“Pre-SowingSeedTreatmentsWithSelectedOrganicsonGrowth,YieldandYieldAttributingTraitsinChickpea~~(*CicerarietinumL.)*~~varDesiHimmat”

ABSTRACT

The present study entitled, **“Pre-Sowing Seed Treatments With Suitable Organics onGrowth,Yield,Yield attributing Traits in Chickpea (*Cicer arietinum* L.) var Desi Himmat”**was carried outwith Panchagavya,Neem Leaf Extract,Vermiwash,Tulsi Leaf Extracts ofvarying concentrates at the duration of 12hrs. ~~with T~~an objective to asses~~s~~s the ~~effect of thesetreatmentsonChickpeaandto~~se treatments' effects on Chickpea and findtheoptimalpre-sowingtreatment.Theresultsdepictedthatseed treatment showed significant variation for all the ~~characters that were recorded andperformed well on comparision~~recorded characters and performed well compared to the untreated control.Seed treatment with T_2-Panchagavyaat10%for12hrs.recordedfieldemergenceof92.33%andplantheightatmaturity71.33 cms,days to 50% flowering is 63.67 days,and days to 50% pod setting 71.67 days,days tomaturity is 106.33 days,32.99 pods per plant,1.91 seeds per pod,14.33gm seed yield perplant,23.66gm of 100 seed weight,35.80gm of biological yield per plant and 39.11% of harvestindex.At par treatment, T_4-Vermiwash at 8% for 12 hrs. performed well with 13.66gm seedyield per plant, and ~~36.52% harvest index was found to be~~the 36.52% harvest index was promising.Thus ~~treating with~~, treating T_2.Panchagavya at 10% for 12 hrs. was so productive and can be suggested for cultivation ~~for~~ona commercialscale.

***Keywords:*Panchagavya,Vermiwash,NeemLeafExtract,TulsiLeafExtract**

1. INTRODUCTION

Chickpeawiththechromosomenumber(2n= 2x=16)and~~being~~isthethirdmostfrequently cultivated legume crop afterdrybean (*Phaseolus vulgaris* L.) and Field pea(*Pisum sativum* L.).Chickpea is the mostsignificant self-pollinated pulse crop for theRabi season (Akansha et al., 2018). It isdivided into Desi and Kabuli chickpeas andhas Eastern Turkey as its main region oforigin.However,thedesiformismorepreva lentandmakesuproughly80-85percentofglobalproduction,while~~kabuli~~ Kabuli type makes up about 15-20 percent(Dhima*etal.*,2018).Chickpeasupplie d49.3%ofallpulsesproducedin2020-21,withtheremainderpulsesreceivingcontri butionsfrompigeonpea(16.2%),mungbean(10.3%), urdbean(9.3%),l entil(4.9%)andotherpulses9.9%.~~Therichest source of protein for both humansand livestock in underdeveloped areas islegume~~Legumes are the richest source of protein for humans and livestock in underdeveloped areas.In addition,they are employed asgreenmanuresand~~green~~feedforlivestock. Theyaremostlyusedtofixatmosphericnitrog entoenhance~~thechemical and physical characteristics of soil~~soil's chemical and physical characteristics(Mannivan*etal.*,2019).Inaddi tiontoincreasingsoilfertility,certainlegumes ~~have the capacity to~~can~~solobilize~~ solubilize phosphatethat would otherwise be inaccessible byexcreting organic acids from their roots ~~inadditionto~~andimprovingsoilfertility(*Rayet*

