obtuse at apex, oblong-lanceolate, bearded at apex, reflexed in open flower, stamens six, 7.4 ± 0.79mm long, adnate to perianth lobes at base, filaments flat at base, swollen and cylindrical in middle, tapering towards apex, 5.24 ± 0.54mm long. Anthers versatile, introrse, dorsifixed, yellowish-green, 3.33 ± 0.46 × 1.5 ± 0.35mm. Pollen grain macroreticulate, monocolpate, 83 × 79μm. Pistil tricarpellary, syncarpous, superior, 8.66 ± 0.55mm long, 42.4 ± 7.0 ovuled, style slender, 3.49 ± 0.33mm long, stigma swollen, trilobed, 1.86 ± 0.17mm in diameter. Capsule 16.2 ± 0.27 × 6.2 ± 0.1mm, oblong or ellipsoid, trilocular, loculicidal, 14.00 ± 9.00 seeded, pericarp stiff, hard, brittle (Plate II Fig. 2). Seeds 7.56 ± 0.85 × 4.78 ± 0.48mm oblong or obovate-oblong, compressed, winged, testa black shining. (Plate II Fig. 3)

**Distribution:**

Widely distributed in fairly dry localities in India. In Maharashtra it is distributed at Aurangabad, Shingnapur, Kagal, Appachiwadi, Dahiwadi, (Fig. 2).
Phenology:

It starts flowering and fruiting from February and flowering fruiting is continued up to May. In month of June the bulbs sprout and vegetative growth is continued up to October-November. Then the leaves die off in October-November. Bulbs remain dormant from November to February, then they again start flowering.

Ecological Note:

This species blooms during night. It grows in open rocky grounds in dry districts of Maharashtra. It shows tendency to produce daughter bulbs and vegetative propagation through daughter bulbs is common.

5. *Urginea razi* Ansari. (2n=20):

Bulbous herb scapigerous, hysteranthus (Plate I). Bulbs 3.2 ± 0.9cm in diameter, 4.2 ± 1.3cm in height, ovate or subglobose with 2.4 ± 1.2cm long neck, scales white, basal rooting disc 5.3 ± 1.9mm in diameter with low ability to produce roots. Leaves 4.9 ± 1.4 per plant, erect or ascending, narrowly linear, fleshy, grooved above, broadest at base, acute at apex, glabrous 15.8 ± 4.9cm × 3.2 ± 0.09mm, green, scape (Plate II Fig. 1) 15.7 ± 3.3mm in length with 1.64 ± 0.26mm basal diameter, slender, reddish green, glabrous. Inflorescence simple raceme, 14.8 ± 5.24 flowered. Flowers ascending, pediceled, bracteate, brownish, 1.46 ± 0.2cm in diameter, opening around 10a.m. in morning and closes by 4 in evening, pedicels 0.62 ± 0.22cm long, spreading ascending, bracts 1.5 × 1mm, spurred, evanescent. Perianth segments six joined at base, in two whorls, perianth lobes of outer whorl 6.58 ± 0.81 × 2.66 ±
0.35mm linear, perianth lobes of inner whorl slightly smaller 6.3 ± 0.9 × 2.04 ± 0.23mm, linear, both one nerved, brownish, bearded and reflexed at apex in open flower. Stamens six, free, 5.2 ± 0.38mm long, adnate to perianth at base, filaments flat at base, cylindrical, and narrowed at apex, 3.59 ± 0.36mm long, anthers versatile, introse, dorsifixed, yellow 2.8 ± 046 × 1,24 ± 0.63mm, pollen grains 73 × 69μm, microreticulate, monocolpate. Pistil tricarpellary, syncarpous, superior, 6.09 ± 0.49mm long. Ovary triloculed 3 ± 0.24 × 2.02 ± 0.24mm, 20.6 ± 2.3 ovuled, style slender, straight, 3.02 ± 0.4mm long, stigma swollen, trilobed, 0.52 ± 0.04mm in diameter. Capsule 7.86 ± 0.69 × 4.86 ± 0.69mm, ovate or elliptic-ovate trilocular, loculicidal 9.00 ± 4.00 seeded(Plate II Fig. 2). Seeds 5.9 ± 0.57 × 3.7 ± 0.34mm broadly, ovate or elliptic winged, black, testa shining (Plate II Fig. 2).

**Distribution:**

So far it is reported from type locality-Divaghat in Maharashtra (Fig 2). It seems to be endemic to Maharashra.

**Phenology:**

It starts flowering and fruiting in March- April. After reproduction phase, bulbs sprout in the month of June after first rains and vegetative growth continues up to September – October. By the end of October the leaves die off and bulbs remain dormant from November to February and starts flowering again in the month of March.
Ecological Note:

It grows in rocky, open grounds on slopes in arid zone. Its reproductive ability is low and seems to be newly evolved species. It can be very easily identified by its narrow linear fleshy leaves, which are not found in any other Indian species.

