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Comparative Performance of Garlic Cultivars

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Abstract : Four cultivars of garlic namely, G.S-1, Lehson Ghulabi, Chinese and Italian (local and exotic) were evaluated for yield and yield components during 2000-2001. The cultivar "Italian" took significantly longer time (216 days) to reach 50% neckfall than rest of cultivars which took 179 to 199 days. The average bulb weight in cv. Chinese was significantly higher than rest of cultivars which ranged from 27-35g. The cultivar "Chinese" was found to be high yielding with 11.6 tones bulb yield per hectare which was 3.4, 2.3 and 1.6 times higher than G.S-1, Italian and Lehson Ghulabi, respectively.

Key words: Garlic, cultivars, yield, evaluation, yield

Introduction:

Garlic (*Allium sativum* L.) has been recognized all over the world as a valuable spice for foods and popular remedy for various ailments and physiological disorder (Nhinde and Sontakke, 1993). This crop was cultivated on an area of 9200 hectares with production of 82700 tones (Anonymous, 2000). MacIntosh *et al.* (1992) tested the potential of two garlic cultivars on soils of Southern Island of Newzeland and obtained yield of 16-17 t/ha. They claimed that commercial production of garlic in otake and mataavra soils appeared to be feasible. Pandy and Singh (1989) conducted research on garlic and found that cultivar HGI has the greatest height and yield with lowest incidence of purple blotch. Majeed *et al.* (1994) conducted date of planting cum varietal trial on garlic and found significant difference in fresh yield among cultivars. Three varieties Swat local, Tarnab Peshawar and Italian were evaluated in Swat valley at three different dates of sowing and highest yield was found in variety Italian (Khan *et al.*, 1997). Mahmood *et al.* (2001) compared three cultivars of garlic for yield and yield components and found Chinese cultivar as significantly higher yielder than G.S-1 and Lehson Ghulabi.

The evaluation and selection of local and exotic varieties is a continuous work. Some varieties may have greater adaptability while other provide a valuable source of variability for breeding improved varieties. It was therefore, considered appropriate to make a comparative study of garlic cultivars of both exotic and local origin for screening high yielding cultivars suitable to agro-climatic conditions of Islamabad.

Materials and Methods

Four garlic cultivars i.e. Lehson Ghulabi, G S-1 Chinese and Italian were evaluated in vegetable programme during 2000 to 2001 at National Agricultural Research Centre (NARC), Islamabad. Lehson Ghulabi and G.S-1 were obtained from local market while Chinese and Italian were imported from China and Italy, respectively. The garlic cloves were sown in October 6, 2000 and crop was harvested at 50% neckfall condition. The plot size was 2.4 m². Plant to plant and row to row distances were 10 and 30cm, respectively. Chemical fertilizer NPK @ 100:90:60 kg/ha was applied in two doses i.e., half at land preparation and remaining at six leaf stage of the crop.

The experiment was laid out in Randomized Complete Block Design (RCBD). Data on maturity, number/weight of bulbs harvested/plot, average number and weight of cloves per bulb and yield per hectare were taken and analyzed, treatments were compared by using Duncan's multiple range (DMR) test (Steel and Torrie, 1980). Leaf initial length/clove length ratio (LIL/CL) was determined by dissecting cloves and measuring the clove and leaf initial lengths. The value 1.0 shows the leaf initial length is equal to clove lengths.

Results and Discussion

Data regarding the leaf initial length/clove length (LIL/CL) ratio at sowing, germination and yield are presented in Table 1. Time taken to 50% germination was statistically non-significant in GS-1, Lehson Ghulabi and Chinese but in case of cv Italian, it took significantly higher days to germinate. Days to 50% germination are directly related to LIL/CL ratio of these cultivars. The ratio was significantly lower in cv. Italian than rest of the cultivars. A simple dissection of clove and measurement of leaf initial length is a good technique for knowing dormancy status. Late germination behavior of cv., Italian may either be cultivar characteristic or due to dormancy of bulbs as the bulbs were brought from Swat valley where the crop is harvested late than the existing agro-ecological conditions. Days to 50% neckfall showed the maturity of crop. The cv Italian was found as a late maturing cultivar (215 days) as compared to rest of cultivars. The G.S-1 was early maturing cultivar (179 days) followed by Lehson Ghulabi (188 days) and Chinese (199 days). Mahmood *et al.* (2001) also found cv. Chinese as a late maturing cultivar as compared to cvs Lehson Ghulabi and GS-1. The cv., Chinese was found significantly high yielder as compared to rest of cultivars. Part of this higher yield in Chinese is attributed to higher number of bulbs harvested/plot than cvs. GS-1 and Italian. However there is no significant difference was found between Chinese and Lehson Ghulabi as for as number of bulbs harvested/plot is concerned. The main reason for higher yield in cv., Chinese is due to significantly higher bulb weight (Table 2). Bulb weight of cv., Chinese was significantly higher than rest of the cvs. Lehson Ghulabi, G.S-1 and Italian. The higher bulb yield of Lehson Ghulabi (Table 1) than GS-1 and Italian is mainly attributed to higher number of bulbs

