

Fall Armyworm: A·selrangko Sandiani aro Kam Ka·ani

(Chonbegipa U·ie Ra·ani Ki·tap)



Originally published in

English by

D. M. Firake

G. T. Behere

Subhash Babu

N. Prakash

A·chikkuona Pe·skagipa

Stive Zandhy R. Marak

Tarshina Ch. Sangma

Rumki Heloise Ch. Sangma

Fall Armyworm: A·selrangko Sandiani aro Kam Ka·ani (Chonbegipa U·ie Ra·ani Ki·tap)

Originally published in English by

D. M. Firake

G. T. Behere

Subhash Babu

N. Prakash

A·chikkuona Pe·skagipa

Stive Zandhy R. Marak

Tarshina Ch. Sangma

Rumki Heloise Ch. Sangma



July 2019

**ICAR Research Complex for NEH Region, Umiam,
Meghalaya-793103**

- © ICAR Research Complex for NEH Region, Umiam-793 103, Meghalaya, India
- *All rights reserved. Ia chapa ka-gimin ki-tapni bakoniko nokgipani see on-ani bil gri mamung dakeba chapa ka-ani dingtang dingtang cholrangko jakkale chapa ka-dappajachina.*
- **Correct citation:**
 Firake D.M., Behere G.T., Babu Subhash, Prakash N. 2019. *Fall Armyworm: A-selrangko Sandiani aro Kam Ka-ani (Chonbegipa U-ie Ra-ani Ki-tap)*. A-chikkuona Pe-skagipa Marak S.Z.R., Sangma T.C. and Sangma R.H.C. ICAR Research Complex for NEH Region, Umiam-793 103, Meghalaya, India. 44p.
- Translated the English version of the book into Garo language by Stive Zandhy R. Marak, Assistant Professor, Garo Department, Sankardev College, Shillong; Tarshina Ch. Sangma, Associate Professor, Garo Department, Sankardev College, Shillong and Rumki Heloise Ch. Sangma, Scientist (Agril. Entomology), ICAR RC NEH Region, Umiam, Meghalaya.
- Published ka-gipa by Director, ICAR Research Complex for NEH Region, Umiam-793 103, Meghalaya, India, during July 2019

U·iatchengani

Fall Armyworm (FAW) ia jo·ongrang a·gilsak gimiko tangka paisa man·gnina game-ge·e cha·ani bosturangna nambatgijagipa aro simsakna nangatgipa sabisi ong·a. FAW jo·ongara America a·songoni ding·gipa aro ding·kalgipa jolrangoni ong·a aro ia jo·ong Africa a·songoba bang·bea jolrangona napdrabae jelbrae bang·bea tangka paisani gita gimaataniko on·aha. FAW jo·ongni gimin India a·songoba May 2018 bilsio Karnataka-o koborko man·chengaha, ja·mano March 2019 jani bijangchio India a·songo damchikking dingtang dingtang a·dokrangonaba giproroani koborko man·aha. Indiani Salgro- Salaram a·dokrango, skanggipa changna Mizoram a·dokni Lunglei district-o aro Tripura-ni saliram jolrango ia napdragipa sabisini koborko man·aha. Unikoa, April 2019 ja·mango Mizoram aro Nagaland a·doko ia sabisini rang·san jalaniko rim·a man·aha. Uni ja·man, May 2019 ja·ni a·bachengachibara India-ni Salgro-Salaram jolrango Meghalaya, Manipur, Sikkim aro Arunachal Pradesh a·dokrango Me·rakku bipangrangko nisiatanirangko nik·na man·aha.

FAW jo·ongni napdrana man·ani aro jalaniko nigrike, uko skanggipa gadangon tarakbeen champengani kamrangko ka·na nanga. Ia kan·dike talatani ki·tapko, FAW jo·ongni sabisini a·selrangko tarake sandiani kamrangko ge·e-game cha·giparangna, kam ka·giparangna, poraigiparangna aro gipin dangdike on·giparangna tarake kamko ka·na man·na gita miksonge tariaha. Dingtang dingtang ong·telaigiparangchi champengani cholrangko aro a·bachengo dakna nanggipa kamrangko somoi gita ja·rikna man·a gita u·iataniko on·na jotton ka·ani ong·a.

