Effect of Growth Regulators and Growing Media on Seed Germination of Ber (Ziziphusmauritiana)

ABSTRACT

The present investigation was carried out at Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad, during the period 2023. The experiment was laid in completely randomized block design with 11 treatments and was replicated three times. Berc.v. Gola Ber were collected from Department of Horticulture, Sam Higginbottom University of Agriculture Technology and Science, Praygaraj. Seeds were Germinate in polybags .Seeds were soaked for 12 hours in both Ga3. The treatment T10 Soil + FYM + VC + PM (1:1:1:1) + GA3 @150ppm (Seed soaked for 12 hours) registered significantly maximum vegetative growth, Germination Percenatge % Stem diameter (mm). On the basis of our experimental finding it can be concluded that the best result was found in treatment T11 Soil + FYM +VC + PM (1:1:1:1) + IBA @50 ppm (Seed soaked for 12 hours) in term of vegetative growth parameters viz., plant height (cm), Number of leaves per plant Survival Percenatge %, leaf area (cm2) and , chlorophyll content of Ber (Ziziphusmauritiana) c.v. Gola ber.

Key words:-FYM, Vermicompost, Soaked, GA3, IBA and Be

INTRODUCTION

The Indian Ber (ZizyphusmauritianaLamk.) belong to family RhamnaceaeandgenusZiziphus which includes about fifty species, and among those, 18 -20 species arenative to India (**Pareek et al., 1983)**. It is tetraploid in nature with a chromosome number 2n=4x=48. Origin place of fruit ber is believed to be India to South - Western Asia. Ber is avery famous ancient fruit crop of India and China. It is also called as Chinese date or Chinese fig orplum[20-22].

It is considered as religious fruit of India, grown at various religious places of Hindus ,Muslims and Sikhs .Ber is considered to be favorite fruit of Hindu Lord Shankar , whose devotion is believed to be unacceptable without offering him ber fruits especiallyduring festival of MahaShivratri.

The use of this fruit is found in several Puranas, Vedasand other ancient literatures of India. In India, ber is cultivated in various part of countryparticularly in arid and semi-arid regions

comprising of 53,000 ha area, producing 5.70 lakh MT of fruits (National Horticulture Board, 2021-22).

The major ber growing regions are Punjab , Haryana ,Uttar Pradesh , Rajasthan Gujarat , Maharashtra , Andhra Pradesh , Bihar , Madhya Pradesh , Tamil nadu and Assam where as in Uttar Pradesh beror chards are found around Varanasi, Ayodhya, Agra and Raibareilly districts but it is an ideal fruit for cultivation in the dryland semi-arid zones of Northern India(Bal et al.,1982).

MATERIAL AND METHODS

Experimental Setup: - The experiment was conducted at the Horticulture Research Farm, Department ofHorticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture,Technology & Sciences, located in

Prayagraj (UP), from 2022 to 2023.

Prayag raj, located at an elevation of 78 meters above sea level (25.87° N latitude and 81.150° E longitude), experiences a subtropical climate with notable temperature fluctuations. Winters can be chilly, with temperatures dropping to 20°C in December and January, while summers are scorching, with temperatures soaring to 50°C in May and June. Frost occurs in winter, and hot, dry winds are common in summer. The region receives an average rainfall of approximately 1013.4 cm, with the heaviest rainfall typically occurring from July to September, supplemented by occasional winter.

Running Status-

Germination percent (%)

Germination percent was calculated as the number of seeds sown and the number of seeds.

RESULTS AND DISCUSSIONS

The result of the in investigation based on the various observations viz., sapling length (cm),Numberofleavesperplant,stemdiameter(cm),leafarea(cm^2)and,chlorophyllcontentandsurvivality%arepresentedanddiscussedinthischapterunderappropriateheadingsandsubheadings.Thedatagiveninthetablearethemeanvaluesandhavebeenstatisticallyanalysed.

Table 1Effectofseedtreatmentongermination (%)ofber

Treatments	Germination percent(%)
T_0-CONTROL	58
T_1-Soil+vermicompost(1:1)	91
T_2-Soil+vermicompost(1:1)+seedsoakingwithGA3@150ppm	91
T_3-Soil+vermicompost(1:1)+seedsoakingwithIBA@50ppm	96
T_4-Soil+Poultrymanure(1:1)	92
T_5-Soil+Poultrymanure(1:1)+seedsoakingwithGA3@150ppm	92
T_6-Soil+Poultrymanure(1:1)+seedsoakingwithIBA@50ppm	90
T_7-Soil+FYM(1:1)	87
T_8-Soil+FYM(1:1)+seedsoakingwithGA3@150ppm	91
T_9-Soil+FYM(1:1)+seedsoakingwithIBA@50ppm	92
T_{10}-Soil+FYM+VC+PM(1:1:1:1)+GA3@150ppm	92
T_{11}-Soil+FYM+VC+PM(1:1:1:1)+IBA@50ppm	90
F-Test	**50.095**
SE.d(±)	**1.962**
C.V.	**2.716**
C.D.at5%	**4.096**

