



Effect of size of bulb, growing conditions and depth of planting on flower and bulb production of Asiatic hybrid lily (*Lilium* spp) cv. Brunello

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ABSTRACT

In present study on flower and bulb production of Asiatic hybrid lily (*Lilium* spp) cv. Brunello, the response of size of bulb, growing conditions and depth of planting were tested. Field experiment was conducted in CSIR-Institute of Himalayan Bioresource Technology, Palampur during 2008-2010. The bulbs were planted at spacing 15×15 cm row to row and bulb to bulb in November. The results have been explained on the basis of mean data of two years and indicated that among the different size of bulb, showed maximum length of flower shoot and number of flower buds/shoot (69.90 cm and 7.34 respectively) in 5.30 cm diameter of bulb with the depth of 12.50 cm planting. The maximum yield of bulbs and bulblets were recorded in 5.30 cm diameter bulbs were planted at 17.50 cm depth under shade net conditions.

Key words: Depth of planting, Growing conditions, Lily, Size of bulb

Lilies are very important bulbous plants belonging to the family Liliaceae. It has beautiful, attractive and bright flowers with long life. Lilies are native to northern hemisphere in Asia, Europe and North America. Most of the species are endemic to temperate zone reported by Mc Rac (1998). Among the different types of lilies, the Asiatic hybrid lily is very popular and high income generating per unit area. It is widely used in the floral industry as cut flowers and potted plants. In Asia (50-60 species), North America (24 species) and Europe (12 species) have been reported by Dole and Wilkins (1999). The Asiatic hybrid lilies are derived from atleast seven Asian species, viz. *Lilium amabile*, *L. cernum*, *L. concolor*, *L. dauricum*, *L. davidii*, *L. maculatum*, *L. tigrinum* and one European species *L. bulbiferum*. Asiatic hybrid lily can be multiplied through seeds, bulb scales, bulb division, stem bulblets and stem bulbils. Stem bulblets and bulb division are suitable propagation methods. The number and size of bulb and bulblets depends upon the growth of lilies plants. The optimum size of bulb, growing conditions and depth of planting is required for proper development and growth of plants. Though Asiatic hybrid lily is being commercially cultivated in India since more than two decades and every year traders are importing the bulbs in bulk quantity and supplying to the flower growers on high cost. Significant

research finding on production technology has not been reported under Western Himalaya region. Hence, the present study was first time conducted to investigate the effect of size of bulb, growing conditions and depth of planting on yield and quality of flower and bulbs production of Asiatic hybrid lily cv. Brunello under Western Himalaya region.

MATERIALS AND METHODS

The experiment was conducted at the Floriculture Research Farm of Council of Scientific Industrial Research -Institute of Himalayan Bioresource Technology, Palampur during 2008-2010. The site is located at altitude of 1290 amsl and 32° 6' N, latitude and longitude 75° 5' E. The soil of experimental plot was well drained, clay loam in texture and having pH 5.26 and EC 1.03 mmhos/cm. The experiment was laid out in three factor factorial randomized block design consisting of cv. Brunello of Asiatic hybrid lily and using five different diameter of bulbs (S) 5.30 cm (S₁), 3.52 cm (S₂), 3.09 cm (S₃), 2.46 cm (S₄) and 2.26 cm (S₅) and four level of depth of planting (D) 10 cm (D₁), 12.5 cm (D₂), 15 cm (D₃) and 17.50 cm (D₄) with two growing conditions (L) 50% shade net (L₁) and open field (L₂) with three replications. Bulbs were planted at spacing 15×12 cm row to row and bulb to bulb in the month of November under both growing conditions during both years.

In the laboratory, soil from the bulk sample of the plot of Asiatic hybrid lily during flowering period was used for analysis. Soil pH (6.30), electrical conductivity (797 µS), available nitrogen (210 kg/ha) and available phosphorus (29 mg/kg) were measured by standard method (Gupta *et al.*

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Table 1 Effect of size of bulb, growing conditions and depth of planting on flowers production of Asiatic hybrid lily cv. Brunello

Treatment	Stemlength (cm)	Diameter of stem (cm)	Number of leaves/shoot	Length of leaves	Width of leaf (cm)	No. of flower buds/shoot
<i>Diameter of bulb</i>						
5.30 cm (S ₁)	69.90	0.92	57.29	10.17	0.65	7.34
3.52 cm (S ₂)	64.40	0.83	52.23	9.90	0.61	4.93
3.09 cm (S ₃)	55.45	0.69	43.74	9.63	0.59	2.95
2.46 cm (S ₄)	39.79	0.48	28.16	9.49	0.58	0.85
2.26 cm (S ₅)	26.21	0.29	18.00	9.21	0.56	0.40
CD (P=0.05)	1.41	0.033	1.21	0.19	0.015	0.22
<i>Shade net (L₁)</i>						
Shade net (L ₁)	54.58	0.68	40.92	9.76	0.599	3.56
<i>Open field (L₂)</i>						
Open field (L ₂)	47.20	0.62	38.84	9.61	0.601	2.88
CD (P=0.05)	0.89	0.02	0.77	0.12	NS	0.14
<i>Depth of planting</i>						
10.00 cm (D ₁)	50.40	0.65	38.39	9.68	0.60	3.11
12.50 cm (D ₂)	55.64	0.68	42.22	10.11	0.65	3.82
15.00 cm (D ₃)	52.07	0.64	41.82	9.64	0.60	3.29
17.50 cm (D ₄)	46.48	0.61	37.09	9.30	0.55	2.66
CD (P=0.05)	1.26	0.03	1.08	0.18	0.013	0.19

