Crop, Chr.no & Scientific Name	FAMILY	ORIGIN	SEEDRATE &SOWING	IMP POINTS	VARITIES
Cereals:					
Rice 2n=24 (*oryza sativa*) (*O. glaberrima*) present in Africa.	Graminae	Indo-burma	Dapog 4-6 seedlings/hill at 14 DAS. SRI 1 seedling /hill at 25X25 cm or 30X30 cm at12 DAS 60 to 80 kg/ha For direct seeded and transplanted.	**DEE-GEE-WOO-GEN** is dwarf gene; Protien 6-7%; Short day plant; Kharif crop.	IRRI Rice varieties from IR 8 to IR 72. **Spontaneous mutation:** GEB 24,ADT 41 - Dwarf mutant of Basmati 370.**Induced mutation:** Parbhani, Jagannath. **Rice Hybrids:**APHR – 1 (IR 58025A X Vajram) APHR – 2 (IR 62829A X MTU9992) KRH1 (IR 58025A X IR 9761-10-IR) CORH – 2 (IR 58025A X C 20R); Co 31 (*O.perennis x* GEB 24) Drought resistance. **Red rice** Heera; **HYVs:** Swarna, Vijetha, MTU1000,Jaya. **Blast**: NLR-145, Somasila Swathi, Shravani; **BPH:** Vajram, Vijetha Deepti, Krishnaveni;**Gall midge** : Kavya, Surekha Jagtial sannalu;**Short slender**: Chittimutyalu, Kala namak **Long slender**: Pusa Basmati1, Pusa 1121,Vasumati, Sumati
Wheat: 2n=6x=14 (*Triticum aestivum)* Emmer :2n=4x=28 (*T.dicoccum)* Macaroni 2n=4x=28 *(T.durum)* Einkorn 2n=2x=14 *T.monococum*	Graminae	South West -Asia	100 - 125 k g / ha (bold seed) 75- 100kg /h a (medium size) 25-140kg/ha (late sown)	**NORIN-10-** Dwarf gene. *King of cereals.* Protein 11-12% *Rabi* crop . **Long day** plant.	**1^{0}Introduction:** Sonara63, Sonara64,Mayo64 , Lerma Roj 64 . **2^{0}Introduction** :Safed Lerma, Sharbati Sonara, Kalyansona, **Rust resistant :** Sonalika. ***Note:*** *the protein* ***in*** **pulses** ***is higher in lysine*** *and* ***lower in sulphur*** **amino acids**, *while cereal grains such as wheat or rice* ***are lower in lysine*** *and* ***higher in sulphur*** amino acids.
Maize 2n=20 (*Zea mays*)	Graminae	Mexico	Pure crop- 20-25 kg seed/ha. fodder maize --- 40-50 kg/ha	Protein- 10%, Zerm Oil – 4% Progeniterse; ***Teosinte.*** Queen of cereals . Opaque genes	**High lysine composites** :Shakti man 1&2, Rattan, Protina ; Kisan, Jawahar, Vikram, Sona, Vijay, Amber ; ***CoBc 1*** is latest variety of baby corn. **Introduction:** Sikkim primitive 1 and Sikkim primitive 2. **Mass Selection:** KT 1 - U. P. and RAS 1 - Rajasthan. **Three way cross hybrids** - Ganga -5, Trishulatha **Double cross hybrids** - CoH 3,Ganga 1,Ganga 101,Deccan, Ranjeeth; **Double top cross hybrid** - White kernel hybrid

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					Ganga safed 2, Histarch, Ganga 3, Ganga 4,Ganga 5 etc.
Sorghum 2n= *(sorghum bicolor)*	Graminae	Ehiopia & sudan (Africa)	12-18kg/ha (broadcasting) 8-12kg/ha (drilling) 6kg/ha (dibbling)	**Male sterility:** combined kafir **Protein** : 7.4 – 14.2%	**Introdution :** Milo and kafir from USA. **Use of CMS lines**: CSH 5 2077 A x CS 3541. **Mutation:** X ray mutant from CSV 5 (148) AND Co 19 is a natural mutant from Co 2. **Varieties:** CSV1 CSV-2, CSV-4, M35-1, CSV-13 **Hybrids:** CSH-1(ratoon crop), CSH-2, 3 etc for *kharif* and CSH 7, 12, 13 for *Rabi.* **Striga** resistant varieties -N-13, SPV-462.
Bajra (*Pennisetum americanum*	Graminae	Africa	4.0-5.0 kg/ ha (drilling) 2.5-3.0 kg/ha (dibbling)	Tift 23-A male sterile line 11.6% protien	**HB-1 (PAU) :**Tift 23-A X BIL -3B (first hybrid) HHB-67, Pusa moti, BJ-104 **Varieties:** PS B – 8, PSB 15, mukta.
Fingermillet 2n=36 (*Eleusine coracana*)	Graminae	Vavilov- **Africa** Decandole – **India**	4-6 kg/ha.	Rich in Calcium	Indaf 5 Ragi from Karnataka. **Indaf 9:**Indaf 5 cauvery x IE 929 **Mutation :**T20 - mutant from AKP - 7. **Varieties**: saroda, Kalyani, Simhadri, Padmavathi, Ratnagiri, Godavari, Gauthami.
Korra (*Setaria Italica*)	Graminae	China (or) Central Asia	5 kg /ha.	12.3% - protein italian millet, Fox tail millet German millet.	Chitra, Arjuna, Prasad, Lepakshi, Krishnadevaraya, Nallamala, Narasimharaya, Srilakshmi
Barley (*Hordeum vulgare* L.) **2n=14**	Graminae	Ethiopia	Irrigated – 75-90 kg /ha Late sown- 80-100 kg/ha	Malt used for manufacture of beer and other liquors like brandy, whisky etc.	Ritambhara, Haritma ,Kedar, Azad , Kailash, Amber, Vijaya ,K-141*, Lakhan (K226) Jagarati (K287), BHS46*, VLB1, Manjula (K329)[1], BHS-169*, Geetanjali (K1149)*, K409[1], Karan 16, , RD2508[1], Pragati 226)*, Jagarati
Pulses:					

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Redgram **2n = 22** *(Cajanus cajan)*	leguminasae	Africa	Kharif:12-15 kg/ha Rabi : 45 kg/ha	Protein 21-25%	Prabhat short duration variety from IARI. ICPL 85063 (Lakhsmi) both for kharif and Rabi **kharif**: 170-180 days;ICPL 332 (Abhaya);ICPL 8719 (Asha)'Maruti(LRG-41):**Rabi** ICPL-87 **ICRISAT varieties** – ICPL 870, ICPH-8 (Hybrid variety) Vishakha, Sharada,
Green gram *(Vigna radiate)* **2n = 22**	leguminasae	India	Sole Crop -- 12-15 Kg/ha Green manure -25-30 Kg/ha Summer Crop -25-30 Kg/ha Rice fallow - 30-35 Kg/ha	Protein 25%	Pusa Baisakhi and Co-4 Rice fallows --- LGG 410 Tolerant to high temp. --- Padma, Sunaina & Co-4 Early maturing (60-65 day) --- Pusa Baisakhi, k851,PS16, Padma, Sunaina & Co-4, Pusa Bold (Vishal),
Black gram **2n = 22** *(Vigna mungo L)*	leguminasae	India	Kharif – 15-18 kg/ha. Rabi - 18-20 kg/ha	Protein 24%	Kharif LBG-20, LBG-623, WBG-26, T -9 Rabi (rice follow) : Krishna, LBG-611, LBG-22, LBG-648, LBG-685, LBG-645 Varieties resistant to YMV :UG-218, Pant-U19, DPV-88-31 Varieties resistant to downymildew: LBG-17, LBG-402, LBG-22, LBG-611.
Bengal gram/chana *(Cicer arietinum)* **2n = 16**	leguminasae	Western Asia (Turkey)	Desi Type 65-70 kg/ha Kabuli type 80-90 kg/ha	21% protein, Malic Acid (90-96%); Oxalic Acid (4-10%)	Pusa 256-rainfed condition; Radhey ; **Gaurav** –resistant to **ascochyta blight**; **Avarodhi** &JG-74 resistant to **wilt;** Jaffa(1948) first variety medium size grain& early maturity
Cowpea (*Vigna ungiculata)*	leguminasae	Central Africa (or) India		***Vegetable meat*** Protein 23.4%	Arka garima, Pusa barsati, Pusa dofsali, Pusa phalguni, Pusa komal, Pusa Ritu Raj.
Lentil	leguminasae	India	30-35 kg /ha	Protein 25%;	Pant L 234,NFL 92 (Narendra Masoor 1) , Bombay 18,IPL

