VEGETATION PROPAGATION OF FOUR *FICUS* SPECIES BY USING DIFFERENT FERTILIZERS.

Dissertation
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IN

BOTANY

by
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DEPARTMENT OF BOTANY
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JADCHERLA – 509 301

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DECLARATION

We hereby declare that the Research work presented in this Dissertation entitled **"**Vegetative Propagation of Four *Ficus* Species by using different fertilizers**"** is original work carried out by us under the supervision of **Dr. B. Sadasivaiah**, Department of Botany, Dr. BRR Government Degree College, Jadcherla during the period 2022-2023 for the award of the degree of Student Study Project in Botany. The research work is original and no part of the work has been submitted for the award of any degree or diploma of this College or any other College/University.

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……Deepika, Srivani, Sangeetha

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Chapter-I

INTRODUCTION

Horticulture is the branch of agriculture that deals with the science, business techniques, technology of plants cultivation .it includes the cultivation of fruits, vegetables, seeds, herbs, sports, mushrooms algae, seaweeds and non-food crops such as grass and ornamental trees and plants. It's also includes plants conservation, land scape restoration and garden design and construction arboriculture maintains ornamental and lawns. The study and practice of horticulture have been traced back thousands of years. Horticulture contribution to the transition from human communities of secondary or semi sedentary horticulture communities. Horticulture involves the use of hands tool such as diggings sticks hoes and carrying to horticulture, agriculture is a more intensive involving strategy. The use of plowing, animal traction and complex techniques or irrigations and soil management. Stem cuttings in which a piece of stem in part buried in the soil including at least one leaf mode. The cutting can produce new roots. Usually at the node root cuttings in which section of root is buried just below the soil surface and produce a new shoot, stem cuttings are used in a gaffing. The cuttings of a healthy young branch of a plant oh having leave which is planted in most soil is called stem cutting. the cutting develops roots and gross into new plants.

Ficus is a genius of about 850 species of wood trees shrubs vines epiphytes family murices collecting known as fighters or Ficus. They are native thought. The tropics with a few species extending into the Seni warm temperate zone. The common fig is native to southwest Asia and the meterman region. Some better -known species that represent to diversity of the genus included the common fig a small temperate deciduous tree, who's fingered fig leaf well known is art and iconography. The weeping fig.

Specific identification of many of the species can be difficult, but members of the genus Ficus or relatively easy to recognize many have roots the unique fig pollination system. Involving times highly specific wasps known as fig. The enter via ostiole those subleased influence on both pollinate.

Tapping of latex from a tress for use in rubber produced in nature latex is funded as a milky flued which is present in 10%. To all flower plants on explosive to air consisting of proteins alkyds starches, sugar, oil, resins, tannins and guns it is usually executed after tissue injury. It is distinct sub stone separately produced and defines functions.

All the *Ficus* species were vegetative propagated through stem cuttings. Generally growth regulatory hormones like Auxins used for the growth. There no works done without growth regulatory hormones. Hence, the present work was undertaken with the following objectives.

- To know the growth pattern of 4 different *Ficus* species by using various natural substratum as hormone.
- To know the Axillary Bud Proliferation (ABP) of *Ficus* species
- To know the leaf growth of *Ficus* species
- To propose key strategies for effective vegetative propagation of *Ficus* species by stem cuttings.

Chapter-II
REVIEW OF LITERATURE

Leonardo (2022) worked on prodation of acalypha wilkesiana seedings using steam cutting the propagation and use of ornamental plants as been following the growing intrest of life incressing improving the quality of life increasing investment in and specing environment and gen-easing a demand for particular prodution techniques of different species (alencar&cardos,2015;loss,2015).

Fechnelo(1995)mention that cuttings with larger diameter have higer levels of reserve all so have I hats of shoots impring root formation this may have occurred in this work as the herbaceous type cutting presented a higer NR compared to semi-woody and woody cutting (table1) .this is probably realted to the fact that the highest concertation's of free auxin in plants are found in the apicalmeristems of the shoot and young leaves ,as they are the main sites of biosynthesis of this.

Belonging to the famliy moraceae is a very lorge tree, 20 to 30 miters high with wide – spreding branches bearing areal roots.the roots extract as be used in medicinal since ages to bust the immune system is used extensively in floop medicine as vermicid astringent hypotensive and antidyacntery drug the active component isolated from f.bengalensis includ glucosides flavonoids etc.the menthalolic and water extracts have immunostimulatory propertys and enhances the phagocypic potelpil of(PBMCs) it also includs the proliferapion of lymphocytes and hens to genaration of cytokines that activate other immune self the hydroalcoholic leaf extracts of if.bengalansis.linn significantly increased to the pha gocypic activate of women neutrophil's and hens engulfement and clearns of microorganisms by leucocytes along with free radicals scavenginge properties and reduction of oxidatetive streets there by showed immunomodulatory and antioxidant activity.

Its natural stands or fast disappeared due to its indiscriminate collection ,over exploitation ,natural resources for commercial purpose and to meet the requirements where as conveentional propagation is hampared bue to its poor seed viability ,low rate of germination and poor rooting ability of vegatative cuttings,there four alternative propagation methods woodby beneficial in accelerating larege scale multyplikation ,improvement and conversation of the plant. The present study aims to develop the high frequency reganeration in ficus bengalansis.

