



REPUBURIKA Y'U RWANDA
IKIGO GISHINZWE ITERAMBERE RY'UBUHINZI
N'UBWOROZI MU RWANDA (RAB)



UBUHINZI BWA KIJYAMBERE KU GIHINGWA CY'IBIGORI



**Commercialization and De-Risking for Agricultural
Transformation (CDAT) Project**

Huye, June 2024

1. Aho ibigori bihingwa mu Rwanda

Ibigori bihingwa hose mu gihugu kuva ku butumburuke bwa metero 920 (Bugarama) kugeza ku butumburuke bwa metero 3000 (ku nkengero z'ibirunga). Aho ibigori bihingwa hagizwe n'imisozi migufi (metero 920-1300), imisoze iciriritse (metero 1300-1800) n'imisozi mireremire (hejuru ya metero 1800).

2. Ubutaka:

Ibigori byera neza iyo bihinze mu murima ufumbiye, utarekamo amazi, utaragundutse, mu butaka bw'isi ndende, bworoshye kandi bubika amazi. Umurima ugomba kuba utasaruwemo ibigori cyangwa ibindi binyampeke nk'amasaka n'ingano mu gihembwe cy'ihinga giheruka.

3. Amoko yamamazwa:

No	Izina rya iburide	Aho yera	Ubutumburuke (m)	Nyir' imbuto
1	RHM1402	Mu misozi migufi n'imisozi iciriritse	900-1700	RAB
2	RHM1407	Mu misozi migufi n'imisozi iciriritse	900-1700	RAB
3	RHM1409	Mu misozi migufi n'imisozi iciriritse	900-1700	RAB
4	RHMH1520	Mu misozi miremire	1700-2200	RAB
5	RHMH1601	Mu misozi miremire	1700-2500	RAB
6	RHMH1611	Mu misozi Miremire	1700-2500	RAB
7	PAN53	Mu misozi migufi n'imisozi iciriritse	900-1800	PANNAR
8	WH505	Mu misozi migufi n'imisozi iciriritse	900-1800	Western Seed Company
9	WH507	Mu misozi migufi n'imisozi iciriritse	900-1700	Western Seed Company
10	WH403	Mu misozi migufi n'imisozi iciriritse	900-1700	Western Seed Company
11	H628	Mu misozi miremire	1800-3000	Kenya Seed Company
12	H629	Mu misozi miremire	1800-3000	Kenya Seed Company
13	PAN691	Mu misozi miremire	1700-2600	PANNAR
14	WH605	Mu misozi miremire	1700-2800	Western Seed Company
15	WH101	Mu misozi migufi n'imisozi iciriritse	900-1600	Western Seed Company
16	WH504	Mu misozi migufi n'imisozi iciriritse	900-1700	Western Seed Company

Icyitonderwa: Aya moko yamamazwa ni iburide. Ahingwa igihembwe kimwe gusa, igihembwe gikurikiyeho ukajya kugura imbuto nshya ku bacuruzi b'inyongeramusaruro bemewe. Gutera ibigori bisaruwe kuri iburide bigabanya umusaruro bigateza umuhinzi igihombo.

4. Uko umurima wo guhingamo ibigori

Gutema ibihuru biri mu murima no kubitongora, kurima nibura mu byumweru bibiri mbere yo gutabira. Gutabira neza uringaniza umurima, gufumbiza imborera iboze neza hanyuma ugatera.

5. Gushyiramo ishwagara

Ishwagara ikoreshwa mu mirima ifite igipimo cy'ubusharire (pH) kiri muni ya 5,5. Ishyirwa mu murima byibura ibyumweru bibiri mbere yo gutera. Inyanyagizwa mu murima wose, ku buryo nta hantu hasigara itagiyemo. Kugeza ubu mu Rwanda hari ubwoko bubiri bw'ishwagara bukoreshwa: Ishwagara nimeru ya mbere n'ishwagara nimeru ya kabiri.

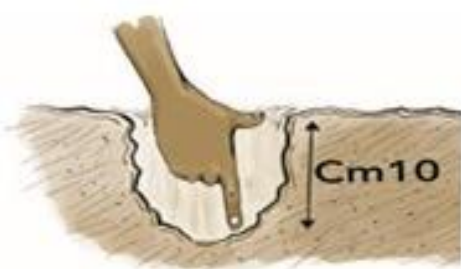
Ishwagara nimeru ya mbere iba inoze kandi iyunguruye neza. Hakoresha hagati y' ibiro 500 n' ibiro 750 kuri hegitari (500-750kg/ha) cyangwa hagati y' ibiro 5 na 7,5 kuri ari (5-7,5kg/ are). Ishwagara nimeru ya kabiri iba itanoze kandi itayunguruye neza. Hakoresha hagati y' ibiro 2500 kugeza 7500 kuri hegitari (2500- 7500kg/ ha) cyangwa hagati y' ibiro 25 na 75 kuri ari (25-75kg/are).

Akamaro ko gukoresha ishwagara:

Ishwagara igabanya ubusharire mu butaka, bigatuma igihingwa kibasha kuvoma intungagihingwa (imyungungugu) mu butaka, ituma igihingwa gikoresha neza amafumbire mvaruganda bigatuma umusaruro wiyongera.

