Environment & Ecology 27 (3) : 1178—1180, 2009
 ISSN 0970-0420

Evaluation of Onion (*Allium cepa* L.) Genotypes under Subtropical Conditions of Jammu Region

K. L. BHAT AND ANIL BHUSHAN

Division of Vegetable Science & Floriculture, FOA, Main Campus Chatha
SK University of Agricultural Sciences & Technology-J
Jammu 180009, India

Abstract

An experiment was conducted to evaluate the performance of ten genotypes of onion, namely Agrifound dark red, L-28, Agrifound light red, N-53, Arka Niketan, Yellow globe, Brown Spanish, Arka Kalyan, Patna Red and Local during *rabi* of 2004-05. Among all the genotypes evaluated, Agrifound light red recorded maximum yield of 35.2 q/ha followed by Arka Niketan (33.9 q/ha) which were found to be significantly higher than all other cultivars. However, four other cultivars i.e. Arka Kalyan (32.2 q/ha), Patna red (30.8 q/ha), N-53 (30.0 q/ha) and Brown Spanish (29.3 q/ha) also performed better than Local cultivar (24.3 q/ha) whereas the remaining genotypes performed poorly in terms of yield and other yield contributing characters.

Key words : Onion genotypes, Varietal evaluation, *Allium cepa.*

Onion (*Allium cepa* L.), a bulbous biennial herb of family Alliaceae is one of the most important vegetable-cum-condiment crops grown world wide ranking third in respect of area (12.3%) and fourth in production (6.0%) (1). India is the second largest producer of onion covering an area of 0.45 m ha with annual production of 4.75 MT. The area under onion cultivation is increasing on account of its greater domestic demand and high export potential. Although there is a spectacular increase in area (88.64%) and production (168.42%) during the last two decades (2), the average productivity has almost remained static at 10.67 t/ha compared to world average of 14.9 t/ha (3). In India, particularly in Maharashtra and Gujarat, the crop has gained importance as a cash crop rather than a vegetable crop because of its high export potential. However, Jammu and Kashmir lags behind from other states despite having favorable climate for onion cultivation especially in Jammu region, where it is cultivated in an area of about 1,120 ha with a production of about 16,800 metric tones (4). Onion cultivation in Jammu region has been hampered in past due to the non-availability of locally adapted cultivars. Since, onion is a photo-thermo-sensitive crop and specific varieties need to be standardized for various agro-climatic conditions. The present investigation, therefore, was an attempt to identify suitable varieties amongst some popular varieties of the country and evaluate their performance for successful bulb production under Jammu condition.

Methods

The experiment was laid out in randomized block design (RBD) conducted during *rabi* season of 2004-2005 at Vegetable farm, Chatha, SKUAST-Jammu. The soil of the experimental field was clay-loam in texture with 159.89, 14.01 and 87.24 kg/ha available content of nitrogen, phosphorus and potassium, respectively. The treatments comprised ten varieties of onion, namely, Agrifound dark red, L-28, Agrifound light red, N-53, Arka Niketan, Yellow globe, Brown Spanish, Arka Kalyan, Patna Red and Local. The seeds were sown in raised nursery beds (1 m × 3 m size) in the first week of October, 2004. Six-week old healthy sedlings of uniform size and vigor were selected for transplanting in the main field in which full dose of SSP (125 kg/ha) and half dose of urea (45 kg/ha) were applied following recommendation to raise crop successfully. Experiment field was divided into three blocks of ten plots having dimensions of 1.5 × 1.5 m each. The seedlings were transplanted 15 cm apart in ten rows per plot. The second half of urea (45 kg/ha) was applied one month after transplanting, just after weeding and

Table 1. Evaluation of different genotypes of onion under Jammu conditions.

Genotype	Plant height (cm)	Neck thickness of bulb (cm)	Diameter of bulb (cm) Polar	Diameter of bulb (cm) Equatoral	Average leaf length (cm)	Fresh weight of bulb (g)	Bulb yield (t/ha)
Agrifound light red	56.3	1.56	5.32	5.56	8.92	55.0	35.2
L-28	40.2	1.46	4.80	4.66	5.97	36.0	27.4
Agrifound dark red	32.0	1.44	4.78	4.54	5.85	27.5	23.5
N-53	48.0	1.30	4.64	4.58	6.64	40.0	30.0
Arka Niketan	52.4	1.60	5.10	4.90	6.82	50.0	33.9
Yellow globe	27.8	0.92	4.72	4.37	5.78	24.5	20.8
Brown Spanish	33.4	0.78	5.20	5.47	5.92	37.5	29.3
Arka kalyan	51.2	1.38	5.82	6.06	6.28	52.0	32.2
Patna red	50.2	1.29	4.72	5.13	5.75	43.0	30.8
Local	47.5	1.22	4.92	5.22	4.93	34.2	24.3
CD 5%	4.18	0.12	0.35	0.24	1.92	3.40	1.40

hoeing. Rest of the intercultural operations were conducted as per recommended package of practices of university. Observations on plant height, number of leaves/plant, neck thickness, bulb diameter and fresh weight of bulb were recorded from ten randomly selected plants in each plot basis. The mean data were statistically analyzed following standard procedure.