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(Lens culinaris Medik) **2n=14**				*Rabi* crop.	81(Noori) ,K 75 (Malika) , Pusa 4076 (Shivalik), Pusa 1, Pusa 4,Pusa 6 ,PL 77-12 (Arun) ,LH 82-6 (Garima) ,Ranjan ,Asha , L 4147 (Pusa Vaibhav) .
Oilseeds: Groundnut *(Arachis hypogaea)* **2n = 40**	leguminosae	Brazil.	In kg/ha Kharif:120(B) 150(S); Rabi: 150(B),180(S), Summer150(B) 180(S) ***Note: B-Bunch type S-Spreading***	47-53% oil and 26% protein; Ca- def.***popping*** B- deficiency ***Hollow heart.***	JL – 24 (Phule pragathi), TAG -24, Greeshma, Prasuna, Abhaya,Apoorva,ICGV-86590,K – 134, TPT-2, TPT -3, ICGV 86325, DRG 12, Kadiri 4,5,6, Jcc-88, ICGS 11,ICGS - 44 ICGS – 76, Kalahasti, Narayani, TG 26, TMV 2, J-11, Gaug – 1.
Sesame **2n=26** *(Sesamum indicum)*	Pedaliaceae	Ethiopia	**Row seeding** :5kg (rainfed) :4kg (irrigated) **Broadcasting:** :6kg (rainfed) :5kg (irrigated)	Oil 18-20%	AP:-Gauri, Madhavi,YLM-11, YLM-17, Chandana(ICS-94) Brown seeded varieties à Grown in Coastal areas. Gauri, Madhavi, YLM-11, YLM-17,Varada,Usha,TMV6 ; White seeded varieties à Grown in Telangana area Rajeswari, Swetha, Pratap, RT-125, Mrug-1, TG-22, T-12, T-78 etc., Black seeded varieties à Krishna, Soma,
Sunflower **2n=34** *(Helianthus annus)*	Asteraceae	Southern USA (Peru) & Mexico	Varieties: 8-10(rainfed) 6-7(irrigated) Hybrids: 5-6 (Rainfed) 4-5(irrigated)	Oil 48-53%	Maruti, KBSH 44, Pro Sun 09, NDSH – 1, DRSH – 1, MSFH – 8, APSH – 11, Jwalamukhi, Sungene 85 Hybrids : TNAUSUF 7, DRSF 108, EC 69874, EC 68413, EC 68414 (Russian) Sunrise selection (Canadian)
Rapeseed&Mustard **Four diploids are :** 1. *B.nigra* - Black mustard **2n=16** 2.*B.oleracea*-Cabbage 3. *B.campestris* -	Brassicacea e	India and Afganistan, pakistan	Major *rabi* oilseed crop. 5-6 kg/ ha should be sown in rows at a depth of	Refined oil is called **colza** is used in Europe. **Allopoly ploids** 1. *B.napus* - Rape seed of Europe	**Rapeseed:** a) Toria : Agrani, Bhawani, Parbati, Anuradha ,Sangam and T-22(Punjab selection) b)Brown sarson: Pusa kalyani,Supla,M-18. c)Yellow sarson: Benoy,YST-151,Type-42,M-3.

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Rape seed. 4. *B.tourne frotii* - Wild turnip			2.5 to 3.0 cm in case of a pure crop. 1.5-2.0 kg /ha for mixed cropping	**2n=38** **2. *B.juncea* – 2n=36 Indian mustard** 3.*B.carinata*-sthipplammustard (veg /oil seed)	**Mustard :** Pusa Agrani, Pusa bold, Geeta, Kranti, Jagannadh, Jawahar Mustard 2,Vasundhara,Varuna, Vardhan, M-27, RLM 198, Krishna, Rohini ,Prakash, Pusa Jaikisan(bio-902)developed by *V.L. Chopra.*
Safflower **2n=24** *Carthamus tinctorius*	Asteraceae		8-10 kg/ha pure crop. 4-6 kg/ha-Mixed crop/ Border crop.	oil is used in the preparation of **"roghan"** in Europe. Oil is	**Varieties –** Manjira, Sgaramuthyalu (APRR – 3), Parbhani Kusum, Phule Kusum,A-1 (National Check) **Hybrids** - DSH – 129, NH – 1 (Firdt non-spiny hybrid in the world), NARI – 15,NARI – 38, Bhima, Girna, Sharda and Swetha.
Soybean **2n = 40** (*Glycine max*)	Leguminosae	central China	75-80 kg/ha; Late sown: 100-120 kg/ha	20% 0il and 40% protien	JS- 93 – 05, JS – 335, PK – 1029, MACS – 450, LSB – 1, LSB – 3.
Niger (*Guizotia abyssinica*)	Compositae	Ethiopia	Broadcasting : 8 kg/ha Line sowing : 5 kg/ha Spacing **:** 30 x 10 cm	35-40% oil, Linoleic acid is major FA.	Ootacamand, GA 10, Phulbani, GAZ, GA 10, CHH4, RCR 317, TN 5.
Linseed/ **common flax** (*Linum usitatissimum*) 2n=	Linaceae	Eastern - Mediterranean to India	rainfed **:** Broad casting @ 40 kg/ha Drilling @ 30kg /ha	Oil is high in omega-3 fatty acid, 20-24 % protein, 37-42% oil.	Dual purpose varieties including Gaurav, Shikha, Jeevan and Parwati; Surabhi, Janki, Himalini, Surabhi ,Janki, Nagarkol, R-552 Kiran, Sheetal Jawahar -23 , Punjab LC-54, Himalini LC-54, Swetha, Shubra, Garima and Neelam