Japang Kattarang

SN	Katta Bichongrang	Jak
1	Aganchengani	6
2	Fall Armyworm jo·ongko u·ie ra·ani.	7
3	Fall Armyworm jo·ongni bitchirangni bimang.	8
4	Fall Armyworm jo·ongni pe·gimin bimang.	9
5	Dal·gimin Fall Armyworm jo·ongko u·ie ra·ani.	10
6	Fall Armyworm jo·ongni janggi tangani gadangrang.	11
7	Fall Armyworm jo·ongni tom·dakgipa bitchirang	12
8	Fall Armyworm jo·ongni skanggipa bimang.	13
9	Skanggipa sabisini chinrang.	14
10	Fall Armyworm jo·ongni gnigipa bimang.	15
11	Gittamgipa, brigipa aro bongagipa Fall Armyworm jo·ongni bimang	16
12	Fall Armyworm jo·ongni dingtang dingtang rongrang.	17
13	Fall Armyworm jo·ongni jo·ongskako cha·ani.	18
14	Dal·gimin aro bitipo donggipa Fall Armyworm jo·ongrang.	19
15	Fall Armyworm jo·ongko me·rakkuo champengna kam ka·ani cholrang.	20
16	Nirokani.	22
17	Sandiani.	23

Japang Kattarang

SN	Katta Bichongrang	Jak
18	Gama- ge·ani bidingrangchi champengani cholrang.	25
19	Dingtang dingtang jakkalani bosturangchi champengani cholrang.	26
20	Dingtang dingtang ong·telaigiparangchi champengani cholrang.	30
21	Indiani Salgro-Salaram a·doko ge·a-gamano man·gipa dingtang dingtang ong·telaigiparangchi champengani cholrang.	34
22	A·dokni sabisisiko champengna man·ani cholrang jean Fall Armyworm jo·ongni jelaniko komiatgen.	35
23	Indiani Salgro-Salaram a·dokrango ge·a-gamani bidingo man·gipa dingtang dingtang tampini ma·malrangchi champengani cholrang.	36
24	Indiani Salgro-Salaram a·dokrango ge·a-gamani bidingo bija ‘A·mengni nokdangrangko’ jelatani.	37
25	Indiani Salgro-Salaram a·dokrango ge·a-gamani bidingo ka·rakgipa jo·ongskako cha·skagipa bokchitrang.	38
26	Indiani Salgro-Salaram a·dokrango me·rakkuko ge·a-gamani bidingo ka·rakgipa jo·ongrangko cha·gipa guangrang.	39
27	Indiani Salgro-Salaram a·dokrango <i>Spodoptera</i> spp. entomopathogenrangni chu·sokgnirang.	40
28	Samrangchi Champengani.	41
29	Nangchongmotgipa chanchianirang.	43
30	U·iatgiparang.	44

Aganchengani

- U·iao tik ong·e dongipa (Scientific) bimung: *Spodoptera frugiperda*
- Gadang: Lepidoptera
- Nokdang: Noctuidae
- America a·songoni ding·gipa aro ding·kalgipa jolrangoni ong·a. Africa aro Asiani a·songrangona napdrabae tang·ka paisani gita dal·bea gimaataniko ong·ataha.
- Fall Armyworm jo·ong ge·gimin gamgimin bosturangko dangni dal·dalgipa a·songrangoni dam 50 a·songrango bilsio gnini gisepo sa·bisi man·ataha.
- May 2018 bilsio FAW jo·ongni gimin India-o koborko on·aha aro phylogeneticke che·eme sandiano India o me·rakkuni jo·ongrangko Florida (mi-o niggipa), Ghana, Nigeria, Uganda-o me·rakkuo niggipa jo·ongrang baksa don·dimatna man·a.



Fall Armyworm jo·ongko u·ie ra·ani

Bon·chotgipa janggilni
baknigipao apsane dambri
dake dal·dale su·tota.

Damgipin janggilni bako
dambenge apsane
dambri dake
chonchonkale su·tota

Skoni bako
'Y' indake ch in donga.



Delmrue janggilo ketchie
sala donga. Janggilo delmrue
sala donga.

Ketchio chikkale
tong daka.

Chikmrake janggilni bako
donga.

