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*Original Research Paper*

# Aeroponics approach for production of gladiolus (*Gladiolus hybridus* Hort.) corms and cormels

**Bharathi T.U.[1], Rao T.M.[1], Kalaivanan D.[2], Kumar R.[1] and Kumaran G.S.[3]**

[1]Division of Flower and Medicinal Crops, [2]Division of Natural Resources,
[3]Division of Postharvest Technology and Agricultural Engineering
ICAR-Indian Institute of Horticultural Research, Bengaluru - 560089, Karnataka
*Corresponding author Email : UshaBharathi.T@icar.gov.in

## ABSTRACT

Gladiolus is a popular commercial flower crop among top ten cut flowers of international trade. In order to improve the rate of multiplication, eleven gladiolus varieties with three nutrient regimes (N1- 96:18:108, N2-128:24:144 and N3-160:30:180 ppm of NPK) were evaluated under aeroponics system. The results revealed that different varieties and nutrient regimes had significant influence on plant growth, corm and cormel production. Among the genotypes, Arka Naveen recorded maximum plant height (109.44 cm), on par with Arka Amar (104.77 cm). The genotype Arka Amar (1.89) recorded highest number of corms per plant, on par with Arka Ranjini (1.78), Arka Aayush (1.44), Arka Naveen (1.44) and Arka Shobha (1.67). However, number of cormels were recorded highest in Arka Aayush (1.67), on par with Arka Amar (1.67) and Arka Ranjini (1.44). Among the nutrient regimes, N2 (128:24:144 ppm NPK) registered maximum plant height (85.44 cm), on par with N3 (160:30:180 ppm NPK) (77.42 cm). The number of corms (1.39) and cormels (3.56) per plant were recorded highest in N2 (128:24:144 ppm of NPK). The genotype Arka Manorama did not produce cormels under aeroponics system. Gladiolus varieties Arka Amar, Arka Aayush and Arka Naveen were found as best suited under aeroponic system for better corm multiplication under the nutrient regime of N2 (128:24:144 ppm of NPK).

**Keywords :** Aeroponics, corm, cormel, gladiolus, multiplication, nutrient regime

## INTRODUCTION

Gladiolus (*Gladiolus hybridus* Hort.) is an important commercial cut flower crop cultivated for its elegant flower spikes, vibrant colours, better vase life and wide adaptability. It is one of the top ten cut flowers of international trade. Propagation and rate of multiplication is important for the adoption and popularisation of any crop. Gladiolus is propagated vegetatively through underground storage organs called corms and cormels. The *in vitro* propagation of cormels is expensive which increases the production cost per corm. Generally, the mother corm produces one or two corms and minimum of 25 cormels per season (Sinha & Roy, 2002). The cormels need one season (six to seven months) to reach a standard plantable size of corm. After harvest, the corms and cormels are dormant (Priyakumari & Sheela, 2005) which need proper cold storage to release dormancy to facilitate planting.

The scarcity of quality planting material supply in gladiolus is primarily due to the low multiplication efficiency and greater spoilage of corms during storage (Singh & Dohare 1994). Gladiolus is prone to *Fusarium* wilt disease, which leads to the loss of corm and cormels. Added to that, the multiplication of corms under soil cultivation increases the risk of *Fusarium* wilt infestation in the propagules. The Fusarium infected mother corms produce disease-ridden daughter corms which succumbs to death in the storage or in the field during subsequent cropping season. To overcome the soil borne disease problems and to improve the multiplication efficiency of gladiolus, an innovative method *i.e.*, aeroponics is used. Aeroponics is the method of growing plants in an air or mist of nutrients devoid of soil or any media (Farran & Castel, 2006; Chiipanthenga et al., 2012). Studies on aeroponics mediated potato seed production indicated that this technique has advantage over conventional method in terms of energy conservation, survival rate, growth rate, maturation time, disease free planting material

production and tuber yield (Stoner, 1983; Otazu, 2010; Tsoka et al., 2008).