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Castor **2n=20** (*Ricinus communis)*	Euphorbiaceae	Ehiopia	Rainfed crop **:** 12 - 15 kg/ha **:** 55,000 plants / ha Irrigated crop **:** 5 - 6 kg/ha **:** 18,500 plants/ha	Oil is used as lubricant contains recinoliec acid. Oil is 40-45%, 12-16% proteins,23-27% fibre.	Kranthi, Haritha, Kiran released by PJTSAU,HYD. Jyothi, Jwala, DCH-177, DCH-519 released by IIOR Hyd. Bhagya and Sowbhagya are the oldest varieties. **Aruna** is a mutant variety.
Fibre crops:					
Cotton *(Gossypium hirsutum)* **2n = 4x = 52**	Malvaceae	India	HYV-10 to 15 kg/ha, Hybrids – 2.5 to 3.0kg/ha. *Depth of Sowing*: 4 to 6cm	**King of Fibres;** White Gold. 14.5- 22.5% (desi cotton), 17.5-22.5% (American cotton) 1 Bale =170Kg **Fibre strength:** Stelometer;**Fibre fineness:** micronair **Colour of fibre:** Nickerson –hunter **Fibre maturity:** Sherly analyser	**Introduction** : **Cambodia cotton** in South India, **MCU- 1** **Varieties:** MCU – 5, MCU – 10, K9, K10 **Hybrids:** ***Interspecific hybrids*** - HB 224, Varalakshmi (Laxmi x SB 289E), ***Intraspecific hybrids*** - Dhanalaxmi, H6, H4 *shankar* (Gujarat 67 x American nectariless). **Desi cotton** - DH 7, DH9 **Male sterility based hybrids** - Suguna, PKVHY3, ARDH- 7 **Mutation :**MCU 7- Xray irradiated mutant of L 1143 MCU 10 - Gamma irradiated mutant of MCU 4 Indore – 2,MCU – 5 and Rasmi etc.
Jute 2n=14 *i(Corchorus capsularis) ii(Corchorus olitorius)*	Tiliaceae	i)Indo-Burma ii)Africa	i) 10- 11 Kg/ha. ii) 6 to 7 Kg/ha	Golden Fibre, 1 Bale =180Kg.	*capsularis* – JRC 212, JRC 321, JRC 7447 *olitorious*– JRO 524, JRO 878, JRO 835 ***Mutation breeding*** : Using x rays JRC 7447 and Rupali
Mesta *i(Hibiscus Cannabinus)* 2n=36 *ii(Hibiscus sabdariffa)* 2n= 72	Malvaceae	i)Africa ii)India	Drilling – (line sowing) - 6Kg/ha Broad casting -12 Kg/ha	i)Single reed method -**Good Quality fibre.**ii) Beat-Break Jerk Method - **Poor quality fibre,**	i)Bimili 1; AMC-108 HC- 583 ii)HS 4288; HS 7910 AMV 1; AMV 2; AMV 3(surya), AMV – 4 (Kalinga), AMV – 5 (Durga)

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				Dry Retting - poor quality ;**Wet Retting** - Give good quality fibre.	
Agave / sisal *(Agave sisalina)* *(A. Americana)*	Amaryllidaceae / Agavaceae	Mexico	1. Suckers 2. Bulbils	Flowering (Polling) Hecogenin- (Cortico steroids)	----------
Sugarcrops: Sugarcane (*Saccharum officinarum*) 2n= **ii)Polarimeter& Seurolyser-**sucrose *%*.	Graminae Flowering - arrowing	Indo china Myanmar border and New Guinea	30,000 setts of 3 budded setts or 70-75q/ha; 80,000 setts of 2 buds. **Earthing up, Detrashing and Propping**	62% of world sugar; **i)Hand Refracto meter:**Brix reading (Total Solids present in the juice in %); 18-20 %	**Early varieties** [Co- 8336 Co -8341 Co -T 64] **Drought resistant varieties** like Co -740, Co- 235, Co -997, Co -6304 **jaggery preparation***:* Co7706 **Late maturing varieties (12 -13 months):** Co 7219, Co7706, Co8011, CoR8001. **Saline / Alkaline Soils** *:* 81V48, 81A99, CoT8201, 93A145
Sugarbeet *(Beeta vulgaris)*	Chenapodiaceae	Silesia (meditarranean sea)	Seed rate = 10 kg / ha. Depth of sowing 2-3 cm	Bolting; **Multigerm** (4 seedlings **glomerule**) BRIX- 23-24 %	Erotype E - West Germany. Romoskava -U.S.S.R. U.S. 35 %U.S. 75 - U.S.A. Maribo Anglo Poly ,Maribo Magna Poly ,Maribo Resista Poly-denmark. Triplex & Bush E - U.K.
Tobacco *(Nicotiana tabacum)* *(Nicotiana rustica)*	Solanaceae	Cental America	Avg. wt. of the seed is 0.08 to 0.09 mg & 11,000 - 12,000seeds/g. Seed rate is 3 kg/ha for *N. tabacum* and 6 kg/ha for *N.*	Bidi tobacco (Anand)**9.7%** *Orobanche* **full root parasite.** *Priming:* (harvesting mature leaves) *Curing:* drying process.	**FCV:** Chatam, Delcrest, Kanaka parbha, Dhanadayi, Jayasri, hema, bhavya, gauthami, trupti, ratna, kanti and hemadri. **Bidi:** keliu 20, anand 2,3,23,119, GT-4,5 and bhavyasree. **Chewing:** Chama, Podali, Gandak, Bahar, Sona, Vairam, Thangam, Bhagyalakshmi, Maragadham, Prabha, Meenakshi, Vaishali Special, Abirami, Dharla and Lichchavi (PS-14). **Rustica:** Sonar Motihari. **Natu:** Prabhat, Vishwanath, Natu Special, Pyruvithanm and Bhairavi (NG73).

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			rustica. optimum seed rate is 3-5 kg/ha.	First transgenic plant in the world.	**Cheroot:** DR 1, Bhavani Special, Lanka Special and Sendarapatty Special. **Cigar-wrapper:** Krishna **Burley:** Sweta (BSRB 2) and Banket A1
Crop, Chr.no & Scientific Name	**FAMILY**	**ORIGIN**	**Propagation method**	**IMP POINTS**	**VARITIES**
Fruit crops: Mango 2n=40 *(Mangifera indica)* **Kurukkan :** Salt resistant and Polyembryonic**.** **Olour :** Vigorous rootstock **Rumani,Kalepad& Vellaikolamban :** D w a r f i n g . **Moovandan and Nekkare :** Salt tolerant. **Pulima :** Prolific rootstock **Kalaypad** -dwarfing stock,	anacardiaceae	Indo burma region	Veneer grafting Or inorching **Some Poly emgryonic root stocks:** Bappakai, Chandrakaran Bellary, Goa, Pahutan, Salem, Mazagoaon, Mylepalium and vellaikolumban.	King of fruits* ***"National fruit of India",*** Only**0.1%** flowers develops into fruits. Pollinator *house fly.* **Alphonso** variety is very susceptible to this spongy tissue. **Storage temp. is 8- 9 ^{0}C**	*Neeleshan:* **Neelum X Baneshan.** Late maturing ; *Neelgoa:* **Neelum X Yerra Mulgoa**Regular bearing,high yield; *Swarna Jahangir*: **Chinna suvarnarekha X Jahangir.** AU Rumani:**Mulgoa X Rumani.**Heavy and regular bearer with *KMH-1(Kodurmango hybrid -1):***Cheruku rasam X Khader** *Manjeera* **Rumani X Neelum** *Arka Aruna* :**Banganapalli X Alphonso** Dwarf, regular, prolific *Arka Puneet:* **Alphonso X Banganapalli** Regular and prolific *Arka Anmol :***Alphonso X\Janardhanpasand** *Arka Neelkiran:* **Alphonso X Neelum** Ideal for HDP. *Amrapali :***Dashehari X Nellum** Ideal for HDP. *Mallika :***Neelum X Dashehari** Regular bearer, *Ratna(Neelphonso):* **Neelum X Alphonso** *Sindhu :(***RatnaX Alphonso)** Back cross progeny of Ratna Prabhasankar :**Bombay X kalaepad** *Mahamudbahar:* **Bombay X kalaepad** *Jawahar:* **Gulabkhas x Mahamooda Bahar** *PKM-1:***Chinna suvarnarekha x Neelum**, long distance trans. PKM-2: **Neelum X Alphonso** **Table varieties:** Baneshan, Neelum, Bangalora, Rumani, Alphonso, Mahamooda and Goa bunder. **Juicy varieties:** Chinna rasam, Pedda rasam, Cheruku rasam, Kothapalli kobbari,Panchadara kalasa. Panakalu, Phirangiladdu. **Table and juicy varieties:** Chinna suvarnarekha , Peter. **Off-season Varieties:** Neelum, Bangalora, Baramasi, Rumani ,