Fall Armyworm jo-ongni bitchirangni bimang

Fall Armyworm jo-ong jerangkoni me-rakku-rango nikna man-a uarangni tin-gimik bitchini bimangko gipin rokok nangchapgipa ma-gni jo-ong/ me-pilip-ni jatrang baksa dingtangrikatna aditan rakbegipa ong-a. FAW jo-ong bitchirangko bijak ba ga-tengni bikap ning-o tin-dake chie dona. Bitchirangko basakoba mitapsa ba gadang gadang dake chie dona. Bitchini rongara mitim gita daka aro ki-sangni bako kimil kasota ba basakoba kimil gri pindapa gita daka.



**Fall Armyworm jo-ongni
Bitchirang**
Spodoptera frugiperda



**Ramramgipa bi-jakni
jo-ong-ni bitchirang**
Spodoptera litura



**Ramramgipa
Armyworm jo-ongni bitchirang**
Mythimna separata

Fall Armyworm jo·ongni pe·gimin bimang

Ia jo·ong baditana kingking gipin nangchapgipa jo·ongrang jerangan me·rakku bipangrangko cha·e janggi tanggiparang baksa dingtanga?



Fall Armyworm jo·ong
Spodoptera frugiperda



Ramramgipa bi·jakni
jo·ong *Spodoptera litura*



Ramramgipa armyworm
jo·ong *Mythimna separata*

Dal·gimin Fall Armyworm jo·ongko u·ie ra·ani

Ia jo·ong baditana kingking gipin nangchapgipa jo·ongrang jerangan me·rakku bipangrangko cha·e janggi tanggiparang baksa dingtanga?



Fall Armyworm jo·ong
Spodoptera frugiperda



Ramramgipa bi·jakni
jo·ong *Spodoptera litura*



Ramramgipa armyworm
jo·ong *Mythimna separata*

Fall Armyworm jo·ongni janggi tangani gadangrang



Bitchi

(bamani somoi:Sal 4- 6)



Jo·ong

(jo·ong onge dongani:Sal 14-17)



Ma·pilna skang

(Ma·pilna skang nade dakani:
Sal 7-8)



Bipa ma·pilgimin me·pilip

(Ma·pilgimin Me·pilipni janggi tangbangani somoi: Sal 7-9)



Bima ma·pilgimin me·pilip

Fall Armyworm jo·ongni tom·dakgipa bitchirang

Ma·pilgimin me·pilip bima rong 1000 bitchirangna baten changsa ba chang ni chang dake me·rakku ba gipin nokchakgipa sam·bolni bipangrango bitchirangko chi·a.



Fall Armyworm jo·ongni skanggipa bimang

Jo·ongrang tom·dake bijak bikaprangni paksamsako cha·roroe uni ja·man
an·tangtango balpongate gipin gital nokchakgipa bipangrangona sokangrora.



Skanggipa sabisini chinrang

Bijakrang nikprotna
man·gipa ba·rengreng
lekka gita daka aro
ruronga.



Fall Armyworm jo·ongni gnigipa bimang

Skanggipa gadango jinma tom·dake cha·e chonchogipa bijakrango a·kol ba nikprotna
man·gipa ba·rengreng lekka gita dakata.



Gittamgipa, brigipa aro bongagipa Fall Armyworm jo·ongni bimang

Mangsan dake bijakni bikap ning'o
cha·ronga aro dal·bee a·kolko ong·atan
baksa jabolrangko ga·akata(ki-i).

