Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 8 [12] November 2019 : 52-59

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD
Global Impact Factor 0.876
Universal Impact Factor 0.9804
NAAS Rating 4.95

ORIGINAL ARTICLE **OPEN ACCESS**

Effect of GA_3 and growing media on seedling growth of jamun (*Syzygium cumini* L.)cv. Local

PradipJ. Parmar*, K. M. Karetha,Hemanshi P. Purohit,Subhrajyoti Mishra, and V. L. Purohit
Department of Horticulture, College of Agriculture, Junagadh Agricultural University,
Junagadh-362001, Gujarat, India.
* Corresponding author E-mail: kmkaretha@jau.in

ABSTRACT
The present investigation was conducted at Fruit Research Station, Lalbaug, Department of Horticulture, College of Agriculture, JAU, Junagadh during 2018. The treatments comprised of different concentrations of GA_3 and growing media. The treatment G_4: GA_3 500 ppm had significant influence on different seed germination traits like maximum number of leaves, stem length, stem girth, root length, seedling fresh and dry weight, root: shoot ratio and leaf area. The media M_3had significant influence on different seedling traits like maximum number of leaves, stem length, stem girth, root length, seedling height, fresh and dry weight of shoot, fresh and dry weight of root, root: shoot ratio and leaf area injamun seedlings. Among the interaction effect $G_4M_3$was found to be significantly better in terms of various seedling growth parameters viz., number of leaves, stem length and stem girth. Similarly, maximum seedling height (70.09 cm), fresh weight of shoot (16.26 g), dry weight of shoot (5.04 g), fresh weight of root (6.04 g), dry weight of root (3.05 g), root: shoot dry weight ratio (0.60) and leaf area (13.59 cm^2) were also found significantly in interaction effect of treatment G_4M_3.From the observation, it can be concluded that seedling growth of jamun seedling cv. Local, can be enhanced by the seed treatment with GA_3 @ 500ppmfor 24 hours followed by sowing of the seeds in media consistingof Soil+ Cocopeat+ Vermicompost (1:1:1) alone or in combination.
Keywords: *Jamun, Media, Gibberellic acid,Cocopeat, Vermicompost, FYM.*

Received 17.09.2019 Revised 20.10.2019 Accepted 08.11.2019

INTRODUCTION

Jamun [*Syzygium cumini*L.] is an important indigenous minor fruit, belonging to the family Myrtaceae and grown throughout the tropics and subtropics as an avenue crop. It is also known as Indian blackberry, java plum and black plum. In India, these are mostly found in scattered range from lower Himalaya region having an elevation of 1300 m to Kumaon hills of 1600 m. It is widely grown in various part of India from the Indo-Gangetic plains in the north to Tamil Nadu in the south [5].

It is commonly propagated by seed and has no dormancy period hence fresh seeds are sown immediately after extracting from fruits. Seed can be sown 4-5 cm deep in the nursery. There is occurrence of polyembryony in jamun to the extent of 20-50%, hence nucellar seedling may be utilized to produce true to the type plants. The seeds of jamun took 24-61 days for total germination under Bihar conditions. Studies revealed that seed extraction of jamun after heaping the fruits for a single day was better for getting good quality seeds in comparison to the extraction of seeds immediately after collection [15]. Large sized seeds have higher germination percentage (99-98%) then small sized (89-79%) [13]. Seeds are orthodox in nature and it can't be stored for long time because germination capacity decreases with increasing storage period.

The increase in seedling growth with GA_3 treatments was due to the fact that this hormone increased osmotic uptake of nutrients, causing cell elongation and thus increased height of the plant and stem girth also increased due to greater cell division and elongation[14].Gibberellins (GA_3) activate the embryonic vegetative growth, weakens the endosperm layer that involves in the embryo and restricts its growth and mobilizes the energetic reserves from the endosperm of cereals [3].