al.,2017).Whengrowninarotationwithnon-legumionouscrops,legumes alsoaidinrecoveryofsoilorganicmatterandthereduction ofpest and disease issues(Devi*etal*.,2019).Temperaturesbetween24ºCto30ºC,alongwithappropriatemoisturelevels,areidealforchickpeacropgrowth.Itiswintercropthatdoeswellinbothrainfedandirrigatedenvironments.Itisfrequentlygrown inheavysoiltypesbecause itstotoleratecoldclimates,andtheappropriatepHrangeof5.5to7.0forgreatergrowthandyield(Farijan*etal*.,2018).Chickpeasare rich in dietary fibre, particularlyraffinose,asolublefibre.Accordingto(Munirathnam*etal*.,2015),theplantsseedisprimarilyediblecomponentandrichestsource of protein (23.3-28.9%), carbs(61.5%), lipids (4.5%) andminerals(phosphorous,calcium,magnesium,iron,zinc).Legumesarebeneficial asfoodnotonlyforhumans butalsoforcattle because oftheirhighproteincontent.Despite~~thehighyieldingpotentialandseveralbenefitsofchickpea~~chickpeas' high yielding potential and several benefits,Indiahasalow~~yieldperunitareaoftheccrop~~crop yield per unit area.From2000-01to2018-19,India'schickpeaoutputclimbedfrom 38.55 to122.29 lakh tonnes,while the acreageincreasedfrom53.85to122.29lakhha,andtheyieldincreasedconsistentlyfrom 744kg/ha to1077kg/ha (Pooniya*et al*.,2019).Overthepastthreedecades,thearea and production of chickpeas have steadilydecreasedinUttar Pradesh.Theproduction

has reduced from 12.50 lakh tonnes eventhough the area has decreased from 17.26lakhhain1975-76to7.40lakhhain2005-06.~~The productivity,however,~~However, productivity has increasedfrom724to 893kg/ha.

2. MATERIALS ANDMETHODS

The experiment was conducted at the SeedTesting Laboratory of the Department ofGeneticsandPlantBreeding,NainiAgricul turalInstitute,SamHigginbottomUniversity of Agricultural Technology andSciences.Prayagraj(U.P.)2022.TheChic kpeavarDesiHimmatseedsweretreatedwith organicstoevaluategrowth,yield and yield attributing traits.Theseedsaresubjectedtodifferentsoaki ngconcentrations ~~over a period of~~for 12hours.The seeds are treated organically with T1-Panchagavya8%,T2-Panchagavya10%, T3-Panchagavya15%,T4-Vermiwash8%, T5-Vermiwsh 10%, T6-Vermiwash 15%,T7-NeemLeafExtract5%,T-8NeemLeafExtract 10%, T9-Neem Leaf Extract 15%,T10-TulsiLeafExtract5%,T11-TulsiLeafExtract 10%, T12-Tulsi Leaf Extract 15%for12hoursrespectively.The Experimentwas laid out in RBD,with 13 treatments withthreereplications.~~Int~~In theperiodfromgermination to harvest, growth parameterswererecordedatfrequentintervals andafterharvestyieldparameterswererecorde d,~~includes~~includingFieldEmergence,Plant

height,Daysto50%Flowering,Daysto50% pod setting,Days to Maturity,No.ofpods per plant,No.of seeds per pod,Seedyield per plant,Seed Index,Biological yieldper plant, and Harvest Index were recorded andstatisticallyanalysedusingANOVAasa pplicableto RBD.

METHODOLOGY

ForthepreparationofsolutionofPanchagavy aandVermiwash toprepare8% solution take 80ml of each solutions inasaperateseparatebeakereachandtheywe readdedin 1000ml. of distilled water with constantstirring.Then the volume of solution willfinallyconstitutetosolution volume will finally constituteonelitre,anditbecamebecominga n 8%stocksolutionofPanchagavyaandVermi wash.

For the preparation ofTo prepare plant leaf extract,thefreshleavesofconcernedplantsw erecollectedsaperatelyseparatelyanddried undershade.Thedriedleaveswerepowdered usinga motorandpistil.Toprepare a 5%solution,5gofleaafextractpowderwasad dedontoo100mldistilledwater,and concerne dleafextractsolutionswereprepared.The leaf extracts were filtered byusingmuslincloth toremoveunwantedmaterialandplantdebris .

After the preparation of solutions,chickpeaseeds were soaked in respective solutionsfor12hrsat25ºCtemperature.Untre atedseedsiscalledControl.After12hrsof

soaking the solutions were drained ~~out fromthebeakerandpre-soakedairdriedto~~from the beaker and pre-soaked air dried to theoriginal weight.After seed treatment, seedsweresowninthe fieldforfieldobservations.

3. RESULTS AND DISCUSSION3.1.GROWTHA TTRIBUTES

(i).FIELDEMERGENCE

ThemeanperformanceofFieldEmergence (%) ranged from 83.33 to 92.33,witha grandmeanof88.18.~~In~~Table1indicates that maximum field emergence(92.33%)was recorded in T2-Panchagavyaat 10% for 12hrs. and least in T0-Control(83.33%).Alltreatmentswerefounds ignificantlyincomparis~~i~~ontothe control.Amongthesignificanttreatments,Tr eatmentT12-Panchagavyaat10%for12hrs.washigherinc omparis~~i~~ontocontrolaswellasothertreatmen ts.