Asia and afrianficus benjiamaina a multipurpose tree,used as floder,firewood and for shade in asia and afrian. the identify a low cost rooting mediwen for from-grown cutting a comparative experiment was conduction to compresson the effect of :(a) 100% non-streile sand ,(2)mixture of 50% sand and 50 comerecid media and (3) commercial media (cna) on root and shoot growth using tree replacates of 16 cutting per plot in a randmised complate block design.cutting were maintained under controlled temperate of 20 to24c every five minets throughout the experment. the root and the shoot growth were recorded 55 days after planting.numbers of surving roots and leaves did not differ between media.length of the longest roots (5.3,7.8and 7.0=0.45mm)and numbers of ne leaves(1.2,3.2and3.0=0.23)leaves in treatment sSM and CM respectively.it is concluded the that unwashed sand provides a satifactory medium for estanlishingcutting of ficus plants in form conditions. Treaments were 100% river sand,100%commerical medium and 50:50 mixture of the two particle diameter in the sand was 70%<2 mm and 30%2-5mm diameters,no fertilizers was added and the sand was not sterilised.A radomised complete block design with three repliations with 16 cutting per plot was used for the experment.

Ficus benjamaina leaves,bark and wood contain mlikysap, which oozes out during,twising and breaking and cutting.to aviod sticking while preparing the cuttings the sap was washed off by immerrsing cutting in clean water immediatly after branches were from the trees.this also helped minimise evapotranspriration stress of cutting.Atotal of 144 cutting were prepared using trees awarlable at the PDG,MASSEY UNIVERSITY,NEW ZEALAND.three out of 25 trees were randomly selected as mother trees from which the cutting were taken. In this trail cutting varied from 20to80cm in the length,2to 21 branches, 2-100 levaes,2-8 branches and 2-15levaes,trimmed to 22.5cm length,were alocated at random between treament and replicates.A single wored was made in the camtricum layers of each cutting using a sharp knife and then treated with 0.3%

indolebibityric acid.cutting stents maintained at 20to40c in a controlled temperatic heat bed,regulared for a10sencond spary every five minits throught at the experment.the root and the shoot growth were record 55 days after planting.after washing gently using a water hose total roots on a cutting were counted.and the longest root in a cutting was measured refention of older leaves and the growth of new leaves on a plant was also recorded.

The general linear model of statistical analysis system was used to perform compared (SAS VERSTION 8.2, 1999-2001). Unless otherwise stated,statistical singnificance was tested at the 5% level($P<0.05$). Coarse and non-sterile sand can be a low cost altemative medium for rooting of *Ficus benjamina* cutting.

The present papers deals with the preliminary phytochemicals analysis to find out the various chemicals constituents from the plant sample of *Ficus heterophylla*. The plant specimen is utilized by the tribal communities for the treatment of various of aliment such as diabets, melthutus, cancers and HIV etc. which is described in many talks books inducing Ayurveda, after completion of qualivaction mical and the plant presence of carbohydrates, phenol cardicalycosides, terpenoids are present in all three solvents. Among all the three extracts, maximam phytochemicals were found dissolved in water, and methanol.

The *Ficus heterophylla* levaes were separated and eleaned well cleanded leaves were then dired under shade.the drying was done unill all the water molecules evaporated and leaves becames well-dried for grinding.after drying,the leaves were ground well using mechanicall blender into fine powder and transferred into air-tight and powered leaves were extracted sequentally with methanol,mether and aqueous was weighted (20gm) and successively extracted with 200ml of solvents like methaol,etherand aqueous by soxhelateion for a period of 24 hours.

The present study was carried out of determine the qualitative phytochemicals constituents present in the extracts of ficusheterophylla leaf .the results reveals maximum phytochemicals constitues.study also provides a strong evidence for the use of extract treat various phormacological activies.it was concluded that the plant is rich in phyochrmicals with sighficants medials applications.

Wild fig is a very popular edible wild fruit plant,jocally known as bedu,commonly found growing in different regiouns of uttarakhand.this experment was aimed to evalued response of ouxi concertractions to wild fig cutting at hortcultural deserch center and department of horticulture, during2014-15and under rendomized block design with three replications.semi-hard wood cutting of jully prepared fromone year old shoots in moth of july and treated wih different concenfrations of IBA semi-hard.wood cuttings of pencil size thickness and 15cm length. during and after finishing the experment traits such as numbers of spouted cutting ,length of spouts,percentage of rooted cutting ,number of roots /cutting,length of logest root and survival percentage of cutting was measured. The investigation was carried out under the mist chamber of hortculatel reserch center,deoartement of horticulater(.HNGARHWAL UNIVERSITY.SRINAGAR GARHWAL uttarakhand during the year 2014-2015.the expermental design adopted for present investion was completely randomized block design with replications with 20 cutting and semi-hard cutting of pencil size thickess and 15to20cm in length were prepard from one year old leoty shorts with 3-4 leaves in the month of july,2014 for the experment. the tralments included four concentrace of IBA (0,3000,6000,9000ppm). tratments were given by quick dipping the based end of the cutting in the prepard solutions for 5-10seconds. obervations on of aerial observi\ation such as percentage of the root cutting ,number of cutting were recorded three month after planting of cutting the root traious. On the basis of above results wild fig cutting treated with 6000ppm IBA responed well and recorded maximum. results in all the rooting and shooting parameters studied under this eperiment,therfore,on the basis of above present results it can be recommed that 6000ppm IBA treament is suitable for sucess of wild fig semi-hard wood cutting.