6. Gukoresha ifumbire y'imborera

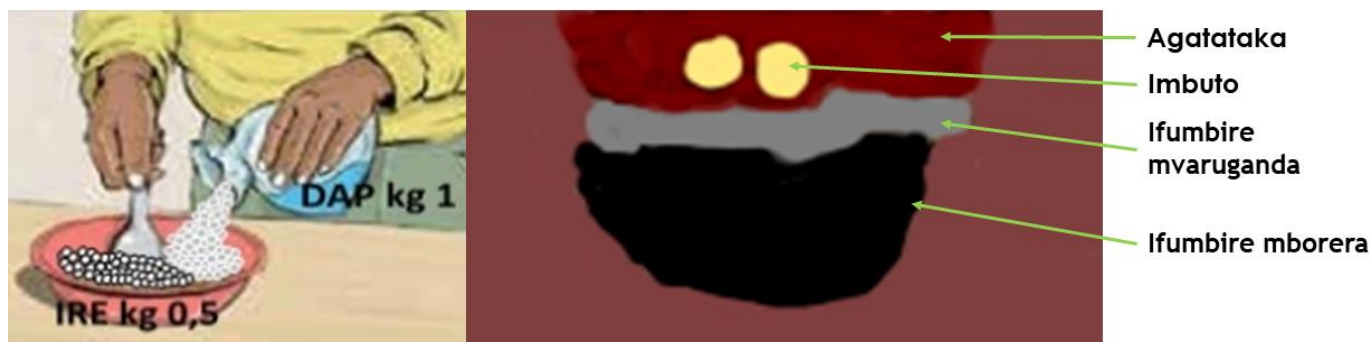
Gukoresha ifumbire y'imborera ingana na toni 20 kuri hegitari (20t/ha). Gucukura utwobo two guteramo dufite cm 10 z'ubujyakuzimu. Gushyira muri buri kobo ifumbire y'imborera iboze neza ingana n'amashyi abiri kugeza muri cm 5 z'ubujyakuzimu.



7. Gukoresha ifumbire mvaruganda mu gihe cyo gutera

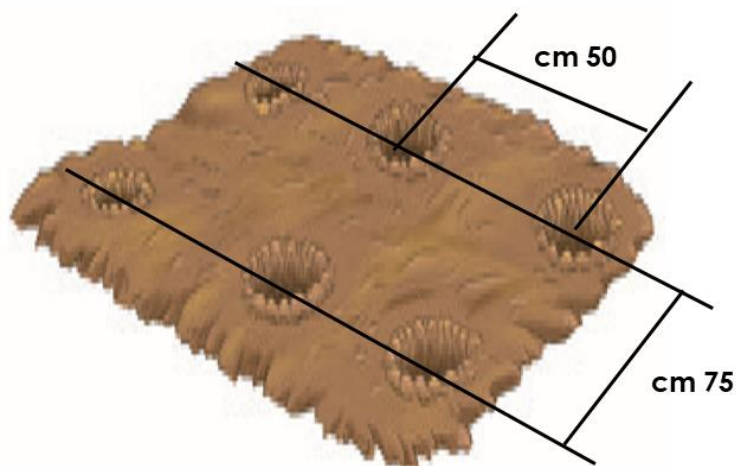
Ifumbire zikunze gukorshwa mu gihe cyo gutera ibigori ni DAP (18-46-0) ivanze na Ire (46-0-0), niy'indi yitwa CEREALS (23-10-5+2Mg+3S+0.3Zn). Iyo uhisemo gukoresha DAP ivanze na ire, uvanga ibiro 100 bya DAP n'ibiro 50 bya Ire, ugatera iyo mvange kuri hegitari imwe (100kg bya DAP + 50kg bya Ire/ ha) cyangwa ukavanga ikiro cya DAP n'inusu ya Ire ugatera iyo mvange kuri ari imwe (1kg cya DAP + 0.5kg ya Ire/ ha) . Bityo ukaba ukoresheje kg 41 by'umunyu ngugu wa Azote (Nitrogen) na kg 46 by'umunyu ngugu wa Fosifore (Phosphorus) kuri hegitari. Iyo uhisemo gukoresha CEREALS (23-10-5+2Mg+3S+0.3Zn), utera ibiro 100 kuri hegitari (100kg/ha). Bityo, ukaba ukoresheje ibiro 23 by'umunyu ngugu wa Azote, ibiro 10 by'umunyu ngugu wa Fosifore n' ibiro 5 by'umunyu ngugu wa Potasiyumu. Kandi hiyongeraho imyunyu ngugu ikoreshwa ku rugero ruto: ibiro 2 by'umunyu ngugu wa Manganeze, ibiro 3 by'umunyu ngugu wa sirifire n' ibiro 0,3 by'umunyu ngugu wa Zinke.

Ushyira ifumbire mvaruganda mu kobo wabanjemo iy'imborera, hanyuma ukarenzaho agataka kugira ngo ifumbire mvaruganda idahura n'intete ikazitwika. Usigaza ubujyakuzimu bungana na santimetero 3 (3cm) zo gutera mo intete. Warangiza ukarenzaho agataka ukaringaniza umurima.



