



**NOSTO KA·GIPA JO·ONGRANGKO  
WARACHAKGIPARANG ARO UARANGKO  
MAIKAI JAKKALGEN UI·ATANIRANG  
(Bio - pesticides & Bio - control Agents)**



# JELBRA JELSUATBO IA NAMGIPA PULRANG ARO JO'ONGRANGKO

*Ia pulrang aro jo'ongrang nosto kagipa jo'ongrangko komiata aro uarangchi nosto ong'aniko komiata*

## NAMGIPA PULRANG



**COSMOS**



**SUNFLOWER**



**ZINNIA**



**SNAP DRAGON**



**GENDA PUL**



**MORNING GLORY**

## NAMGIPA JO'ONGRANG



**TELENOMUS**



**CHAROPS**



**ADUSRANG**



**FUNGAL  
DISEASES**



**GONIOSUS**



**LADY  
BEETLE**



**GUK**



**CHIGRING**



**JONGMEN**



**MIRD BUG**



**OPHIONEA**



**ARINGA  
JO'ONG**



**GUWANG**



**PAEDERUS**



**GUWANG**



**DRYINID**

Warachakgipa jonturangko jakkale mi misi nosto ka-gipa jo-ongrang, samsirang aro mia misini sabisirangko namatanikon 'Biological Control' ine agana. Warachakgipa jo-ongrang rokom gittam donga uarangara predators (giping jo-ongrangko cha-e janggi tangipa), parasitoid (gipin jo-ongrangni bitchio bitchi pe-gipa) aro pathogens (mikronchi nikna mangijagipa bacteria, virus, fungi aro porotoza-rang). Iandakgipa namgipa a-gilsako donggipa warachakgipa jonturangko jakkalaniara nosto ong-atgipa jo-ongrang aro namgijagipa sabisirangko sana bana gita nama, unbaksanaba wilwila a-a chirangkoba nosto ka-ja.

- Warachakgipa jonturangko jakkalaniara Integrated Pest Management-ni gesa mongsongipa bak ong-a.

### **Warachakgipa jo-ongrangko jakkalani namgnirang:**

- Chemicalrangko jakkalani mandeni be-en bimangna aro wil-wilanaba namgijarangko ra-baa. Uandakgipa ong-anirangko warachakgipa jonturangko jakkalanichi komiatnagita man-gen.
- Chemicalrang bang-a jo-ongrangkon nisiata indiba warachakgipa jonturangde an-tang bobilkosan nosto ka-aia, manderangna aro gipin jo-ongrangnade mamungba namgijako on-ja.
- A-a chirangnaba bi-si satna mamungba kenani dongja.

### **Warachakgipa jo-ongrangni bilgrianirang:**

- Warachakgipa jonturangko jakkalna rakbate kam ka-na aro tarisamsona nanga.
- Warachakgipa jonturangko jakkalna somoi bate nanga aro chakchikani baksa agantalate mesoke on-anirangkoba nanga.
- Chemicalrangko jakkalode jo-ongrang tarake sia indiba warachakgipa jonturangde namatna gita somoi nanga.

## Dakgnirang:

- Warachakgipa jonturangko jakkalaniko se jote rakkina nanga jedakode uarangko mikkangchi nambate jakkalangna man-gen.

## Gelna nanganirang:

Bang-a warachakgipa jonturang chemicalrangna nosto ong.a uni gimin uarangko apsan jakkaldimna man-jawa. Warachakgipa jonturangko jakkale nampilatna somoi nangnaba donga indiba uarangko jakkalani namgnirang mandena aro a.a china bang.a. Ia namgnirangni gimin warachakgipa jonturangko chemicalrangna bate jakkalna basena nanga.

## Biological control ni jachipchangrang



Fig.1 Ladybird-ni bi-sa  
(Ladybird beetle)



Fig. 2 Ladybird dalgimin  
(Ladybird beetle)



Fig. 3 Adusurang (Dragon fly)



Fig.4 Guwang (Spider)



Fig.5 : Chigring/Apeng ni dol



Fig.6 Gangi (Preying mantis)



Fig.7 Tangsekkipa lacewing  
(Green lacewing)

## I. Trichogramma- Chongipa Chigring

Trichogramma chongipa chigring ong·a. Uarang ‘egg parasitoid’ chongmotan gipin jo·ongni bitchio bitchi pe·e dal·gipa ong·a. Iar-angara meplipni aro mothni dolrangko warachakna jakkalna man·a. Chigring bima mepliprangni bitchi ningo bitchi chia, aro ia bitchirang pe·e uanon dal·a aro jadelbolchagimin chigringrang uanoni ong·kata, indake mepliprangni bitchiko nosto ka.a. Mangsa chigring uni janggi tanganio ge 90-100 bitchirangko nosto ka·na man·a.

