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Standardization of nursery raising methods in Cape gooseberry (*Physalis peruviana* L.)

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Abstract

Propagation of fruit plants under protected conditions is gaining importance for the production of pest & disease free quality saplings. Seedlings of fruit crops can be produced using different methods of nursery raising. An experiment to study the nursery production of local variety of Cape gooseberry from Hathras district of Uttar Pardesh using different methods was carried out at Punjab Agricultural University's Fruit Research Station, Jallowal-Lesriwal, Jalandhar, Punjab, during the year 2015. Seeds of Cape gooseberry were sown on raise bed, flat bed and two type of Portrays with varying dimensions. The experiment was laid out in Randomized Block Design with four treatments and five replications. The observations regarding germination (%), plant height, number of leaves, stem thickness and disease infected plants were recorded. The portrays resulted in maximum plant growth during nursery production.

Key words: Cape gooseberry, sowing methods, portray, germination, growth

Introduction

Cape gooseberry,a short duration fruit crop, can be used as cash crop as well as intercrop and has high significance for diversification with fresh production. According to Gupta and Roy (1980), it is commonly called *Poha or Poha berry* in Hawaii, *Golden berry* in South Africa and *Rashbhari, Makoi, Tepari, Husk cherry, Peruvian ground cherry* in India. The plant is herbaceous, soft wooded erect and somewhat veining shrub. The plant like sunny, frost free location and sheltered from strong winds. It can thrive in mild cold up to 5°C and higher temperature of 35°C; however, temperature around 21°C is ideal for good crop. Successful cultivation of any crop depends upon several factors related to its propagation, especially time and method of seed sowing. These factors are influential in developing good nursery traits, appropriate growth during initial stage of the crop and quality & qualitative fruit production on later stages. Hamma *et al.*, 2012 also stressed that method of nursery raising and plant population per unit area play decisive in obtaining optimum growth of plant and high fruit yield. There are no reports regarding evaluation of seed sowing methods for nursery production of Cape gooseberry under agro climatic conditions of Punjab. Nursery raising under open field conditions results in poor seedling production so protected nursery raising is the demand of the day (Nangare *et al*., 2015).In order to maximize survival and growth, it is essential to raise seedlings in nurseries with proper care (Bognounou *et al*. 2010). Therefore, study on seedling production of Cape gooseberry under protected conditions also needs to be undertaken. It will not only play vital role in achieving higher germination of seeds with adequate seedling growth, but can enhance the quality of nursery plants in term of low disease and pest incidence. To date, there is not much work available on nursery production of this crop under screen house. Portray nursery technique also needs to be studied to work out its benefits over the conventional methods of seed sowing. Portrays provide individual cell for each seed sown which helps in overcoming the transmission of diseases from one seedling to another. Use of such technologies can also help in early development of root system and thereby early transplanting of seedlings. The benefits of portray nursery also includes improved seed germination, lower seedling mortality, uniform growth, healthy and early maturity, easy handling, better transportation and good main field establishment and crop stand (Yadav *et al*., 2014). Sharma *et al*. (2013) elucidated that nursery raising in portrays in cape gooseberry ensures higher

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yield and quality fruit production and also better economy of land use of a crop. Therefore, in light of all the factors discussed above, study was carried out to investigate the effect of different methods of nursery raising under open and screen house conditions.

Materials and Methods

The experiment was carried out at Punjab Agricultural University's Fruit Research Station, Jallowal-Lesriwal, Jalandhar during the year 2015 to evaluate methods of plant nursery production of local variety of Cape gooseberry from Hathras district. The data were analyzed statistically in RBD factorial design as per the procedures of Gomez and Gomez (1984). There were four treatments which were replicated five times.

Treatment details

M_1 - - Portray (50 cell)
M_2 - Portray (20 cell)
M_3 - - Raise bed
M_4 - Flat bed

The specifications of both type of portrays was as under:

Specification	Portray (50 cell)	Portray (20 cell)
Number of cells	50	20
Length of portray (cm)	53.5	18.5
Breadth of portray (cm)	27.7	14.7
Depth of cell (cm)	4.8	12.0
Diameter of cell (cm)	5.0	3.3

Portrays were filled with the growing medium viz. coco peat, sand and FYM (2:1:1). A small depression (0.5 cm) was made in the center of each cell of portray for sowing. One seed per cell was sown and covered with medium. The observations regarding percent germination, plant height (cm), number of leaves, stem thickness (mm) and disease infected plants were noted after 45 days of sowing under different dates.

