

Serthlum-in leitha a mamawh leh a pawimawh dan

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Kan ser kung a lo dam rei zawk nan leh rah tha tak mai a chhuah reng theih nan leitha a mamawh tawk pek reng hi a pawimawh em em a, Ser kung a rah hma leh a rah hnu hian leitha mamawh zat a in ang lo hle a, chung a mamawh dan hrangte chu hriat a, a mamawh dan ang zel a pek hi ser kung tha leh damrei kan neih theih nan tih ngei ngei tur a ni.

Kan ser kungte chuan leitha an mamawh dan leh mamawh zatte chu a hnah a chawtha awm zat atangte, a chinna lei that dan a zirte leh a thlai kungin leitha a hip ral dan a zir tein a chhut chhuah theih a, amaherawhchu hmun kilkhawr a awm te chuan kan hriathran theih dan tur ber chu a kung leh a rah a lo lanchhuahdan atangin a ni ber awm e, chuvangin hetiang a lo lang chhuak tawh a nih chuan a rang thei ang berin a mamawh tawk leitha pek dan kan ngaihtuah vat tur a ni.

Thei kungte hi thlai kumhlun a nih avangin a zung a kaih thukin a zau hle a, leitha a mamawh dante, mamawh zatte, mamawh hunte pawh kumkhat thlaite nen chuan a in anglo hle a ni.

Kan ser kungte chu a rah tam lam aain a rah len that leh hrisel lam kan ngai pawimawh zawk tur a ni a, chutiang tur chuan eng leitha nge a mamawh tih leh eng hun a pek tur nge tih kan hriat chian a ngai a ni. Chutihrualin, uar lutuk a kan pek hian a chhe zawngin(keeping quality) a rah-ah nghawng a nei thei thin.

Nitrogen (N), Phosphorus (P) leh Potassium (K)-te hi serthum in chaw mamawhpui berte a ni a heng leitha pathumte hi kumtluanin tam tham takin a mamawh reng a ni, hengte hi organic manure (bawngekleitha, leichunglang hang tha leh hnimtawih) ten kan serkung mamawh a puhru zo lo a, chemical fertilizer (Urea, MOP, SSP) te kan pek belh a ngai thin, heng bakah hian leitha tlem deuh zawk a mamawhte a awm bawh, chungte chu Sulphur (S), Calcium (Ca), Magnesium (Mg), Zinc (Zn), Copper (Co),Manganese (Mn), Iron (Fe), Boron (B), Molybdenum (Mo) te hi an ni. Hengte erawh hi chu ranek leitha ah hian tlem tlemin a awm deh vek a kan thlai in a mamawh tawk a hmulo anih chuan siamsa (chemical micronutrient) kan pek belh a ngai thung.

Ser kungin a mamawh leitha hnathawh leh a tlakchham lo lanchhuah dan en hmasa i la:-

Major-nutrient:

Nitrogen:

- Kan ram lei hian a tlangpuiin Nitrogen leitha a pai tlem tlangpui a, chuvangin nitrogen leitha hman hi ser-in a thatpui hle.
- Nitrogen hi Protein leh Chlorophyll siam nan a chawpui ber a ni a, a mamawh tawk Nitrogen a hmuh loh chuan ser kungte chu a lo **eng** in a **than a thu** thin.

- Serin Nitrogen a tlakchham chuan a tang leh zarte lo roin a lan danah pawh a hrisello thin, Phosphorus leh Potassiumte pawhin an hna thawh tur an thawk tha thei thin lo.
- A tlangpuiin ser kung puitling tawh chuan Urea 800-1000gms kum khatah a mamawh thin.
- Urea aia Ammonium Phosphate leitha hman hian nasa takin leithur tur a veng thei a chu chuan Phosphate, Iron, Magnesium leh Zinc te thlai ei theihin a siam.
- Ser kungte hian engtiklai pawhin nitrogen hi a mamawh reng a, chubakah leihnuai lam a luanral leh boruakah te a tham ral chak ve bawh avangin, mithiamten pek hun tur an tih ah hian pek hram hram thin tur a ni.
- A pek hnem zawng erawh a in ang vek thei lo, a chhan chu a lei thur dante, a leilung awmdan leh a leitha pai hnem dan a zirte, a pek hunte, a pek dante, a kung upat dan a zirin a danglam thin.
- Tui tin khatah urea chawefiankhat vel chawh tui a ser hnah a kah hian a thawk chak ber mahse a daih rei lo.

