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RESEARCH ARTICLE

Effect of nitrogen, phosphorus and potash on growth, yield and yield attributing traits in garlic (*Allium sativum* L.) cv. AGRIFOUND WHITE

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SUMMARY

The present experiment was carried out entitled effect of nitrogen, phosphorus and potash on growth, yield and yield attributing traits in garlic (*Allium sativum* L.) cv. AGRIFOUND WHITE at Horticulture Research Farm, Department of Applied Plant Science (Horticulture), Babasaheb Bhimrao Ambedkar University (A Central University), Vidya-Vihar, Rae Bareli Road, Lucknow-226025(U.P.) India. The experiment was carried out during the *Rabi* season of the year 2008-2009. The experiment being conducted under Randomized Block Design with three replications. There were nine treatment combinations of nitrogen, phosphorus and potash were used. The observations were recorded on 12 characters *viz.,* height of plant (cm), no. of leaves/plant, length of leaves (cm), width of leaves (cm), diameter of stem (cm), no. of cloves/bulb, length of cloves/bulb (cm), neck thickness of bulb (cm), weight of bulb (g), no. of bulbs/kg and bulb yield/plot (kg). From different treatment combinations of NPK, it can be concluded that treatment T_7 (recommended dose of NPK 120:80:60) was found for all the fruits in respect of higher bulb yield.

Key Words **:** Nitrogen, Phosphorus, Potash, Garlic

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Garlic (*Allium sativum* L.) belongs to the family Alliaceae and second most important bulb crops after onion. It contains 2n = 16. It is very hardy vegetable crop and is grown throughout country. Madhya Pradesh is the leading state in garlic production contributing more than 31 per cent area and 30 per cent production. The garlic growing states are Gujarat, Maharashtra, Uttar Pradesh and Andhra Pradesh of garlic in the world and India ranks second in area and third in production. Garlic is used as spice and condiment. It has higher nutritive value than other bulbs crops. It is used in different preparation to care against sore throat and lingering stomach diseases sore eyes and earaches. It reduces the cholesterol level in the blood. The foliage of garlic is flattered rather than hallow like that of the onion. A colourless, odourless, water-soluble amino acid known as *alliin* is present in uninjured garlic. On injury of the cells an enzyme alliance comes in contact with *allin* and causes its break down in to sulphur containing product *allicin*. Alliums are the antibacterial substance of garlic and has the typical odour of fresh garlic. It is unstable and breaks down into the strong smelling constituents of garlic oil. The *allin* of *Allium sativum* contains an allyl radical from which is derived the pungent diallyl disulphide of garlic oil and possibly also other allyl products observed. Garlic contains 0.1-0.4 per cent essential oil. The cheif constituents of the are diallyl disulfide (60%), diallyl trisulfide (20%), allyl-propyl disulfide (6%) a small quantity of diethyl disulfide and

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probably diallyl polysulfide. Di -allyl disulfide is said to possess true garlic odour.

Garlic is considered to possess antibacterial, antibiotic, antitumour, antiviral, antifungal, anticandidal, antiinycotic, antithrombotic, fibrinolytic, antirosderosis be more platelet aggregation inhibitory, hypoqlycemic, cystotoxic and lipid lowering properties. Allicin, ajoene, diithins and the essential oil are the principal contributors in this direction.Garlic oil is an item of commercial. Fresh garlic bulbs and whole plant on steam distillation yield 01-02 and 0.05-0.9 per cent, respectively of essential oil. Up to 0.5 per cent oil has derived from the bulb for recovery of the oil, fresh garlic is the best. This essence consists primarily of diallyl, dimethyl and allylmethyl sulphide, disulfide and trisulfide and a few minor components including those containing an n-propyl group, all formed by thermal de composition of *allicin* and its homologues. *A. longicuspis Rgl.* is believed to be its wild ancestor. Garlic is a perennial species, producing a much divided bulb, consisting of several cloves, covered by a thin white skin. It differs from *A. cepa* in that the leaf base does not store food, but matric as dry scales enclosing the cloves. The cloves are well developed auxiliary buds with in thin foliage leaves garlic is a sexually sterile diploid, unknown in the wild. Under domestication it has become exclusively propagated by vegetative methods *i.e.* by cloves and in some cases inflorescence bulbils.

There are many essential nutrients which are required to promote plant growth and development but nitrogen, phosphorus and potash are needed in larger quantities. In recent years, the use of balanced nutrient containing N, P and K in proper proportion has been given emphasis in crop husbandry.These studies indicated that garlic needed more nitrogen and phosphorus than potash, it has been found that the supply of nutrients *viz.,* N, P and K for increasing the growth development and yield of crop would be more beneficial when used together in combinations rather than when used in isolation.