8. Gutera ibigori

Guterera igihe (imvura itangiye kugwa) mu ntangiriro z' igihembwe cy' ihinga. Hacibwa imirongo itandukanyijwe n'intera ya cm 75; muri iyo mirongo hacukurwa utwobo two guteramo dufite ubujyakuzimu bwa cm 10 (ari natwo dushyirwamo imborera) dutandukanyijwe n'intera ya cm 50 hagaterwa intete ebyiri, cyangwa intera ya cm 25 hagaterwa intete imwe muri buri kobo. Kuri hegitari haterwa imbuto ingana n'ibiro 25 (25kg/ha) cyangwa ibiro 0,25 kuri ari (0.25kg/ari). Guhinga imbuto yujuje ubuziranenge iturutse mu bacuruzi bemewe b'inyongeramusaruro cyangwa ibigo bitubura iyi mbuto kandi bibifitiye uburenganzira.



Akamaro ko gutera ku mirongo.

- Gukoresha ingano y' imbuto izwi kandi ijyanye n'ubuso bwo gutera;
- Bituma ibihingwa bitarwanira imirasire y'izuba n'imyunyu ngugu iri mu butaka;
- Byorohereza umuhinzi gukora imirimo itandukanye nko kubagara, kuhira, gutera imiti no kongeramo ifumbire (ire, amidas),...

9. Kubagara

Kubagara ni ugukura ibyatsi byameze mu murima w'ibigori harimo n'ibindi bihingwa byose byimejeje. Kumenera cyangwa kubagara bwa mbere bigira umumaro ukomeye iyo bikozwe mu byumweru bitatu nyuma yo gutera ibigori (ibigori bifite nk'amababi abiri). Kumenera bigamije koroshya ubutaka kugira ngo amazi yinjiremo neza, ariko binafasha kurwanya ibyatsi bikimera.

Umuhinzi agomba kubagara umurima we kugeza ibigori byeze hasigaye nk'ibyumweru bibiri ngo bisarurwe. Iyo atabagaye, ibyatsi bicuranwa n'ibigori imyunyungugu, urumuri n'amazi ndetse bikaba indiri y' ibyonnyi n'indwara bityo bigatuma umusaruro ugabanuka.

Ubundi buryo bwunganira kubagara mu kurwanya ibyatsi mu murima twavuga:

- Kurima kare bituma imbuto z'ibyatsi zibitse mu butaka zimera mbere zikarandurwa mu gihe cyo gutabira no gusanza;
- Gukoresha imborera iboze neza bigabanya ubwinshi ndetse n'ubwoko bw' ibyatsi byari kuzamera mu murima biturutse ku mbuto zaje mu cyarire cg mu byatsi byakoreshejwe mu gukora ibirundo by' ifumbire kuko zimwe ziba zapfiriye mu ruhererekane rwo kubora.
- Gukura ibyatsi mu murima bitarageza igihe cyo kurabya no kuzana imbuto bigabanya ukororoka kwabyo mu gihe kirambye.

- Gusimburanya ibihingwa mu murima bigabanya ukororoka k'ubwoko bumwe na bumwe bw'ibyatsi. Urugero: Kurisuka cyangwa Bariyentaraza (Striga) yororokera ahahinzwe ibinyampeke gusa.
- Gutera hubahirijwe ingero zagenwe zo gutereraho nkuko zagaragajwe mugika kivuga ibijyanye no gutera, birinda ko hagati y' ibigori hasigara umwanya munini utuma ibyatsi bibona urumuri n' imyunyungugu bibifasha gukura byisanzuye.



Umurima utabagaye



Umurima ubagaye neza

10. Kongera ifumbire mvaruganda mu murima w' ibigori no gusukira

Kongeramo ifumbire mvaruganda mu murima w' ibigori no gusukira bikorwa igihe ibigori bigize amababi umunani agaragaza urugori. Iyo wakoreshije imvange ya DAP (18-46-0) na Ire (46-0-0) igihe cyo gutera, wongeramo Ire. Naho iyo wakoreshije CEREALS (23-10-5+2Mg+3S+0.3Zn) mu gihe cyo gutera, wongeramo AMIDAS (40% N + 14% SO₃). Mu kongeramo ifumbire mvaruganda, uca agaferege ka santimetero indwi (7cm) kazengurutse buri kigori, gafite ubujyakuzimu buri hagati ya santimetero ebyiri n'eshanu (2cm- 5cm). Ushyiramo Ire cyangwa AMIDAS wapimishije agafuniko kamwe ka fanta. Ubwo uba wongeyemo ibiro mirongo itanu bya Ire cyangwa mirongo itanu bya AMIDAS kuri hegitari (50kg/ ha). Bityo uba wongeyemo ibiro 23 by'umunyungugu wa Azote iyo wakoreshije Ire, cyangwa ibiro 20 by'umunyungugu wa Azote n'ibiro 7 by'umunyungugu wa Sirifire iyo wakoreshije AMIDAS. Iyo urangije gushyiramo ifumbire uhita usukira umurima wose. Gusukira bitwikiriza ubutaka imizi y'ibigori minini imera nyuma ku uruti hejuru y'ubutaka bishyigikira ikigori ntigihungabanywe n'umuyaga ndetse bigafata amazi ibigori bikayakoresha igihe kirekire. Imizi y'ibigori imera nyuma (brace roots) igira umumaro wo gukomeza ibigori mu butaka, kuvoma amazi n' imyunyungugu ku rugero rwo hejuru.

11. Gusura umurima

Umuhinzi agomba gusura umurima we nibura kabiri mu cyumweru kugira ngo agenzure ko nta bibazo biwurimo (, ibyatsi, indwara, ibyonnyi, ukeneye kumenerwa, kongerwamo ifumbire, , gusukirwa n'ibindi...) no gufata ingamba zo kubikemura.