Nitrogen tlachham lanchhuah dan:-

- Nitrogen tlachham serthlum kung chu thang pangngai-in lang mahse a tlachhamlo kung aiin a te a, a rah atlem in a rah pawh a regular lo.
- A par a chawi tlem bikin, a chawr pawh a pangailo a, a tang a tein a thang tha lo. A zikte pawh a thi duh bawh thin.
- A hnah a hringdal ruap loh pawhin a lo eng deuh thin.
- A hnah upaah a lang hmasa a chumi hnuah a hnah no lamah a insawn chho thin, a nasaah chuan a pum en pup thin.
- A vein, midrid, leh lateral vein te a lo eng deuh a, a hnah tak erawh chu a hring thin.
- Iron, manganese leh zinc tlachham te pawh hetiang tho hian a eng ve thin a, mase a hnah no-ah a eng (yellow leaves) chhuak hmasa thin.
- Hlo tur kan kah palh vangte pawhin a hnah a eng ve thin tho bawh.

Phosphorus:

- Phosphorus te hi tlai than nan leh an cell inthendarh nan a tangkai hle.
- Kan lei hian Phosphorus a pai tam loh bakah a awm chhun pawh thlai ei theihloh in a awm tlangpui thin.
- Serin a tlakchham chuan a hnah hnuailam a hringdal duap duh in, a hnahchunglam pawh a hring rangruai a, a ro bawh thin. A rah kawr a chhahin a bawl hrup duh a, tui (Juice) a pai thlem a, a rah a te bawh.
- Nucleic acid, Phytin, Phospholipids te siamna ber a ni a, chuvangin thlai ti thang thatu a ni a, tha tak a thlai kung thawk (respire) tirtu a ni bawh.

Phosphorus tlachham lanchhuah dan:

- A thang tha lo, a par a tlem in a rah chhun pawh a tla duh hle.
- A hnah upa lamah a langchhuak hmasa thin a rawng hring duk hlarh a awm lo
- A hnah a te, a sin bakah rawng sen or senuk deuhin a kap thin.
- A hnah a hun hmain a til duh a, a rah pawh a lawh hun hmain a til bawh.

- A rah a puitling har deuh thin, a rah kawr achhahin a bawl hrup duh a, a lai a thawp duh bawk.

Potassium:

- Potassium hian serkung a ti tuarfei a, natna, khawvawt, khawlum leh khawkheng lakah thlai a venghim.
- Ser rah a titam duhin, a dahthat rei theih (keeping quality) .
- A par laite, a rah insiamlai leh a rah puitlin dawn hnaihah potassiumte hi a mamawh hnem zual.

Potassium tlachham awm dan:

- Serin a thlakchham chuan a hnahte a lo chuar a, a thente chu in herhngual ten a lo awm thin, a zik a thang chakloin a hnahte ruallo takin a eng nual thin. A than a thu a, a rah a te bawk thin.
- A hnah tawp (tips) leh a tlang sir vel a lo eng hmasa thin, a nasa-ah chuan a lo ro in a til thin, a hnah upa-ah a awm hmasa thin.
- A hnah a te in nasa-ah chuan a par/rah a til nasa thin, a rah chhun pawh a te in a pil pawh mam tha tak mahse a puitlin hmain a lo eng mai thin.

Micronutrient:

- Ser kung hian a chungka kan sawi tak leitha NPK chauh khi a mamawh a ni lo a, tlem deuh zawk a mamawh leitha a awm ve nual a, chungte chu pek ve ngei ngei a ngai a ni.
- Chungte chu ngaihthah anih chuan ser kung than a rual loin, a lang hrisel tawk thei lova, ser rah tam takin a puitlin theihloh phah thin.
- Ser kung a hrisel a a rah that zak nan Major leh micronutrient te hi a mamawh tawk a pek ngei ngei tur a ni.
- Micronutrient pakhat pawh a tlakchham chuan a rah leh a kungah a hriat thin.
- Chung micronutrient-te chu lei lam a pek emaw a hnah emaw a kah mai tur a ni.
- Mi thenkhat chuan leithate hi inbuktawkin an pe lo a, chu chuan a leitha dang thlaiin a ei tur a dang thei.
- Lei a thur lutuk (below 5.5)emaw al lutuk (above 9) emaw a nih chuan micronutrient te leiah tam hle mahse thlai in a ei thei lo.