(ii)~~.~~PLANTHEIGHT

ThemeanperformanceofPlantheight (cms)~~was~~ranged from62.34 to 71.33witha grandmeanof67.21.Maximumplant height was recorded (71.33 cms) inT2-Panchagavya at 10% for 12hrs. and least(62.34cms)inT0-Control.Alltre~~a~~atments

were found significantly in ~~comprision~~ comparison to the control. Among these treatments, T2-Panchagavya at 10% for 12hrs. was found significantly higher in comparis~~i~~on to control and other treatments.

(iii). DAYS TO 50% FLOWERING

The mean performance of Days to 50% flowering ~~was~~ ranged from 63.67 to 70.33 with a grand mean of 66.13. Among the treatments, T2-Panchagavya at 10% for 12hrs. was lowest (66.13 days) and highest was found in T0-Control (70.33 days). Among the significant treatments, Treatment T2-Panchagavya at 10% for 12hrs. was significantly lower as compared to control and other treatments.

(iv). DAYS TO 50% PODSETTING

The mean performance of Days to 50% podsetting was ranged from 71.67 to 78.33 with grand mean ranged from 73.79. Among these treatments T2-Panchagavya at 10% for 12hrs. was lowest (71.67 days) and highest found in T0-Control (78.33 days). Among the significant treatments, Treatments T2-Panchagavya at 10% for 12hrs. was significantly lower as compared to control and other treatments.

Table1.

Meanperformanceeffectofseedtreatmentsongrowth,yieldandyieldattributingtraitsinchickpea

Treatments	Field Emergence	Plant Height	Daysto50% Flowering	Daysto50% PodSetting	Days to Maturity
T_0	83.33	62.34	70.33	78.33	111.33
T_1	86.33	67.33	66.67	75.00	108.00
T_2	92.33	71.33	63.67	71.67	106.33
T_3	89.33	63.67	69.33	74.67	108.33
T_4	91.33	70.33	64.67	72.00	107.33
T_5	86.67	68.00	69.00	75.33	111.00
T_6	88.33	64.66	67.33	73.33	110.33
T_7	89.67	65.67	64.33	76.67	109.67
T_8	86.67	68.67	64.67	74.00	107.67
T_9	86.33	69.67	64.33	74.67	107.67
T_{10}	87.67	66.67	66.00	72.67	109.33
T_{11}	89.67	67.67	65.33	73.33	108.33
T_{12}	90.33	68.33	64.67	73.67	108.67
Grand Mean	88.30	67.25	66.17	74.25	108.76
F-Test	**S**	**S**	**S**	**S**	**S**
S.Em	0.53	0.97	0.88	0.89	0.92
S.Ed	0.76	1.27	1.24	1.25	1.25
C.V	1.08	2.50	2.64	2.09	1.47
T.value	2.06	2.06	2.06	2.06	2.06
C.D.at5%	1.56	2.83	3.17	2.59	2.69

Table 2 : Mean performance effect of seed yield and biological yield in chickpea

Treatments	No.of Pods per Plant	No.of Seeds per Pod	Seed Yield per Plant(g)	SeedIndex(g)	BiologicalYield(g/plant)	HarvestIndex(%)
T_0	25.67	1.55	7.33	20.33	22.67	31.82
T_1	28.67	1.22	9.67	21.33	29.67	30.33
T_2	32.99	1.91	14.33	23.66	35.80	39.11
T_3	27..66	1.40	7.33	20.34	22.07	33.23
T_4	32.00	1.78	13.67	23.34	35.60	36.52
T_5	30.33	1.29	11.67	22.00	30.93	36.64
T_6	28.67	1.53	7.67	20.67	22.27	34.44
T_7	28.33	1.67	8.33	22.67	22.60	35.41
T_8	30.67	1.28	12.33	22.67	33.47	35.86
T_9	28.33	1.32	12.67	21.33	33.60	37.71
T_{10}	29.34	1.35	9.33	21.67	24.80	36.29
T_{11}	29.67	1.62	10.33	22.33	30.40	32.91
T_{12}	29.67	1.77	11.67	21.33	28.74	36.29
Grand Mean	29.52	1.51	10.48	21.82	28.66	35.12
F-Test	**S**	**S**	**S**	**S**	**S**	**S**
S.Em	0.59	0.03	0.18	0.29	0.47	0.55
S.Ed	0.59	0.05	0.38	0.33	0.90	1.01
C.V	3.51	3.09	3.01	2.30	2.83	2.72
T-value	2.06	3.06	2.06	2.06	2.06	2.06
C.D.at5%	1.74	0.07	0.52	0.84	1.37	1.61

