

Vase Life Studies as Influenced by Biofertilizers in Different Sized Gladiolus Seed Corms (*Gladiolus grandiflorus* L.) cv. Piccardy

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ABSTRACT

An experiment was conducted on the effect of vase life studies on biofertilizers coated different sized corms of gladiolus spikes during the year 2013-14 at Department of seed science and technology UAS Bengaluru, Karnataka state. The experiment was laid out in Factorial complete block design with three replications and four vase solution treatments (0, 2, 3 percent sucrose). The result reveals that mean maximum water uptake of 59.08 g was found in treatment VAM+Azospirillum+ Azotobactor + large size corm+ RDF (T₁₅) harvested spikes in Three percent sucrose vase solution as compared with control (no inoculation) +small size+ RDF (49.99 g) in distilled water and maximum vase life of (10.66 days) was recorded in spikes harvested from VAM+Azospirillum+ Azotobactor + large size corm+ RDF treated plots(T₁₅) in 3 percent vase solution.

Key words *Gladiolus corms, Biofertilizers, Spikes, Vase solutions, RDF*

Gladiolus (*Gladiolus grandiflorus* L), a bulbous ornamental crop and a member of Iridaceae family is known for its unique beauty and economic value. It is believed to be the native to south and tropical Africa. The name *gladiolus* is derived from a Latin word 'Gladius' meaning sword because of sword like shape of its foliage, hence it is also known as sword lily. The inflorescence is called spike that bears a large number of florets which open one by one in acropetal succession.

The latest trend of growing crops organically has been very much obvious in the commercial flower production. The use of bio fertilizers is quite important concepts of organic farming. It largely excludes the use of synthetic chemicals and relies more upon efficient recycling of crop residues and manures. It also overcomes the problem of increased cost of cultivation, ecological imbalance

due to continuous use of chemical fertilizers and inferior quality produce. Therefore, the emphasis was focused on the use of bio fertilizers.

The bio fertilizers are more appropriately called as microbial inoculants. They contain live or latent cells of efficient strains of microorganisms like biological nitrogen fixers, phosphorous solubilizers which may bring about transformation of several fixed elements in the soil in available form. Besides it is also known to promote the production of certain growth substances viz., auxins, gibberellins and cytokinins. Consequently, the role of bio inoculants and plant bio regulators have been identified in improving the qualitative and quantitative characters of various crops.

MATERIALS AND METHODS

The present investigation was carried out at department Horticulture in floriculture block UAS, GKVK Bangalore during 2013-14. The experiment was laid out in Randomized block design with factorial concept (FRCBD) having 15 treatment combinations viz., There were fifteen treatments laid out in factorial randomized block design with three replications. The treatments combinations includes T₁=control +Small size + RDF, T₂= control +medium size + RDF, T₃= control +large size + RDF, T₄=VAM+ small size+ RDF, T₅= VAM+ medium size+ RDF, T₆= VAM+ large size + RDF, T₇=Azospirillum+ small size+ RDF, T₈= Azospirillum+ medium size+ RDF, T₉= Azospirillum+ large size+ RDF, T₁₀= Azotobactor + small size+ RDF, T₁₁= Azotobactor +medium size+ RDF, T₁₂= Azotobactor +large size+ RDF, T₁₃= VAM + Azospirillum + Azotobactor +small size+ RDF, T₁₄=VAM+ Azospirillum+ Azotobactor +medium size+ RDF, T₁₅= VAM +Azospirillum +Azotobactor +large size + RDF. Flowers are harvested from each treatment and use for the experiment.

Table 1. Uptake of water (g) in vase as influenced by nutrient levels and seed corm size on vase solutions of Gladiolus.