The nutrient solution or mixture plays a key role in multiplication of gladiolus under aeroponics which is primarily soilless. The composition of nutrient mixture was another major phenomenon in the production and multiplication of gladiolus corms and cormels under aeroponics. Keeping the above in view, the study on corm and cormels production in gladiolus through aeroponics using different nutrient mixtures were carried out to standardize the nutrient solution and to find the suitable gladiolus variety for aeroponics system.

## MATERIALS AND METHODS

The experiment was conducted at ICAR-Indian Institute of Horticultural Research, Bengaluru during the year 2019 to 2021. The eleven gladiolus varieties namely Arka Amar, Arka Aayush, Arka Naveen, Arka Poonam, Arka Shobha, Arka Kesar, Arka Tilak, Arka Pratham, Arka Gold, Arka Manorama and Arka Ranjini were used for the study. The aeroponic system was designed and fabricated at ICAR-IIHR, Bengaluru (Hemlata, 2019), was used for this study. The aeroponic system consisted of root chamber (18 x 90 x 90 cm) with sliding door, nutrient tank (80 litre capacity) and automated nutrient misting system with 50-micron sprinklers. The nutrient tank was connected with motor (0.5 hp) to pump the nutrient solution to the root chamber with the pressure of 60 psi. The motor was connected with the automated timer to manage the misting time and duration.

The uniform size of corms (4 to 5 cm) was planted in the net pot and burnt clay balls were placed over the corms for the support. Three different nutrient regimes viz., N1-96:18:108 ppm, N2-128:24:144 ppm and N3-160:30:180 ppm of NPK were applied. The pH of the nutrient solutions N1, N2 and N3 were 6.5, 6.7 and 6.9 and EC were 1.1, 1.2 and 1.3 $dSm^{-1}$ respectively. For all nutrient regimes, the secondary and micronutrients were kept unchanged. The mean temperature observed during the crop growth period in the aeroponics system was 25 to 30 ºC. The experiment was conducted using factorial completely randomized design with three replications. The flower spikes emerged were removed without disturbing the leaves as experiment was carried out for corm and cormels production, The observations on plant height (cm), leaf length (cm), leaf width (cm), root length (cm), root growth (visual scoring), corm weight (g), corm size (cm), number of corms per plant, number of cormels per corm and weight of cormels (g) were recorded. The data collected were analysed statistically.

## RESULTS AND DISCUSSION

The effect of eleven different gladiolus varieties, three different nutrient regime and their interaction on multiplication efficiency under aeroponics system was studied. The results revealed the significant differences for the growth parameters (Table 1). Among the varieties, Arka Naveen recorded the highest plant height (109.44 cm), on par with Arka Amar (104.77 cm), Arka Aayush (99.50 cm), Arka Kesar (96.55 cm) Arka Shobha (78.59), and Arka Ranjini (78.61 cm), while, lowest was recorded in Arka Manorama (10.33 cm). Among the three different nutrient regimes, N2 registered maximum plant height (85.44 cm), on par with N3 (77.42 cm). There was no significant influence noticed for the plant height with respect to the interaction of variety and nutrient regime.

Leaf length was recorded highest in Arka Amar (68.66 cm), on par with Arka Naveen (61.23 cm), Arka Aayush (54.68 cm) and Arka Ranjini (51.38 cm). The variety Arka Kesar (2.22 cm) recorded highest leaf width, on par with Arka Aayush (2.11 cm), Arka Naveen (1.82 cm) Arka Amar (1.79 cm) and Arka Shobha (1.78 cm). Among the three different nutrient regime N2 recorded the highest leaf width (1.71 cm), on par with N3 (1.47 cm). Nutrient regime alone and interaction of varieties with nutrient regime have not recorded significant differences for leaf length and width. The variation in plant growth among the varieties are due to the inherent genetic character of the individual genotype. Apart from that the different concentrations of nutrients present in the three different nutrient regime has greater influence on the plant growth parameters. Effat et al. (2018) reported that the plant height of gladiolus was increased under aeroponic culture with the increasing flow rate of nutrients. As per Ritter et al. (2001), the plants grown under aeroponics grow fast and absorb nutrients better than the plants grown in hydroponics. The growth of gladiolus was reduced in nutrient regime (N1) with low concentrations of nutrient solution, which might be probably due to low availability of mineral nutrients.