1997). Available potassium (140 mg/kg) was determined by digital flame photometer (Knudsen *et al* 1982) while the method described by Chopra and Kanwar (1991) was used to determine the percentage of organic matter (1.90 %) in the soil sample. A mixture of sand @ 0.0453 MT/m² and decomposed farmyard manure (FYM) @ 5 kg/m² as well as NPK @ 25:5:30 g/m² were applied. Total quantity of sand, FYM, phosphorus and potassium in the form of single super phosphate (SSP) and muriate of potash (MoP) respectively were incorporated into the soil before planting of bulbs. The improved plant height might be result of increased synthesis of proteins and protoplasm by nitrogen, reported by Wand Leigh (1957). Nitrogen was applied in the form of calcium ammonium nitrate (CAN) in three equal split doses at the time of planting, at 40 and 80 days after planting and weekly irrigated the crop. Various parameters on vegetative growth, flower and bulb production were recorded. The pooled data of two years were analysed using the analysis of variance (ANOVA) technique, outline by Gomez and Gomez (1994) and treatments were compared by using tabulated 'F' value at 5% level of significance.

RESULTS AND DISCUSSION

The results have been explained on the basis of average data of two years. Data related to the effect of size of bulb, growing conditions and depth of planting on flower and bulb production of Asiatic hybrid lily cv. Brunello are given in Table 1 and 2. Size of bulb has profound influence on flower quality and bulb production parameters as all the different five levels (S₁ to S₅) exhibited significant improvement in many characters. Among the five levels studied, size of bulb 5.30 cm diameter (S₁) showed maximum significant values with respect to stem length (69.90cm) and diameter (0.92), number of leaves (57.29), length of leaves (10.17), width of leaf (0.65) and number of flower buds (7.34) per shoot (Table 1). This clearly indicated that highest

Table 2 Effect of size of bulb, growing conditions and depth of planting on bulbs and bulblets production of Asiatic hybrid lily cv. Brunello

Treatment	No. of bulbs/plant	Diameter of bulb (cm)	Weight of bulb/plant (g)	No. of bulblets/plant	Weight of bulblets/plants (g)
<i>Diameter of bulb</i>					
5.30 cm (S ₁)	1	5.925	94.14	3.69	5.84
3.52 cm (S ₂)	1	5.29	63.27	3.06	5.29
3.09 cm (S ₃)	1	4.98	53.02	2.99	4.76
2.46 cm (S ₄)	1	4.50	43.69	2.77	3.79
2.26 cm (S ₅)	1	3.42	29.10	2.08	3.27
CD (P=0.05)	NS	0.11	2.75	0.22	0.44
<i>Shade net (L₁)</i>					
Shade net (L ₁)	1	5.07	62.44	3.221	5.29
<i>Open field (L₂)</i>					
Open field (L ₂)	1	4.59	50.84	2.62	3.88
CD (P=0.05)	NS	0.069	1.74	0.140	0.28
<i>Depth of planting</i>					
10.00 cm (D ₁)	1	4.74	59.36	2.43	3.78
12.50 cm (D ₂)	1	5.19	61.01	4.106	6.75
15.00 cm (D ₃)	1	4.89	52.61	3.01	4.71
17.50 cm (D ₄)	1	4.48	48.51	2.11	3.11
CD (P=0.05)	NS	0.098	2.46	0.19	0.39

diameter of mother bulb 5.30 cm (S₁) was more effective in increasing the diameter of bulb (5.92), weight of bulb (94.14 g), number of bulblets/plant (3.69), and weight of bulblets (5.84 g)/plant followed by medium diameter bulb 3.52 cm (Table 2).

Lilies in general prefer sunny condition. But in a country like India where the sunlight is usually very bright it has been observed that Asiatic hybrid lily if exposed to full sunlight throughout their growth period will have dwarfing effect on the plants. Bloom *et al.* (1995) reported shading

conditions increases growth of plant for Asiatic hybrid lily.

The result of present experiment inferred that growing conditions significantly brought sustainable increase in stem length and diameter, number of leaves, length of leaves and number of flower buds/shoot. The maximum number of bulblets/plant (3.22), diameter of bulb (5.07 cm), weight of bulb (62.44 g) and weight of bulblets/plant (5.29 g) were recorded in 50% shading net conditions followed by open field conditions (Table 2).

The depth of planting of the lily bulbs is very much dependent on a number of factors such as the types of soil where the bulbs will be planted, time of planting, size of the bulbs and the growth habit of the particular species or hybrid of lily (Mukherjee 2006). Planting of Asiatic hybrid lily bulbs at 12.50cm (D₂) depth resulted in significantly highest number of flower bud 3.82/plant. Bulb and bulblets yield was significantly highest at 12.50 cm depth followed by 15.00 cm depth of planting. Based on the overall result, it may be concluded that large sized bulb, 50% shading net conditions and 12.50 cm depth of planting are suitable for better yield and quality of flower and bulb production of Asiatic hybrid lily cv. Brunello under Western Himalaya region.

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