The genus Ficus tinnaeus with 115 taza is distributed throughtout india from south to north up to dimoriu in case of non-epiphytic and jorin in caseof epiphytic species in assam,india. 28 taxa including varities and 1 subspeices under te sudgenus urostingma(gaspanrini) miquel,pharmaacoscea(myquel)miquel,sycomorus,ficus and sucidium myquel are recored from seven disricts of the taxa in varies from epiphytic in early stage and free standing later to middle sized tree shrub,scandent,dimber.f,heteropluera blume of subgenu of sycidium shous variations in habitat such as shurb,scandent,sreeping and even crect sometimes.five forms of flower arragement are recored under three types of fower male,female and gall flowers.In paddition morphological and distributional studies,adnational studies are also requeted for the taxa particularly from north eastem region of india. Regular field visits were undertaken in the study area during the years

2010-2014.the standered field and herbaring techniques were followed for collection and processing into mounted herbaring specimens vocher specimens were submitted at GUBH. SPECIMENS are identified with the help if published literatures and matched with the authentic identifled specimens at assam. the photograhy was done in laboratory with carl ess stereozoom-microscope fitted with cammon cybershot camer.for nomenclatural status www.theplant list org and literatures such as chaudhary etal.(2012) and wu ct al (2003) were throughly consulted. Northeastern region is considered as the hot spot region for the genus in india with maximum number of species recored by chudhary etal(2012) the present aretial provides the details of general and floral morphology of ficus linnaues growing in upper assam. however,additional anatomical and palynlolgical studies can be understand for better under standing of the genus.

The present study was undertaken to evaluate the and phytocuthemical or stituerts in the extract of ficus nervosa heyne ex roth,with which in north traditionally used as a medicinal plant. A prelaminory phytochemical and analysis was correct out and concluced the presence of various phytichemicals.biochemical estimation of total carbohydrate,protien,lipids,as assorbic acid,vitamin p,crude fiber,free aminoacid,alkaloids,novonoids,and phenols were performed by standed produres. the nutrotive value(kal/100g) was found to be 90.6 (kal/100g) photochemical indicated that the leaf condise a board spectorn of secondary metabolites and presenced these medicirally impotant bioactive compounds justifies use mediclanes for the treatment of different dieases.

The fresh and dieases free plant leafs speciemens collected from dibrugarh and other near by region were washed in running tap water,dried under the sun then crushed in motherla pestla and were subjected to various biocemical analysis.the maisture cintent was determined by taking that fresh plant samples in petridishes and kept over night is an air oven at 100-110c untill they attined a constant weight. alkaloids,flovonoids,tammins,phenol,and saponing were tated following the method of tyler and herbalagaram,1994;harborne,1973(8,9).the totals carbo naotraed,content was estimated by anthrone method.quantitative estimation of alkaloids by daniels method (16),estimation of phenolics was done folowing folon-cicocalteu reagent method (17),estimation of flovonoid by aluminum chloride colour metric method (18)and estimation of saponons following the method of kroshnian at al(19).crude fiber was calculated by the follow formula(19):

The uses of medicals plants are well-known to the people of NE india in our study,we tried of find out the biochemical constituents and nuritive value of the flok medicinals plants so that the nurtrivie value of the could be made from these plants.overall date presented vegetable respresent useful dietcary source. the preliminary photochemial screening of the plants for secomdary metabolites and shows that it may be potent source of the usefull drung.

Pot experment was conducted to investigate the 'response' of fig cutting to different to sawing dates and potting media at horticulte nursery ,the university of haripur during iamuary to april2019.the horticulture nursery has situated in distruct and haripur with 33c44'N latitude,72 35'E longitude and altitude of 610m from the mean sea level.the overal mean tempareture and rainfall during the expermental period are given in (fig).media and pot prepartion.

Cutting of fig cultivar sawari was collected from tarnab form peshwar ,wheave 30cm longfig cutting with uniform thickenss were collected from healthy mother plant.one cutting per pot was planted and each pot wasconsidered as a single replicaton.

Fig cutting were collected sown on two different dates on 1st january and on 15th january.cutting were sown in pots in which were property filled b media and then kept a plastic tinnel all cultural placties like weeding,hoeing irrigation were carried eveing throughtout the study period. experiment all design and statistical analsys.

Date regarding days to sprouting, length of the root (cm),survial percentage (cm),shoot thickness(cm)and number of reaves /plants were recorded during the experiment.a total number of days,was calculated by counting the days takes by each cutting of fig to sporut .survival percentage was calculated by using the following formula.