Media is one of the factors, which plays an important role in growth and survival of seedlings. Different growing media like soil, cocopeat,Farm Yard Manure (FYM) and vermicompost either alone or in different

proportion have been found beneficial to influence growth of seedlings. A good growing media provides sufficient anchorage or support to the plant, serves as a reservoir for nutrients and water, allows proper oxygen diffusion to the roots and permits gaseous exchange between roots and the atmosphere outside root substrate. Hence the present study was conducted to evaluate the effect of GA_3 and media on seedling growth of jamun cv. Local.

MATERIAL AND METHODS

The experiment was conducted at Fruit Research Station, Lalbaugh, Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat during July to November of 2018. Junagadh is situated at 21.5°N latitude and 70.5°E longitude with an altitude of 60 meters above MSL on the western side at the foot hill of mountain Girnar sierra (Gujarat). Climate is typically subtropical, characterized by fairly cool and dry winter, hot and dry summer and warm and moderately humid monsoon. The rainy season commences by third week of June and ends in September. July and August are the months of heavy precipitation. Winter sets in the month of November and continues till the month of February. December and January are the coldest months of winter. Summer commence in the second fortnight of February and ends in the middle of June. April and May are the hottest months.

The treatments comprised of different concentrations of GA_3 (G_1: Water soaked, G_2:GA_3 300 ppm, G_3: GA_3 400 ppm and G_4: GA_3 500 ppm) and different growing media [M_1: Soil+ Cocopeat+ FYM (1:1:1), M_2: Soil+ Cocopeat+ FYM (2:1:1), M_3: Soil+ Cocopeat+ Vermicompost (1:1:1), M_4: Soil+ Cocopeat+ Vermicompost (2:1:1)]. There were sixteen treatments combination embedded in a Completely Randomized Block Design (factorial) with three repetitions. The details of the treatments applied in the present investigation are as under: T_1: G_1M_1, T_2: G_1M_2, T_3: G_1M_3, T_4: G_1M_4, T_5: G_2M_1, T_6: G_2M_2, T_7: G_2M_3, T_8: G_2M_4, T_9: G_3M_1, T_{10}: G_3M_2, T_{11}: G_3M_3, T_{12}: G_3M_4, T_{13}: G_4M_1, T_{14}: G_4M_2, T_{15}: G_4M_3 and T_{16}: G_4M_4.

Gibberellic acid solution of 300, 400 and 500ppm were separately prepared by dissolving 300, 400 and 500 mg GA_3. (GA_3 was completely dissolved by addition of small quantity of NaOH pellets) in 1 liter of distill water. Seeds were soaked with different concentration of GA_3 for 24 hours and sown 1.2 cm deep in the 9 x 11 cm polythene bags. Whereas, Different growing media were prepared 1st July, 2018 according to proportion of soil, cocopeat, FYM and vermicompost and filled in 9 X 11 cm black polythene bags. A light irrigation was given immediately after dibbling of seeds for proper establishment. Irrigations were given repeatedly depending upon soil moisture status of the plant. Five plants were selected at random from each treatment and tagged for recording the observations. Required observations were recorded from each repetition of different treatments and average value was calculated. The analysis of variance for experimental design was carried out for all the characters under study.

The height from the base of shoot to the tip of the shoot, girth at bottom and number of leaves of five tagged seedlings was measured by metric scale,vernier callipers, manual counting respectivelyat 30, 60, 90, 120 and 150 days after sowing and average value was calculated. The leaf area was measured by leaf area meter with five seedlings per treatment at the 150 days after sowing and average value was calculated. The height of five tagged seedlings was measured by metric scale from the tip of root to the tip of the shoot of the seedling at 150 days after sowing and average value was calculated. The root length of five seedlings was measured by metric scale from the base of shoot to tip of root at the end of experiment and average value was calculated. The fresh weight of five seedling shoots and roots were weighed on digital weighing balance and average value was calculated at the end of experiment. The dry weight of seedling shoots and roots were calculated by drying them up under shed for three days and then oven dried at 60°C till the constant weight. The average value was calculated at the end of experiment. The shoot: root fresh weight ratio and dry weight ratio of five seedlings was calculated by dividing shoot fresh weight by root fresh weight and shoot dry weight by root dry weight respectively at the end of experiment and average value was calculated.