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					Royal special.**Pickle varieties:** Achar pasand, Tellagulabi of Nuzivid, Alipasand, Guddemar(Hamlet) **Varieties for preservation:** Baneshan and Bangalora.
Banana 2n=33 *(Musa paradisiaca)* *(Musa acuminata)* **edible sps**.*(triploid)* **Storage temp. is 12-13 ^{0}C**	Musaceae	South East Asia	*Sword suckers* Cut rhizomes called Bits and Peepers.	**Desuckering, propping** and **mettocking** are imp. Practices. Riped banana contains 26% sugar. **Apple of Paradise and Tree of paradise**,	**Varieties:** Dwarf Cavendish, Robusta, Grand nine, lal velchi (red skin), **poovan:** Rastali, Amrit pani, Mortman; Poovan mysore, Nendran (banana chips), Monthan (culinary purpose), Ney Poovan, **safed velchi, lady finger (diploid varities).** **Hybrids:** FHIA-1(gold finger), bodles altafort, rajapuri, moongli, CO-1: kellar laden x m. balbasiana x kadali **Hill Bananas**: Virupakhi
Papaya 2n=18 *(Carica papaya)* **Storage temp. is 9-10 ^{0}C**	Caricaceae	Tropical America	**Seed** rate is 250-300g/ha (gyno dioecious); 400-500 g/ha (Dioecious) 1g=20 seeds	**Papain(enzyme)** contains 72.2% protein. Yellow pigment in papaya –*caricaxanthin.*	**Gynodioecious varieties:** *pusa delicious, pusa majesty, coorg honey dew(selection from honey dew), sunrise solo, Taiwan,* surya etc. **Diecious varieties:** pusa gaint, pusa dwarf, pusa nahna-(extremely dwarf), *CO-1, CO-2, CO-3, CO-5(Papain extraction), pink flesh sweet (TSS-12-14BRIX).***HYBRIDS:** **CO-3: CO-2X sunrise solo, CO-4:CO-2 X Washington:**
Guava 2n= *(Pidium guajava L.)* **Storage temp. is 9-10 ^{0}C**	Myrtaceae	Tropical America (from Mexico to Peru)	**Seed and** Air layering or ground layering.	**Ambe-bahar**: Feb to March **Mrig-bahar:** Nov to January. **Hasth-bahar**: October	**Seeded varieties-** Allahabad safeda, Lucknow-49, Arka Mridula , Red fleshed and Allahabad Surkha; **Seedless:** Nagapur seedless, Saharanpur seedless **Hybrids:** *Saefd jam***: Allahabad Safeda x Kohir,** *Kohir Safeda:* **Kohir x Allahabad safeda,** Nasik, Apple colour, Banarasi, Hafsi, Dharwar, Anakapalli, Harijha and chiitdar etc.
Amla /Aonla 2n= *(Emblica orficinalis)*	euphorbiaceae	South East Asia			
Sapota *(Achrus zapota)* **(***Manilkara achras,*	Sapotaceae	Tropical America	Seed, inarching and soft wood	**Gutta parcha** - chewing gum (Chicle).	Varieteis: Cricket ball, kalipatti, Kirthibatti, Pala, Guthi, CO2, PKM-1 Baramasi, Chhatri, Jonna valasa, vavivalasa, Bangalore, Thagarampudi,etc.

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Manilkara zapotilla)			grafting.		**Hybrids: CO-3:** Cricket ball and Vavivalasa. **PKM-2:** Guthi and Kirthibarthi. **PKM-3:** Guthi and Cricket ball.
Pomegranate (*Punica granatum)*	Punicaceae	Iran (Persia)	**stem cuttings**	Edible part is **aril.** *Fruit cracking* due to **B deficiency. Storage temp. is 0-2 ^{0}C**	**varieties :**Bhagwa, Bedhana, Jodpur, RedDholka, Ganesh, Alandhi, Musket Red, Jalore seedless, jyothi, Papershell, Spanish Ruby, Vellodu, Kabul, Khandhari, and Arakta etc. **Hybrids: Mridula:** Ganesh X Gul-e-sha Red. **Ruby:** Ganesh x Kabul xYercaud x Gul-e-sha Rose pink.
Pine Apple *Ananas comosus Ananas sativus*	Bromiliacea e	Brazil	Shoot suckers, ground suckers, slips, crown, and stem bits.	**Queen of fruit crops.** Enzyme called **"Bromelin."**	**varieties :** Giant Kew, Kew, Queen, Mauritius, Jaldhup , Lakhat, Charlotte Rothschild etc. **Storage temp. is 11-13 ^{0}C**
Ber **Indian Ber :** *Zizyphus mauritiana* **Chinese ber:** *Zizyphus jujuba*	Rhamnacea e	Indo-China region	Mainly **Seeds** superior varieties by **budding.**	**Poor mans fruit.**	**Varieties:** Umran, Kaithli, Banarasi karaka, Gola, Seb Dandan, Meharun, Sanur-2, Meharun, Dandan etc.
Custard apple *Annona squamosa*	Annonaceae .	Tropical America.	Seeds; cuttings, grafting and budding.	**Stone fruits.**	Lalsithapal, Mammoth, Balanagar, British Guinea, Pinks Mammoth, Islandgem, Washington, Arka Sahan, Atemoya
Jack fruit *Artocarpus heterophyllus*	Moraceae	India	seeds.	**Vivipary is common and** *Cauliflorous.* monoecious	Rudrakshi and Ceylon **NJT1, NJT2, NJT3 and NJT4** **NJC1, NJC2, NJC3 and NJC4**
FIG (Anjur) *Ficus carica*	Moraceae	Southern Arabia	hard woodcutting.	**i)Capri fig:**wasp ***Blastophaga psenes***. **ii)Adriatic fig or**	i)Stanford, Crosic, Samson, Roe ding etc. ii) Black Ischia, Turkish white, Marseilles, Kadota, Mission, Adriatic, Brown turkey, Celeste, Conardia etc. iii) Zide, Taranimt.Calimyrna.