From this study it was concluded that fig cutting were sown on 15th january have showed more promisng result in stead of those which were sown on 1st january. among different potting media miture compost and fym have in creased.the different studies parameters. ther are fore from the abive study it cn be concluded that; media and dates of stem sowng play of important role in prodution of healthy plants though stem cutting.it is recommed that cutting of fig should be collect on january 15tn for better survival and success.

Chapter-III
METHODOLOGY

Before starting our project work three types of soil were taken namely black soil, cattle dung and red soil,were taken as three types of soil.all the three types of soil were placed together about two 2:4:1 ratio of block soil, red soil and farmyard manure was taken and mixture of these soils were used to fill in the selected polythene covers for plantation.the selected plants for the study are Ficus Bengamaina, Ficus Heterophylla ,Ficus Microcarpa Ficus Tinktoria,

The stem cutting of above plants were collected From Telengana Botanical Garden,(Dr.BRR GOVERMENT COLLEAGE ,JADCHERLA.)The lengthof the stem cutting was 15cm each for all the species.All the stem cutting were soaked in the extract of AOLE VERA 15minutes and planted in the covers and the tips of the stem cutting were closed with cow dung. Water was given every day .after 15 days the plants were observed for Axillary Bud Proliferation (ABP) and the initiation of leaves. To known the vegetative growth analysis it selected plants drava jeevamrutham, vermicompost, DAP, farmyard manure and control were selected as different fertilizer categories and 20 stem cutting were planted in 3*5cm polythylene cover. The axiliary Bud proliferation (ABP) and the number of leaves were counted on every 15 days internal. The photographs showing methodology in plate-1,2,3.

Plate 1: Methodology

Plate 2: Methodology

Plate 3: Methodology

Chapter-IV

RESULTS

FICUS BENGALENSIS

Evergreen Tree, up to25cm high,50cm Canopy ,branches spreading ,aerial roots from as branches ,bark grey milky ,smooth wood grey .white i young branches pubescent ,latex milky ,and leavesalternate,elliptic-ovate,10-17*7-12cm,coraiaceious,glabrous above ,pubescent below, base rounded, margin, open obtuse ,to sub cute; 5to6 veins arise from base ,lateral veins 3-6 pairs, flattened above, raised below ,intercostals transverse,2igzag in the middle ;petiole to a 4cm long ,glabrous, glands below the base of Lamina ;stipules deciduous, leaving annular scars,2*1.5cm. figs monoecious,10r2,axillary,depresend-globase,1.5*2cm Across, Puberulous without ,sessile dark pink or red when repeibracts4-5,cupularo;tepals3-5,shortly connate,2mm across, glabrous ,male flowers dispersed with female; stamen 1i filament 0.8-1mm long ;anther oblong, parallel ,unequal ,to 1mm,across,shortly mucronate ;connective brown ,female flowers sessile; ovary abovoid ,glabrous 1.5*1mm,dark brown on Style r Side ;style erect orcurved,2mm long, tapering, gall flowers similar to female flowers,pedicellate,achenesglobose-ellipsoid,12*1.5mm,dark brown.

It is every common though out the state and its medicinal importance, the vegetative propagation through stems cutting of the species are given below in **Table 1.**

The initiation Axillary Bud Proliferation (ABP) was high in *Ficus bengalansis* by using cow hung liquid with 3, followed by onion extract with 2 and *Aloe vera* extract, dravajeevamrutham with 1no ABP was observed in control within 8 days. After 70 days observation the high ABP was observed in drava jeevamrutham with 9 followed by onion extract, *Aloe vera* extract, cow hung liquid each with 8ABP and 6 was recorded in control. The initiation of leaf flushing and matter leaves was observed that onion extract showed 4 leaves with average of 6cm length showed by aloe vera extract ,drava geevamrutham and cow dung liquid each 2 leaves with an average of 1.33 leaf length observation first 8 days. After 70 days observation the high leaf initiation observation observed in onion extract with 16 leaves an average of10.8cm followed by cow dung liquid with 15 leaves, *Aloe vera* extract 14 leaves and dravajeevamrutham, control with 12 leaves each with an average of 9.3cm length.

Table 1: *Ficus benghalensis*					
Date	**Onion Juice**	**Aloe vera juice**	**Drava jeevamrutham**	**Cow dung liquid**	**Control**
22/2/2023	0	0	0	0	0
1/3/2023	ABP-2	ABP-1	ABP-1	ABP-3	ABP-0
	L-4,06cm	L-2,0.2cm	L- 2,.3cm	L-2,0.7cm	L-0
15/3/2023	ABP-4	ABP-3	ABP-4	ABP-3	ABP-1
	L- 7,4.2cm	L-4,3.4cm	L-5,2.8cm	L-5,1.9cm	L- 3,1.5cm
1/4/2023	ABP-4	ABP-6	ABP-5	ABP-5	ABP-3
	L- 9,5.3cm	L- 8,5.2cm	L-7,5.8cm	L- 7,5.4cm	L-5,5.4cm
			Fl-1		
15/4/2023	ABP-6	ABP-7	ABP-7	ABP-6	ABP-5
	L-10,8.6cm	L-9,8.7cm	L-6,7cm	L-12,8cm	L-8,8cm
1/5/2023	ABP-6-8	ABP-6-8	ABP-7-9	ABP-6-8	ABP-5-6
	L-16,10.8cm	L-14,9.0cm	L-14,8.7cm	L-15,9.3cm	L-12,9.3cm

