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Effect of Different Dates of Sowing on Germination of Cape gooseberry (*Physalis peruviana* L.) in Central Uttar Pradesh

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ABSTRACT

The present investigation was carried out to find out the effect of different dates of sowing on germination of Cape gooseberry (*Physalis peruviana* L.) in Central Uttar Pradesh. during the year 2012-2013. The experiment was conducted in Complete Randomized Design with 7 treatments, replicated thrice. Observations were recorded on germination parameters of Cape gooseberry. The maximum seed germination and growth was recorded from 20 september 2012 date of sowing than others of Cape gooseberry under Lucknow conditions.

Key words: Different date of sowing, Capegooseberry, Germination.

INTRODUCTION

The genus *Physalis* = *bladder*, of the family solanaceae includes annual and perennial herb bearing globular fruits, each enclosed in inflated calyx, which become papery on maturity and look like Chinese lantern. Various species of genus *Physalis* have been subjected too much confusion in literature and trade. A species, which bears superior fruit and has become widely known, is ***Cape gooseberry (Physalis peruviana L.).*** It is also commonly called *Poha or Poha berry* in Hawaii, *Golden berry* in South Africa and *Rashbhari, Makoi, Tepari, Husk cherry, Peruvian ground cherry* in India [2,7]**.** The name of Cape gooseberry is most probably derived from the name of "Cape of God Hope'' of South Africa where it was commercially grown. Fruits are yellow-orange berries, 1 to 3.5 cm in diameter, very juicy aromatic and with a particular bitter-sweet flavour. They are enclosed by the acescent epicalyx, which gives them the shape of a bladder.

The Cape gooseberry is reportedly native to Peru and Chile and has been widely introduced into cultivation of other tropical, sub-tropical and even and temperate areas. It is said to succeed wherever tomato can be grown from nutritional point of

view, it[s] importance is not less than any other major fruit crops, as the edible portion of berry contains 11.5% carbohydrates, 1.8% protein, 0.2% fat, 3.2% fibre, 0.6% mineral matter and 49mg ascorbic acid per 100g edible portion of fruit (**Khan and Gower, 1955**). The fruit also contains carotene **(as vitamin A 2380 I.U) (Anonymus, 1969),** pectin 0.9% **[5].** The ripe fruits are eaten as fresh fruit and used in making excellent quality of jelly, sauces and particularly jam for which it is called as "Jam fruit of India" The fruits are also attractive sweet when dipped in chocolate or other glazes or pricked and rolled in sugar. The Cape gooseberry is an herbaceous, soft wooded erect and somewhat veining shrub. Plants have ribbed, often purplish spreading branches nearly opposite on which, velvety heart shaped pointed leaves of 6-15 cm long and 4-10 cm wide appears regularly along the stem. Yellow pendulous flowers born in leaf axils having companulate hairy corolla's with purple to brown spot. The flowers are self pollinated but the pollination in enhanced by gentle shaking of flowering stems or giving the plants a light spray with water **[7].** after the flowers falls. The calyx expands, ultimately forming a straw-coloured husk much larger than the fruits encloses. Fruit ripes best when it still attached with plant The berry is globosely, smooth, glossy, orange-yellow skin and juicy pulp containing numerous very small yellowish seeds. As the fruits ripen, they begin to drop on the ground. Generally fruits are harvested manually at frequent interval, which is considered to be most expensive operation is Cape gooseberry production. It has grown as annual crop in plains of North India and as perennial crop in hill of Southern region. It is grown successfully in states like Uttar Pradesh, West Bengal, Madhya Pradesh, Haryana, Punjab, Nillgiri hills and other parts of country. In North India it can be successfully grown up to an elevation of 1200m. While in South India it thrives well up to 1800m. The plant like sunny, frost free location and sheltered from strong winds. It can thrive in mild cold up to 5^0C and higher temperature 35^0C; however, temperature around 21^0C is ideal for good crop. The dates of sowing and plant population per unit area play decisive role with regards to obtain optimum growth of plant and high yield. According to **Bhatnagar and Pandita, [1]**the correct date of sowing time resulted higher yield and induced the fruit quality of tomato. Successful cultivation of any crop depends upon several factors, sowing date as reported in tomato and sweet pepper. There are no reports regarding to date of sowing to cultivate the crop under agro climatic condition of Lucknow. Date of sowing obviously effect the yield and quality of fruits It can thrive in mild cold up to 5^0C and higher temperature at 35^0C; however, temperature around 21^0C is thought to be ideal for crop. Frosting or excessive desiccation is quit unsuitable for the crop [8]**.**