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				Common fig; iii)Smyrna fig; iv) White Sanpedro.	iv) San Pedro, dauphine, Gentile, Blanguette, king and Lampeira etc.
Grape 2n= **European grapes:** (*Vitis vinefera)* **American grapes-** *vitis labrusca* and *vitis rotundifolia*	Vitaceae	Armenia near Caspian Sea	**Resistant root stocks**: **i)Phylloxera (Aphid) -** St.George and Riparia. **ii) Nematode &soilsalinity**- Salt creek **iii)Nematode** --Harmony and Dog ridge	**TRAINING: i)Head System:** Simple &cheap; **ii)Pendal System/** Arbour/ Pergola/ Mandwa/ Over head/ Bower system. **Iii)Telephone system/ Over head trellis / Telephone trellis system. iv)Kniffin/ espalier System: PRUNING: i)Summer:** (March-April) also back/ growth pruning. **ii)**Winter/forward: **(Oct –Nov)**	**Variteis:** Bangalore blue, Gulabi, Anab-e-Shahi, Dilkush, Patcha Draksha, Puas seedless, Thompson seedless, Beautty seedless and Perlette. **Hybrids**: Arkavati: **Black champa X Thompson Seedless,** Arka Kanchan: **Anab-E-Shahi X Queen of Vineyard,** Arka Hans: **Bangalore Blue X Anab-e-Shahi,** Arka Shyam :**Bangalore Blue X BlackChampa,** Arka Neelmani: **Black champa X Thompson** Seedless, Arka Shweta: **Anab-e-Shahi X Thompson Seedless,** *Arka majestic:***Anab-e-Shahi X Black Champa**(Table purpose) *Arka Chitra :* **Angoor Kalan X Anab-e-Shahi** Table purpose *ArkaSoma:* **Anab-e-Shahi X Queen of Vine Yard** *Arka Trishna :***Bangalore Blue X Queen of Vineyard (wine)** *Arka Krishna:* **Bangalore Blue X Convent large Black** (juice) *Arka Urvashi:***Hur X Beauty seedless** (juice & wine resistant to *Anthracnose)* Pusa Navarang: **MadeleineAngavine X Ruby Red.** **Storage temp. is 0-2 ^{0}C**
Litchi *Litchi chinensis*	Sapindaceae	Southern China	Seeds and air layering or gootee.	edible portion is **aril**. **Storage temp. is 0-2 ^{0}C**	Saharanpur Early bedana, Dehra doon**,** Culkattia, Muzzafarpur, Late bedana, Swaran roopa (selection).
Bush Phalsa: *Grewia subinaequalis* **Tree Phalsa:**	Tiliaceae	India	**seeds**		Sharbathi only.

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Grewia asiatica					
Citrus Group: **Sweet orange** - *Citrus sinensis* **Mandarin Orange-** *Citrus reticulata* **Acid lime –** *Citrus aurantifolia* **Lemon**- *C. limon* **Grape fruit-** *Citrus paradisi* Pummelo -*C. grandis* Citron-*Citrus medica* **Sweet lime –** *Citrus limettoides* **Gaganimma** -*Citrus pennivesiculata* **Sour Orange-** *Citrus aurantium* **Rough lemon –** *Citrus jamberi* **Rangapur Lime -** *Citrus limonia*	Rutaceae	South East Asia.	Seeds exhibit 45-90% poly embryony. Shield or T-budding.	**Root stock:** i)Jamberi, ii)Gajanimma, iii)Trifoliate Orange, iv)Karnakhatta v)Sathgudi seedling, vi) Rangpur lime, vii)Acid lime, viii)Kichili, ix)Pummelo, x)Wood apple, xi) Sweet Lime. **Bahar Treatment** **Jan-Feb** (Ambe bahar or Angam), **June** (Mrig bahar or Edagam), **Oct** (Hastha bahar or Gairangam).	**Sweet Orange:** Sathgudi, Mosambi and Batavian, Malta, Malta Blood Red, Jaffa, Hamlin,Washington Navel Orange and Pineapple. **Mandarin:** Nagapur Mandarin, Coorg Mandarin, Khasi Orange, Kinnow Mandarin(King Mandarin x willow leaf Mandarin) Mandarin, Ponkan, Satsuma Mandarin, Dancy Tangarin, Darjeeling, Sikkim Orange and Cleopatra Mandarin. **Acid lime:** Vikram, Pramalini, Chakradhar, Balaji; **Lemons:** ***Seed Varieties-***Lisbon, Villa Franca, Eureka, Nepali Round, Nepali Oblong and Rajhamundry. ***Seedless Varieties-*** Malta, Lucknow and Italian.
Apple *Malus pumila / Malus sylvestris* **Storage temp. is 0-2 ^{0}C**	Rosaceae	South West Asia	**Malling IX** root stock. **Crab apple** *Malusbaccata* used in india. Budding or grafting methods.	***King of temperate fruits*** fruit is a false fruit **(Pome).** Ambri is Indigenous and extensively grown in the Kashmir.	**Variteis:Diploids-** Reddelicious, Yellowdelicious, Jonathan,**Triploids**- Baldwin, Beauty, RomeBeauty, Ambri, Sunheri, Ambstarking, Ambroyal, Ambrich, Chaubattia Princess , tropical beauty, Chaubattia Anupam, Ambred Red. **Hybrids: Lal Ambri:** Red Delicious X Ambri **Sunehr**i (Ambri X Golden delicious), **Ambstarking** (Starking delicious X Ambri 81), **Ambroyal** (Starking delicious X Ambri 84), **Ambrich** (RicharedXAmbri 15),

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					Chaubattia Princess (Delicious X Early Shanburry), **Chaubattia Anupam** (Delicious X Early Shanburry), **Ambredred** (Delicious X Ambri 57)
Peach *Prunus persica* L.	Rosaceae	China	grafting and budding (T or shield budding).	Peach is generally self fruitful except the variety J.H Hale, peach is a drupe.	**Table cultivars:** Alexander, Elberta, J.H.Hale, Cardinal etc. **Canning cultivars:** Certex, Halford, Fortuna, Crawfords early, Golden bush etc. **Nectarine cultivars:** Nectared, Sun grand, Sunlite, Sun red, Sun rise and sun ripe.
Pear **French / European / Soft pear: -***Pyrus communis* **Oriental/Japanese Pear-***Pyrus pyrifolia*	Rosaceae	South-West Asia	Shield (T) budding.	Pear trees are usually trained to **Modified leader method**.	Baghu Gosha, Conference, Early china, Bartlett, Favourite, Hardy, Nashpati and Kieffer etc. **Storage temp. is 0-1 ^{0}C**
Plum *Prunus domestica* (**European plum**) *Prunus salicina* (**Japanese plum**)	Rosaceae	i)Caspian Sea ii)China	Tongue grafting, Chip budding and T budding.		Santa Rosa, Beauty, Grand duke, Plum red, Kelsey, wickson, Bur Bank, Victoria etc. Beauty, Santarosa and Mariposa are self fruitful cultivars and used as pollenizers for plum. Kelsey, Eldorado, Wickson, Larado and Farmosa are self unfruitful cultivars
Cherry **Sweet Cherry:** *Prunus avium* **Sour Cherry:** *Prunus cerasus*	Rosaceae	South Central Europe and Asia Minor	**T budding or Inverted T Budding.**	Trained on **modified leader system.**	**Sweet cherry:** Emperor Francis, EarlypurpleBlackheart, Compact Lambert, Jubilee, Sam, Summit, Sue, Sunbrust e, English morello etc. **Sour cherry:** Mont morency, North Star, English morello
Vegetable crops: Tomato:2n = **24** Cultivated tomato - ***Licopersicon esculentum***	**Solanaceae**	**Peru, Ecuador – Bolivia**	400 to 500 g/ha.	**love of apple'** or **'love apple'**. **poor mans orange'.** Alkaloid-**tamatin**	**Hilly areas& plains** : Pusa rubi, Pusa early dwarf, Marutham, Arka vital, Pusa 120, HS-10, sweet 72, S-12, Co -1, Sioux (American var), Best of all, Pusa early dwarf **processing:** Roma and Punjab chuharra **IIHR:** Arka Abha, Arka Abhizit, Arka Ahuthi, Arka