FICUS HETEROPHYLLS

Very variable shrub, creeping, sarmentose or sometimes erect; branchlets pithy and more or less hollow, brown hairy, hispid or with dense spreading pubescence. leaves very variable ,linear, linear-lanceolate ,ovate, elliptic to broadly ovate-oblong unlobed or shallowly or deeply pinnatidly2-many-lobed,12.5-12.5cm long, base obtuse ,rounded ,subcordate or cordate shortly acuminate ,more or less hispid or scabrid above ,softly pubescent or scabrellous beneath ,petiole 0.4-7.5mm.figs axillary ,solitary ,young more or less pyrifrom or ellipsoid and hispid ,mature globose or sudglobose,1.8-2.5cm long and 1.2cm across, mouth board peduncle 5-10mm long .gall flower pedicelled.tepals4,linear2.5-3mm.male flower;tepals3,shorter then in gall flower ,stamen1.

It is very rare in the state and it has medicinal and importance. The results vegetative propagations through steam cutting of the species are given below in **Table -2.**

Table 2: *Ficus heterophylla*					
Date	**Onion Juice**	**Aloe vera juice**	**Drava jeevamrutham**	**Cow dung liquid**	**Control**
22/2/2023	0	0	0	0	0
1/3/2023	ABP-0	ABP-0	ABP-0	ABP-0	ABP-0
	L-0	L-0	L-0	L-0	L-0
15/3/2023	ABP-2	ABP-2	ABP-0	ABP-1	ABP-0
	L-3,0.9cm	L-2,0.5cm	L-0	L-2,1.1cm	L-0
1/4/2023	ABP-3	ABP-3	ABP-0	ABP-1	ABP-0
	L-10,3.6cm	L-6,4.7cm	L-0	L-4,3.8cm	L-0
15/4/2023	ABP-6	ABP-6	ABP-1	ABP-2	ABP-2
	L-15,5.6cm	L-8,5.8cm	L-3,1.9cm	L-5,4.9cm	L-3,2.4cm
1/5/2023	ABP-7	ABP-8	ABP-3	ABP-3	ABP-6
	L-23,7.8cm	L-13,7.0cm	L-5,3.5cm	L-7,5.3cm	L-5,4.6cm

In the initiation Axillary Bud Proliferation (ABP) was high in *Ficus heterophylla* by using drava jeevamrutham with 2, no ABP was observed in onion extract, *Aloe vera* extract, cow hug liquid and control within 8 days. After 70 days observation the high ABP was observed in *Aloe vera* extract with 8 followed by Drava jeevamrutham, cow dung liquid each with 3 ABP and onion extract 6 was recorded in control. The initiation of leaf flushing and matter leaves was observation that drava jeevamrutham showed 2 leaves with average of 0.5cm length followed by onion extract observed 1 leaves with an average of 0.6cm leaf length observation first 8days. After 70 days observation the high leaf initiation observation in 20 leaves an average of 7.8cm followed by *Aloe vera* extract with 13 leaves, drava jeevamrutham with 6 leaves ,cow hug liquid with 7 leaves, control with 5 leaves each with an average of 4.6cm length.

FICUS MICROCARPA

Every green, up to 15m night; aerial roots few; bark brown ,nearly smooth; wood light reddish-grey branches glabrous .leaves coriaceous, elliptic or obovate 4-8*2.5-4.5cm glabrous ,shining ,base cuneate-acute ,margin entire, apex ,rounded to retuse ;basal veins3,laterial 12-9 pairs ,closly pinnate , raised on either side,intercostals0,secondary lateral veins as prominent as a primary, veins;petiole to 1.5cm long,glandular at apex below ,conaliculated ,glabrous, stipules as

–lanceolate ,to 1cm long. Fing monoecious,6-8mm across, sessile ,axilary , pairedor or ovate solitary ,globose, globose ,yellow ish-ed when ripe; bracts3,ovate,ellipic,boat-shaped,2mm across, obutuse ,persistent ;orifice plane or slightly raised,closed by 3 flat,aspail branches;internal bristles minute, sparse raised,closed;tepals3-4,free,ovate-lanceolate,1.5mm long,brownish,glubrous,male flowers dispersed;stamen1,hardly exserted ;filament0.3mm;anther unequal,ovate-oblong,0.7mm mucronate,female flowers sessile;overy oviod-globose,red-brown,1mm across;style 1.5mm long, tapering.gall flowers similar to female flowers, pedicellate.fig wall fleshy and smooth, achenes smooth.