This Data of leaf area (cm^2)influenced by seed treatment are presented in table 1. Germinationpercent(%)recordedat90DATshowedsignificantvariationamongthetreatment. Statisticalanalysisat90DATrevealedahighestGermination percent(%)of (96%)wasfoundintreatmentT3Soil+VC(1:1)+IBA@50ppm,whichwasonparwithT10Soil+FYM+ VC + PM(1:1:1:1) + GA3@150ppm and differed significantly fromother treatments. It wasfollowedby T9Soil +FYM(1:1)+ seedsoakingwith IBA@50ppm 92 ,T8 Soil +FYM(1:1)+seedsoakingwithGA3@150ppm91.Whereastheminimumleafarea(58)wasfoundi ntreatment T_0 Control. The increase in girth might be due to optimum supply of plants

nutrients
andgrowthhormonesinrightamountduringtheentirecropperiodcausedvigorouslyinducingtheve getativedevelopmentoftheplantsandultimatelymorephotosynthesis.

Increase in germination percentage is might be due to GA_3 which acts on the embryo and causes synthesis of hydrolysing enzymes particularly amylase and protease and this hydrolysed food is utilized for growth of embryo and thereby enhanced the germination **(Paleg, 1965).** Similar results were also obtained by **Deb *et al.* (2010)** in papaya. It might be due to the media containing organic manures possess organic acid within them. Therefore, more available moisture and some acids may have helped in better germination percentage **(Bisla*et al.* 1984).** These results were in close agreement with **Mandal *et al.* (2015)** and **Ramteke*et al.* (2015)** in papaya when they used cocopeat as ingredients of growing media.

(2)EffectofSeedTreatmentonSurvivalpercent(%)ofber

The dataobtainedon survival percent (%)in berafterapplication seedtreatmentillustratedintable2.Statisticalanalysisoftheresultsindicatedthatthesurviva l(%)inberdifferedsignificantly. The treatment T11 Soil + FYM + VC + PM (1:1:1:1) + IBA @ 50 ppm registeredsignificantly maximum survival percent (92.00). It was followed by T10 Soil + FYM+ VC + PM(1:1:1:1)+GA3@150ppm 85.00andT2Soil +vermin compost (1:1)+ seedsoakingwith GA3@150 ppm.Where as, the minimum survival percent (61.33) was foundin treatment T7 Soil + FYM(1:1).

It might be due to soil and cocopeat is improved soil texture, structure, porosity, water holding capacity, activity of useful soil micro fauna and flora, maintained soil temperature and improved soil health and nutrient status of medium **(Hartmann and Kester, 1997).** Similar results were also obtained by **Bhardwaj (2014)** and **Ramteke*et al.* (2015)** in papaya.

Table 2: EffectofSeedTreatmentonSurvivalpercent (%)ofber

Treatments	Survivalpercentage
T_0-CONTROL	52.66
T_1-Soil+vermicompost(1:1)	66.52
T_2-Soil+vermicompost(1:1)+seedsoakingwithGA3@150ppm	76.67
T_3-Soil+vermicompost(1:1)+seedsoakingwithIBA@50ppm	72.78
T_4-Soil+Poultrymanure(1:1)	65.67
T_5-Soil+Poultrymanure(1:1)+seedsoakingwithGA3@150ppm	74.33
T_6-Soil+Poultrymanure(1:1)+seedsoakingwithIBA@50ppm	65.67
T_7-Soil+FYM(1:1)	61.33
T_8-Soil+FYM(1:1)+seedsoakingwithGA3@150ppm	66.33
T_9-Soil+FYM(1:1)+seedsoakingwithIBA@50ppm	64.58
T_{10}-Soil+FYM+VC+PM(1:1:1:1)+GA3@150ppm	85.00
T_{11}-Soil+FYM+VC+PM(1:1:1:1)+IBA@50ppm	92.00

F-Test	100.262
SE.d(±)	1.503
C.V.	2.620
C.D.at5%	3.138

EffectofSeedtreatment onNumber ofleavesofBer

Data of number of number of leaves influenced by application of GA3 and IBA are presented intable3Observationonnumberofleavesrecordedat90DATshowedsignificantvariationamongth etreatment.

Statistical analysis at 90 DAT revealed a highest number of leavesof (9.85) was found intreatmentT11Soil+FYM+VC+PM(1:1:1:1)+IBA@50ppm,whichwasonparwithT10Soil+F YM+VC+PM(1:1:1:1)+GA3@150ppmanddifferedsignificantlyfromothertreatments.Itwasfol lowedbyT5Soil+Poultrymanure(1:1)+seedsoakingwithGA3@150ppm,T9 Soil+FYM(1:1) + seed soaking with IBA@50ppm8.85.Where astheminimumleafarea(6.48)wasfoundintreatmentT_0Control.Theincreaseingirthmightbeduet ooptimumsupplyofplantsnutrientsandgrowthhormonesinrightamountduringtheentirecropperi odcausedvigorouslyinducingthevegetativedevelopmentoftheplantsandultimatelymorephotos ynthesis.