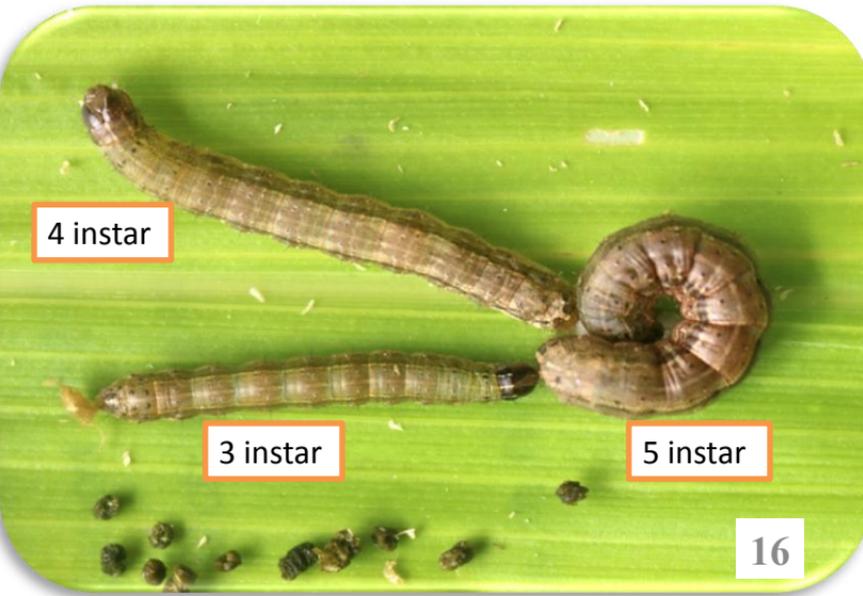


Photo credit: Bakordalin Chyne

Fall Armyworm jo·ongni dingtang dingtang rongrang

Jo-ongrang pangnan dingtang dingtang rongrangko mesoka aro bijak bikaprango dongnue salni bako dongronga. Bol ginchi dake ran·gimin jabol gita bijakrango nikrongna man·a, jean ong·telaigipa bobilrangoni naljoke rakkia (dakjee dongnua)



Fall Armyworm jo·ongni jo·ongskako cha·ani

Jo·ongrangni ka·namgija dake jo·ongskaranko cha·ronganiko nikna man·a. dal·dalgipa jo·ongrang chonchongipa jo·ongrangko cha·ronga, jechin armyworm ma·a chong·motoni ma·ekata.



Dal·gimin aro bitipo donggipa Fall Armyworm jo·ongrang

Pangnan uamang bijak bikap ning·o dongnue donga aro a·aona ga·akone a·ningo bitip
dake donga.



Fall Armyworm jo·ongko me·rakkuna champengani chanchigimin cholrang

Mai dake an·ching uko dakgrikgen?

**Samtangtango sabisini atchianiko, jelanganiko aro champenganiko
simsake aro ja·kuantina name chanchisamsoaniko dakna nanga.**

India Sorkarini janapgipa chalaiani cholrangko

(Ref: OM: F. No. L3-L60/2019-SD.IV, tarik 6th May 2019 aro OM : F. No 12080/37/2018-PPI, tarik 28th May 2019)

Sabisiko champengani chu-gimik kam ka-ani cholrang.

- 1. Nirokani.**
- 2. Sandiani.**
- 3. Gama- ge-ani bidingrangchi champengani.**
- 4. Jakkalani bosturangchi champengani.**
- 5. Ong-telaigiparangchi champengani.**
- 6. Samrangchi champengani.**

Nirokani

- Gamkari ba gama matchoto acre 5 prak gamenggipa biapo ba ge·gimin bosturango sabisi sokgnigipa biapo maiaba jo·ong ba mat·buringoni ong·katgipa gingsikatani bitchirangko done ja·ga sana nanga.



Sandiani

Sandianiko a·bachengon ‘W’ chinni bewalo tarake me·rakku bi·jak ong·ahaon dakna nanga.

- Bijak chabaoni bijak bikap dakbaengona (Anti 3-4 bijak naani ja·man)

5% bakni bipangrang nosto ong·anggenchimode kam ka·na man·gen.

- Bijak bikaprangni dal·ani tong·sa ong·aoni chu·gimik ong·aona (Anti 5-7 bijak naani ja·man)

10% bakni bijak bikaprangni dal·dale tong·sa nosto ong·o kam ka·na man·gen.

- Chokchimani somoio aro chokchimani ja·man (Rinokmiting gadang)

Samrangko satna nangja (jo·ongni samko jakkalna nangja).

Indiba,10% bak ong·osa dakna nanga.