RESULTS AND DISCUSSION

The result of the present investigation revealed that the different concentration of GA_3 growing media and their interaction were significantly affected the seedling growth parameters(presented from Table-1 to 6).

Effect of GA_3 on seedling growth parameters

The results pertaining to seedling growth parameters were significantly influenced by varying GA_3 concentrations. The maximum number of leaves (5.55, 9.00, 10.23, 11.65 and 12.30), stem length of seedling (13.40 cm, 18.15 cm, 22.18 cm, 28.19 cm, and 35.43 cm) and stem girth of seedlings (1.90 mm, 2.09 mm, 2.41 mm, 2.81 mm and 3.31 mm)at 30, 60, 90, 120 and 150 DAS respectively was recorded treatment(G_4).The same treatment also have enhanced effect on root length (11.95 cm), seedling height (67.79 cm), fresh weight of shoot (15.76 g), dry weight of shoot (4.56 g), fresh weight of root (5.53 g), dry

weight of root (2.55 g), root: shoot fresh weight ratio (0.59), root: shoot dry weight ratio (0.55) and maximum leaf area (13.20 cm^2).

The increase in seedling growth parameters might be due to the involvement of GA_3 in the activation of cytological enzymes along with increase in cell wall plasticity and better water absorption. This hormone increased osmotic uptake of nutrients, causing cell elongation and thus increased height of the plant.Stem girth also increased due to greater cell division and elongation [14]. The increase in number of leaves and leaf area might be due to activity of GA_3 at the apical meristem resulting in more synthesis of nucleoprotein responsible for increasing leaf initiation and area. The number of roots, root length and root: shoot ratio increased due to GA_3 treatment might have resulted in increased production of photosynthates and their translocation through phloem to the root zone [16]. The seeds treated with GA_3 might be accelerated the translocation and assimilation of auxins, resulting better root growth and vegetative characters due to overall assimilation and redistribution of materials within plants enhance the growth attributes. Moreover, GA_3 also induced the activity of gluconeogenic enzymes during early stages of seed germination and vigour characteristics that are reflect in terms of increase in root length [7]. These results are in close agreement with [10] in ber. Whereas, increase in fresh and dry weight of stem and leaves were due to the fact that GA_3 improves the rate of photosynthesis and cause greater accumulation of photosynthates in papaya [4].

Effect of media on seedling growth parameters

Regarding different media under study, the medium consisting of M_3*i.e.* Soil+ Coco peat+ Vermicompost @ 1:1:1 was recorded significantly maximum influence on different traits of jamun seedling like maximum number of leaves (5.28, 8.50, 9.44, 10.52 and 11.73), stem length (12.03 cm, 16.79 cm, 20.70 cm, 26.72 cm and 33.73 cm) and stem girth (1.78 mm, 2.05 mm, 2.37 mm, 2.76 mm and 3.26) at 30, 60, 90, 120 and 150 DAS, respectively.

The maximum root length (30.57 cm), seedling height (64.30 cm), maximum fresh weight of shoot (13.32 g), dry weight of shoot (3.85 g), fresh weight of root (4.47 g), dry weight of root (1.83 g), root: shoot fresh weight ratio (0.64), root: shoot dry weight ratio (0.47) and leaf area (13.15 cm^2) were maximum under the same treatment combination of M_3.