**Table 1 : Effect of different nutrient regime on growth parameters of gladiolus varieties under aeroponics**

| Treatment | Plant height (cm) | | | | Leaf length (cm) | | | | Leaf width (cm) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $N_1$ | $N_2$ | $N_3$ | Mean | $N_1$ | $N_2$ | $N_3$ | Mean | $N_1$ | $N_2$ | $N_3$ | Mean |
| Arka Amar | 104.33 | 103.00 | 106.97 | 104.77 | 68.47 | 66.17 | 71.33 | 68.66 | 1.47 | 2.27 | 1.63 | 1.79 |
| Arka Aayush | 90.80 | 104.67 | 103.03 | 99.50 | 44.17 | 58.57 | 61.30 | 54.68 | 1.63 | 2.83 | 1.87 | 2.11 |
| Arka Naveen | 97.17 | 117.50 | 113.67 | 109.44 | 61.40 | 65.17 | 57.13 | 61.23 | 1.40 | 1.83 | 2.23 | 1.82 |
| Arka Poonum | 68.67 | 33.33 | 67.00 | 56.33 | 36.73 | 18.83 | 45.33 | 33.63 | 1.37 | 0.70 | 0.90 | 0.99 |
| Arka Shobha | 72.67 | 92.93 | 70.17 | 78.59 | 35.60 | 42.43 | 47.27 | 41.77 | 1.73 | 1.80 | 1.80 | 1.78 |
| Arka Kesar | 71.50 | 108.33 | 109.83 | 96.56 | 37.10 | 44.37 | 55.50 | 45.66 | 1.93 | 2.53 | 2.20 | 2.22 |
| Arka Tilak | 0.00 | 85.17 | 106.00 | 63.72 | 0.00 | 51.67 | 69.87 | 40.51 | 0.00 | 1.13 | 1.93 | 1.02 |
| Arka Pratham | 51.60 | 65.47 | 53.70 | 56.92 | 21.33 | 26.70 | 39.13 | 29.06 | 0.87 | 1.10 | 1.20 | 1.06 |
| Arka Gold | 67.00 | 104.50 | 37.33 | 69.61 | 42.30 | 58.40 | 21.53 | 40.74 | 1.30 | 2.07 | 0.63 | 1.33 |
| Arka Manorama | 0.00 | 31.00 | 0.00 | 10.33 | 0.00 | 21.00 | 0.00 | 7.00 | 0.00 | 0.53 | 0.00 | 0.18 |
| Arka Ranjini | 58.00 | 93.93 | 83.90 | 78.61 | 42.67 | 60.07 | 51.40 | 51.38 | 0.80 | 1.97 | 1.77 | 1.51 |
| Mean | 61.98 | 85.44 | 77.42 | | 35.43 | 46.67 | 47.26 | | 1.14 | 1.71 | 1.47 | |
| | C.D. | SE(d) | SE(m) | | C.D. | SE(d) | SE(m) | | C.D. | SE(d) | SE(m) | |
| Variety | 32.01 | 15.99 | 11.31 | | 20.83 | 10.41 | 7.36 | | 0.661 | 0.330 | 0.234 | |
| Nutrient | 16.72 | 8.35 | 5.90 | | NS | 5.43 | 3.84 | | 0.345 | 0.173 | 0.122 | |
| V x N | NS | 27.71 | 19.59 | | NS | 18.03 | 12.75 | | NS | 0.572 | 0.405 | |