Scouting

Pictorial representation



Gama- ge·ani bidingrangchi champenganirang

- Bitchil ge·na skang a·ako name gamna nanga. Iako dakanichi FAW jo·ongni bitiprangko uko cha·skagipa jonturangna nikatna man·gen.
- Somo i gita bitchilrangko simsake ge·na nanga. Skele ge·aniko gelna nanga.
- Me·rakkuko gipin ge·ani bosturang jean ua jolo man·a uarang baksa ge·chapna nanga. (jekai Me·rakku + Mendu/ Kalai/ Mung Dal).
- Acre 10 prak gamgipa biapo ge·gipa bostuni skanggipa gadango do·orangna ba·chakna go·olrangko songna nanga(sal 30-na)
- Ja·gana ge·gimin bosturangko jol 3-4 dake me·rakku ge·gipa biapni wilwilao ge·na nanga aro NSKE ba azadirachtin 5% bak 1500 ppm-ko jen somoio ja·gana ge·gipa bosturang FAW jo·ongchi saako nikon tarake satna nanga.
- Rongtale gama-ge·aniko dakna nanga aro a·salrangko apsangrikesan jakkalna nanga.
- FAW jo·ongchi saataniko komiatna hybrid me·rakku jean ma·ketgipa bikaprangchi pindapgiparangko ge·na nanga.

Jakkalani bosturangchi champengani

- Jo·ong bitchi aro bitiprangko jakchi kolame chimonge uko binekatna nanga ba Kerosine-o sim·bolna nanga.



Jakkalani bosturangchi champengani

- FAW jo·ongko a·bao nikon tarake me·rakku bipang bijak bikaprango ran·gimin an·chengko jo·ong cha·gipa biapo nongna nanga.



Jakkalani bosturangchi champengani

A•mangko bijak bikap ning•o nongani



Jakkalani bosturangchi champengani

Bipa me·pilip jo·ongranko
rim·chimongna gita acre 15 prako
maiaba jo·ong ba mat·buringoni
ong·katgipa gingsikatani bitchiranko
done ja·ga sana nanga.



Dingtang dingtang ong·telaigiparangchi champengani cholrang

Jolo man·gipa bosturangchi chalaiani Situ iachi champengna man·gen:
Dingtang dingtang ge·a- gamani bosturangko ge·chapachi aro bibal balgipa
sam- bolrangko ge·achi ong·telaigipa bobilrangko ong·atna dakchakaniko
man·a.



Ong·telaigiparangchi champengani

Trichogramma pretiosum ba *Telenomus remus*-rangko anti rikit 50,000 acre prako ba mang 3 me·pilipko ja·ga saao rim·na man·ao pangchake bang·bate watna man·gen.



Ong·telaigiparangchi champengani

Ong·telaigipa samrang:

Namgniara a·bachengo bijak bikap dakbaengo 5% nosto ka·aniko ong·ata aro Entomopathogenic (jo·ongko siatgipa me·gimu) me·gimu (fungi) aro mikronarichi nikna mangijagija jo·ong(bacteria) iarangchi 10% nostoko ong·ata.

Entomopathogenic (jo·ongko siatgipa me·gimu)me·gimuko jakkalani niamrang:

- *Metarhizium anisopliae* gindeko jakkalani niam (1×10^8 cfu/g) litre prako 5g-ko bijak bikaprango sal 15-25 ge·ani ja·man nongna nanga. Changgipino sal 10 ni gisepo chang 1-2 jo·ongchi nosto ka·ao pangchake satna man·a.

Ba

- *Nomuraea rileyi* rokomsa mi bite-ni me·gimuko jakkalani niam (1×10^8 cfu/g) litre prako 3g-ko bijak bikapo sal 15-25 ge·ani ja·man nongna nanga. Changgipino sal 10 ni gisepo chang 1-2 jo·ongchi nosto ka·ao pangchake satna man·a.



Ong·telaigiparangchi champengani cholrang

- *Bacillus thuringiensis* var *kurstaki* ko jakkalni niam-ara litre prako 2g ba acre prako 400g-ko jakkalna nanga.



An·senggipa FAW jo·ongni ma·pilna skangni bitip.



Sabisi man·gimin jo·ongni ma·pilna bitip ra·na man·gijagipa.

**Indiani Salgro-Salaram a·doko
ge·a- gamanio man·gipa dingtang
dingtang ong·telaigiparangchi
champengani cholrang**

A·doko sa·bisiko champengsona bil donggipa jean napdragipa fall armyworm-ni jelaniko komiatna amgiparang



A·ningo donggipa
Inchneumon a·meng bija



Cotesia jo·ongni bitip



Chelonus formosanus ni
jo·ong bitchi *S. litura*



Metopius rufus



35 *Microplitis manilae*

Indiani Salgro-Salaram a·dokrango ge·a-gamani bidingo man·gipa dintang dintang tampini ma·malrangchi champengani cholrang



Tachina sobria



Cuphocera varia



Turanogonia chinensis



Blepharella spp.