12. Indwara n'ibyonnyi byibasira igihingwa cy'ibigori

A. Indwara

1. *Cyumya y'ibigori cyangwa Kirabiranya y'ibigori (Maize Lethal Necrosis)*

Indwara ya Cyumya y' ibigori iterwa n'uruhurirane rwa virusi ebyiri, ariko iy'ingenzi ni *Maize chlorotic mottle virus (MCMV)*. Iyi virusi iyo ihuye n'imwe muri izi zikurikira: virusi ifata ibisheke yitwa *Sugarcane mosaic virus (SCMV)*, virusi ifata ingano yitwa *Wheat Streak Mosaic Virus (WSMV)* cyangwa ifata ibigori yitwa *Maize Dwarf Mosaic Virus (MDM V)* nibwo bitera indwara ya Cyumya y'ibigori. Cyumya y'ibigori igira ubukana bwinshi kurusha izindi ndwara zose z'ibigori kandi igabanya umusaruro kugeza ku gipimo cyi 100% iyo itarwanyijwe.

Ibimenyetso biranga indwara ya Cyumya cyangwa Kirabiranya

- Amababi y'ikigori cyafashwe ahinduka umuhondo, akuma ahereye ku mpande z'ikibabi, bigana imbere cyangwa akuma ahereye ku mwumba;
- Iyo ibigori bifashwe n' iyi ndwara bikiri bito biragwingira;
- Ingenge z'amara y'umuhondo uhereye ku mwumba ugana ku bibabi byo hasi;
- Umuheko w'ikigori cyafashwe n'uburwayi ugaragara nk'aho ikigori cyeze, nyamara iyo uwuvanyeho ibishishwa usanga intete zikiri mbisi, hanyuma aho kwera zikabora;
- Umuheko ugaragara nk'aho harimo impeke, ariko uvanyeho ibishishwa ugasanga nta mpeke zirimo cyangwa ari nke cyane;
- Iyo uburwayi bukabije, umuheko w' ikigori urabora ndetse ukanuka cyane.



a) Kuma bihereye ku mpande z'ikibabi, bigana imbere cyangwa kuma bihereye ku mwumba bigana ku mababi yo hasi



b) Kugaragara nk'aho ikigori cyeze, nyamara iyo uwuvanyeho ibishishwa usanga intete zikiri mbisi, hanyuma aho kwera zikabona



c) Ingenze z'amara y'umuhondo uhagaze ku mwumba ugana ku bibabi byo hasi



d) Umuheko ugaragara nk'aho ikigori cyeze, nyamara iyo uwuvanyeho ibishishwa usanga intete zikiri mbisi, hanyuma aho kwera zikabona

Uburyo bwo kuyirinda no kuyirwanya

- Guhinga imbuto zifite icyemezo cy'ubuziranenge;
- Gusimburanya ibigori n'ibindi bihingwa bitari ibinyampeke nk'amasaka. Ugahinga ibinyabijumba nk'ibirayi n' ibijumba ndetse n'ibinyamisogwe nk'ibishyimbo na soya. uko gusimburanya ibihingwa gutuma iyo ndwara igabanuka mu murima;
- Kurandura urubingo n'ibisheke byose bigaragaza ibimenyetso by' indwara ya Cyumya y' ibigori;

- Abahinzi bagomba guhingira igihe no guterera rimwe (kubahiriza igihe cyagenwe cyo gutangira guhinga no gupfundikira itera ry'ibigori) kugira ngo hirindwe insigane mu mikurire y' ibigori; bityo virusi ibure aho yororokera;
- Kurandura no kuvana mu murima ibigori bigaragaza ibimenyetso by'iyi ndwara bigatabwa mu cyobo kirekire gifite nibura metero imwe y'ubujyakuzimu;
- Kwirinda gutwara ibigori cyangwa ibikomoka ku bigori byasaruwe mu murima wagaragaje uburwayi ubivana mu gace kamwe ubijyana mu kandi haba mu gihugu cyangwa hanze yacyo;
- Gukoresha amoko y'ibigori yihanganira iyi ndwara nka RHM1407, RHM1409, RHM1520 na RHM1601.

2. Ingenge z'amabara (Maize streak virus)

Indwara y'Ingenge z'amabara cyangwa indwara y'imirongo (Maize Streak Virus disease) n'indwara yo mu bwoko bw'amavirusi ikwirakwizwa n'agakoko kitwa **Cicadulina mbila (Naude)**. Ibigori cyafashwe kirangwa n'imirongo y'amabara y'umweru n'umuhondo werurutse yegeranye kandi iteganye igenda ikurikira imigongo mito y'ikibabi. Ibyo bimenyetso bitangirira ku bibabi byo hejuru bikagenda bimanuka ku bibabi byo hasi. Ibigori byazahajwe n' iyi ndwara biragwingira kandi umusaruro ukagabanuka.



Uburyo bwo kuyirinda no kuyirwanya

- Gukoresha amoko y'imbuto y'ibigori yihanganira iyi ndwara nka RHM107, RHM1409, RHMH1520, RHMH1601 na RHMH1611;
- Kurandura no gukura mu mirima ibigori byose bigaragaza ibimenyetso by'iyi ndwara.
- Kubagara igihe cyose mu murima hajemo ibyatsi kugira ngo bitaba indiri y' udusimba dukwirakwiza iyi ndwara.