Treatments	Uptake of water (g)			Mean
	Vase solutions			
	Distilled water	Sucrose 2 %	Sucrose 3%	
F ₀ : RDF kg ha ⁻¹	46.88	51.00	54.55	51.44
F ₁ : VAM + RDF kg ha ⁻¹	49.77	52.11	57.33	53.30
F ₂ : Azospirillum + RDF kg ha ⁻¹	50.77	52.66	55.33	52.21
F ₃ : Azotobacter + RDF kg ha ⁻¹	48.88	51.88	54.55	51.96
F ₄ : VAM + Azospirillum + Azotobacter + RDF kg ha ⁻¹	53.55	53.88	58.22	55.82
S.Em+	0.44	0.56	0.58	
CD@ 5%	1.29	1.62	1.70	
	Seed corm size			
S ₁ :1.0-2.5 cm	48.0	50.26	53.86	51.28
S ₂ : 2.5-4.0 cm	49.13	51.60	55.06	52.34
S ₃ :>4.0cm	52.80	55.06	59.06	55.99
S.Em+	0.57	0.72	0.76	
CD@ 5%	1.66	2.09	2.19	
vase solution x seed corm size				
S ₁ F ₀	45.33	50.00	53.00	49.99
S ₁ F ₁	48.33	50.66	55.00	51.66
S ₁ F ₂	48.00	49.66	52.00	50.41
S ₁ F ₃	47.00	49.66	53.66	50.99
S ₁ F ₄	51.33	51.33	55.66	53.41
S ₂ F ₀	47.00	50.33	54.33	51.08
S ₂ F ₁	49.00	52.33	56.3	52.82
S ₂ F ₂	49.00	51.0	54.0	52.25
S ₂ F ₃	48.33	51.0	54.0	50.58
S ₂ F ₄	52.33	53.33	56.66	54.99
S ₃ F ₀	48.33	52.66	56.33	53.25
S ₃ F ₁	52.0	53.33	60.6	55.39
S ₃ F ₂	55.33	57.33	60.0	57.74
S ₃ F ₃	51.33	55.0	56.0	54.49
S ₃ F ₄	57.00	57.0	62.33	59.08
F test	*	*	*	*
S.Em+	1.000	1.259	1.316	1.313
CD@ 5%	2.887	3.635	3.801	3.793

RESULT AND DISCUSSION

The data pertaining to post harvest physiology (uptake of water and vase life) as influenced by bio-fertilizers with recommended dose of fertilizers and solutions sucrose (2%, 3%), 50 ppm GA₃ and water are presented in the tables.

Uptake of water

The uptake of water by the spikes differed significantly due to the influence of bio fertilizers with RDF and vase solutions and their interaction.

The mean maximum water uptake of 58.22g was found in treatment VAM + Azospirillum

Table 2. Vase life (days) as influenced by nutrient levels and seed corm Size of Gladiolus.

Treatments	Vase life (days)			Mean
	Vase solutions			
	Distilled water	Sucrose 2 %	Sucrose 3 %	
F ₀ : RDF kg ha ⁻¹	6.77	8.22	8.55	7.9
F ₁ : VAM + RDF kg ha ⁻¹	8.22	8.55	8.77	8.3
F ₂ : Azospirillum + RDF kg ha ⁻¹	7.66	8.88	9.88	8.93
F ₃ : Azotobactor + RDF kg ha ⁻¹	8.88	9.33	9.88	9.13
F ₄ : VAM + Azospirillum + Azotobactor + RDF kg ha ⁻¹	8.00	10.44	9.66	9.38
S.Em+	0.28	0.32	0.21	
CD@ 5%	0.81	0.93	0.60	
Seed corm size				
S ₁ :1.0-2.5 cm	7.13	7.86	8.13	7.73
S ₂ : 2.5-4.0 cm	8.06	9.00	9.20	8.74
S ₃ : >4.0 cm	8.53	10.40	10.73	9.78
S.Em+	0.36	0.41	0.27	
CD@ 5%	1.05	1.20	0.78	
Interaction				
S ₁ F ₀	6.0	7.0	7.33	6.91
S ₁ F ₁	7.00	8.00	7.33	7.41
S ₁ F ₂	7.33	7.33	9.00	8.08
S ₁ F ₃	8.33	7.33	8.00	7.74
S ₁ F ₄	7.0	9.66	9.00	8.49
S ₂ F ₀	7.0	8.0	8.33	7.99
S ₂ F ₁	9.0	9.00	9.00	8.66
S ₂ F ₂	7.66	8.33	9.66	8.82
S ₂ F ₃	7.33	9.66	10.00	8.83
S ₂ F ₄	7.66	10.00	9.00	8.99
S ₃ F ₀	7.33	9.66	10.0	9.08
S ₃ F ₁	8.66	8.66	10.0	8.83
S ₃ F ₂	8.00	11.00	11.0	9.49
S ₃ F ₃	9.33	11.0	11.66	9.41
S ₃ F ₄	9.33	11.66	11.00	10.66
F test	*	*	*	*
S.Em+	0.632	0.72	0.47	0.580
CD@ 5%	1.82	2.09	1.36	1.676