The increasing seedling growth parameters might be due to combined application of soil, vermicompost, FYM and cocopeat probably due to the synergistic combination of different media in improving the physical conditions of the growing media and nutritional factors. The conducive effect of media composition on water holding capacity, porosity, soil aeration supplying substantial amount of nutrient specially nitrogen and micronutrients for good seedling growth over soil alone [6]. Increase in number of leaves might be due to corresponding increase in plant height [8]. The beneficial effect of media on number of roots, root length and root: shoot ratio might be due to improved soil structure, porosity, water holding capacity, activity of useful soil micro fauna and flora, maintained soil temperature and improved soil health and nutrient status of media [9]. The findings of this experiment are in close conformity of [1] and [12] in papaya, [2] in phalsa. The leaves of seedling grown in this media (M_3), also has better effect due to presence of nitrogen in vermicompost and cocopeat which might improve the photosynthetic rate and dry matter production. The medium with vermicompost and cocopeat is more suitable than vermicompost alone because of the better physical properties and enhanced nutrient level [11].

Table 1:Effect of different GA_3 levels and growing media on number of leavesof jamun cv. Local

Treatments	30 DAS	60 DAS	90 DAS	120 DAS	150 DAS
Gibberellic acid (G)					
G_1	4.37	7.55	8.41	9.02	10.57
G_2	4.47	7.64	8.78	9.81	10.95
G_3	4.96	8.38	9.02	10.50	11.53
G_4	**5.55**	**9.00**	**10.23**	**11.65**	**12.30**
S.Em.±	0.08	0.10	0.08	0.11	0.08
C.D. at 5%	0.23	0.28	0.23	0.31	0.24
Media (M)					
M_1	4.35	7.72	8.93	10.16	11.11
M_2	4.77	8.15	9.02	10.12	11.20
M_3	**5.28**	**8.50**	**9.44**	**10.52**	**11.73**
M_4	4.95	8.21	9.05	10.19	11.31
S.Em.±	0.08	0.10	0.08	0.11	0.08
C.D. at 5%	0.23	0.28	0.23	0.31	0.24

Interaction					
T_1 : G_1M_1	4.29	7.08	8.29	9.07	10.43
T_2 : G_1M_2	4.34	7.79	8.32	9.15	10.46
T_3 : G_1M_3	4.48	7.86	8.53	9.13	10.68
T_4 : G_1M_4	4.36	7.47	8.50	8.72	10.69
T_5 : G_2M_1	3.78	6.68	8.91	9.42	10.86
T_6 : G_2M_2	4.63	7.80	8.77	9.78	10.95
T_7 : G_2M_3	4.82	8.17	8.78	9.73	11.03
T_8 : G_2M_4	4.65	7.91	8.67	10.31	10.95
T_9 : G_3M_1	4.40	8.23	9.09	10.33	11.34
T_{10} : G_3M_2	4.87	8.27	9.17	10.37	11.49
T_{11}: G_3M_3	5.50	8.56	9.09	10.64	11.63
T_{12} : G_3M_4	5.06	8.46	8.73	10.68	11.68
T_{13} : G_4M_1	4.92	8.87	9.43	11.80	11.80
T_{14} : G_4M_2	5.22	8.74	9.80	11.15	11.92
T_{15} : G_4M_3	**6.33**	**9.41**	**11.35**	**12.58**	**13.58**
T_{16} : G_4M_4	5.73	8.99	10.32	11.06	11.91
S. Em.±	0.16	0.19	0.16	0.21	0.16
C.D. at 5%	0.47	0.55	0.46	0.61	0.47
C.V. %	5.83	4.08	3.04	3.60	2.49

Table 2: Effect of different GA_3 levels and growing media on stem length (cm)of jamun cv. Local