MATERIALS AND METHODS

The present experiment was conducted at the Horticulture Research Farm of the Department of Applied Plant Science (Horticulture) Babasaheb Bhimrao Ambedkar University, Vidya Vihar, Rae Bareli Road Lucknow, during 2012-13 to find out the Effect of different dates of sowing on germination, growth and yield of Cape gooseberry (*Physalis peruviana L.*) In Central Uttar Pradesh. The experiment was laid out in Complementry Randomized Design with three replications. The treatment comprised of seven date of sowing, i.e. 20 september 2012, 5 october 2012, 20 october 2012, 5 november 2012, 20 november 2012, 5 december 2012 and 20 december 2012 which constitutes total Twenty One treatment combinations. The sowing media (cocopeate) was treated in autoclave at 100^0C for 15 minutes for killing of microbes. Then after cooling treated sowing media and seeds were sown in the seed germinating portrays containing cocopeate. Portrays were filled from cocopeate. Thirty number of seeds were sown in each portray and was irrigated immediately after sowing and them portrays were kept in shade area. Optimum

moisture of germinating media was maintained during the period of seed germination. The seeds of first treatment were sown first time on 20th September 2012. Then after whole treatment seeds were sown in 15 days intervals. Observations like Days taken to germination, Number of seed germinated, percentage of seed germination, Diameter of plant (mm), Height of plant (cm) , Length of root (cm), Number of secondary roots and S tem diameter (mm)

RESULT AND DISCUSSION

The days taken to germination was recorded on the basis of emergence of the seedling from the seed and its being visible just above the surface of growing media. The number of days taken to seed germination as influenced by the various treatments has been presented in Table No. 1. Seed germination was recorded at one day interval from the data of emergence of seedlings and continued up to 30 days after sowing. Treatment T_1 had the maximum number of seed germinated 74.3% at the 10 days after sowing while treatment T_7 46.3% show minimum germination and the data presented in Table 2 reveals that the maximum seedling height (5.18cm), length of tap root (2.50 cm), number of secondary roots (6.80)cm and diameter of stem (1.28 mm) at 30 days after germination was recorded in treatment first T_1 i.e., (20-09-12) however, minimum seedling height (1.45cm), length of tap root (1.25) cm number of secondary roots (3.80cm), stem diameter(0.61) mm at 30 days after germination was recorded in treatment T_7, Wadhwa et al; 2001 reported that germination was higher when seeds were sown on 28 October than on 8 and 18 October. Pre-germination of seeds before sowing slightly enhanced germination. Transplanting on 23 December recorded higher survival percentage, better growth and higher tuber yield compared with transplanting on 3 and 13 December. Pre-germination of seeds before sowing did not influence growth and yield of the potato crop after transplanting in the field. Chamandi, 2013 showed that germination speed and germination percentage increased in second sowing date due to higher temperature. Primed seeds with tap water and zinc sulphate solution germinated more and faster than no primed seeds. M9 cultivar was better than two other cultivars. Priming with Zn solution increased leaf area index in all cultivars, also it increased biological yield of M7 and M9 cultivars in the first sowing date. In the first sowing date the crop growth rate of three soybean cultivars were increased by Zn priming. Meanwhile in M9 and L17 cultivars priming with tap water compensated sowing delay side effects on growth indices. Benzioni et al 1991 reported that Plants sown in mid-March set fruit in mid-May and gave a higher yield of export-quality fruits than plants sown in mid-April, which set fruit normally but produced a large proportion of small (< 200 g) fruits. Plants sown in June did not flower until Oct. *C. metuliferus* sown in a greenhouse on 3 dates in Oct. and Nov. developed very slowly during the cold months and leaves were chlorotic; however, fast growth and development resumed in the spring and high yields (46.4-64.0 t/ha) were eventually achieved. Pushp Sharma et al 2013 studied that Groundnut exhibits indeterminate growth habit resulting in seeds of varying sizes and maturity at harvest and probably there may also be differences in quality. Even under sub-optimal conditions, 20-30% seeds either do not germinate or fail to develop into healthy seedlings due to loss in seed vigor resulting in poor plant stand in the field. Laboratory experiment was carried out to determine the quality of seeds of SG 99 (Spanish bunch type) and M 522 (semi-spreading) cultivars grown in field on 4 sowing dates (25 April, 10 May, 25 May and 10 June) and harvested at 3 different stages (120, 135, 150 days after sowing). Studies were initiated three months after each harvesting date to overcome seed dormancy. Significant variations were recorded in the two cultivars for most of the parameters studied (germination, moisture, fresh weight, dry weight, seedling length, vigor index). Sowing and harvesting dates significantly influenced some of