Exorista spp.

Indiani Salgro-Salaram a·dokrango ge·a-gamani bidingo Indiani Salgro-Salaram a·dokrango ge·a-gamani bidingo



Delta pyriforme



Vespa tropica



Dolichovespula media



Polistes olivaceus



Chrysis nitidula



Phimenes flavopictus



Priocnemis bicolor



Chrysis inaequalis



Scolia soror



Priocnemis monachus

**Indiani Salgro-Salaram a·dokrango ge·a-gamani bidingo
ka·rakgipa jo·ongskako cha·skagipa bokchitrang**



Ophionea indica



Cicindela duponti



Cicindela sexpunctata

Indiani Salgro-Salaram a·dokrango me·rakkuko ge·a-gamani bidingo ka·rakgipa guangrang

SN	Spider types	Scientific names
A	Jumping spiders	<i>Marpissa calcuttaensis</i> <i>Phidippus spp</i>
B	Lynx Spiders	<i>Argiope pulchella</i> <i>Oxyopes rubisternum</i>
C	Wolf spiders	<i>Lycosa pseudoannulata</i>
D	Orb Spinners	<i>Lecauge decorate</i> <i>Larinia tabia</i> <i>Cyrtophora carrisae</i>

Indiani Salgro-Salaram a·dokrango Spodoptera Entomopathogenrangni chu·sokgnirang



Metarhizium (=Nomuraea) rileyi



Metarhizium anisopliae



Beauveria bassiana



Bt infected caterpillars



Baculovirus
infected larvae

Samrangchi Champengani

(Ref: OM: F. No. L3-L60/2019-SD.IV, Dated 6th May 2019 aro
OM : F. No 12080/37/2018-PPI, Dated 28th May 2019 aro
ICAR-IIMR Folder Publication No./2019/02)

- **Skanggipa mesokani (Bitchiloni skanggipa bijak bikap ong-ani gadangona):**

FAW jo-ong-ko 5% nosto ong-atna NSKE ba Azadirachtin-ko 1500 ppm litre prak chi-o 5 ml-ko jakkale 5%-ona satanichi gital bitchirangni pe-aniko komiata.

- **SecoGnigipa mesokani (Bijak bikap tong-sa ong-aoni bon-kamgipa gadangona):**

2-gipa aro 3-gipa gadangona sokgipa jo-onrangko 12-20% nosto ong-atna Spinetoram-ko 11.7% SC ko chi litre prak-o 0.5 ml ba Thiamethoxam-ko 12.6%+ lambda cyhalothrin 9.5%-ko chi litre prak-o 0.25 ml ba Chlorantraniliprole 18.5 % SC-ko 0.4 ml litre prak chi-o jakkale satna gita man-a.

Samrangchi Champengani

Gittamgipa mesokani (anti 8-gipao chokchimani somoio aro chokchimani ja·man):

Jo·ong siatgipa samko satani ia gadango namgni dongjaha. Jakchi kolamaniko dakskana nanga.

Nangchongmotgipa chanchianirang

1. Sam-ko bijak bikapni wilwilao satna nanga aro salchuna skang ba attamo dakna nanga.
2. Bilko rikaniko aro pilaknan u-iataniko dakna nanga.
3. Jo-ongni jelaniko ge-giminko galchippgipaoniko niroke somoi gita sam bipangrango samrangko nongna nanga.
4. Sko chakenggiparangna skie on-anichi/jinma chanchirimanichi nangchongmotgipa mikrakataniko ong-atna nanga.
5. Chalaiani cholrangko chu-sokatna ma-malantio pangchake aro apale chanchibewale re-mikkanganiko dakna nanga.



Photo credit; Shri P K Lynshing

Uiatgiparang

- The Director, ICAR- Indian Institute of Maize Research, Ludhiana
- Dr. D Pasweth, Senior Scientist & Head, KVK (Jaintia Hills)
- Smt. R W Rangad, SMS (Plant Protection), KVK (Jaintia Hills)
- Smt. B Wahlang, Senior Scientist & Head, KVK (East Khasi Hills)
- Smt. B Chyne, SMS (Plant Protection), KVK (East Khasi Hills)
- Shri. P K Lynshing, Block Technology Manager, ATMA Thadlaskein
C& D block