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Small fruited tomato- ***Licopersicon pimpinellifolium***				Pigment **Licopene** **Blossom End Rot: Calcium deficiency;** **Fruit cracking:** Boron deficiency ***Flavrsavr*** is Bt. tomato variety.	Aloukik,Arka Meghali, Arka Sourab, Arka Sourab, Arka Srasika, Arka vartnan, Arkavikas, Arka visal, **S-12,** **Pusa Sheetal** (cold resistant), **Best of all, IVRI -2** **Floradade:** brought from Florida, **SL-120** (nematode rest) **Hybrids:** *Pusa rubi:* Sioux X Improved meeruti (Indeterminate) *Pusa Early Dwarf :*Improved meeruti X Red cloud(determ) Pusa Red Plum:L. esculentum X L. Pimpinellifolium Co 1, Co -2 ,Co -3,Gulmohar (MTH 6) ,Punjab chuharra, Ox heart, Punjab kesari, Pusa sada bahar, Sweet – 72, Roma, Yasvanth ,**ARKA RAKSHAK** latest hybrid of IIHR
Brinjal / egg plant 2n = 24 *Solanum melongena*	Solanaceae	Indo-Burma	375 to 500 g per hectare.	***S. auriculatum*** is immune to little leaf. Fruit type is **berry.**	**Long fruit varieties:Pusa purple long**: . **Pusa purple cluster long**: **Long green varieties:** arka kusumakar, arka shirish, Krishna nagar, green long. **Round purple: Pusa purple round**: *is resistant to fruit borer and little leaf of brinjal.* Selection-6, suphala, arka navaneet, krihsnanagar, purple round, pant ritu raj, vijaya hybrid, shyamala. **Round green:** banarasi gaint, round striped. **Roundish white:** Manjeri, Visali. **Oval fruited varieties:** Junagad oblong, Bhagyamati, H4., **Cluster fruited varieties:** pusa purple cluster, arka kusumakar, **Bhagyamathi (APAU variety).** **Spiny varieties:** H-4, Manjeri. **Hybrids:** *Pusa anmol :* **pusa purple long x hyderpur;** *Arka Navaneet* :**IIHR22-1 X Supreme.**
Chilli *Capsicum annum* **Bell pepper** *Capsicum fruitiscens* –	Solanaceae	Chilli **-Peru** ; Bell pepper **-South America**	**1 to 2 kg** seed/ ha	Green chillies are rich in **Rutin;** Pungency due to **capsaicin**. Pigment due to	**Varities:** Bhagya laxmi (G4), Sindhuri, Baskar/ CA -235, Prakash (LCA 206), Hissar sakthi, N.P46 A, Arka lohit, **Hybrid:** *Pusa Jwala:* **Pusa Red X N.P 46A;** *Pusa sadabahar :***Pusa jwala X IC 31339;** *Punjab lal* :**Perennial X long red;**

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				capsanthin.	*Kiran (x235):* **G4 X anther mutant.** **Bell pepper Varieties:** Arka basant,Arka gourav,Arka mohini, California wonder, Yolo wonder, **Pusa deepthi** (suitable for both kharif and rabi)
Okra/ bhendi ***Abelmoschus esculentus*** 2n = **72 to 144 (poly ploidy)**	**Malvaceae**	**South Africa**	20- 25 kg /ha (summer); 12 - 15 kg / ha (rainy season)	Fruit is **capsule**, used as clarifier in **jaggery** manufacture	Arka Abhaya, DUR – 1(seetla jyothi), DVR – 2 (seetla uphar): EMS – 8(mutant derived from pusa sawani), Harbajan, Pusa makhmali, Perkins long green: **Pusa sawani:** CIC 1542 x Pusa mukhmali **P-7:** pusa sawani x *A. manihot* sp *manihot*. **Arka Anamika:** *A.esculentus* x *A. manihot* sp*tetraphyllus*. **Parbani kranthi***: A. esculentus sp pusa sawani x A. manihot.*
Cucumber: 2n = **24** ***Cucumis sativus***	Cucurbitaceae	India	3 to 5 kg per ha	**cucurbitacins, -** *tetra cyclic triterpenes* **bitter pollen fertilizer is called** metaxenia	**Vars:** Japanese long green, KTCH – 11, Straight – 8, Gemini, Poinsettia(Resistant to angular leaf spot, downy mildew). **Hybs: KTCH – 8:** poinsettia x LC – 3. **Pusa samyog:** *Japanese gynoecious line x green long naples* Cucumber can be trained in **bower system**.
Ridge gourd 2n = **26** ***Luffa acutangula* -** Sponge gourd- ***Luffa cylindrical* -**	Cucurbitaceae	spain	5 to 7 kg per ha.	delightous compound - **Luffein**	**Sponge gourd vars:** Kalyanpur chikni, Pusa chikni, Pusa sneha &Pusa supriya. **Ridge gourd vars:** Arka swathi, Arka sumeeth, Pusa nasadar, Punjab sadabahar, Satputia (hermaphroditic flowers).
Bottle gourd - *Lagenaria sicerarea*	Cucurbitaceae	**Malabar region of India**	**3 to 6 kg** per ha.	Bottle gourd is strictly cross pollinated.	**Pusa manjari:** pusa summer prolific round X selection 11. **Pusa meghdoot:** pusa summer prolific long X selection – 2 **Pusa summer prolific long: summer** crop.
Snake gourd- *Trihcosanthes anguina* 2n = 22	Cucurbitaceae	**china**	3 to 6 kg per ha.	Ratio of male and female ranges from 31 : 1 -22 : 1	Light green – with white stripes Dark green – with palegreen stripes
Bitter gourd *Momordica charantia*	Cucurbitaceae	**Indo – Burma region**	4 to 6 kg per ha	**1 st rank** among the cucurbits in Fe, vit- C.	Arka harith, Coimbatore long, Pusa do mausami, Pusa vishesh (picking and dehydration.) Alkaloid **momordicasoides.**