+Azotobactor +large size + RDF (F₄) which was on par with the treatment F₃ (54.55g). The minimum was recorded in the treatment F₂ (46.88g). The mean water uptake of spikes by the effect of vase solution was maximum in sucrose 3% (58.22g) and was minimum in control +Small size + RDF (46.88g).

Interaction effects of treatments and vase solution significantly influenced the water uptake of the spikes. The maximum water uptake (62.33g) was recorded in the interaction of VAM+Azospirillum+Azotobactor + large size + RDF (F₄) + control + small size + RDF distilled water. (45.33g).

Quality is an important consideration in any crop which ultimately decides the market value of the harvested produce. Quality of spikes and seed corms is important in gladiolus from the point of market value. Among the various quality traits, length of spike, length of rachis and number of florets per spike are discussed in detailed here under, as these decides the quality of cut flower for export and local market.

The vase life of gladiolus spikes was influenced not only by vase solutions, but also the quality of harvested spikes as influenced by treatment combination in field level. The use of vase solution sucrose 2% had significant influence in the uptake and transpirational loss of water and also this was enhanced by the treatment effect. Among the treatments T₁₅ (VAM +Azospirillum +Azotobactor +large size + RDF) reported to be influencing the uptake of water at the maximum (58.22g) followed by T₁₃ (57.33 g), regarding the vase solutions, the spikes kept in sucrose 2% had drawn more water compared to spikes in distilled water. Interaction effects of treatments and vase solutions recorded significant difference in uptake of water. The maximum water uptake (62.33g) was found in the interaction treatments T₅S₃ (VAM +Azospirillum +Azotobactor +large size + RDF + sucrose 3%). This could be attributed to the physiological character of spike which was effected by the treatment and sucrose, which provides the energy needed by the cells continuously.

Vase Life (days)

The data on vase life was found to be significant has influenced by treatments vase solution and their interaction table 32.

The maximum vase life of 10.44 days was recorded in spikes harvested from VAM+Azospirillum +Azotobactor +large size + RDF (F₄) treated plots of sucrose 2% which was on par with sucrose 3% the treatments F₄, F₂ (9.88) respectively days while the minimum was recorded in the control(6.77) days. The spikes kept in sucrose solutions at 2% recorded maximum Vase life of 10.44 days compared to distilled water(days).

Interaction between bio fertilizers with recommended dose of fertilizers and sucrose (2%) solution recorded a maximum vase life of 11.66 days in the interaction of VAM+ Azospirillum +Azotobactor +large size + RDF with sucrose 2%

(F₄) and minimum of 6.0 days in the interaction of Small size + RDF with distilled water.

Spikes harvested from VAM +Azospirillum +Azotobactor +large size + RDF treated plots recorded maximum vase life of 10.44 days and spikes kept in 2% sucrose solution were compared to distilled water (6.77 days) with control (no inoculation) +small size + RDF (T₁). This could be attributed to continuous uptake of after and transpiration which kept the spikes turgid and humid around the plant. The present findings are in line with the results by Wen (1991) who reported 3 days vase life in mycorrhizae treated plants of gerbera. Hemavathy (1997) reported longest vase life (9days) in chrysanthemum plants inoculated with VAM +50 per cent recommended NPK. These life are also in confirmation with the results of Barman *et al.* (1992) AndDe *et al.* (1996). With respect to vase life studies, it is confirmed that pre harvest treatment has certain influence on post-harvest life of gladiolus cut flowers

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Received on 24-08-2015

Accepted on 29-08-2015