Rooting parameters are important to understand the performance of gladiolus varieties under aeroponics system (Table 2). Profuse root growth was observed in majority of the gladiolus varieties under three different nutrient regimes. The gladiolus varieties susceptible to *Fusarium* wilt are not able to withstand the continuous water spray and subsequently rotten and not survieved in all the nutrient regimes under aeroponics system. The root length was recorded maximum in Arka Aayush (80.94 cm), on par with Arka Naveen and Arka Kesar. Among the nutrient regime N2 recorded the highest root length (62.10 cm) followed by N3 (50.13 cm). In contrary to present results, Souret & Weathers (2000) reported that the root growth of *Crocus* under aeroponics culture was less as compared to soil culture. Root growth of gladiolus varieties was recorded by visual scoring, the density and appearance of the roots under aeroponics system. Root growth was profuse and recorded maximum in Arka Amar with the score of 3.44 out of 4.0, on par with Arka Naveen (3.00), Arka Gold (2.89), Arka Naveen and Arka Kesar (2.78), minimum was recorded in Arka Manorama (0.44). The *Fusarium* wilt susceptible varieties have produced few roots initially and as the disease progressed, they succumbed to wilt.

The nutrient regimes alone had no significant influence on the root growth, whereas, the interaction between the varieties and nutrient regime had the significant influence on the root growth (Fig. 1). The results of the interaction effect revealed that the variety Arka Amar recorded the highest root growth with the score of 5.00 in the N2 nutrient regime. The variety Arka Manorama which was susceptible to *Fusarium* wilt could not survive under the nutrient regime N1 and N3. Though survived in the nutrient regime N2, it recorded lowest score for root growth (1.33). As a whole, the root growth in gladiolus was better under aeroponics and this might be due to the fact that the plants are placed in air gets good root aeration and 100% of existing oxygen (Sun et al., 2004).

Among varieties, Arka Amar recorded the highest number of corms (1.89), on par with Arka Ranjini (1.78), Arka Aayush (1.44), Arka Naveen (1.44) and Arka Shobha (1.67) (Table 3 & 4). The nutrient regime alone has not recorded any significant influence on the corm production. The interaction between varieties and nutrient regime revealed that the variety Arka Amar under nutrient regime N2 recorded the highest number of corms per plant (2.67), on par with Arka Naveen (2.00), Arka Pratham (2.00), Arka

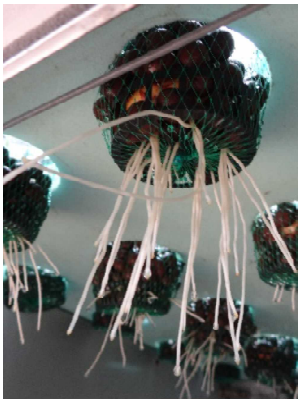
**Table 2 : Effect of different nutrient regime on root parameters of gladiolus varieties under aeroponics**