3. Kubora k'uruti rw'ikigori (Stalk rot)

Indwara yo kubora k'uruti rw'ikigori iri mu bwoko bubiri: "Diplodia stalk rot" na "Fusarium stalk rot". Diplodia stalk rot iterwa n'agahumyo kitwa "*Stenocarpella maydis*", naho "Fusarium stalk rot" iterwa n'agahumyo kitwa "*Fusarium verticilliodes*". Indwara yo kubora k'uruti rw'ikigori itangira amababi ahindura ibara agahinduka umuhondo werurutse iyo ari "Fusarium stalk rot" cyangwa agasa n'ikijuju iyo ari "Diplodia stalk rot". Hanyuma ububore bugatangirira ku ngingo z'ikigori, bukagenda bukwirakwira hagati y'ingingo zikurikiranye ku buryo uruti rw'ikigori rutakaza imbaraga akantu gato kagikoraho kigahita kigwa.



Uburyo bwo kuyirinda no kuyirwanya

- Gusimburanya ibigori n'ibindi bihingwa: ibinyamisogwe n'ibinyabijumba;
- Gukura ibisigazwa by'ibigori mu murima igihe umaze gusarura.
- Guhinga ari ko kuzika ibisigagzwa by'ibigori;
- Gifumbira neza kurikije inama z'ababamaza-buhinzi;
- Gusimburanya ibigori n'ibindi bihingwa mu murima: ibinyamisogwe n'ibinyabijumba.

4. Kubabuka kw'amababi (Turcicum Leaf Blight or Northern Leaf Blight)

Indwara yo kubabuka kw'amabi iterwa n'agahumyo kitwa *Exserohilum turcicum*. Iyo igitangira irangwa n'utudomo tuza ku mababi tukagenda dukura

tugafata igice kinini k'ikibabi. icyo gice cyafashwe kikagaragara gisa nk'aho cyababutse. Amababi yohasi niyo abanza gufatwa hanyuma ibimenyetso by'uburwayi bikagenda birushaho kugaragara uko ikigori gikura. Iyi ndwara igabanya umusaruro cyane kuko ishobora gutuma amababi y' ikigori yose yuma.



Uburyo bwo kuyirinda no kuyirwanya

- Gukoresha imbuto zihanganira iyi ndwara nka RHM1407 na RHM1409;
- Gusimburanya ibigori n'ibindi bihingwa bitari ibinyampeke nk' ibinyamisogwe (ibishyimbo) n'ibinyabijumba (ibirayi);
- Gukura ibisigazwa by'ibigori mu murima igihe umaze gusarura;
- Guterera ibigori ku gihe.

5. Kubora kw'amahundo y'ibigori (Maize Ear Rot)

Indwara zo kubora kw'amahundo y'ibigori zirimo ubwoko bwinshi ariko iz'ingenzi ni "Diplodia ear rot" iterwa n'agahumyo kitwa "*Stenocarpella maydis*", "Fusarium ear rot" iterwa n'agahumyo kitwa "*Fusarium verticillioides*" naho "Gibberella ear rot" iterwa n'agahumyo kitwa "*Gibberella zeae*". Ubwoko bwa "Diplodia ear rot" bugaragazwa n'uruhumburu rusa n'ikijuju cyangwa igihogo hagati y'impeke no ku mpeke ku gice cy'ihundo cyane cyane igice cyo ku ndiba n'igice cyo hagati. Ubwoko bwa "Fusarium ear rot" bugaragazwa n'uruhumburu rusa n'igihogo cyangwa rwerurutse ruri ku mpeke ziri hirya no hino kw'ihundo, cyangwa ku

mpeke ziri hamwe mu gace kamwe k'ihundo. Ubwo bwoko bushobora kugaragazwa n'uturongo tw'uruhumbu tw'umweru turi ku mpeke. Ubwoko bwa "Gibberella ear rot" bugaragazwa n'uruhumbu rusa n'igaju cyangwa n'umutuku werurutse, rukaba rutangirira ku mutwe w'ihundo rukamanuka ruja hagati.



Diplodia ear rot

Fusarium ear rot

Gibberella ear rot

Uburyo bwo kuyirinda no kuyirwanya

- Gukura mu murima inisigazwa byose by'ibigori;
- Guhinga ari ko kuzika ibisigagzwa by'ibigori;
- Gifumbira neza kurikije inama z'ababamaza-buhinzi;
- Gusimburanya ibigori n'ibindi bihingwa mu murima: ibinyamisogwe n'ibinyabijumba;
- Gukura mu murima amahundo yose arwaye, gusarura hakiri kare ibigori bimaze kwera no kumisha neza amahundo n'impeke;
- Gusarura kare, ibigori ntinitinde mu murima;
- Guhita usarura iyo 10 % cyangwa birenga by'ibigori bifite ububore;
- Kumisha ibigori ujageza ku buhehere mu mpeke bwa 13%.

B. Ibyonnyi

1. Bariyentaraza, Kurisuka cyangwa Rwona (*Sitiriga spp*)

Biriyentaraza, Kurisuka cyangwa Rwona bitewe n' agace runaka, ni icyatsi cy'indirizi (parasite) bivuze ko ubwacyo kitashobora kwivomera mu butaka imyungungugu ndetse n' amazi gikenera kugira ngo gikure; bityo Bariyentaraza yisunga imizi y'ikindi gihingwa cyane cyane ibinyampeke nk'ibigori n'amasaka. Imbuto za Bariyentaraza zishobora kumara imyaka 20 zisinzirirye mu butaka zigashobora kumera ari uko hatewe ibigori cyangwa amasaka.