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Water melon- 2n = **22** *Citrullus lanatus*	Cucurbitaceae	**South Africa**	3 to 5 kg per ha.	richest iron, lycopene and anthocyanin pigments.	Arka jyothi, Arka manik, Asahi yamato, sugar baby, **Pusa bedana:** *tetra – 2 (4x) x Pusa rasard (2x).*
Musk melon2n= **22** *Cucumis melo*	Cucurbitaceae	**China**	4 to 6 kg per ha	**slip stage**.	Arka jeet, Arka rajahans, Har madhu, Pusa madhuras, Pusa ras raj, Pusa sharbati.
Cole crops: **Cabbage** *Brassica oleracea var capitata*	Cruciferae		375 g /ha.	Pickle is called as **Sauerkrat**. **Flavor-glucoside** called **sinigrin**.	Golden acre, Pusa Drum Head, chief drum head savoy, **Conical head group** (Jersey wake field). **Red cabbage:** red rock, red Danish. edible parts called **head**.
Cauliflower ***Brassica oleracea var botrytis***	Cruciferae	Mediterranean region	375 g /ha.	Edible part is **CURD.** **Browning-***B def* **Whiptail:** *Mo def*	Early Kunwari, Pusa Deepali, Pusa Himjyoti, Pusa Shubhra, Dania, Pusa snowball K-1:
Knol – khol *Brassica caularapa*	Cruciferae	Northern Europe		**Edible part: Knobs** (swollen portion above the ground)	**Late varieties:** wiser snscor, wiser tribe, king of north; **Early varieties**: *White Vienna, Purple Vienna.*
Onion *Allium cepa*	Amaryallidaceae	North West India	flowering shoot known as **Scape.** bulbs1000 to 1200 / ha	Plant part **: Bulbs** flavor:**Allyl propyl disulphide,** red pigment is **"Quercetain"**.	**Pusa Red:** yellow colour and mild pungency. resistant to onion thrips. Bellary Big, Bellary Red, Poona Red, Nasik Red, Patna Red,Arka Kalyan,Arka Niketan and Arka Pragati
Garlic ***Allium sativum***	Amaryallidaceae		clove or bulbils or aerial bulbils.	**flavor is due to** Allecin(AA) and Diallyl disulphide. Plant part**: Cloves**	**MH @ 2500 to 5000** ppm when sprayed 2 weeks before harvest inhibited **sprouted** in storage
French bean ***Phaseolus vulgaris*** **2n =22**	Leguminaseae	Central America	Bush type 95 kg/ha Pole type - 25 to 30 kg/ha	Also called as : Kidney bean or snap bean	arka komal, bountiful, contender, Kentucky wonder: Pant anupama, Pusa parvathi (X ray radiation)

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Cluster bean **2n =24** ***Cyamopsis tetragonolobus***	Leguminaseae	**India**	30 to 40 kg per ha	Guar gum (galactomannan).	Durga bahar, IC 11521, Pusa mausami, Pusa nav bahar, Pusa sada bahar,
Garden pea 2n =14- ***Pisum sativum***	Leguminaseae	**Ethiopea**	100 to 120 kg per ha.	**deficient** in s containing **amino acids methionine, cysteine.**	Alderman, Arkel, Asauji, Bonneville, Early badger:
Dolichos bean ***Dolichos lablab***	Leguminaseae				Arka jay, Arka vijay, Pusa early prolific, DL.1428(Arthanari)
Colocasia **2n =28** ***Colocasia esculenta***	**Araceae**	**South Central Asia**	amylase (17 – 25%). **Cormels or daughter corms**	Corm paste:fufu in Africa, **taro**, **Gaint taro, Alocasia**.	**Panchamukhi, Sahasramukhi, Sathamukhi** Deshi, Bunda, Benda,fisabad,bunsi, lathara, gyano no. 12, gyano no.22, gyano no 36, gyano no 40, vane no. 1,2, 3 and S 11.
Elephant foot yam ***Amorphophallus campenulatus***	**Araceae**	**India**	**Corm**	**acridity and irritate -** *crystals of calcium oxalates.*	**----------**
YAM ***Dioscorea alata***	**Araceae**	South East Asia	**Tubers, tuber pieces and vine cuttings**	yam contains **sapogenins** (base of **steroidal drug**) and alkaloid	Dioscorea alata: **Srikisthi, Sri rupa, Srilatha** Dioscorea rotundata: **Srisubra, Sripriya.** sapogenin is **diosgenin**.
sweet potato ***Ipomaea batatas*** **2n =6x=90**	Convolulaceae	South America	**Tuber and vine cuttings**.	highest solar energy fixing efficiency. rabi season crop.	**Kiran,** and Samrat; Pusa safed, pusa lal, rajendra sakarkand, kemhangad local, srinandini, sreevardhini.
Potato *Solanum tuberosum*	Solanaceae	Peru	**Seeds and stem tuber.**	Botanically modified *Stem tuber* . **late blight** is most danger disease of potato.	**Early mature:** kufri chandramukhi, kufri lavkar, kufri ashoka, kufri jawahar. **Late :**kufri deva, kufri megha, Mid: kufri sindhuri, kufri jyoti, kufri lalima, kufri swarna, kufri badshah,kufri giriraj, kufri Sutlej. Clonao selection: kufri red, Kufri safed,

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Tapioca 2n =36 *Manihot esculenta* **short day plant.**	**Euphorbiaceae**	**Brazil**		Roots/tubers contains poison **HCN.** Cynogenic glucosides: **Linamarin and Lotaustralin**	**Sago**is an important food product derived from cassava starch.
Carrot ***Daucus carota***	**Umbelliferae**	Central Asia	5 to 6 kg per ha	beverage called **kanji**, rich in **carotin** a precursor of vitamin A	**Nantes** (The core is tender sweet self orange coloured) **Chanteney** (core sweet and deep reddish orange) **Pusa kesar IARI: local red x nantes half long**. **pusa meghali (temperate type) half long:**
Radish ***Raphanus sativus***	Cruciferae	Europe or Asia		edible portion is **fleshy root**	**Pusa himani, Pusa desi, Pusa chetki, Pusa reshmi, Hill queen.**
Turnip 2n = 18 ***Brassica rapa***	Cruciferae	Russia and Siberia	500 seeds weight /g. 2-3 kg/ha.	Root formation is called **knob formation.**	**pusa kanchan, Pusa swethi, Cranford,** **Pusa swarnima: golden ball X Japanese white** **MH spray** to the crop before harvest to prevent *sprouting*.
Flower crops: Rose ***Rose sinensis***	**Rosaceae**	Oregon and Colorado of USA	**Shield or T-Budding**	**Queen of the flower;** Rose water; Rose gulkand ☹ 1:1 sugar & rose petals	1.**Hybrid Teas:** Abhisarika, Akashsundari, Anupama, Anuraag, Arjun, Ganga, Dr. B.P. Pal, Golden afternoon, Haseena, Mridula, Nurjehan, Poornima, Rakta gandha, President Radhakrishnan 2**. Floribundas**: Akash nartaki, Arunima, Delhi Princess, Himangini, Madhura, Mohini, Sindhur 3. **Polyanthas**: Anjani, Nartaki, Swati, 4. **Miniatures:** Chandrika, Pushkala, 5. **Climbers**: Akash pradip, Delhi white pearl
Jasmin *J.sambac,* *J.auriculatum,* *J.grandiflorum*	Oleaceae	**India**	**cuttings**		**Varities:** Gundu Malli, Single Mohra, Double Mohra, Madanban, Ramabanam, Kasthuri malli. **High-yielding varieties**:CO_1 Mullai, CO_2 Mullai, Pari Mullai, Long point, Long round, Medium point, Short round