It might be due to the cocopeat provides adequate nutrients and enhances both the physical and biological properties and the water holding capacity of soil **(Soegiman, 1982).** These results were also in conformity with the finding of **Kumawat*et al.* (2014)** in papaya when theyused cocopeat as ingredients of growing media.

Table 3. EffectofSeedtreatmentonNumber ofleavesofBer

Treatments	No.ofleaves
T_0-CONTROL	6.48
T_1-Soil+vermicompost(1:1)	7.83
T_2-Soil+vermicompost(1:1)+seedsoakingwithGA3@150ppm	8.58
T_3-Soil+vermicompost(1:1)+seedsoakingwithIBA@50ppm	8.22
T_4-Soil+Poultrymanure(1:1)	8.64
T_5-Soil+Poultrymanure(1:1)+seedsoakingwithGA3@150ppm	8.85
T_6-Soil+Poultrymanure(1:1)+seedsoakingwithIBA@50ppm	8.52
T_7-Soil+FYM(1:1)	7.96

T_8-Soil+FYM(1:1)+seedsoakingwithGA3@150ppm	8.28
T_9-Soil+FYM(1:1)+seedsoakingwithIBA@50ppm	7.53
T_{10}-Soil+FYM+VC+PM(1:1:1:1)+GA3@150ppm	9.47
T_{11}-Soil+FYM+VC+PM(1:1:1:1)+IBA@50ppm	9.85
F-Test	43.192
SE.d(±)	**0.190**
C.V.	**2.780**
C.D.at5%	**0.396**

Table 4EffectofSeedtreatmentonleafarea(cm^2)ofBer

Treatments	**Leafarea**
T_0-CONTROL	2.89
T_1-Soil+vermicompost(1:1)	3.36
T_2-Soil+vermicompost(1:1)+seedsoakingwithGA3@150ppm	3.72
T_3-Soil+vermicompost(1:1)+seedsoakingwithIBA@50ppm	3.49
T_4-Soil+Poultrymanure(1:1)	3.35
T_5-Soil+Poultrymanure(1:1)+seedsoakingwithGA3@150ppm	3.80
T_6-Soil+Poultrymanure(1:1)+seedsoakingwithIBA@50ppm	3.62
T_7-Soil+FYM(1:1)	3.69
T_8-Soil+FYM(1:1)+seedsoakingwithGA3@150ppm	3.82
T_9-Soil+FYM(1:1)+seedsoakingwithIBA@50ppm	3.85
T_{10}-Soil+FYM+VC+PM(1:1:1:1)+GA3@150ppm	4.00
T_{11}-Soil+FYM+VC+PM(1:1:1:1)+IBA@50ppm	4.04
F-Test	47.35
SE.d(±)	0.066
C.V.	2.236
C.D.at5%	0.139

Dataofleafarea(cm^2)influencedbyapplicationofGA3andIBArepresentedintable4 .Observationonleafarea(cm^2)recordedat90DATshowedsignificantvariationamongthetreatment.Statisticalanalysisat90DATrevealedahighestleafarea(cm^2)of(4.04)wasfound intreatmentT11Soil+FYM+VC+PM(1:1:1:1)+IBA@50ppm,whichwasonparwithT10 Soil+FYM+VC+PM(1:1:1:1)+GA3@150ppmanddifferedsignificantlyfromothertreatments.ItwasfollowedbyT9Soil +FYM(1:1)+seedsoakingwith IBA@50ppm 3.85,T8Soil +FYM(1:1)+seedsoakingwithGA3@150ppm3.82.Whereastheminimumleafarea(cm^2)(2.89)wasfoundintreatmentT_0Control.Theincreaseingirthmightbeduetooptimumsupplyofplantsnutrientsandgrowthhormonesinrightamountduringtheentirecropperiodcausedvigorouslyinducing the vegetative development of the plants and ultimately more photosynthesis.

This might be due to combination of this media provided better condition like aeration and porosity for proper growth and development of seedlings leads to increase number of leaves. These results were in close agreement with **Ramteke*et al.* (2015)** in papaya when they used cocopeat as ingredients of growing media.

CONCLUSION

OnthebasisofourexperimentalfindingitcanbeconcludedthatthebestresultwasfoundintreatmentT11Soil+FYM+VC+PM(1:1:1:1)+IBA@50ppmintermofvegetativegrowthparametersviz .,saplinglength (cm), Numberof leaves per plant , leaf area(cm^2), shoot length , root lengthand root toshootratiofollowedbyT10intermesofstemdiameter(cm)andchlorophyllcontent(mg)ofber(*Ziziphusmauritana*L.)cv.Golaber.

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