Calcium (Ca):

- Thlai kung ti chaktu leh ti khauhtu a ni a, a zung insiam nan a tangkai.
- Serin a tui hipluhte tangkai tak a hman tir tu a ni.
- Thlai-in Nitrogen, iron, boron, zinc, copper leh manganese lei atanga chawr tangkai turin a pui.
- Lei thain thlai a chhiatna(toxic effect) a neih tur lakah a veng a ni.
- Serin a tlakchham chuan a zung a thang thalo.
- Calcium a tlem chuan lei a thur duh.

Magnesium (Mg):

- Chlorophyll siamtu a ni a, thlaiin a tlakchham chuan a rah tha mawh hle.
- Serin a tlakchham chuan a hnahbul lam leh tawp lam-ah triangle/V shape-in a hring deuh a, midrib bulvel a eng thin.
- A hnah no lam aiin a hnah upa- ah a lang chhuak thin.

Sulphur (S):

- Sulphur hi chlorophyll leh protein siam nan a tangkai.
- Thlaiin a tlakchham chuan a hnah a lo engin a vein velah a eng zual thin. Nitrogen tlachham nen a in ang hle a Urea pek pawh a a la en fo chuan Sulphur tlachham a ni duh hle.
- A tang chunglam a tangin a thi thin, tin , a rah kawr a chhah duh.
- Urea aiah Ammonium Sulphate pek a tha.

Zinc (Zn):

- Chlorophyll leh protein siamtu a ni a, khaw ro leh tuidul lutuk lakah a venghim bawk
- Ser in a tlakchham chuan a than a muangin a hnah a lo eng deuh thin.
- A tan tirah chuan a hnah a var paw (creamy white) lam atanga eng deuhin a awm thin.
- A rei deuhin a *vein* lai hringin a *vein* leh *vein* inkar a eng thin.
- A hnah thenkhatte chu a te in a zum deuh duh bawk, a lo tlakawlh a a tang a thi zui thin.
- A kung a thang tha theilo.
- Zinc sulphate a kah tur.

Iron (Fe):

- Chlorophyll siamtu a ni a, nitrogen in hna tha tak a hna a thawhtheihnan a puitu a ni.
- Iron tlachham hnahte chu engdal leh vein bul hring deuh in a tial riai thin.
- A nasat chinah chuan a hnah chawrno tharte chu a var deuh vo thin.
- A hnah a te a, a hunloah a til mai thin. A rah pawh a tlem in, a te a a tharchhuah pawh a tlem nge nge.
- Lei tur ah a iron thlakchham a zual thin.
- A tantirah chuan Nitrogen, Manganese leh zinc tlachham landan nen a inang hle, Nitrogen tlachham chu a hnah upa-ah alangchhuak hmasa a, Manganese deficiency ah chuan vein leh vein inkar eng hi iron thlachham a awm aiin a chianglo deuh.
- Hetianga a awm chuan iron cheleate pek emaw ferrous sulphate a kah tur.

Manganese (Mn):

- Chlorophyll leh protein ten hna an thawh theih nan a puitu a ni. Khaw ro leh tuihul lo lakah vengin cell ti thangchaktu a ni.
- Mg tlachhamte chu a hnahno lam a eng dal deuh a, *midrib* leh *vein* vel a hringdal ruau thin.
- A than a thu in a thar tlem pah thin.

- Iron leh zinc thlachham nen a in ang hle a mahse iron thlachham hnahte chu chiang takin (*sharply delineated*) a vein leh midrib vel a hring a manganese erawh chu a a buai deuh nuaih (Fuzzy) thin.
- Zinc thlachham hnahte chu a pangngai aiin a te hret a manganese erawh chu a a normal thung.
- Manganese sulphate in kah tur.

Copper (Cu):

- A tang a ti khauh a, khaw kheng leh fur ruahtui tam lutuk a vanga chhiatna lakah a veng a, carbohydrate hnathawh a pui bawk.
- Cu tlachhamte chu an hnah hrinna a lo tlahiam a, a thente chu eng deuh dawn dawn ten an awm a, a hnah a mamtha zan thin lo.
- A tang chawrno te chu adingil thalo leh S-shaped ang deuh dawn dawn ten an awm thin.
- A tangah te chuan durh ang deuh a puar/bawk deuhin a awm a, a chhungah gum/thil ban ang deuh awm thin.
- Co tlachhamte landan hi iron, zinc, Manganese tlachhante lan dan nen a in ang deuh. Copper leh zinc sulphate (0.5%) a kah tur, a rah a ti tha in a hnah pawh a timam.
- Copper fungicide (Eg copper oxychloride) hman hian a tiziaawm.