Mu Rwanda haboneka ubwoko bubiri bwa Bariyentaraza aribwo: Sitiriga igira ururabo rusa n'ibara ry' umwura (purple) "*Striga hermonthica*" iboneka mu turere twa Nyagatare, Gatsibo, Kayanza, Ngoma no mu Mayaga. Hakaba na Sitiriga igira ururabo rufite ibara ry' umutuku "*Striga asiatica*" iboneka mu karere ka Bugesera. Mu karere ka Kirehe haboneka ubu bwoko bwombi bwa

Bariyentaraza. Muri utu turere n' agace k' Amayaga byavuzwe Bariyentaraza yibasira igihingwa cy'ibigori n'amasaka.

Bariyentaraza inyunyuzwa intungagihingwa zavomwe n'imizi y'ikigori ku buryo usanga ari yo yakuze cyo kikagwingira. Bariyentaraza iyo itarwanijwe neza ishobora kugabanya umusaruro w'ibigori ku gipimo cy'ijana ku ijana (100%).



Striga hermonthica



Striga asiatica

Uburyo bwo kuyirinda no kuyirwanya

- Kurandura Bariyentaraza itarazana ururabo kugira ngo imbuto zayo zidakomeze kwiyongera mu butaka; iyo hari iziranduwe zararabije bisaba kuzitwika;
- Gusimbura mu murima ibinyampeke, ibinyamisogwe n'ibinyabijumba; ibinyamisogwe (Soya, Ubunyobwa n' ibishyimbo) bifite umwihariko wo gutuma Bariyentaraza ishobora kumera ariko ntibashe kubaho kuko imizi yayo idashobora kuvoma ibiyitunga mu mizi y' ibi binyamisogwe;
- Gufumbira umurima neza hakoreshejwe ifumbire y'imborera ndetse n'iyi mvaruganda bifasha ikigori kugira imbaraga zo guhangana n' iyi ndirizi.
- Kwirinda kunyuzwa amatungo mu murima wagaragayemo Bariyentaraza kuko ashobora kuyijyana mu yindi mirima.
- Kwirinda gutera imbuto zasaruwe mu murima irimo Bariyentaraza
- Gufasha imbuto za Bariyentaraza ziri mu butaka kumera ari nyinshi (kugira ngo zirandurwe ari nyinshi zigabanuke mu murima) haterwa ibigori ku ngero zagenwe,

2. Nkongwa (African maize stalk bor or *Busseola fusca*)

Nkongwa ni icyonnyi kiri mu bwoko bw'ibinyugunyugu, ariko igishorobwa cyayo ni cyo cyangiza ibihingwa. Igishorobwa gitobagura amababi nyuma kikinjira mu ruti rw'ikigori, hakagaragara ifu aho cyaciye imyenge. Kinjira mu ruti rw'ikigori, kigagenda kirya iby'imbere, kandi kigacamo umuhora. Iyo usatuye uruti rw'ikigori

cyafashwe usangamo igishorobwa kimeze nk'urunyo. Uruti rw'ibigori byafashwe nta mbaraga biba bigifite ku buryo bishobora kuvunika no kugushwa n'umuyaga.



Uburyo bwo kuyirinda no kuyirwanya

- Gusimburanya mu murima ibigori n'ibinyamisogwe cyangwa ibinyabijumba bigabanya ikwirakwira rya nkongwa;
- Gufumbira ubutaka hakoreshejwe ifumbire y'imborera;
- Kugenzura umurima bihoro bifasha kurwanya ikibazo hakiri kare;
- Kuvanga ibigori na desimodiyumu, umurima ukawukikiza urubingo. Nkongwa ihunga impumuro ya desimodiyumu mu rubingo kandi idashobora kororokeramo (Push-Pull);
- Isuku y'umurima: Gutaba ikigorigori nyuma yo gusarura cyangwa bikagaburirwa amatungo;
- Mu gihe ibigori byafashwe birenze 10%, ushobora kurwanya nkongwa ukoresheje imiti nka:
 - Lambda cyhalothrin ku rugero rwa 1-2 ml z'umuti muri 1l z'amazi;
 - Cypermethrin+profenofos (roket) ku rugero rwa 15ml/ litiro 15 z'amazi.

3. Nkongwa idasanzwe (fall armyworm)

Nkongwa idasanzwe ni icyonnyi kitari gisanzwe mu Rwanda, cyaje mu mwaka 2017 kandi kiri mu bwoko bw'ibinyugunyugu. Igishorobwa cyacyo ni cyo cyangiza ibihingwa cyane cyane ibigori.

Nkongwa idasanzwe irangwa n'ibi bikurikira: ku mutwe hagaragara ishusho y'inyuguti ya "Y", utwoya twirabura tugaragara ku mubiri wayo, umurongo mugari ubengerana uri ku mugongo uvuye ku mutwe ugana inyuma ukikijwe n'uturongo

twirabura kumpande zawo n'ibidomo bine bikoze ishusho ya "mpandenye ndinganire" ahagana inyuma.