(v). DAYSTOMATURITY

The mean performance of days to maturityranged from 106.33 to 111.33, with a grandmean of 108.51. For Days to Maturity, allthe treatments were significantly lower incomparisonthantothe control.Amongthetreatments,T2-Panchagavyaat10%for12hrs. was found lowest (106.33 days) incomparisoncomparedtocontrolandothertreatments.

3.2.YIELDATTRIBUTES

(vi). PODSPERPLANT

The mean performance of number ofpods per plant ranged from 25.67 to 32.99,with a grand mean of 29.67.For number ofpodsper plant, all the treatmentsweresignificantlyhigherAll the treatments were significantly higher for the number of pods per plantincomparisioncomparedtothe control.Amongthetreatments,T2-Panchagavya at 10% for 12hrs. (32.99) wasfound significantly higher in comparision tocontrol andothertreatments.

(vii). SEEDSPERPOD

The mean performance of the Number ofSeeds per pod ranged from 1.15 to 1.91,with agrandmean of1.64.Among thetreatments,forno.of seeds per pod treatmentT2-Panchagavya at 10% for 12hrs. (1.91)wasfoundsignificantlyhigherincomparisoincomparedtocontrolandothertreatments.

(ix).SEEDYIELDPERPLANT(g)

ThemeanperformanceofSeedyieldp er plant(g) was ranged from 7.33 (g) to14.67(g). with a grand mean of 10.15(g).~~Forseed yield per plant (g),all the treatmentsweresignificantlyhigher~~All the treatments were significantly higher for seed yield per plant (g)~~incomparision~~comparedto~~t~~he control.Amongthetreatments,seedyieldper plant(g) treatment T2-Panchagavya at10 % for 12hrs. (14.67 g) was found to behigher in comparis~~i~~on to control and othertreatments.

(x). SEEDINDEX(g)

Themeanperformanceofthe SeedIndex(g)wasrangedfrom20.33(g)to23 .66(g). with a grand mean of 21.72(g).Among the treatments,seed index treatmentT2-Panchagavya at 10% for 12hrs. (23.66g) was found to be highest in comparis~~i~~ontocontrolandothertreatments.

(xi). BIOLOGICALYIELD(g)

The mean performance of Biologicalyield(g)wasrangedfrom22.67(g)to35.87(g) with a grand mean of 28.74(g).Forbiologicalyield(g),allthetreat mentsweresignificantlyhigherincomparisi ontocontrol.Amongthetreatments,forbiolo gical yield treatmentT2-Panchagavyaat10%for12hrs.(35.87g)wasf oundsignificantlyhigherincomparisiontoc ontrol andothertreatments.

(xii). HARVESTINDEX(%)

Themeanperformanceofthe HarvestIndex(%) was ranged from 31.82 to 39.11,with a grand mean of 35.21. ForHarvestIndex, all the treatments were significantlyhigher in comparisonthan tothe control. Amongthetreatments,forharvestindexT2-Panchagavya at 10% for 12 hrs. (39.11%)wasfoundsignificantlyhigherincomparisoncomparedtocontrolandothertreatments.

CONCLUSION

Itisconcludedfromthepresentexperimentationofseedtreatmentswithdifferentkindsofseedtreatmentswerefoundaffectingto affectsignificantlydifferentcharacteristicsofgrowth,and yieldinchickpeas.Treating with T2-Panchagavya at 10% for12hrs. was found superior which affectedallthegrowthandyieldparametersin chickpeaincompare, affecting all the growth and yield parameters in chickpea comparedwithcontrolandothertreatments.ThusseedtreatingwithT2-Panchagavya with 10% for 12hrs. is usefulhelpfulinimprovingthe yieldinchickpeas.

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