

deuhin tui pek tur a ni a, a bal (tuber) in siam hun lai hi tui an mamawh zual lai ber a ni. Ni 10 dan zel ah tui pek ngai ngei a ngai bawk. Khaw awm dan a zir in tui pek hi hmun hrang hrang ah a dang lam thei bawk.

Eichhetu rannung enkawl dan: Thlai hip chhe tu (sucking pests) viz., white fly, mealy bug, mites, scale insects (rannung te reuh te te) te enkawl na atan a hnuaia tarlan ang hian kalpui tur a ni

- A chi a tann a hman te chu natna kai lo leh hrisel tha tak an ni tur a ni.
- Rannung man na ban deuh (yellow sticky trap) kha huan ah khan khai tur a ni a, he thil ban hian rannujng te reuh te te (whilefly) te kha zing dar 4 atanga dar 6 inkar ah a lo man chat chat thin a ni.
- Parasitoid (an mahni ti chhe thei) te kha eichhe tu rannung chi hrang hrang control nan hman tur.
- Predator (eichhe tu rannung te hmelma) kha a hman theih bawk.
- ICAR-CTCRI siam bioformulation ‘Nanma’ (7ml l -1) pawh a hman theih bawk.
- Neem hriak 15 ml hi tui litre l ah chawhpawlh in hman thin tur.
- Insecticide viz., Imidacloprid 17.8 SL (1ml hi tui litre 3 ah) leh Chlorpyriphos 20 EC (4ml l -1) te leh
- Spiromesifen 240 SC (1.5-2 ml l) leh Dicofol 18.5 EC (2.5 ml l -1) te pawwh rannung ven nan hian a hman theih vek a ni.
- Natna enkawl dan: Pangbal a natna tlanglawn ber chu hetiang hian a pumpelth theih a-

- Thlai chi hrisel hman
- Meristem atanga chhuak thlai hman
- CMD do thei chi chi hrang hrang chin (Sree Padmanabha, Sree Reksha, Sree Sakthi leh Sree Suvarna te)
- Huan kha fai taka siam tur.
- Natna pu darh tu rannung te control - Imidacloprid 0.03% spray hmang in a lo invent theih.
- Natna do thei thlai chi tha siam chhuah (Natna pu darh tu rannung te reuh te te awm loh na hmun ah)

A lak/seng hun: Phun atanga thla 9-10 hnu ah a lak theih tawh a. A thar hma variety ho chu phun atanga thla 6 tanga thla 7 inkar ah an cho thin a. A lak hun a pelh nasat viau chuan a bal ah khan fibre (hrui chi khat) a lo awm teuh thin bak ah taksa tan a tha starch kha lo a tla hniam thin a ni. A chi tha variety ah chuan thla 9-10 chhungin a vaiin hectare khat hmun ah 35-40 tonne an thar chhuak thin a,a thar hma chi ah chuan thla 6-7 chhung in hactre khat hmun ah 28-30 tonne a thar chhuah theih bawk.

A kuang (stem) vawnthat dan: A kuang la thar lam tak hi phun atan chuan duhthusam a ni a, mahse, hun rei tak ruahtui tlak tawh loh na hmun emaw ruahtui tlak tamna hmnunn ah chuan vawnthat ngei ngein a ngai thin a. Hun rei tak dahthat hian a maha hnawng (moisture) awm kha atla hniam thin a, chubak ah rannung chhi hrang hrang ten a lo ei chhe hman thin a ni. Pangbal thar chhuah hlim kung (stem) hi ventilation awm that na leh daihlim ah chuan thla 2 atanga thla 3 chhung chu a vawn that theih ani.



Agro Techniques in Cassava



Cassava (Pângbal) chin dan

Khawlum a chin theih bâl (tuber) zawng zawng zing ah pângbal (Cassava -*Manihot esculenta* Crantz) hi a lar ber pawl a ni a. Brazil (Latin America) ram ah an ching hmasa ber a, kum zabi 17-na ah Portuguese sumdawnge chuan India ram Kerala-ah an rawn la lut a ni. Cassava hian unit area khat ah calorie tam zawk a siam thei a, ruahtui tlak tam lohna hmun ah pawh an tha duh em em a ni.

Chi tha zawk (Improved varieties): ICAR-CTCRI chuan ei tur leh industry atana hman tur quality hrang hrang nei variety 19 lai a siam chhuak tawh a, pângbal (cassava) chi hrang hrang te chipchiar takin a hnuaia mi ang hian tarlan a ni.