Nkongwa itangira yangiza amababi akiri mato iyaharura nyuma ikajya mu mwumba. Iyo ikuze itobora imyenge ku mababi igakata n'umwumba, ari nako igenda isiga umwanda wayo ku mababi umeze nk'ifu itose. Iyo umwumba wariwe cyane byangiza imikurire y'ikigori n'umusaruro ukagabanuka.



a) Ibishorobwa bigikura



b) Igishorobwa kimaze gukura



c) Igikonoshwa



d) Nkogwa idasanzwe iriho irya ibibabi by'ibigori



e) Nkogwa idasanzwe iri mu mwumba w'ikigori. Yangiza umwumba kandi igasiga umwanda wayo ku mababi



f) Nkogwa idasanzwe itangira iharura amababi y'ibigori

f) Nkogwa itobabagura amababi y'ibigori ikanayatabura



h) Amagi ya nkongwa idasanwe



i) Ikinugunyugu cy'ikigabo cya nkongwa idasanzwe



j) Ikinugunyugu cy'ikigore cya nkongwa idasanzwe

Ikinugunyugu cy'ikigore cya nkongwa idasanzwe gitera amagi ku bibabi mu ruhande rwo munsu. Ayo magi avamo ibishorobwa. Ibishorobwa ni byo byangiza ibigori kandi bitangira konona bikiri bito biharura amababi. Ibishorobwa birakura bikava ku rwego rwa mbere bikagera ku rwego rwa gatandatu ari nako kwangiza ibigori bigenda byiyongera. Ibishorobwa byo ku rwego rwa gatandatu bivano ibikonoshwa bigahita bijya mu butaka. Ibikonoshwa birakura bikavamo ibinyugunyugu.

Uburyo bwo kwirinda no kurwanya nkongwa idasanzwe

- Guhinga ugeza isuka hasi ugamije kugaragaza, kuvanamo cyangwa gutaba nkongwa n'ibikonoshwa byayo;
- Kongerera ibihingwa ubudahangarwa hakoreshwa ifumbire y'imborera iboze neza n'imvaruganda ku bipimo nyabyo;
- Gusimburanya mu murima ibinyampeke n'ibinyamisogwe nk'ibishyimbo na soya cyangwa n'ibinyabijumba nk'ibirayi n'ibijumba;
- Guturagura ibishorobwa bya nkongwa idasanzwe mu murima no kubyica;

- Gukoresha umuti wica udukoko nka:
 - Cypermethrin 4%+profenofos 40% (roket, target, cypro, jaket) ku rugero rwa 1-2 ml z'umuti muri 1l z'amazi,
 - Lambda-Cyhalothrin 50g/l, ku rugero rwa 1-2 ml z'umuti muri 1l z'amazi;
 - Pyrethrum 5% EWC, ku rugero rwa 8ml muri 1l y'amazi.
 - Acetamiprid 20g/l + Lambda-Cyhalothrin 16g/l, 4-6ml muri 1l y'amazi.
- Iyo utera umuti wibanda cyane cyane mu mwumba w' ikigori.

4. Imungu (maize weevil)

Imungu ni agasimba kangiriza ibigori mu buhunikiro. Imungu ikuze igira uburebure buri hagati ya cm 3 na cm 3,5 kandi isa n'umukara cyangwa igihogo kijimye. Ku gice cy'igituza cyayo hagara utuntu tumeze nk'udutobore. Utwo dutobore tugaragara kandi dutonze umurongo inyuma ku mababa akomeye. Amababa akomeye afite utudomo tw'umutuku wijimye cyangwa oranje yijimye. Imungu kandi ifite umunwa muremure usongoye, n'amahembe atereye ku ntugu afite ingingo umunani. Igishorobwa cy'imungu gisa n'umweru kandi nta maguru gifite. Imungu icukura imyobo mu mpeke ikinjiramo, ikarya iby'imbere byose, igasiga gusa agahu k'inyuma rimwe na rimwe kariho ifu yera y'umwanda wayo. Iyo ushyize impeke z'ibigori mu mazi, impeke zose zireremba ziba zarariwe n'imungu.



Uburyo bwo kwirinda no kurwanya imungu

- Gusarura ibigori bimaze kwera, ntibitinde mu murima, kuko ishobora gutangira kwangiza umusaruro bikiri mu murima;