these parameters. Delay in sowing from 25 April to 10 June reduced 100 kernel weight and oil content but marginally increased shelling out turn. Maximum dry matter at physiological maturity was accumulated by crop harvested at 135 days after sowing (DAS). Overall, seeds of crop harvested at 135 DAS had significantly higher mean germination (91.3%), seedling length (8.8 cm), dry matter (0.090 g) and vigor index I (806.4). Bunch type cultivar (SG 99) surpassed the semi-spreading cultivar (M 522) in almost all the germination related traits and vigor index.

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Number of seed germination after sowing

Table No. 1 Effect of different dates of sowing on germination after sowing.

S. N.	Treatments	6 Days	8 Days	10 Days	12 Days	14 Days	16 Days	18 Days	20 Days	22 Days	24 Days	26 Days	28 Days	30 Days	Total seed germination	% of seed germination
1	**T1**	27.00	62.30	74.30	_	_	_	_	_	_	_	_	_	_	66.87	74.30
2	**T2**	_	16.70	55.70	69.60	_	_	_	_	_	_	_	_	_	62.64	69.60
3	**T3**	_	_	8.70	24.30	40.00	55.30	_	_	_	_	_	_	_	49.77	55.30
4	**T4**	_	_	_	_	18.70	34.30	48.60	65.70		_	_	_	_	59.13	65.70
5	**T5**	_	_	_	_	_	13.20	33.30	53.30	69.30	_	_	_	_	62.37	69.30
6	**T6**	_	_	_	_	_	_	13.60	40.00	57.60	66.70			_	60.03	66.70
7	**T7**	_	_	_	_	_	_	_	_	_	_	6.70	18.70	46.30	41.67	46.30
8	**S.E ± (m)**	0.08	0.14	0.24	0.25	0.19	0.24	0.21	0.28	0.19	0.14	0.07	0.11	0.13	0.25	0.71
9	**C.D (0.05)**	0.24	0.44	0.71	0.76	0.57	0.73	0.64	0.84	0.58	0.43	0.22	0.34	0.38	0.76	2.14

Table No. 2 Effect of different dates of sowing on vegetative growth at 30 days after sowing

S. No.	Treatments	Seedling length (cm)	Length of tap root (cm)	Number of secondary roots	Stem diameter (mm)
1	**T1**	5.18 cm	2.50 cm	6.8	1.28 mm
2	**T2**	4.24 cm	2.36 cm	6.5	1.16 mm
3	**T3**	3.25 cm	2.24 cm	6.3	0.98 mm
4	**T4**	2.28 cm	2.12 cm	6.0	0.91 mm
5	**T5**	2.09 cm	1.96 cm	5.8	0.87 mm
6	**T6**	1.87 cm	1.43 cm	5.4	0.80 mm
7	**T7**	1.45 cm	1.25 cm	3.8	0.61 mm
8	**S.E (m)**	0.09	0.07	0.39	0.04
9	**C.D (0.05%)**	0.25	o.21	1.21	0.11