| Treatment | Root length (cm) | | | | Root growth (visual scoring) | | | |
|---|---|---|---|---|---|---|---|---|
| | $N_1$ | $N_2$ | $N_3$ | Mean | $N_1$ | $N_2$ | $N_3$ | Mean |
| Arka Amar | 44.70 | 59.50 | 72.17 | 58.79 | 3.00 | 5.00 | 2.33 | 3.44 |
| Arka Aayush | 65.33 | 102.00 | 75.50 | 80.94 | 3.00 | 3.00 | 3.00 | 3.00 |
| Arka Naveen | 64.90 | 81.33 | 60.33 | 68.86 | 4.33 | 1.67 | 2.33 | 2.78 |
| Arka Poonum | 46.47 | 21.00 | 37.33 | 34.93 | 3.00 | 0.33 | 0.67 | 1.33 |
| Arka Shobha | 48.43 | 75.00 | 50.17 | 57.87 | 3.00 | 3.00 | 2.67 | 2.89 |
| Arka Kesar | 45.00 | 85.30 | 74.23 | 68.18 | 3.00 | 2.33 | 3.00 | 2.78 |
| Arka Tilak | 0.00 | 52.13 | 72.90 | 41.68 | 0.00 | 2.00 | 2.33 | 1.44 |
| Arka Pratham | 40.83 | 47.67 | 32.00 | 40.17 | 1.33 | 2.67 | 1.33 | 1.78 |
| Arka Gold | 39.03 | 84.13 | 28.33 | 50.50 | 2.67 | 4.33 | 1.67 | 2.89 |
| Arka Manorama | 0.00 | 14.00 | 0.00 | 4.67 | 0.00 | 1.33 | 0.00 | 0.44 |
| Arka Ranjini | 26.13 | 61.03 | 48.17 | 45.11 | 0.67 | 3.00 | 2.33 | 2.00 |
| Mean | 38.26 | 62.10 | 50.13 | | 2.18 | 2.61 | 1.97 | |
| | C.D. | SE(d) | SE(m) | | C.D. | SE(d) | SE(m) | |
| Variety | 21.29 | 10.64 | 7.52 | | 1.27 | 0.636 | 0.449 | |
| Nutrient | 11.12 | 5.55 | 3.93 | | NS | 0.332 | 0.235 | |
| V x N | NS | 18.43 | 13.03 | | 2.20 | 1.10 | 0.778 | |

**Table 3 : Effect of different nutrient regime on corm parameters of gladiolus varieties under aeroponics**

| Treatment | Corms per plant (Nos.) | | | | Corm size (cm) | | | | Corm weight (g) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $N_1$ | $N_2$ | $N_3$ | Mean | $N_1$ | $N_2$ | $N_3$ | Mean | $N_1$ | $N_2$ | $N_3$ | Mean |
| Arka Amar | 2.00 | 2.67 | 1.00 | 1.89 | 3.57 | 4.47 | 3.00 | 3.68 | 14.00 | 26.67 | 10.00 | 16.89 |
| Arka Aayush | 1.33 | 1.33 | 1.67 | 1.44 | 3.83 | 4.17 | 4.53 | 4.18 | 22.33 | 24.00 | 29.67 | 25.33 |
| Arka Naveen | 1.33 | 2.00 | 1.00 | 1.44 | 3.60 | 3.77 | 4.07 | 3.81 | 13.67 | 22.00 | 20.00 | 18.56 |
| Arka Poonum | 1.00 | 0.67 | 2.00 | 1.22 | 2.60 | 1.77 | 3.67 | 2.68 | 5.67 | 3.67 | 15.33 | 8.22 |
| Arka Shobha | 1.33 | 1.00 | 1.67 | 1.33 | 4.17 | 3.40 | 3.43 | 3.67 | 25.33 | 15.67 | 11.33 | 17.44 |
| Arka Kesar | 1.00 | 1.00 | 1.00 | 1.00 | 4.70 | 4.10 | 4.07 | 4.29 | 27.00 | 20.33 | 19.67 | 22.33 |
| Arka Tilak | 1.67 | 0.67 | 0.00 | 0.78 | 3.87 | 3.90 | 0.00 | 2.59 | 18.33 | 18.00 | 0.00 | 12.11 |
| Arka Pratham | 0.67 | 2.00 | 0.67 | 1.11 | 2.10 | 3.30 | 1.43 | 2.28 | 8.00 | 17.33 | 4.33 | 9.89 |
| Arka Gold | 0.67 | 1.67 | 1.00 | 1.11 | 2.73 | 4.97 | 3.73 | 3.81 | 15.33 | 39.67 | 17.33 | 24.11 |
| Arka Manorama | 0.00 | 0.33 | 0.00 | 0.11 | 0.00 | 0.73 | 0.00 | 0.24 | 0.00 | 2.00 | 0.00 | 0.67 |
| Arka Ranjini | 2.00 | 2.00 | 1.33 | 1.78 | 3.70 | 4.60 | 2.87 | 3.72 | 16.00 | 26.33 | 8.33 | 16.89 |
| Mean | 1.18 | 1.39 | 1.03 | | 3.17 | 3.56 | 2.80 | | 15.06 | 19.61 | 12.36 | |
| | C.D. | SE(d) | SE(m) | | C.D. | SE(d) | SE(m) | | C.D. | SE(d) | SE(m) | |
| Variety | 0.622 | 0.311 | 0.220 | | 0.818 | 0.409 | 0.289 | | 6.09 | 3.04 | 2.15 | |
| Nutrient | NS | 0.162 | 0.115 | | 0.427 | 0.213 | 0.151 | | 3.18 | 1.58 | 1.12 | |
| V x N | 1.07 | 0.538 | 0.381 | | 1.41 | 0.708 | 0.501 | | 10.54 | 5.27 | 3.72 | |