Boron (B):

- Leithur leh balu lei lamah *Bo* thlachham hi a awm duh bik hle, tui pek that viau pawhin a kungte a ro tho thin.
- Boron a tlakchham chuan a natna do theihna a tlahniam a. Boron hian thlai than chaktirtu hormone siam turin a pui bawk.
- Boron a tlakchham chuan a hnah a tein a khawr duh bawk.
- A pil ah hian thilsak sakhat deuh bik a awm thin, a chang chuan a chhung lairil laiah pawh awm thin.
- A rah a sak in a piangsual duh a, a khi duh bawk.
- A rah a hut duhin a til duh bawk.
- Borax or Boric acid (0.1%) a kah tur. Pek tam lutuk erawh thlai tan a pawh thei.

Molybdenum(Mo):

- Leitha dang a hip luhte tha tak a thlaiin a ei theihnan a pui.
- Leithurah a thlangpuiin a awm duh.
- A hnahah eng bial dal deuhin a awm a, a nasat deuh hunah a lang chiang deuh mai thin.

Heng a chunga micronutrient kan sawite hi a tlakchham chuan a hnuaiia damdawi chawhpawlh hian kah tur:

Zinc sulphate – 50 gms, Ferrous sulphate – 20 gms, Magnesium sulphate – 20 gms,

Manganese sulphate – 20 gms, Boric acid – 10 gms, Urea – 100 gms, Lime(chinai) – 60 gms te hi tui 10 litres a chawhpawlh a kah tur.

A chung kan sawite hi a awmlo anih chuan **Multiplex for citrus** in 1.5g/L of water a kah tur tah hian serthlumin a mamawh micronutrient te a kim a ngaih a ni.

(Leitha kan pek laiin Ranek/FYM pek tel hram thin tur, ranek-ah hian heng a chung a kan sawi leithate hi tlem tlein a awm kim deuh vek a ni.)

Serin a mamawh leithate chu fertmilizer leh manure (bawngkek leitha, compost, leichunglang hangtha etc) atangte in kan pe thei a, mahse Manure hian fertiliserte ngaituah chuan leitha thlain a mamawh pui ber (Major nutrient ie NPK ..) te a pai tlem hle a a mah ngawt chuan thlain a mamawh khawp a pe zo lo a ni, chu vangin heng leitha (manure) ringawt hi kan ring thei lo anga chemical fertilizer leh leitha siamthei thil dang pawh a mamawh tawh kan pek tel ngei a ngai a ni, chungte chu:-

1. Organic manure: organic manure kan tih te hi chemical rimnam lo leitithatu kan ti thei awm e:

- **FarmYard Manure (FYM):** ran ek leh zun lakkhawmte a ni ber a,
- **Compost :** thenkhat chuan ranin ah buhpawlte ,thingzaina dip leh ran zun hip khawm thei thilte pahin chu chu thlai tan dah tawihin thlai chin nan an hmang thin. Hetianga tih hian ran zun leitha tak tak te kha tlai tan a tangkai bik a ni. Ranin a dah kher lo pawh hian huan samna hnim hnahte lakhawmin a remchang laiah khur laiin an dah tawih a chungchu a tawih that hnuah la chhuak lehin ser an pe leh thin.
- **Green manuring:** thing hnah leh thlainnah hmuh theih ang angte lakhawmin leiah an lehnhah thin a chu chu green manuring an ti. Abikin behlawi, chana, Dhaincha etc te hi a tha duh bik.
- **Concentrated organic manures:** Bonemeal, fishmeal, oilcakes etc ho hi a ni a, organic manure dang aiin leitha a paihnem bik.

2. Legume planting

Legume crops an tih ho te hian an zungah bacteria chi khat Nitrogen siamthei leitha a awm a, chung ho te chuan leitha siamin thlai dang tan pawh a tangkai a ni. Eg. Chana, behlai, bekawng, behliang, bête etc.