It is very common throughout the state. The results vegetative propagation through steam cutting of the species are given below in **Table 3.**

Table 3: *Ficus microcarpa*

Date	**Onion Juice**	**Aloe vera juice**	**Drava jeevamrutham**	**Cow dung liquid**	**Control**
22/2/2023	0	0	0	0	0
1/3/2023	ABP-3	ABP-2	ABP-1	ABP-2	ABP-2
	L-5,0.3cm	L-2,0.8m	L-3,0.2cm	L-4,0.7cm	L-2,1cm
15/3/2023	ABP-5	ABP-4	ABP-3	ABP-5	ABP-3
	L-12,1.9cm	L-8,2.4cm	L-6,1.5cm	L-7,1.9cm	L-5,2.5cm
1/4/2023	ABP-8	ABP-7	ABP-4	ABP-8	ABP-5
	L-18,5.7cm	L-12,4.8cm	L-10,2.5cm	L-9,3.4cm	L-8,4.3cm
15/4/2023	ABP-9	ABP-8	ABP-7	ABP-10	ABP-8
	L-20,7.0cm	L-16,6.3cm	L-15,12.2cm	L-12,5.7cm	L-11,6.7cm
1/5/2023	ABP-12	ABP-10	ABP-12	ABP-13	ABP-9
	L-23,15.3cm	L-20,8.2cm	L-19,15cm	L-18,9.7cm	L-13,7.7cm

The initiation axillary bud proliferation (ABP) was high in ficus microcarpa using by onion extract with 3 followed by aloevera extract with 2 and cow dung liquid,control with 2,dravajeevamruth with1 observed within 8 days. After 70 days observation the high (ABP) was observation in cow dung liquid with 13, followed by onion exract ,dravajeevamrutham each with 12cm,and 10 with *Aleo vera* extract 9 was recorded in control. The initiation of leaf flushing and mature leaves was observation that onion extract showed 5leaves with average of 0.3cm length followed by alovera extract,control each 2 leaves,and drava jeevamrutham was showed 3 leaves with average 0.8cm leaf length observed first 8 days. After 70 days observed the high leaf initiation observed in onion extract with 23 leaves an average 15.3cm followed by aloe vera extract with 20 levaes,drava jeevamrutham with 19 leaves, cow dung liquid with 18 leaves ,control with 13 leaves each with an average of 7.7cm length.

FICUS TINCTOREA

Tree, up to 10m high; often epiphytic, enclosing the trucks of tree a perfect network of branches and creeping along the walls and on side of wells ,without aerial roots, bark greyish, smooth wood brownish hrey.levaes thinly coriceous, Rhomboiod or sub-romboiod or elliptic ovate ,4-12*3-6cm hispid and dark green above ,scabride and minutely hispid and paler beneath; apex acute,margin entire,base oblique,5-7mm across ,paired globose ,pedumcled ,hairy,male receptacles yellow; female receptacles red wjen ripe. it is very common throught out the state and its medicinal and spirital importance. The results vegetative propagation throught steam cutting if the species are below in **Table- 4.**

The initiation axillary bud proliferation (ABP)was high in ficus tingktoria by using onion extract with3,followed by alovera extract with 2 ,no (ABP) was obseced in drava jeevamruthsm ,cow dung liquid,and control within 8 days.

After 70 days observation the high (ABP) was observed in aloevera extract with 9 followed by drava jeevamruthsm , control, each with 7 (ABP)and 5 was onion extract ,6 was recorded cow dung liquid. The initiation of leaf flushing and mature levaes was observed that alovera extract showed 4 leaves with average of 1.4cm lenght followed by cow dung liquid ,control drava jeevamrutham no leaves was observation first 8 days. After 70 days observation the high leaf

initiation observation in cow dung liquid with 10 leaves an average 5.8cm followed by drava jeevamrutham with 7 leaves, alovera extract, control with 9 leaves onion ectract with 8 leaves each with an average of y7.5cm.

Table 4: *Ficus tinctorea*					
Date	**Onion Juice**	**Aloe vera juice**	**Drava jeevamrutham**	**Cow dung liquid**	**Control**
22/2/2023	0	0	0	0	0
1/3/2023	ABP-3	ABP-2	ABP-0	ABP-0	ABP-0
	L-2,0.4cm	L-4,1.4cm	L-0	L-0	L-0
15/3/2023	ABP-3.	ABP-2	ABP-1	ABP-2	ABP-1
	L-2,3.8cm	L-5,2.8cm	L-2,1.3cm	L-0	L-2,0.8cm
1/4/2023	ABP-4	ABP-4	ABP-2	ABP-2	ABP-2
	L-4,4.3cm	L-5,6cm	L-4,2.5cm	L-5,1.4cm	L-5,3.6cm
15/4/2023	ABP-4	ABP-4	ABP-5	ABP-3	ABP-6
	L-6,6.5cm	L-8,8.9cm	L-7,4.8 Cm	L-8,4cm	L-6,5.9cm
1/5/2023	ABP-5	ABP-6-9	ABP-7	ABP-6	ABP-7
	L-8,7.5cm	L-9,9.5cm	L-7,6.5cm	L-10,5.8cm	L-9,6.6cm

FICUS VIRENS

Large , spreaading ,deciduous trees, epiphytic in early stages, with as few aerial roots; bark greenish-grey smooth ;wood ,grey abruptly acuminate ,margin entire to slightly undulate ,base acute, trancate or subcordate ;condary nerves 7-12 pairs ,basal pair ,basal air shorter, intercostals zig-zag ;petiole 2.5-7cm articulate ,glandular at the apex below. Receptacels axillary, paired shortly they penducled ,globose,within with red dots.