### **Chigringni dolrang jerangkon State Bio-Control Laboratoryo (SBCL), Upper Shillong-o jelata aro uarango jakkalani**

Rokom bri chigringrangko SBCL –o jelata uaragara:

1. *Trichogramma chilonis*: Iako mi bijak dolgipa jo·ongrangna, kil bibal pugipana jo·ongna aro meraku jateng pugipa jo·ongrangna jakkalna man·a.
2. *Trichogramma japonicum*: Mi jateng pugipa jo.ongna jakkala.
3. *Trichogramma brassicae*: Iako banda kobini melipna jakkala.
4. *Trichogramma pretiosum*: Iako mesuo pugipa jo.ongrangna aro merakuo pugipa jo.ongrangna jakkala.

#### **Jakkalani:**

1. Chigringrangko labrangoniko “tricho card”-ni bimango man-agita ama.
2. Chin dakgimin ritingjoljol rate, kingsa card-ko bak 24 dakna nanggen.
3. Ratgimin bichitrangko bijak kokimao 5-8 metre gesa gepinoni chelgrikao a.o tekape donbo.

4. Mi a-palo donode bichitrangko disposable cup-ni ningao sike tekape , cup-ko bikpilate donbo jedakode mikka nangjawa.
5. Changgittam dake sal chibonga prako gesa biapo chigringrang-ko watna nanga. Sakanggipa aro gnigipa wato card ge-gni, aro gitttamgipa wato card gesa jakkalna nanga.



Fig. 8 *Trichogramma* Fig.9

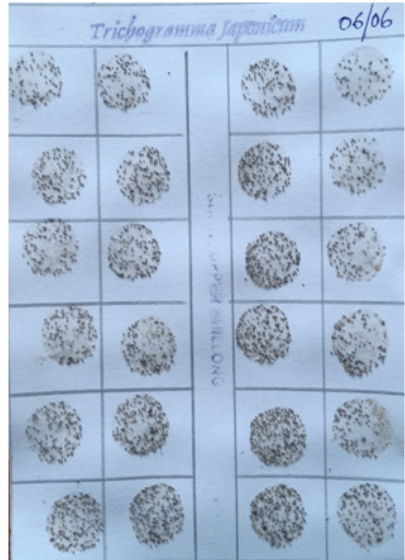


Fig.10 *Chongipa Chigring/ Apeng ni dol*



Fig.11



Fig.12

Mesu bijangchio disposable plastic-ni cup-ni ningo dongimin tricho card

## **II. *Metarhizium anisopliae* – tangsekgipa megimuni dol**

- *Metarhizium anisopliae*, jekon Green Muscardine fungus ba tangsekgipa megimu ming a-o chagipa megimuni dol ong-a. Iako a-gilsak gimik mana aro ia megimu jo-ongrango sabisiko ong-ata.

- Ia megimuni bitchil jensalo jo ongrangni bigilo ga aka, bimik nana abachenga aro indake jo ongni bigil gita napange jo ongo chana abachenga. Jamango jo ongni be en gimin chae jo ongo siata.

**Ia *Metarhizium* megimuko a ao donggipa jo ongrang, jongkingrang aro jongsrurangna jakkalna man a.**

**Jakkalani:**

- Bitchilo brinani:** 5g ba 5ml *Metarhizium*-ko Kg 1 bitchil baksa chi ontisa on e brine minute 15 oni 20 rangona donna nanga. Uni jamano bitchilrangko bikote minute 15oni 20 rangona salakimo ran atna nanga . Uni jamaosa ge na nanga.
- Bijako satani:** 5g ba 5 ml *Metarhizium*-ko ko litre 1 chio brine bijako satna nanga (75g /15 Litre sprayer).
- A.ao on.ani:** A a hal gamitingo 5g ba 5ml *Metarhizium*-ko litre 1 chio brine a ao ru na nanga.
- Asalo jelatani:** Kg 1 *Metarhizium*-ko 100 kg nam e sogimin matchu ki e asal baksa bindana nanga. Uako alamala chichi jipjipe ani jamano plastic chi pindape anti gittamna donna nanga. Salsa prak watchange chobile an pilatna nanga. Sosianikoba nirokna nanga, uko ran a on na nangja. Indake tarigimin asalo megimu jelgen aro anti gittamni jamao uko a barango ba a palrango anganskie talatgiminko gita jakkalskana man gen.

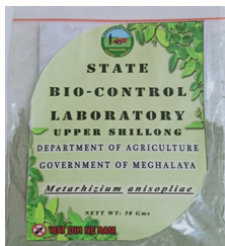


Fig.13



Fig.14



Fig.15

*Metarhizium anisopliae* megimu

### III. *Pseudomonas fluorescens*

*Pseudomonas fluorescens* bacteria dol ong·a aro iarang bolrangni dalroroanina nangipa bosturangko tarigipani dol (Plant Growth Promoting Rhizobacteria) ong·a.

- Iarang bolrangni dal·rororanoio dakchake, sabisirangko warachakna bilakbatata.
- *Pseudomonas fluorescens* iarang ramrang a·arango, chirang aro bolni bigilrango donga aro sigimin bolcheksi aro bijakrangko asal pilatna dakchakgipa ong·a.
- *Pseudomonas fluorescens* mi misini bitchilrang aro jadilrangko namgijagipa sabisi ong·atgipa megimurangoko chelchaka.