Treatments	30 DAS	60 DAS	90 DAS	120 DAS	150 DAS
Gibberellic acid (G)					
G_1	9.39	14.43	18.34	24.34	31.35
G_2	10.61	15.41	19.29	25.29	32.29
G_3	11.78	16.78	20.74	26.73	33.73
G_4	**13.40**	**18.15**	**22.18**	**28.19**	**35.43**
S.Em.±	0.24	0.21	0.19	0.19	0.22
C.D. at 5%	0.69	0.61	0.55	0.55	0.64
Media (M)					
M_1	10.53	15.52	19.53	25.50	32.75
M_2	11.06	15.82	19.80	25.80	32.80
M_3	**12.03**	**16.79**	**20.70**	**26.72**	**33.73**
M_4	11.56	16.64	20.52	26.52	33.52
S.Em.±	0.24	0.21	0.19	0.19	0.22
C.D. at 5%	0.69	0.61	0.55	0.55	0.64
Interaction					
T_1 : G_1M_1	8.83	13.80	17.82	23.81	30.80
T_2 : G_1M_2	10.17	15.32	18.99	24.99	32.17
T_3 : G_1M_3	9.30	14.33	18.33	24.32	31.26
T_4 : G_1M_4	9.26	14.27	18.24	24.24	31.16
T_5 : G_2M_1	9.76	14.78	18.79	24.78	31.78
T_6 : G_2M_2	9.52	14.39	18.57	24.56	31.51
T_7 : G_2M_3	12.39	16.39	20.05	26.05	33.09
T_8 : G_2M_4	10.76	16.09	19.75	25.75	32.77
T_9 : G_3M_1	11.48	16.48	20.46	26.37	33.38
T_{10} : G_3M_2	11.60	16.62	20.59	26.59	33.64
T_{11}: G_3M_3	12.04	17.04	21.01	27.05	34.02
T_{12} : G_3M_4	11.99	16.99	20.90	26.90	33.88
T_{13} : G_4M_1	12.03	17.03	21.03	27.03	35.04
T_{14} : G_4M_2	12.95	16.95	21.05	27.05	33.88
T_{15} : G_4M_3	**14.39**	**19.39**	**23.42**	**29.45**	**36.54**
T_{16} : G_4M_4	14.24	19.21	23.20	29.20	36.27
S. Em.±	0.48	0.43	0.39	0.38	0.44
C.D. at 5%	1.38	1.22	1.11	1.11	1.28
C.V. %	7.33	4.55	3.31	2.55	2.32

Table 3: Effect of different GA_3 levels and growing media on stem girth (mm)of jamun cv. Local

Treatments	30 DAS	60 DAS	90 DAS	120 DAS	150 DAS
Gibberellic acid (G)					
G_1	1.57	1.89	2.19	2.57	3.07
G_2	1.67	1.93	2.24	2.64	3.14
G_3	1.80	1.95	2.25	2.65	3.15
G_4	**1.88**	**2.09**	**2.41**	**2.81**	**3.31**
S.Em.±	0.0232	0.03	0.0366	0.04	0.04
C.D. at 5%	0.07	0.10	0.11	0.10	0.10
Media (M)					
M_1	1.67	1.89	2.19	2.58	3.08
M_2	1.71	1.91	2.22	2.61	3.11
M_3	**1.78**	**2.05**	**2.37**	**2.76**	**3.26**
M_4	1.77	2.00	2.30	2.71	3.21
S.Em.±	0.02317	0.03	0.03657	0.04	0.04
C.D. at 5%	0.07	0.10	0.11	0.10	0.10
Interaction					
T_1 : G_1M_1	1.43	1.78	2.08	2.44	2.94
T_2 : G_1M_2	1.63	1.89	2.19	2.56	3.06
T_3 : G_1M_3	1.60	1.99	2.29	2.66	3.16
T_4 : G_1M_4	1.62	1.91	2.21	2.61	3.11
T_5 : G_2M_1	1.63	2.01	2.34	2.74	3.24
T_6 : G_2M_2	1.57	1.86	2.16	2.56	3.06
T_7 : G_2M_3	1.71	1.93	2.22	2.62	3.12
T_8 : G_2M_4	1.76	1.92	2.22	2.62	3.12
T_9 : G_3M_1	1.78	1.79	2.08	2.48	2.98
T_{10} : G_3M_2	1.83	2.00	2.31	2.71	3.21
T_{11}: G_3M_3	1.79	2.03	2.33	2.73	3.23
T_{12} : G_3M_4	1.80	1.96	2.26	2.69	3.19
T_{13} : G_4M_1	1.83	1.98	2.27	2.67	3.17
T_{14} : G_4M_2	1.80	1.90	2.19	2.60	3.10
T_{15} : G_4M_3	**2.02**	**2.26**	**2.66**	**3.06**	**3.56**
T_{16} : G_4M_4	1.88	2.22	2.53	2.93	3.43
S. Em.±	0.05	0.07	0.07	0.07	0.07
C.D. at 5%	0.13	0.19	0.21	0.20	0.20
C.V. %	4.64	5.92	5.58	4.55	3.83