6. *Urginea congesta* Wt. (2n=20):

Bulbous, scapigerous and hysteranthus (as against synanthus) described by Hooker, (1894), Gamble, (1930) and Deb and Dasgupta, (1974, 1981), herb (Plate I & III). Bulb 3.8 ± 1.4 cm in diameter, 4.2 ± 1.2 cm in height with short neck of 1.9 ± 1.4 cm in length, ovoid, subglobose or umbonate, scale fleshy, soft, white, basal, rooting disc 0.99 ± 0.15 cm in diameter with poor ability to produce the roots. Leaves usually three per plant, spreading on ground, often twisted, 20.5 ± 5.2 × 1.03 ± 0.25 cm, dark green, scape 6.4 ± 1.02 cm in length with 2.3 ± 0.41 mm in diameter at base, slender, purplish-green, glabrous. Inflorescence simple, densely congested raceme and 8.9 ± 3.0 flowered (Plate III-fig. 1). Flowers clustered, congested, ascending, suberect, companulate, bractiate, 1.57 ± 0.26 cm in diameter, opening around 10 a.m. in morning and closing by afternoon, shortly pedicelate, 0.36 ± 0.15 mm long, suberect, bracts 1 mm long, acute, persistent, perianth segments six, joined at base in two whorls. Perianth lobes of outer whorl larger 7.2 ± 1.07 × 3.3 ± 0.6 mm, oblong, inner whorl slightly smaller, perianth lobes bearded and reflexed in open flower. Stamens six, free, 5.2 ± 0.8 mm long, adanate to perianth lobes at base, filaments flat, broad at base, tapering upward, 3.5 ± 0.5 mm long, anthers versatile, introse,
dorsifixed, greenish yellow, \(3.5 \pm 0.4 \times 1.4 \pm 0.2 \text{mm}\), pollen grains \(65 \times 62\mu\text{m}\), microreticulate, monocolpate. Pistil tricarpellary, syncarpous, superior, \(6.7 \pm 0.7 \text{mm}\) long, triloculed, \(3.2 \pm 0.4 \times 2.1 \pm 0.2 \text{mm}\), \(25.5 \pm 3.3\) ovuled, style slender, \(3.6 \pm 0.6 \text{mm}\) long, stigma slightly swollen, trilobed, \(0.8 \pm 0.2 \text{mm}\) in diameter. Capsule \(9.5 \pm 2.1 \times 7.8 \pm 1.0 \text{mm}\), globose, trigonous trilocular, loculicidal, \(13.00 \pm 5.00\) seeded (Plate II-fig. 2). Seeds \(7.7 \pm 0.13 \times 6.2 \pm 0.7 \text{mm}\), nearly round or elliptic, broadly winged, compressed, testa black, shining (Plate II-fig 3).

**Distribution:**

In Maharashtra it is distributed at Shingnapur, Piliv and Kartikswami (Khatav), (Fig. 2). It is also reported from Osmania University campus, Hyderabad and Malbar Sea coast.

**Phenology:**

It flowers and fruits before leaves in the month of March- April. After first rains during June, leaves are produced which die off by about September-October and bulbs remain in dormant condition for four-five months from October to February. The bulb starts flowering in the month of March.

**Ecological Note:**

It grows in rocky-open grounds in arid zones of Maharashtra (Fig 3). It seems to be most slow growing species among Indian species. It can be very easily identified from other Indian species by its short, congested inflorescence. It is difficult to locate the species in fields
during flowering because of short, ash coloured inflorescence, which matches with the colour of soil.

7. **Urginea congesta** Wt. (2n=40):

Bulbous scapigerous hysteranthus herb. Bulb 5.7 ± 1.4cm in diameter, 3.6 ± 1.2cm in height with short neck 2.01 ± 0.4cm in length, ovoid, subglobose or umbonate, scales fleshy, soft, white basal rooting disc 1.11 ± 0.1cm in diameter with poor ability to produce roots. Leaves 5-6 per plant, spreading on ground, often twisted, 15.8 ± 4.8 x 1.04 ± 0.3cm, dark green, scape 6.8 ± 1.2cm in length with 2.7 ± 0.68mm in diameter at base, slender, purplish green, glabrous. Inflorescence densely congested raceme 14.5 ± 3.6 flowered (Plate III-fig. 2 & 3). Flowers clustered congested, ascending, suberect, companulate, bracteate, 1.69 ± 0.26cm in diameter, opening around 10 in morning and closing by afternoon, shortly pedicilate, pedicels short 0.42 ± 0.16mm long, suberect, 1mm long, acute, persistent. Perianth segments six, joined at base in two whorls, perianth lobes of outer whorl larger 7.8 ± 0.14 x 3.6 ± 0.3mm, oblong, inner whorl slightly smaller, 7.09 ± 2.3 x 3.2 ± 0.56mm, both one nerved, nerves dark purple, perianth lobes bearded and reflexed in open flower. Stamens six, free, 5.35 ± 0.2mm long, adnate to perianth lobes at base, filaments flat, broad at base, tapering upwards 3.56 ± 0.5mm long, anthers versatile, introse, dorsifixed, greenish yellow, 3.65 ± 0.3 x 1.6 ± 0.1mm. Pollen grains, 68 x 63 μm, microreticulate, monocolpate. Pistil tricarpellary, syncarpous, superior, 7.2 ±1.8mm long, triloculed, 32.1 ±4.6 ovuled. Style slender, 3.78 ± 0.4 long, stigma swollen, trilobed, 0.9 ± 0.11mm in diameter. Capsule 10.1
± 3.1 × 8.11 ± 2.1, globus, trigonous triloculed, loculicidal (Plate III-fig. 4). Seeds 7.8 ± 1.2 × 6.75 ± 0.4mm, round, or elliptic, broadly winged, compressed, testa black, shining

**Distribution:**

The tetraploid form of *U. congesta* is first time located by the author from South Maharashtra (Nesari) and no other locality is known for it. (Fig. 2).

**Phenology:**

It flowers in the month of March – April. After first rain, the leaves are produced which die off by September – October and bulbs remain dormant condition up to October to February and again starts flowering in the month of March.

**Ecological Note:**

It grows in rocky open ground in South Maharashtra (Fig. 2). It is found growing only in a restricted part of Nesari (South Maharashtra) and can be easily identified from other species by its short congested inflorescence.