MATERIALS AND METHODS

The present experiment was carried out entitled effect of nitrogen, phosphorus and potash on growth yield and yield attributing traits in garlic (*Allium sativum* L.) cv. AGRIFOUND WHITE at Horticulture Research Farm of the Department of Applied Plant Science (Horticulture), Babasaheb Bhimrao Ambedkar University (A Central University), Vidya-Vihar, Rae-Bareli Road, Lucknow-226025(U.P.) India. The experiment was carried out during the *Rabi* season of year 2008-2009. The experiment being conducted under Randomized Block Design with three replications. There were nine treatment combinations of nitrogen, phosphorus and potash were used. The observation were recorded on 12 characters *viz.,* height of plant (cm), no. of leaves/plant, length of leaves (cm), width of leaves (cm), diameter of stem (cm), no. of cloves/bulb, length of cloves/bulb (cm), neck thickness of bulb (cm), weight of bulb (g), no. of bulbs/kg and bulb yield/plot (kg). The planting distance was maintained at a spacing of 15cm x 10 cm. All the package of practices was taken to grow a healthy plant. There were 9 treatment combinations of NPK were used in which doses of nitrogen (60, 90,120 and 120kg) excluding control were used, two doses of phosphorus (*i.e.* 40 and 80 kg) and two doses of potash (*i.e.* 30 and 60 kg) were used.

RESULTS AND DISCUSSION

Data regarding on different characters of five sampled plant was taken at 120 days after transplanting and the mean value of characters has been presented in Table 1. The analysis of variance clearly indicated that the plant height was significantly affected with application of different treatment combinations of NPK. The maximum plant height was recorded in T_7 (75.95 cm) followed by T_8 (73.73 cm), T_6 (72.32 cm), T_9 (71.28 cm), T_5 (67.16 cm), T_4 (66.42 cm), T_3 (65.31cm), T_2 (62.47 cm), while least found in control, However T_7, T_8, T_9 and T_5, T_4, T_3 and T_2 were statistically at par. Data regarding on numbers of leaves/plant of five sampled was counted at 120 days. The maximum numbers of leaves/plant was found in T_7 (7.53) followed by T_8 (7.36), T_9 (6.99), T_6 (6.42), T_5 (6.14), T_4 (5.53), T_3 (5.24) and T_2 (5.20), while minimum was found in control (T_1, 4.65), However, T_7, T_8, T_9, were statistically similar. It is evident from Table 1, that maximum length of leaves (cm) was recorded in T_7 (32.93 cm), followed by T_8 (31.76 cm), T_9 (31.10 cm), T_6 (30.35 cm), T_5 (29.51 cm), T_4 (28.23 cm), T_3 (27.95 cm), T_2 (27.53 cm), while least was found in control T_1 (26.03cm). Significant affect was found in width of leaves (cm) by the application of different treatment combinations of NPK. The maximum width of leaves was found in T_7 (0.76 cm) followed by T_8 (0.74 cm), T_9 (0.73 cm), T_6 (0.71 cm), T_5 (0.69 cm), T_4 (0.65 cm), T_3 (0.62 cm) and T_2 (0.54 cm), while least was found in control T_1 (0.56 cm). The diameter of stem of garlic of five sampled plant was measured with the of vernier callipers. The maximum diameters of stem was recorded in T_7 (0.55 cm) followed by T_8 (0.53 cm), T_9 (0.52 cm), T_6 (0.49 cm), T_5 (0.45 cm), T_4 (0.42 cm), T_3 (0.40 cm) and T_2 (0.38 cm), while least was found in control T_1 (0.38 cm). The maximum diameter of bulb was recorded in T_7 (5.90 cm) followed by T_8 (5.31 cm), T_9 (5.28 cm), T_6 (4.83 cm), T_5 (4.66 cm), T_4 (4.53 cm), T_3 (4.31 cm) and T_2 (3.50 cm) as compared to control T_1 (3.46 cm). The maximum no. of cloves/bulb was found in T_7 (23.33) followed by T_8 (21.63), T_6 (21.53), T_9 (21.38), T_5 (20.59), T_4 (19.93), T_3 (19.15) and T_2 (17.50), while least was recorded in T_1 (15.51).

Effect of different treatment combinations of NPK on length of cloves/bulb (cm) was found significant (Table 1). It was observed that the maximum length of clove/bulb (cm) was recorded in T_7 (2.62cm) followed by T_6 (2.53 cm), T_5 (2.45 cm), T_9 (2.40cm), T_4 (2.36 cm) followed by T_3 (2.27 cm) and T_2 (2.27 cm), whereas minimum was found in T_1 (1.56 cm). The maximum neck thickness was recorded in T_7 (1.38 cm) followed by T_6 (1.33 cm), T_8 (1.31cm), T_9 (1.26 cm) T_5 (1.25 cm), T_4 (1.18

Table 1 : Effect of different treatment combination of NPK on plant height (cm), no. of leaves /plant, no. of leaves (cm), width of leaves(cm), diameter stem (cm), diameter of bulb (cm), no of cloves/bulb, length of cloves/bulb (cm), neek thickness of bulb(cm), weight of bulb (g), no. of bulb (kg), bulb yield/plot (kg)