Lei leh boruak mamawh dan (Soil and climate): Pângbal hi lei chi hrang hrang ah a thang tha duh hle a,

mahse lei al lutuk leh tui luan ralna tha awm lohna hmun ah chuan an thangtha vak theilo . Hmun lum leh vawt, ruahtui a tawk chauh a tlak na hmun pawh an ngeih hle bawk.

A chin hun (Season of planting): Pângbal hi tui tha tak a pek chuan kumtluan in a chin theih a. A phun hun tha ber chu ruahtui tlak tan tirh lai April-May inkar hi a ni a; August-September inkar ah pawh a phun theih bawk.

Leilung buatsaih dan (Land preparation): Tractor emaw bawngtuthlawh hmangin lei chu 20-25 cm vel a thuk in laih phut tur a ni a, Lei thawl (light textured soils)-ah chuan flat method hmanga ram buatsaih a, lei sakhat (heavy textured soils) -ah chuan lei chhun vum (mound method) leh tui pek na hnua (irrigated condition) ah ridge leh furrow method hmanga ram buatsaih a tha.

Variety	Duration (months)	Yield (t ha ⁻¹)	Year of release	Important features
1. H-97	10	25-35	1971	Semi branching, starch awmzat 27-31%
2. H-165	8-9	33-38	1971	Non-branching, starch awmzat 23-25%
3. H-226	10	30-35	1971	Semi branching, starch awmzat 28-30%, susceptible to CMD
4. Sree Sahya	10-11	35-40	1977	Semi branching, starch awmzat 29-31%
5. Sree Vishakhram	10	35-38	1977	Semi branching, starch awmzat 25-27%, a tak eng, β carotene tam na
6. Sree Prakash	7	30-35	1987	Semi branching, starch awmzat 29-31%, hmun hniam lai ah a tha duh a, a puitling hma bawk
7. Sree Harsha	10	35-40	1996	Erect branching, starch awmzat 38-41%, susceptible to CMD, good cooking quality, drought tolerant
8. Sree Jaya	6-7	26-30	1998	Erect branching, excellent cooking quality, suitable for lowland as a rotation crop, susceptible to CMD, early maturing, starch content 24-27%
9. Sree Vijaya	6-7	25-28	1998	Erect branching, excellent cooking quality, suitable for lowland as a rotation crop, susceptible to spider mites and scale insects, starch content 27-30%
10. Sree Rekha	8-10	45-48	2000	Erect branching, good table variety, suitable for both upland and lowland conditions, starch content 28-30%
11. Sree Prabha	8-10	40-45	2000	Semi branching, good table variety, suitable for both upland and lowland conditions, starch content 26-29%
12. Sree Padmanabha	9-10	38	2006	Resistant to CMD with normal yield, starch content 25-26%
13. Sree Athulya	10	35-40	2014	Variety with stable and high extractable starch (30.2%) with higher yield, ideal for cultivation in industrial areas in Tamil Nadu
14. Sree Apoorva	10	35-40	2014	Variety with extractable starch of 29.9% and higher yield, ideal for cassava based industries
15. Sree Pavithra	9-10	35-40	2015	Medium starch (24.4%) content, high K efficiency (243.65 kg tuber/kg K absorbed), suitable for soils which are inherently low to marginal in soil exchangeable K.
16. Sree Swarna	7-8	35-40	2015	Field tolerant to CMD, starch content 25.2%, suitable for both upland and lowland conditions
17. Sree Reksha	8-9	40-50	2017	Non-branching, CMD resistant, starch content 27-31 %, tolerant to post-harvest physiological deterioration

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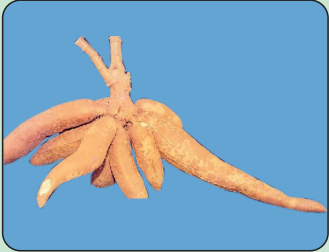
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18. Sree Sakthi	9-10	45-50	2018	Non-branching, CMD resistant, medium starch content 25-27%, industrial use
19. Sree Suvarna	7-8	45-50	2018	Non-branching, CMD resistant, high yielding, high starch content 27-32%, tolerant to post-harvest physiological deterioration
20. Sree Kaveri	9-10	40-50	2023	Resistant to CMD,highnutrient efficiency and drought tolerance and starch content 27-28%