It is very common throught out the state and its medicinal and spriltual importance. The results vegetative propagation through steam cutting of the species are given below in **Table-5.**

The initiation Axillary bud proliferation (ABP) was high in ficus virens by using dhravajeevam rutham with 4 followed by onion extract , *Aloe vera* extract with 2 and cow dung liquid,control each with 3 observed within 8 days. After 70 days observation the high ABP was observed in cow dung liquid with 18 followed by onion extract , drava jeevamrutham each with

12 and 16 ABP with alovera extract,15 was record The initiation of leaf flushing and maliere leaves was observed thatcow dung liquid showed 6 leaves with average of 0.5cm length followed by onion extract,drava jeevamrutham each3 leaves with an average of 1.33cm leaf length observation first 8 days. After 70 days observation the high leaf initiation observed cow dung liquid with 29 leaves an average 12.5cmfollowed by onion extract with 21 leaves ,alovera extrac witht18 leaves,drava jeevanrutham with 19 leaves,control with 8 leaves each with an average of 10,7cm.

Table 5: *Ficus virens*					
Date	**Onion Juice**	**Aloe vera juice**	**Drava jeevamrutham**	**Cow dung liquid**	**Control**
22/2/2023	0	0	0	0	0
1/3/2023	ABP-2	ABP-2	ABP-3	ABP-3	ABP-3
	L-3,0.4cm	L-4,0.9cm	L-3,0.2cm	L-6,0.5cm	L-2,1.2cm
15/3/2023	ABP-6	ABP-5	ABP-5	ABP-7	ABP-5
	L-12,5.7cm	L-6,1.5cm	L-6,2.5cm	L-9,2.3cm	L-7,3.5cm
1/4/2023	ABP-7	ABP-6	ABP-8	ABP-10	ABP-8
	L-16,9.8cm	L-9,5.9cm	L-12,3.6cm	L-15,4.8cm	L-10,5.8cm
15/4/2023	ABP-9	ABP-8	ABP-9	ABP-15	ABP-10
	L-18,9.7cm	L-15,7.7cm	L-15,5.2cm	L-20,6.4cm	L-15,8.2m
1/5/2023	ABP-12	ABP-16	ABP-12	ABP-18	ABP-15
	L-21,15cm	L-18,14.4cm	L-19,10.8cm	L-29,12.5cm	L8.10.7cm