Table 1: Data regarding dormancy, maturity and yield of garlic cultivars

Cultivars	Leaf initial length/ Clove length (LIL/CL) ratio at sowing	Day to 50% germination	Days to 50% neckfall	Number of bulbs harvested /plot	Weight of bulbs harvested /plot	Yield (tones /ha)
G.S-1	0.967A	8.5B	179D	40.0B	0.815C	3.380C
L.Ghulabi	0.970A	8.6B	188C	60.5A	1.803B	7.513B
Chinese	0.950A	6.8B	198.8B	54.3A	2.775A	11.563A
Italian	0.580B	18.5A	215.8A	41.0B	1.190C	5.097C

Values followed by the same letters do not differ significantly at 5% level of significance.

Table 2: Data regarding bulbs and cloves of garlic cultivars.

Cultivars	Avg. Wt.(g) per bulb	Number of Cloves/ bulb	Avg. Wt.(g) per clove
Chinese	55.8A	12.3C	3.250A
L.Ghulabi	27.3B	19.5B	1.292B
G.S-1	30.0B	34.0A	0.763B
Italian	35.0B	8.0D	3.147A

Values followed by the same letters do not differ significantly at 5% level of significance.

Mahmood *et al.*: Evaluation of garlic cultivars

harvests/plot as there is no difference in average bulb weight in above three cultivar (Table 2). The cv., Chinese was also found high yielding than Lehson Ghulabi and GS-1 (Mahmood *et al.*, 2001). Difference in performance of various garlic cultivars under different conditions have also been reported by many workers (Pandy and Singh, 1989; Majeed *et al.*, 1994; Khan *et al.*, 1997; MaCintosh *et al.*, 1992). Lowest number of cloves/bulb in cv., Chinese and Italian showed the big size cloves which is an advantage for peeling but at the same time requires more seed rate/hectare.

Four garlic cultivars were evaluated for yield and yield component. Cultivar Chinese gave 3.4, 2.3 and 1.6 times higher yield than G.S.-1, Italian and Lehson Ghulabi, respectively.

References

- Anonymous, 2000. Fruit, Vegetables and condiments statistics of Pakistan. Govt. of Pakistan M/O Food, Agriculture and livestock Div., Islamabad, pp: 22.
- Khan, H. A. , M. K. Derawadan. and A. Majeed, 1997. Environment effect on garlic genotypes for yield and yield component in Swat Valley. Sarhad Weight of bulbs J. Agric., 13: 357-361.
- Mahmood, T., K. M. Khokhar, S. I. Hussain and M. H. Bhatti, 2001. Studies on garlic cultivars for yield and yield component. Sarhad J. Agric., 17: 209-212.
- Majeed, A., M. K. Derawadan and H. Khan, 1994. Annual report of co-operative research programme on vegetable at NWFP, Agric. Res. Stat. (North) Mingora Swat, Pakistan, pp: 8-10.
- MaCintosh, P. D., R. B. Allen, N. G. Porter and J. A. Lammerink, 1992. Garlic production in North Otago and Southland Newzealand. Newzealand J. crop and Hort. Sci., 20 : 11-16.
- Nhinde, N. N. and M. B. Sontakke, 1993. Vegetable crops edited by T. K. Bose, M. G. Son and J. Kabir. Pub. Prokash Callutta 700006, India, pp: 686-687.
- Pandy, U. C. and J. Singh, 1989. Performance of new varieties of Garlic (*Allium sativum*). Haryana Agricultural Univ. J. Res. Hisar, India, 19: 69-71.
- Steel, R. G. D. and G. H. Torrie, 1980. Principles and Procedures of Statistics. Mc Graw Hill Book Co. Inc. New York.