Results and Discussion

Table 1 reveals that the cultivars differed significantly with respect to different yield contributing factors and resultant yield. The variety Agrifound light red registered the maximum plant height (52.3 cm) with maximum number of leaves (8.92) after 90 days after transplanting and fresh bulb weight (55.0 g), which was closely followed by Arka Niketan in respect of plant height (1.60 cm) followed by Agrifound light red (1.56 cm) whereas maximum diameter of bulb i.e. polar and equatorial was obtained in Arka kalian (5.82 and 6.06 cm respectively) followed by Agrifound light red (5.32 and 5.56 cm respectively). The results regarding different parameters were found to be significantly superior when compared with local cultivar.

Among all the ten genotypes tested, six genotypes namely, Agrifound light red, Arka kalian, Arka Niketan, Patna red, N-53 and Brown Spanish performed statistically better in terms of bulb yield as compared to local whereas L-28, Agrifound dark red and yellow globe, recorded minimum yield. However, significantly highest bulb yield of 35.2 q/ha was recorded in Agrifound light red and Arka Niketan (33.9 qtl/ha) followed by Arka Kalyan (32.2 q/ha), Both these genotypes were found to be significantly higher than all other cultivars. However, four other cultivars i.e. Arka Kalyan (32.2 q/ha), Patna red (30.8 q/ha), N-53 (30.0 q/ha) and Brown Spanish (29.3 q/ha) also performed better than Local cultivar (24.3 q/ha).

Our results regarding yield components and average yield in different genotypes are in consonance with the findings of Mohanty (2) who observed significant difference in yield of Agrifound light red, Arka kalian and Aerka Niketan due to vigorous growth habit and larger size of bulbs. However, Bhonde et al. (5) did not find significant difference in yield among 11 varieties of onion in late *kharif* season including the cultivars under present study. The higher yields among different cultivars can be attributed to the prevalence of mild growing temperature and optimum photoperiod during the initial vegetative and bulb initiation phase and slightly higher temperature and long photoperiod during bulb development and maturity phase (6, 7). However, higher yield among different genotypes can be attributed to the higher crop growth rate and net assimilation rate (8). Neerja et al. (9) also indicated that enhanced crop growth rate of onion resulted in efficient metabolism, thereby increased the sink capacity. Higher metabolism, greater photosynthates mobilization and better source sink relationship helped to produce higher yields (2). Thus, the present study established the superiority of Agrifound light red followed by Arka Kalyan in terms of yield and yield contributing factors over other cul-

tivars tested under Jammu conditions.

References

1. Rana R. S. and A. K. Singh. 1997. Response of different levels of irrigations on onion bulb yield under low hills subtropical conditions of Himachal Pradesh. Veg. Sci. 24 : 20—22.
2. Mohanty B. K. 2001. Effect of planting time on the performance of onion cultivars. Veg. Sci. 28 : 140—142.
3. Singh A., S. P. Singh and B. P. Singh. 2002. Effect of VAM and inorganic fertilizers on growth and yield of onion (*Allium cepa* L.). Veg. Sci. 29 : 40—42.
4. Anonymous. 1998. District wise area and production of vegetables. Direct. Agric., Jammu, India.
5. Bhonde S. R., K. J. Srivastava and U. B. Pandey. 1992. Evaluation of varieties for growing 'Rangda' crop of onion (*Allium cepa* L.) in Nasik area of Maharashtra. Maharashtra J. Hort. 6 : 39—42.
6. Sawant S. V., M. T. Ingavale, K. K. Mangave, B. K. Wath and N. R. Bhat. 2002. Effect of date of planting on growth, yield and quality of onion (*Allium cepa* L.). Veg. Sci. 29 : 164—166.
7. Kumar H., J. V. Singh, A. Kumar and M. Singh. 1998. Studies on the influence of nitrogen on growth and yield of onion (*Allium cepa* L.) cv Patna red. Indian J. Agril. Res. 32 : 88—92.
8. Rao N. K. 1998. Physiological analysis of growth and yield in onion (*Allium cepa*). Indian J. Agric. Sci. 58 : 489—491.
9. Neerja G., K. M. Reddy, P. S. Sharma and V. P. Rao. 2000. Physiological analysis of growth and yield (*Allium cepa* L.) as influenced by irrigation and nitrogen. Ann. Agric. Res. 21 : 199—205.