Table 4: Effect of different GA_3 levels and growing media on root length, seedling height and leaf area of jamun cv. Local

Treatments	Root length (cm)	Seedling height (cm)	Leaf area (cm^2)
Gibberellic acid (G)			
G_1	27.27	58.62	12.66
G_2	29.19	61.47	12.96
G_3	30.76	64.50	12.79
G_4	**32.35**	**67.79**	**13.20**
S.Em.±	0.21	0.33	0.08
C.D. at 5%	0.60	0.96	0.23
Media (M)			
M_1	29.16	61.92	12.57
M_2	29.36	62.14	12.83
M_3	**30.57**	**64.30**	**13.15**
M_4	30.48	64.01	13.06
S.Em.±	0.21	0.33	0.08
C.D. at 5%	0.60	0.96	0.23
Interaction			

T_1 : G_1M_1	25.79	56.60	12.00
T_2 : G_1M_2	27.40	59.57	12.76
T_3 : G_1M_3	27.70	58.96	12.85
T_4 : G_1M_4	28.17	59.33	13.03
T_5 : G_2M_1	28.76	60.54	13.01
T_6 : G_2M_2	28.50	59.94	12.74
T_7 : G_2M_3	29.90	62.99	13.08
T_8 : G_2M_4	29.61	62.38	13.00
T_9 : G_3M_1	30.38	63.77	12.24
T_{10} : G_3M_2	30.65	64.30	12.81
T_{11}: G_3M_3	31.14	65.16	13.07
T_{12} : G_3M_4	30.88	64.76	13.04
T_{13} : G_4M_1	31.71	66.75	13.03
T_{14} : G_4M_2	30.88	64.75	13.00
T_{15} : G_4M_3	**33.54**	**70.09**	**13.59**
T_{16} : G_4M_4	33.27	69.55	13.18
S. Em.±	0.42	0.66	0.16
C.D. at 5%	NS	1.91	0.47
C.V. %	2.41	2.82	2.17

Table 5: Effect of different GA_3 levels and growing media on fresh weight of shoot, dry weight of shoot, fresh weight of root and dry weight of root of jamun cv. Local

Treatments	Fresh weight of shoot (g)	Dry weight of shoot (g)	fresh weight of root (g)	Dry weight of root (g)
Gibberellic acid (G)				
G_1	10.05	2.78	3.78	0.80
G_2	11.83	3.24	4.24	1.29
G_3	14.16	3.73	4.64	1.68
G_4	**15.76**	**4.56**	**5.53**	**2.55**
S.Em.±	0.11	0.06	0.07	0.02
C.D. at 5%	0.31	0.16	0.19	0.06
Media (M)				
M_1	12.39	3.35	4.31	1.35
M_2	12.80	3.45	4.46	1.47
M_3	**13.32**	**3.85**	**4.77**	**1.83**
M_4	13.28	3.65	4.66	1.67
S.Em.±	0.11	0.06	0.07	0.02
C.D. at 5%	0.31	0.16	0.19	0.06
Interaction				
T_1 : G_1M_1	9.21	2.63	3.62	0.65
T_2 : G_1M_2	9.89	2.65	3.66	0.69
T_3 : G_1M_3	10.29	3.14	4.14	1.15
T_4 : G_1M_4	10.81	2.69	3.69	0.70
T_5 : G_2M_1	11.56	3.21	4.21	1.22
T_6 : G_2M_2	11.96	3.26	4.26	1.27
T_7 : G_2M_3	11.96	3.16	4.17	1.36
T_8 : G_2M_4	11.85	3.32	4.33	1.31
T_9 : G_3M_1	13.32	3.50	4.45	1.54
T_{10} : G_3M_2	13.92	3.70	4.70	1.71
T_{11}: G_3M_3	14.76	4.05	4.72	1.74
T_{12} : G_3M_4	14.61	3.69	4.69	1.73
T_{13} : G_4M_1	15.47	4.07	4.97	1.99
T_{14} : G_4M_2	15.44	4.21	5.21	2.22
T_{15} : G_4M_3	**16.26**	**5.04**	**6.04**	**3.05**
T_{16} : G_4M_4	15.85	4.91	5.91	2.94
S. Em.±	0.21	0.11	0.13	0.04
C.D. at 5%	0.61	0.32	0.38	0.12
C.V. %	2.85	5.40	4.99	4.67