Plate 4: *Ficus benghalensis*

Plate 5: *Ficus heterophyllus*

Plate 6: *Ficus microcarpa*

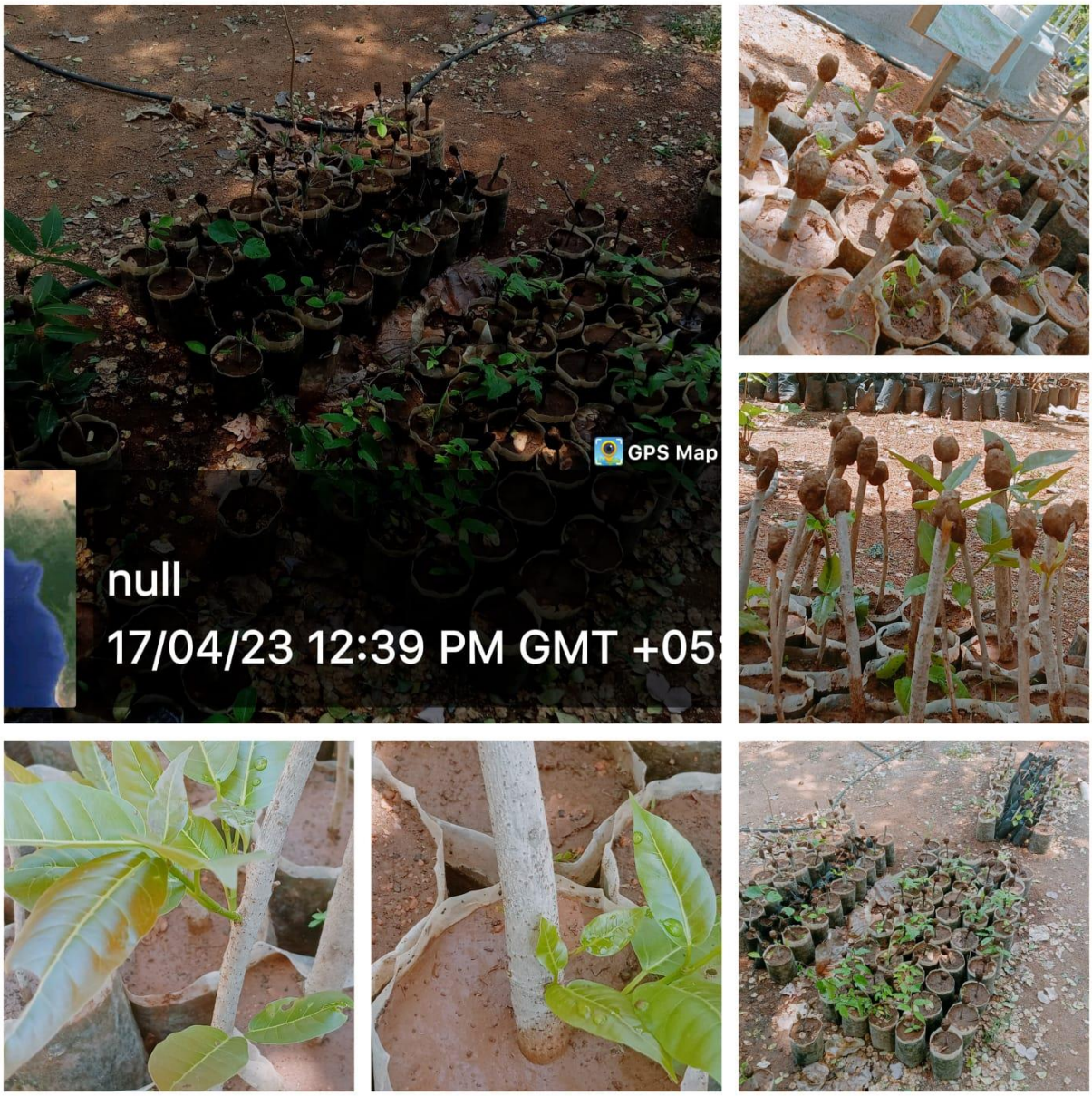

Plate 7: *Ficus tinctorea*

Plate 8: *Ficus virens*

CHAPTER – VI

SUMMARY & CONCLUSION

In the present study, the vegetative propagation of *Ficus benghalenisis, F. heterophylla, F. microcarpa, F. tinctorea* and *F. virens* was grown under various fertilizers and extracts like *Aloe vera* extract, Onion extract, Cow dung liquid, Drava Jeevamrutham and control.

The high ABP and leaf initiation of *Ficus benghalensis* was shown in Onion juice and Drava jeevamrutham where as high number of ABPs and Leaf initiation of *Ficus heterophylla* was in extract of *Aloe vera* and onion extract. The high ABPs and leaf initiation was observed in *Ficus microcarpa* with Onion extract and cow dung liquid.

In *Ficus tinctorea* the high ABP and leaf initiation was good in onion exatract in the first stage and later *Aloe vera* extract is good. *Ficus virens* showed good results of ABPs and leaf initiation in cow dung liquid and *Aloe vera* extract from intial stage and final stage.

Chapter-VI

REFERENCES

1) Bist P Kapoor ML. Sharma, 5K and Chauhan, MS (1977). In vitro clonal propagation of juvenile Eucalyptus hybrid Etencarm & E camaldulentz) Indian Journal of Forestry Vol 20 (1): 93-97.

2) Bock, G and Marsh, J. John Wiley and Sons, New York George EF PD Sherrington (1984) Plant propagation by tissue culture .

3.) Bonga, IM and Aderkas. P. V. (1992). In vitro culture of trees Elmer forestry publishers, Netherlands.

4.) Bonga, IM and Duran DJ (eds) (1987) Cell and Tissue Culture in Forestry Vol 113 Martinus, Nijhoff Publishers, Dordrecht

5) Das T and Mina, G.C. (1990) Micropropagation of Eucalyptus tereticomis, South Plant Cell Tissue and Organ culture 12:95-103.

6.) Duran DJ (1985) Application of cell and tissue culnire in Tree Improrament In Application of Plant Tissue culture.

7). El-Tigi 5.(2003). Comparative anatomy of stam explants uded in vegetati propagation of some Aracia species

Sudan Journal of Basic Sciences Series B: Biological Science 9-21. Publisher Sudan Institute for Natural Sciences.

8) Godfrey. W, Norman, J. C. (1996) Handbook of Common Vegetative Propagation Methods for Fruit Crops and Oraniental Plants.

9) Gupta, PK. and Mascarenhas, AF Cell and Tissue Culture in Forestry.

10) Kumar, V. Rout, 5. Tak, MK. and Deepak KR.(2015) Application of Biotechnology in Forestry: Current status and future perspective Nature Environment and Pollunon Technology 14 (3) 645-653.

11) Leakey, RRB Chapman UR and Longman, KA (1990) Physiological studies for tropical improvement and

conservation: factors affecting root mitiation in cuttings of Tnplochiton seleroxylon K. Scham Forest Ecology and

Management 4.53-66.

12) Rout, S. and Khare, N.(2018) Effect of nous vurface sterilization on contamination and callus regenerations of

Ashoka (Sarava asoco) from leaf segment explants. Int. Jour. Curr Microbilogy app. Sci. 7(7) 2027-2033.

13.) Rout, 5. and Nayak, S. (2015) Vegetative propagation of Karanja (Pongamia pamata Lpiece) through stens cuttings. Journal of Applied and Natural Science, 7(2) 844-850.

14) Rout, S and Nayak 5 (2015) Vegetative propagation of Porgenic Pinnato trough Grafting Journal of International academic research for Multidisciplinary 3(3), 180-186.

15) Rout, S., Khara, N. And Beurs, 5 (2018) Vagetative propagation of Ashoka (Sareca apoca Roxb. De Wilde) by Stem cuttings. The phanus Innovation Journal 7(1) 486-488.