a. Vegetative growth of gladiolus



b. Root initiation

c. Profuse root growth of gladiolus

d. Corm and cormels production under aeroponics


e. Corm and cormels production under aeroponics

Fig. 1 (a-e) : Gladiolus multiplication under aeroponics system

Ranjini (2.00) and Arka Gold (1.67). The varieties Arka Amar and Arka Ranjini recorded 2.0 corms per plant in the N1 nutrient regime. The considerable number of corms of the varieties Arka Manorama was died due to *Fusarium* infestation which could not produce adequate root tissues to absorb nutrients. The tissue cultured plants of potato with well-established root system were transplanted in aeroponics for further multiplication, but in case of gladiolus the corms were planted and allowed to root under aeroponics for further establishment and multiplication which would have limited the survival of *Fusarium* wilt susceptible variety. The corm multiplication of gladiolus varieties under aeroponics was in line with the studies of Hemlata (2019).

The corm size is one of the economic characters which plays major role in deciding the standard size and cost of planting material. Among the different varieties studied, the corm size was recorded maximum in Arka Kesar (4.29 cm), on par with Arka Aayush (4.18 cm), Arka Naveen (3.81 cm), Arka Gold (3.81 cm), Arka Ranjini (3.72 cm) and Arka Amar (3.68 cm), however, minimum corm size was recorded in Arka Manorama (0.24 cm). The nutrient regime N2 registered the highest corm size (3.56 cm), on par with N1 (3.17). The interaction effect revealed that the corm size of Arka Gold (4.97 cm) was recorded maximum under N2, on par with Arka Amar (4.47 cm), Arka Aayush (4.17 cm), Arka Kesar (4.10 cm), Arka Tilak (3.90 cm) and Arka Shobha (3.40 cm).

The corm weight among the varieties, nutrient regime and interaction effect were significant. The variety Arka Aayush recorded the highest corm weight (25.33 g), on par with Arka Gold (24.11 g) and Arka Kesar (22.33 g), while, lowest corm weight (0.667 g) was observed in Arka Manorama. The corm weight was recorded maximum under the