Table 6: Effect of different GA_3 levels and growing media on Root: shoot fresh weight ratio and Root: shoot dry weight ratio of jamun cv. Local

Treatments	Root: shoot fresh weight ratio	Root: shoot dry weight ratio
Gibberellic acid (G)		
G_1	0.31	0.28
G_2	0.35	0.40
G_3	0.34	0.46
G_4	**0.38**	**0.55**
S.Em.±	0.01	0.005
C.D. at 5%	0.02	0.01
Media (M)		
M_1	0.33	0.39
M_2	0.34	0.41
M_3	**0.36**	**0.47**
M_4	0.35	0.43
S. Em.±	0.01	0.005
C.D. at 5%	0.02	0.01
Interaction		
T_1: G_1M_1	0.28	0.25
T_2 : G_1M_2	0.31	0.26
T_3 : G_1M_3	0.32	0.37
T_4 : G_1M_4	0.32	0.26
T_5 : G_2M_1	0.33	0.38
T_6 : G_2M_2	0.35	0.39
T_7 : G_2M_3	0.36	0.41
T_8 : G_2M_4	0.36	0.41
T_9 : G_3M_1	0.34	0.44
T_{10} : G_3M_2	0.35	0.46
T_{11}: G_3M_3	0.35	0.49
T_{12} : G_3M_4	0.33	0.47
T_{13} : G_4M_1	0.37	0.49
T_{14} : G_4M_2	0.34	0.53
T_{15} : G_4M_3	**0.41**	**0.60**
T_{16} : G_4M_4	0.39	0.57
S. Em.±	0.01	0.01
C.D. at 5%	NS	0.03
C.V. %	5.49	4.04

Interaction effect of GA_3 and media on seed germination parameters

The interaction effect between GA_3 concentrations and different media on seedling growth parameters was found to be significant. Among the different combinations of GA_3concentrations and media,G_4M_3[GA_3 @ 500ppm with Soil+ Cocopeat+ Vermicompost (1:1:1)] recorded maximum number of leaves (6.33, 9.41, 11.35, 12.58 and 13.58), stem length (14.39 cm, 19.39 cm, 23.42 cm, 29.47 cm and 36.54 cm) and stem girth (2.02 mm, 2.26 mm, 2.66 mm, 3.06 mm and 3.56 mm)at 30, 60, 90, 120 and 150 DAS respectively. The same combination also provided maximum seedling height (70.09 cm), fresh weight of shoot (16.26 g), dry weight of shoot (5.04 g), fresh weight of root (6.04 g), dry weight of root (3.05 g), root: shoot dry weight ratio (0.60) and leaf area (13.59 cm^2).

CONCLUSION

In the light of the results obtained from this investigation, it can be concluded that seed soaking with GA_3 @ 500 ppm for 24 hours, then after seeds sown in media consisting of Soil+ Cocopeat+ Vermicompost at the rate of 1:1:1 were found to be superior in terms of seedling growth of jamun seedling cv. Local.