1. H-97



2. H-165



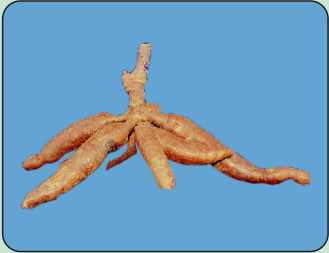
3. H-226



4. Sree Sahya



5. Sree Vishakham



6. Sree Prakash



7. Sree Harsha



8. Sree Jaya



9. Sree Vijaya



10. Sree Rekha



11. Sree Prabha



12. Sree Padmanabha



13. Sree Athulya



14. Sree Apoorva



15. Sree Pavithra



16. Sree Swarna



17. Sree Reksha



18. Sree Sakthi



19. Sree Suvarna

Thlai chi tha thlan dan (Selection of quality planting material):Pangbal hi a tang tan chum (cutting) hmanga tihpun a ni a. Thlai puitling, natna leh rannung ei chhiat loh 2-3cm a chhah chu a tang chunglam leh a laiawl chu tan chum tur a ni a, a tang chunglam a tanga hmun thum a then a hmun khat chu paih thin tur a ni. A zung tha tak a chhuah theih nan a bial zawng in mam tak in tan (cut) tur a ni

A tang (stake) sei zawng leh phun dan: Stake sei zawng chu 15-20 cm a hman theih a, stake hi 5 cm thlenga thuk in phun tur a ni.

Minisett technique: He technique hi bâl (tuber) chi hrang hrang rang taka tihpunna atana hmanraw tangkai ber leh hmantlak ber nia ngaih a ni a. Step hrang hrangte chu

- Natna nei lo nia lang thlai te kha select tur a ni
- Tissue culture method a hman theih a
- Plantlets index te in vitro mother plant anga hman
- Thlai lo tiak te kha green house/ net house chhung ah dah leh phawt tur
- Minisett te chu nursery ah tihpun tur
- Thlai lo tiak te chu huan ah phun mai tur
- A kalphung zawng zawng kha tih nawn zel a, tih pun a, sem chhuah theih a hmalak

Minisett technique mamawhna chhan

- Tuber (bâl) thlai hi a tam zawk chu a chi (seed) hmang lo a tih pun vek an ni a
- Bê leh dâl ho nena khaikhin chuan a tih pun zat (multiplication ratio) a hniam
- Clone hmanga tihpun hian natna an kai awlsam bik a



Protocol for quality planting material production in cassava

Variety siam chhuah thar te hian loneitute hnen a thlen nan hun a duh rei bawh

- Cassava-a quality planting material siamchhuahna tur protocol
- Released varieties take a long time to reach farmers

Quality tha pangbal thar chhuah dan

Stake phun dan: Stake phun dan hrang hrang te chu: vertical (a tung chho zawng a phun), slanted (a awn deuh a phun) leh horizontal (a khampei zawng a phun). A tung chho zawnga phun hian an to rual ber zawk a ni.

A phun inkar hlat zawng (Spacing): Non-branching type - 75 x75 cm, semi-branching leh branching type ah chuan 90 x 90 cm in an phun tlangpui a ni. Thar chhuak hnem tur chuan a tlangpui stake (a tang) pakhat zel an phun thin a ni.

Phun tur mamawhzat : Hectare khata phun tur mamawh zat -75 x 75 cm inkar ah a tang (stake) 3600 leh 90 x 90 cm inkar ah a tang 2500 vel a phun theih.

A chung lam atanga lo chawr chhuak te hi a stake hnuai lam atanga lo chawr chhuak te aiin an thang chak zawk a. A hnah tam lutuk paih then hian a bal (tuber) a in siam tha thei zawk a ni.

A tang phun belh (gap filling): Field-a a tang phun lai hian a tang 5% (600 nos.) chu square meter khata zau nursery-ah 4 x 4 cm inkar ah a hranin phun tur a ni a, ni 20 atanga 25 in kar a upa thlai te chu phawi chhuah a, a tang kan phun dam zo lo ho kha replace mai tur a ni.

Interculture leh earthing up (lei rih vur): A bik takin a tir lam ah hnim hi pawhfai/tihfai a pawimawh hle a, phun atanga ni 45-60 hnuah interculture hmasa ber chu tih tur a ni a, chumi hnu a tang a thla khat hnuah earthing up (lei rih vur) ngei ngei tur a ni.

Leitha pek dan (Manure leh fertilizer): Ram buatsaih lai hian leitha (Bawng ek, ar ek etc) 12.5 tons bakah fertilizer dose 50 kg Urea, 50 kg SSP leh 50 kg MOP chawhpawlh hman a tha. Thlai phun atanga ni 45-60 hnu ah leitha pek te, hnim pawh fait e leh a tul ang ang kha tih thin tur a ni a, 50 kg Urea leh 50 kg MOP te chu hectare khat zel ah kah (spray) thin tur a ni. A thar hma chi leh local variety chi hrang hrangte tan chuan fertilizer dose 50:25:50 kg Urea, SSP, MOP hectare khat zel ah hman thin tur.

Tui pek dan: Phun atanga ni 20 chhung tal chu uluk