**Table 4 : Effect of different nutrient regime on cormel parameters of gladiolus varieties under Aeroponics**

| Treatment | No. of cormels per corm | | | | Weight of cormels (g) | | | |
|---|---|---|---|---|---|---|---|---|
| | $N_1$ | $N_2$ | $N_3$ | Mean | $N_1$ | $N_2$ | $N_3$ | Mean |
| Arka Amar | 1.33 | 3.33 | 0.33 | 1.67 | 0.33 | 1.33 | 0.33 | 0.67 |
| Arka Aayush | 2.33 | 3.67 | 2.00 | 2.67 | 2.67 | 3.33 | 1.00 | 2.33 |
| Arka Naveen | 0.00 | 0.67 | 0.00 | 0.22 | 0.00 | 0.67 | 0.00 | 0.22 |
| Arka Poonum | 0.00 | 0.00 | 1.67 | 0.56 | 0.00 | 0.00 | 0.67 | 0.22 |
| Arka Shobha | 0.33 | 2.33 | 0.00 | 0.89 | 0.33 | 0.67 | 0.00 | 0.33 |
| Arka Kesar | 0.67 | 0.00 | 0.00 | 0.22 | 1.00 | 0.00 | 0.00 | 0.33 |
| Arka Tilak | 1.00 | 0.33 | 0.00 | 0.44 | 0.67 | 0.33 | 0.00 | 0.33 |
| Arka Pratham | 0.67 | 1.67 | 0.00 | 0.78 | 0.67 | 0.67 | 0.00 | 0.44 |
| Arka Gold | 0.00 | 0.67 | 0.00 | 0.22 | 0.00 | 0.33 | 0.00 | 0.11 |
| Arka Manorama | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Arka Ranjini | 0.00 | 4.33 | 0.00 | 1.44 | 0.00 | 4.00 | 0.00 | 1.33 |
| Mean | 0.57 | 1.55 | 0.36 | | 0.52 | 1.03 | 0.18 | |
| | C.D. | SE(d) | SE(m) | | C.D. | SE(d) | SE(m) | |
| Variety | 1.61 | 0.808 | 0.571 | | 0.994 | 0.497 | 0.351 | |
| Nutrient | 0.845 | 0.422 | 0.298 | | 0.519 | 0.259 | 0.183 | |
| V x N | NS | 1.40 | 0.990 | | NS | 0.861 | 0.609 | |

nutrient regime N2 (19.61 g) followed by N1 (15.06 g). The interaction effect showed that the corm weight was highest in the variety Arka Gold (39.67 g) under N2 followed by Arka Aayush (29.67 g) under N3. Different varieties of gladiolus had diverse effect under the nutrient regimes, the variety Arka Poonum performed better in N3, while, Arka Tilak performed well under N1 and N2. The aeroponic culture has advantages such as elevated leaf stomatal conductance, intercellular carbon dioxide concentration and higher photosynthesis rate (Sun et al., 2004). The increase in corm growth under aeroponics culture system was reported by Souret & Weathers (2000) in *Crocus* and Hemlata (2019) in gladiolus.

The influence of varieties and nutrient regime had significant effect on number of cormels and weight of cormels per plant (Table 4). Among the varieties, Arka Aayush (2.67) recorded the highest number of cormels per plant, on par with Arka Amar (1.67) and Arka Ranjini (1.44) and no cormels were produced in Arka Manorama. The nutrient regime N2 has produced highest number of cormels (1.55) per plant. The number of cormels produced were very meagre as compared to soil cultivation. Weight of cormels was recorded maximum in Arka Aayush (2.33 g), followed by Arka Ranjini (1.33 g). Among the nutrient regime, N2 recorded the highest weight of cormels per plant (1.03 g), on par with N1 (0.52 g). The cormels are produced from the axillary bud of the mother corms (Teixeira da & Silva, 2003), which are placed around the daughter corms inside the net pot and though roots are vigorous, the cormels are not produced on fibrous roots as like potato. There was no difference on crop duration of the varieties under aeroponics, and cormels production was very low as compared to the soil production. The aeroponics system can also be experimented further in gladiolus to increase the size of the cormels in shorter period instead of soil planting.

## CONCLUSION

The study indicated that gladiolus varieties Arka Amar, Arka Aayush and Arka Naveen and nutrient regimes N2 (128:24:144 ppm of NPK) found best for corm and cormels production under aeroponic system. The aeroponics system can be studied further to standardize the interval, frequency of nutrient spray and nozzle size as well as the suitability of other gladiolus varieties for multiplication under aeroponic system.

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