Sr. No.	Treatments	Characters											
		Plant height (cm)	No. of leaves /plant	Lenght of leaves (cm)	Width of leaves (cm)	Diameter Stem (cm)	Diameter of bulb (cm)	No of cloves/ bulb	Length of cloves/ bulb (cm)	Neek thickness of bulb(cm)	Weight of bulb (g)	No. of Bulb (kg)	Bulb yield/plot (kg)
1.	$N_0P_0K_0$	60.73	4.65	26.03	0.56	0.36	3.46	15.51	1.56	1.03	32.10	35.14	3.16
2.	$N_1P_1K_1$	62.47	5.20	27.53	0.59	0.38	3.56	17.50	2.12	1.11	33.25	35.97	3.60
3.	$N_1P_2K_2$	65.31	5.24	27.95	0.62	0.40	4.31	19.15	2.27	1.14	34.62	35.91	3.66
4.	$N_2P_1K_1$	66.42	5.53	28.23	0.65	0.42	4.53	19.93	2.36	1.18	42.00	35.85	3.74
5.	$N_2P_2K_2$	67.16	6.14	29.51	0.69	0.45	4.66	20.59	2.45	1.25	37.37	38.19	3.93
6.	$N_3P_1K_1$	72.32	6.42	30.35	0.71	0.49	4.83	21.53	2.53	1.31	39.63	39.19	3.98
7.	$N_3P_2K_2$	75.95	7.53	32.93	0.76	0.55	5.90	23.33	2.62	1.38	49.11	34.78	4.43
8.	$N_4P_1K_1$	73.73	7.36	31.76	0.74	0.53	5.31	21.63	2.30	1.31	48.45	40.85	4.05
9.	$N_4P_2K_1$	71.28	6.99	31.10	0.73	0.52	5.28	21.38	2.40	1.26	47.01	40.11	3.99
C.D. (P=0.05)		5.5	0.78	2.08	0.57	0.53	0.37	1.56	0.18	0.10	2.46	2.84	0.38

cm), T_3 (1.14 cm) and T_2 (1.11 cm), while least was recorded in control T_1 (1.03cm).The maximum weight of bulb (g) was recorded in T_7 (49.11 g.) followed by T_8 (48.45 g.), T_9 (47.01 g.), T_4 (47.01 g.), T_6 (39.63 g.), T_5 (37.37 g.), T_3 (34.62 g.) and in T_2 (32.24 g.) and minimum found in control T_1 (32.10 g.).

It was clear from the data that parameters were also affected by the application of different treatment combination of NPK. The maximum no. of bulbs/kg was recorded in T_8 (40.85) followed by T_9 (40.11), T_6 (39.19), T_5 (38.19), T_4 (36.85), T_3 (35.91), T_2 (35.97), T_1 (35.14) and minimum was recorded in T_7 (34.78). The maximum bulb yield/plot (kg) was found in T_7 (4.33 kg) followed by T_8 (4.05 kg), T_9 (3.99 kg), T_6 (3.98), T_5 (3.93 kg), T_4 (3.74 kg), T_3 (3.66 kg) and T_2 (3.60 kg) and minimum was found in T_1 (3.16 kg). Effect of NPK on growth and yield of garlic was also studeid by various wereas in past (Ahmed-Abbas *et al.,* 2006; Kumar *et al.,* 1996; Das *et al.,* 1985; Pal and Pandey, 1986; Patil *et al.,* 1986).

REFERENCES

Ahmed-Abbas, Sultan-Muhammad, Muhammad-Bashers, Akhtar-Nawaaz and Hakim-Khan (2006). Effect of various levels of nitrogen, phosphorus and potash on the yield of garlic. *Sarhad J. Agric.,* **22**(1):81-83.

Das, A.K., Som, M.G., Sadhu, M.K. and Bose, T.K. (1985). Response to varying levels of N, P and K on growth and yield of multiple clove garlic (*Allium sativum* L.). *Indian Agriculturists,* **29** (3): 183-189.

Kumar, Ashok, Singh, G. N. and Kumar, S. (1996). Effect of NPK on growth, yield and quality of garlic (*Allium sativum* L.) *Recent-Hort.* **3**(1): 118-121.

Pal, R.K. and Pandey, D. (1986). Effect of different levels of nitrogen, phosphorus and potassium on the growth and yield of garlic (*Allium sativum* L.). *Prog. Hort.,* **18**(3&4): 256-259.

Patil, P.Y. , Mahorkasr, Y.K. and Patil, Y.K. (1986). Effect of nitrogen, phosphorus and potash on the bulb size of onion (*Allium cepa* L.). *Punjab Rao Krishi Vidyapith Res. J.*, **8**(2): 67-68.

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