Results and Discussion

The data in table 1 depicts that maximum germination percent (89.50 percent) was attained by second method of nursery raising *viz.* portray with 20 cells followed by portrays with 50 cells (78 percent). However, treatment M_3 (raise bed) and M_4 (flat bed) were at par but were significantly different from treatment M_1 and M_2. It may be due to hard seed coat, which may need constant moisture conditions to soften it, which is not possible on beds (Bali *et al*., 2013). On the other hand number of disease infected plants (37.58 %) was more when seeds were sown on beds as compared to protarys (22.46 % and 25.18% for 20 cell and 50 cell portrays respectively). Riaz *et al*. (2008) elucidated that method of growing is known to have a crucial role on health and development of plant. Seedlings grown in containers have many advantages such as better survival rate, less disease incidence, easier to plant and immediate growth response benefits (Landis *et. al*., 1990).

Table 1: Effect of nursery raising method on germination and disease infected plants at 45 days after sowing.

Treatments (Nursery raising method)	Germination (%)	Disease infected plants (%)
M_1 (Portray : 50 cell)	78.00	25.18
M_2 (Portray: 20 cell)	89.50	22.46
M_3 (Raise bed)	40.10	37.58
M_4 (Flat bed)	38.20	33.04
CD (p=0.05)	07.25	3.33
CV %	10.45	7.31

Table 2: Effect of nursery raising method on vegetative growth at 45 days after sowing

Treatments (Nursery raising method)	Plant height (cm)	Stem thickness (mm)	No. of leaves
M_1 (Portray : 50 cell)	8.79	2.06	3.80
M_2 (Portray: 20 cell)	9.05	2.40	4.02
M_3 (Raise bed)	7.36	1.76	3.74
M_4 (Flat bed)	7.08	1.98	3.55
CD (p=0.05)	1.36	0.43	0.22
CV %	11.06	7.33	5.78

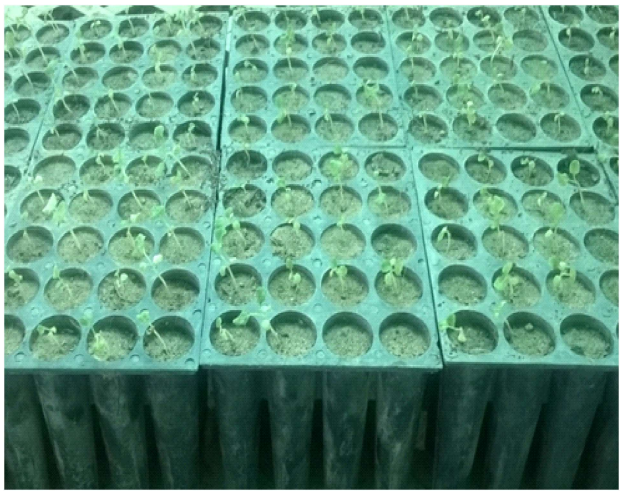

Fig.1: Healthy germinated plants under treatment M_2

In the Table 2 regarding growth parameters, maximum plant height (9.05 cm) and stem thickness (2.40 mm) were observed in M_2 treatment (nursery raising in portrays with 20 cells). Plant height was at par in treatment M_2 and M_1 but significantly different M_3 and M_4. Maximum stem thickness was measured in treatment M_2 (2.40 mm) followed by M_1, M_4 and M_3. Maximum number of leaves (4.02) were also recorded in treatment M_2 followed by M_1 and M_3 where M_3 and M_4 were significantly different from M_2. Gera *et al.* (2007) reported that optimum sowing method ensures proper growth and development of the crop. Further it was reported that plants raised in portrays had significant variations in almost all seedling morphological parameters.

As observed from the results of this trial, second nursery raising method M_2 i.e. portrays (20 cell) performed better in terms of germination and growth characters than the rest of the treatments by giving higher values showing that method of sowing plays a crucial role in plant development.

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