***Pseudomonas fluorescens* mi misirango bang·a megimurangni ong·atgipa sabisirangko sana bana dakchaka jekai mi birong ong·aniko champengipa sabisi, bijako su·tota gita dakgipa sabisi, sigropgipa sabisi, ja·dil soani aro japang sogropani sabisirang. Iarangna *Pseudomonas fluorescens*-ko jakkalana man·a.**

#### **Jakkalani;**

- a) Bitchilo brinani: 5g ba 5ml *Pseudomonas fluorescens*-ko Kg 1 bitchil baksa chi ontisa on·e brine minute 15 oni 20 rangona donna nanga. Uni jamano bitchilrangko bikote minute 15oni 20 rangona salakimo ran·atna nanga . Uni jamaosa ge·na nanga.
- b) Bijako satani: 5g ba 5 ml *Pseudomonas fluorescens*-ko ko litre 1 chio brine bijako satna nanga (75g /15 Litre sprayer).
- c) A·ao on·ani: A·a hal gamitingo 5g ba 5ml *Pseudomonas fluorescens*-ko litre 1 chio brine a·ao ru·na nanga.
- d) Asalo jelatani: Kg 1 *Pseudomonas fluorescens*-ko 100 kg nam·e sogimin matchu ki·e asal baksa bindana nanga. Uako alama-



la chichi jipjipe ani jamano plastic-chi pindape anti gittamna donna nanga. Salsa prak watchange chobile an-pilatna nanga. Sosianikoba nirokna nanga, uko ran-a on-na nangja. Indake tarigimin asalo megimu jelgen aro anti gittamni jamao uko a-barango ba a-palrango anganskie talatgiminko gita jakkalskana man-gen.



Fig.16



Fig.17

*Pseudomonas fluorescens*

#### **IV. Trichoderma- Megimuni dol**

- *Trichoderma* megimu a-ao aro bol ja-dilni wilwilao donggipa a-mango donga.
- Jadilo *Trichoderma* megimu chaani ja-dilni chaani aro dal-roroaniko bariata aro indake bite mananirangko bariata.
- *Trichoderma* megimu a-a mitimko mia misi salopaniko bariata aro Nitrogen jakkalaniko namdapata. Unbaksanaba a-ao donggipa gipin mitimrangkoba jrongatna dakchaka.
- *Trichoderma* megimu matchu ki-e aro bijakrangko soninge namgipa asal pilatna dakchaka.

***Trichoderma* megimuko a-a gita batrorogipa sabisirang jekai ja-dil soani, jata ba bita soani, aro japang sogropani sabisirangko namatna jakkala.**

## Jakkalani;

- a) Bitchilo brinani: 5g ba 5ml *Trichoderma* megimu-ko Kg 1 bitchil baksa chi ontisa on·e brine minute 15 oni 20 rangona donna nanga. Uni jamano bitchilrangko bikote minute 15oni 20 rangona salakimo ran·atna nanga . Uni jamaosa ge·na nanga.
- b) Bijako satani: 5g ba 5 ml *Trichoderma* megimu-ko ko litre 1 chio brine bijako satna nanga (75g /15 Litre sprayer).
- c) A·ao on·ani: A·a hal gamitingo 5g ba 5ml *Trichoderma* megimu-ko litre 1 chio brine a·ao ru·na nanga.
- d) Asalo jelatani: Kg 1 *Trichoderma* megimu-ko 100 kg nam·e sogimin matchu ki·e asal baksa bindana nanga. Uako alamala chichi jipjipe ani jamano plastic·chi pindape anti gittamna donna nanga. Salsa prak watchange chobile an·pilatna nanga. Sosianikoba nirokna nanga, uko ran·a on·na nangja. Indake tarigimin asalo megimu jelgen aro anti gittamni jamao uko a·barango ba a·palrango anganskie talatgiminko gita jakkalskana man·gen.

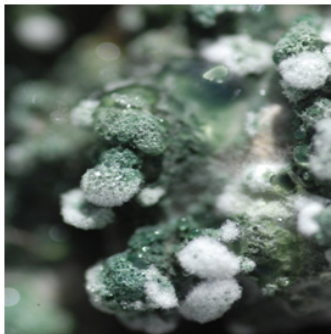


Fig.18



Fig.19

*Trichoderma harzianum megimu*

**NASIMANG GE·A GAMANINA, JILLA KAANINA ARO  
GARIRANGO GE·A GAMANI BA JILLA KAANI  
BOSTURANGKO ANTI/ BAZAR- RANGONA  
SOKATNA NANGGENCHIMODE KU·PATIANIKO  
RA·NA GITA MAN·GEN**



**Da·alo nasimang an·tangtangni phone·oni Toll Free number  
1917 on'a ka'atbo.**

**(SOMBAR·ONI SONIBAR·ONA)**

**7.00 A.M- 7.00 P.M**

**AGAN·KU·PATIGIPA | GARI SALRURAGIPA | ANTI A·KANGO PALA BOTANI**