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Chrysanthemum ***Chrysanthemum indicum***	Compositae	**Europe and Asia**	Cuttings and Suckers.	**Queen of East.** symbol of Royalty in japan	**Large flowered cultivars** i) white : snow ball, Beauty ii) yellow : Chandrama, Super Giant **2. Small flowered cultivars for pot culture** i) white : Mercury ii) yellow : Aparajitha **3. Small flowered cultivars for cut flowers** i) white : Birbal Sahani ii) yellow : Sujatha iii) mauve : Apsara, Neelima **4. Small flowered cultivars for garland** i) white : Sharad shobha ii) yellow : Freedom
Marigold ***Tagetus erecta -*** African marigold ***Tagetus Patula -*** French marigold	Compositae	Central and South America	**seed** (0.8 – 1 kg/ac or 2-2.5 kg /ha) **herbaceous cutting.**	African marigold - "**vulgar minds**" French marigold is a symbol of "**Jealousy**". **Friendship flower in USA.**	**Important cultivars:** yellow boy, Harmony boy, Red brocade, little devil bicolour, little devil yellow, Butterscotch, Royal Bengal, Queen Sophia,and Tangerene. **African Marigold:** Apollo, Aztee, Golden age, Spun gold,Spun yellow, Guys and Dolls, Happiness, Dolly, Pot –o- gold. **French Marigold:** Sparky, Spanish brocade, flame, flaming of fire, orange flame and star of India, **triploid varieties** are showboat; sever star *(T-erecta x T-patula)* **Pusa narangi Gainda** – Cracker Jack x Golden Jubilee **Pusa basanti Gainda** – Golden yellow x Sun giant
Tube rose ***Hyacinthus indicus***	**Amaryillid aceae**	**Mexico**	Seeds **& Bulbs**		Rameswar, sharga
Spices: **Ginger** *Zingiber officinale*	Zingiberacea e	South East Asia	seed rhizomes. 1500 – 1800 kg per ha.	*Kerala* is the largest producer of ginger. Ginger oil and oleoresin.	**Assam:** Jorhat, Nadia, Maran, Thinladium, Thingpuri. **Andhra Pradesh:** Narsipatnam, Siddipet, Tuni. **Kerala:** Wynad local, Ernad, Kuruppamadi, Thoduphuza**. W.Bengal:** Burdwan **Karnataka:** Karakkal **Sikkim:** Bhaise, Gorubathane, Mazole: **Suprabha, Suruchi, Surari;**

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					Exotic varieties: China from chin and Rio-de-janeiro from Brazil
Turmeric *Curcuma longa* and *Curcuma aromatica*	Zingiberaceae	South East Asia	Mother rhizomes 2000 – 2500 kg /ha, Primary fingers: 1500 to 2000 kg/ ha	**Plant part:** Rhizome *kasturi* used for the preparation of *kum kum.* *Curcumin*	**Long duration:** Duggirala, Tekurpeta, Armoor and Mydukur, CLL 324, 325, 326 and 327 **Medium duration:** Kothapet, Krishna, Kesari, CLL **Short duration:** Amalapuram, Dindigram, PCT – 13 (Suguna), PCT – 14 (Sudarshan).
Black Pepper *Piper nigrum* inflorescence is a *catkin*.	Piperaceae	western Ghats of South India (Malabar)	**stem cuttings**	**Useful plant part:** Fruits/ Berry. **Fruiting branches (plagiotropics)** *king of spices.*	**Karimunda, Kalluvally,** Kottandan, Narayakkodi, Aimpiriyan, Neelamundi, Kuthiravally, Balankottah, Malligesara and Uddagare. Panniyur 1, 2 (Krishna), 3 (Shima), 4 and 5
Cardamom Small or **lesserCardamom:** *Elettaria cardamomum* **Large Cardamom:** *Amomum subulatum*	Zingiberaceae	Malabar cardamom native to Eastern Himalayas)	Seed and rhizomes.	plant part: Fruit (capsule)	Mysore type Malabar type Vazhukka type Coorg cardamom Malabar selection – 1 (CCS – 1)(Malabar type, Mudigere – 1(Malabar type),
Coriander *Coriandrum satuvum*	Apiaceae	Mediterranean region	**Seeds** @ 12-15 kg per ha	**Plant part:** Leaves and Fruits (seeds)	Lam CS 2 – **Sindhu,** Lam CS 4 – **Sadhana,** Lam CS 6 – **Swathi,** Lam CS 7.
Fenugreek *Trigonella foenum graecum* **Kasuri methi** – *Trigonella corciculata*	Fabaceae	South East Europe	**Seeds** 30-35 kg -rain fed. 12- 15 kg- irrigated crop.		Pusa Early Bunching, Lam selection 1, Co 1, Rajendra Kranti, Rmt 1.
Cumin *Cuminum cyminum*	Apiaceae	Mediterranean region		**Plant part:** Fruits (dried seed)	Rajasthan zeera 19, Gujarat cumin 1 (GC -1), Gujarat cumin 2, RS – 1.
Plantation crops: Coconut *(Cocos nusifera)*	Palmae/arecaceae	Indo-Malayan	**seed**	*kalpa vriksha'.*	**Tall vars:**East Coast Tall, West Coast Tall, Laccadevi Ordinary, Laccadivi Micro and Andaman Ordinary; **Dwarf vars:**Chowghat orange dwarf (COD), CGD, Malayan

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		Region (South East Asia)			Green Dwarf (MGD), MYD, MOD, Ganga Bondam. **ECT X G.B** (Godavari Ganga) ; **WCT X COD** (Kera Sankara) **COD X WCT** (Chandra Sankara) **LO X COD** (Chnadra Laksha) **L.O XG.B** (Laksha Ganga) **WCT X G.B** (Kerala Ganga) **A.O X G.B** (Anantha Ganga) **Double Century:** clonal progeny selection.
Cashew 2n=42 *(Anacardium occidentale)*	anacardiaceae	Tropical South America (South East Brazil)	**Seeds and** soft wood grafting	**Plant part:** Kernel. Goa Feni (liquor) Nut is a *drupe*.	**BPP 9 (H 3/28):** it is a selection from a cross between T. No.56 x M 10/4. **In Maharastra:** improved varieties are Vengurla 1,2,3,4 and 5. **In Tamil Nadu:** improved varieties are Vridhachalam 1 and 2. **In Karnataka:** improved varieties are Ullal 1 and 2. **In Kerala:** improved varieties are Anakkayam 1, BLA 39-4, and K22 -1.
Tea 2n= 30 *Camelina sinensis*	Theaceae/ caramaliaceae		**Leaf is edible part.**	**Darjiling is main area**	**Grown in west Bengal, assam and kerala .**
Coffee *i)Coffe Arabica* *ii)Coffe robusta*	Rubiaceae	Ethiopia (South Africa)	**Gleanings:** Collection of dropped berries.	**Processing: wet method: parchment coffe; Dry methid: cherry coffee**	**Kent's coffee:** Vigorous – red fruits, **Cauvery-- catura x Hybrido - de – Timor, Selection 5:** Hybrid devamachy x S 881 – vigorous and rust free, **S – 6:** Robusta x Kent‟s Arabica **Selection 1R(S-274):** High yielder **ii) Selection 3R HybridR:** *C. congenesis* x *C. canephora*
Arecanut *Areca catechu*	Palmae/arecaceae	Islands of Indian Ocean	**seeds**	**Economic Plant part:** Kernel **chali supari:** Fully ripe, 9 month **Kalipak supari: 6-7 months**	*Sree vardini :* **A. catechu x A. triandra;** mangala, su mangala; sreemangala, moti nagar, smarudhi.
Cocoa *Theobroma cacoa*	sterculiaceae	Tropical South America	**Cauliflorus habit.**	**Criollo type is best quality. Economic Plant part:** Beans	**I)forestro ii) criollo; TRINITARION: criollo x forester Amazon**, **Amelonado**,

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Rubber			Tapping is done to extract latex.	**Latex contain 32% dry matter.**	**RFU-112,600,605, 703, 513, 625.**
Oil palm *Ealias guinensis*	Palmae/arecaceae	West Africa	**Plant part:** Nut and Mesocarp	**Dura:** shell is present**; pisifera:** Shell is absent ; **tehera:** cross of dura and pisifera.	**Oli palm research station at pedavegi, andra Pradesh.** **Palm oil is used for prdution of margarine.** **Stripping is done in oil palm.** **Rich in palmatic acid**

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