Leitha chi hrang hrang pawimawhna leh a tlakchhamte lo lanchhuah dan kan hre ta bawh a, kan serkungte uluk tak a en chhuakin, an tam a ni tih an lanchhuahtir hma in i chawm tha ang u. Leitha awmsa (kumtin a luanral thin) a duhtawh mai lo in, fertilizer leh bawngkek leitha te pek belhin, kan pek tawhsa a luanral loh nan half moon terrace emaw terrace

pangngai emaw a theih ang ang a dawl zawlin leitha kal ral tur i veng tha ang u, tichuan kan ser kungte leitha mamawh avangin an tam/decline dawn lo nia.

Serthlum - in fertiliser a mamawh dan:

Manure/ Fertiliser	Leitha pek hun	Kum 1 a upa	Kum 2 a upa	Kum 3 a upa	Kum 4 a upa	Kum 5 a upa	Kum 6 leh a chunglam
FYM	Jan-Feb	10kg	10kg	10kg	15kg	20kg	25kg
Urea	March	50g	100g	150g	200g	250g	300g
	June-July	50g	100g	150g	200g	250g	300g
	Sept- Oct	50g	100g	150g	200g	250g	300g
SSP	March	100g	200g	300g	400g	400g	500g
	June-July	100g	200g	300g	400g	400g	500g
	Sept- Oct	100g	200g	300g	400g	400g	500g
MOP	March	50g	100g	150g	200g	250g	300g
	June-July	50g	100g	150g	200g	250g	300g
	Sept- Oct	50g	100g	150g	200g	250g	300g

Source: ICAR, Mizoram centre, Kolasib.

Calendar mila serhuan enkawl dan (Calendar of Operations):

Thla	Tih tur
Dec.-Jan.	<ul style="list-style-type: none"> • Half Moon/Full Moon Terrace siam tur a ni a, hei hian fertilizer leh ranek leitha pek a tihawlsam bakah leitha / lei chung hang luangral tur a veng. • Water sprout, ser tang hrisello , ro leh thi tawh te paih tur a ni, a tang tan chhumna hmuamhma chu Bordeaux paste hnawih tur.
February	<ul style="list-style-type: none"> • Dolomite lime/slaked lime powder (chinai thi) @ 3 kg/tree kum thum danah pek tur.
March-April	<ul style="list-style-type: none"> • FYM/ ranek leitha kung khatah 30 kg pek tur. 300 g Urea + 500 g SSP + 300 g MOP kung khat zel ah pek tur. • Ser kung zawng zawng lei seh chin atanga 2feet vel Bordeaux paste a hnawih tur. • Ser hnah chawrno thar te Bavistin (1g/l) + Monocrotophos (1ml/l) kah tur. • Ser hnah chawrno thar te Zinc sulphate (0.5%) + Magnesium sulphate (0.2%) + Copper sulphate (0.4%) + Manganese sulphate (0.4%) a kah tur.
May	<ul style="list-style-type: none"> • Ser kung zawng zawng lei seh chin atanga 6feet vel 1% Carbaryl 50 W.P. (20 g/l) hnawih tur. • Ser nget siamtu Trunk Borer puitling-te veh a that tur. Ser kung sawi thin hian heng a nget pui te hi a sawi tlak theih a, hei hi a lo berah ni sawm danah tih thin tur a ni.

June-July	<ul style="list-style-type: none"> • Ser hnah chorno thar te Bavistin (1g/l) + Monocrotophos (1ml/l) kah leh tur. • Ni 15 hnua Bordeaux mixture (1%) emaw Blitox-50 (3 g/l) emaw a kah tur. • 300 g Urea +500 g SSP +300 g MOP kung khat zel ah pek tur. • Ser hnah chorno thar te Zinc sulphate (0.5%) + Magnesium sulphate (0.2%) + Copper sulphate (0.4%) + Manganese sulphate (0.4%) a kah tur.
Aug.-Sept.	<ul style="list-style-type: none"> • Ser kung zawng zawng lei seh chin atanga 2feet vel Bordeaux paste a hnawih tur a ni a June-July thla a a kah a kah tur chite kha kah nawn leh tur. • Trunk borer grubs(a nget) te thah nan a nget kua chu tih fai a lapua petrol/Dichlorovos a chiah a hnawh tur a ni. Hetia tih a nih loh pawhin Dichlorovos @ 0.2% (2 ml/l) a kua-ah kah luh a leia hnawh tur.
Oct.-Nov.	<ul style="list-style-type: none"> • 300 g Urea + 500 g SSP + 300 g MOP kung khat zelah pek tur.