REFERENCES

1. Anjanawe, S. R.; Kanpure, R. N.; Kachouli, B. K. and Mandloi, D. S. (2013).Effect of plant growth regulators and growth media on seed germination and growth vigour of papaya.*Annals of Plant and Soil Res*earch;**15**(1): 31-34.

2. Baghel, B. S.; Yadav, R.; Tiwari, R. and Gupta, N. (2004).Response of phalsa (*Grewiasu binaequalis*DC.) cuttings to biofertilizers and rooting media. *Indian JournalHorticulture*;**61**(1): 89-91.
3. Bewley, J. D. (1997). Seed Germination and Dormancy. *Plant Cell*;**9**: 1055- 1066.
4. Chacko E.K. and Singh R.N. (1991).The effect of gibberellic acid on the germination of papaya seeds and subsequent seedling growth. *Tropical Agriculture Trinidad*;**43**(4): 341-346.
5. Chaturvedi, M. D. (1956). Jamun is another of our prized trees. *Indian Farming*,**5**: 9- 17.
6. Chopade, N.; Patil, B. N.; Pagar P. C. and Gawande, R. (1999). Effect of different pot mixtures on germination and growth of custard apple (*Annona squamosa*L.). *Journals of Soils and Crops*;**9**(1): 69-71.
7. Gillard, D. F. and Walton, D. C. (1973).Germination of *Phaseolus vulgaris* IV.Patterns of protein synthesis in excised axes.*Plant Physiology*;**51**: 1147-1149.
8. Govind, S and Chandra, R. (1993).Standardization of suitable potting media for raising seedling of Khasi Mandarin. *Indian Journalof Horticulture*;**50**(3): 224-227.
9. Hartmann, H. T. and Kester, E. (1997).Plant propagation principles and practices.*Prentice Hall of India Private Limited*,New Delhi- 110 001 p. 58.
10. Krishanan and kulasekaran (1984).Studies on seed germination and seedling growth of ber (*Zizyphu smauritiana*).*Annals of Pant Soil Research*;**11**(2): 140-142.
11. Kumar, A. and Arora, R. L. (2007).Rapid *in vitro* multiplication of early maturing peaches and there *in vivo* acclimatization. *Indian JournalHorticultre*;**64**(3): 258-262.
12. Kumawat, R.; Maji, S.; Govind, S. and Meena, D. C. (2013).Studies on seed germination and seedling growth of papaya (*Carica papaya* L.)cv. Coorg Honey Dew as influenced by media and chemicals.*Journal of Crop and Weed*;**10**(2): 281-286.
13. Sasthri, G.; Srimathi, P. and Malarkadi, K. (2001).Effect of seed size on seed quality in jamun [*Syzygium cumini* (L.)Skeels].*Madras Agricultural Journal*;**88**(7-9): 6-524.
14. Sen, S. K.; Hore, I.K. and Bandhopadhyay,A. (1990).Pre-sowing seed treatment and it's role in germination, seedlings growth and longevity of papaya.*Orissa Journal of Agricultural Research*;**2**(4): 160-164.
15. Srimathi, P.; Ramanadene, T.; Malarkodi, K. and Natrajan K. (2003).Seed extraction in jamun [*Syzygium cumini* (L.)Skeels].*Progressive Horticulture*;**35**(2):3-221.
16. Vachhani, K. B.; Gohil, J. H.; Pandey, R. and Ray, N. R. (2014). Influence of chemicals, PGRs and cow dung slurry as seed treatment on germiability, growth and development of khirnee (*Manilkara hexandra* Roxb) under net house condition. *Trends in Bioscience*;**7**(14): 1641-1643.

CITATION OF THIS ARTICLE

P J. Parmar, K. M. Karetha, H P. Purohit, S Mishra, and V. L. Purohit .Effect of GA_3 and growing media on seedling growth of jamun (*Syzygium cumini* L.)cv. Local. Bull. Env. Pharmacol. Life Sci., Vol 8 [12] November 2019: 52-59