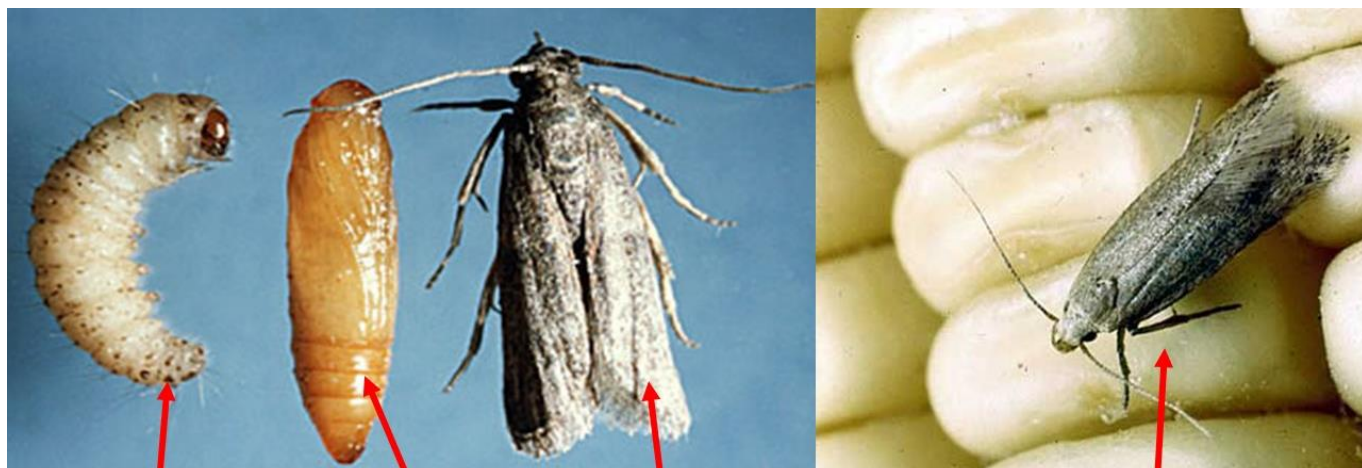
- Kumisha neza ibigori umaze kubisarura, impeke zikuma ku rugero rw'ubuhere buri hagati ya 12 % na 14 % ;
- Guhunka umusaruro ahantu habugenewe, hafite isuku, nta mpeke z'ibigori zindi cyangwa impeke z'ibindi bihingwa zihari ndetse n'ibindi byose bishobora gutera umwanda;
- Gukoresha imiti yica imingu n'ibishorobwa byayo ukurikiza amabwiriza yose aba ari kumwe n'umuti wahisemo. Imwe mu muti wakoresha yemewe mu Rwanda ni iyi:

- Malathion 2% w/w, Dust
- Malathion 2.0% w/w + Permethrin 0.3% w/w
- Profenofos, 40%EC; 50%EC
- Pyrethrins, 75%w/w EC
- Pyrimiphos-Methyl 400g/l + 75g/l Permethrin, EC
- Pyrimiphos-methyl, 2 % PP Dust
- Aluminium phosphide (PH₃), 56%, 57% pills, tablets and plates for fumigation

5. Kanyugunyugu (*Angoumois grain moth*)

Kanyugunyugu ni agasimba kari mu bwoko bw'ibinyugunyugu kangiriza ibigori mu buhunkiro. Kanyugunyugu ni ntoya cyane ireshya na mm 5 kugeza kuri mm 7, ariko iyo ipimwe amababa arambuye igeza kuri mm 20. Umutwe, igituza n'amahembe byayo bimeze nk'urushinge rusa n'igihogo kijya kweturuka. Amababa y'imbere ni maremare, asa n'igihogo kijya kweturuka cyangwa umuhondo wijimye; kandi afite utudomo tujya kwirabura. Igihimba cy'inyuma gisa n'igihogo. Amagi yayo ariburungushuye, asa n'umweru iyo ikinyugunyugu kikiyatera, nyuma ahita ahindura ibara agasa n'umutuku. Igishorobwa cyayo gikurira mu ruheke rumwe, gisa n'umuhondo werurutse, umutwe wacyo usa n'umutuku werurutse kandi umeze nkaho winjiye mu mubiri.

Igishorobwa nicyo cyangiza impeke cyane, kuko ikinyugunyugu gitera amagi mu twenge duto kiba cyatoboye kuri buri ruheke. Igi rimwe kuri buri ruheke rivamo igishorobwa kimwe. Uko gikura kirya iby'imbere byose biri mu ruheke. Igishorobwa mbere y'uko gihinduka igikonoshwa kibanza guca akobo gato gasohoka hanze nyuma kigahita gihinduka igikonoshwa. Igikonoshwa kirakura nko mu minsi 10 kikavamo ikinyugunyugu. icyo kinyugunyugu gihita gisohoka giciye muri ka kobo kaciwe n'igishorobwa mbere y'uko kiba igikonoshwa. Impeke zariwe n'igishorobwa ziba zifite umwuka unuka.



Igishorobwa (larvae)

Igikonoshwa (pupa)

Ikinyugunyugu

Ikinyugunyugu ku mpeke z'ikigori

Uburyo bwo kwirinda no kurwanya imungu

- Kumisha neza ibigori umaze kubisarura kuburyo ugera ku buhehere mu mpeke buri hagati ya 12 % na 14 %;
- Guhunka umusaruro ahantu habugenewe, hafite isuku, nta mpeke z'ibigori zindi cyangwe se impeke z'ibindi bihingwa zihari, nta mukungu, umusenyi n'ibindi byose bishobora gutea umwanda;
- Gukuraho ibyatsi byaba biri hafi y'ubuhunikiro;
- Gusura ubuhunikiro buri cyumweru cyangwa mu byumweru bibiri ukareba niba nta twenge turi ku mpeke;
- Gukoresha imiti yica udusimba two mu buhunikiro kandi ugakurikiza amabwiriza yose ari kumwe n'umuti wahisemo. Imwe mu muti wakoresha yemewe mu Rwanda ni iyi:
 - Malathion 2% w/w, Dust
 - Malathion 2.0% w/w + Permethrin 0.3% w/w
 - Profenofos, 40%EC; 50%EC
 - Pyrethrins, 75%w/w EC
 - Pyrimiphos-Methyl 400g/l + 75g/l Permethrin, EC
 - Pyrimiphos-methyl, 2 % PP Dust
 - Aluminium phosphide (PH₃), 56%, 57% pills, tablets and plates for fumigation

13. Gusarura

1. Kwera kw'ibigori

Ibigori byeze neza bigeze igihe cyo gusarurwa birangwa n'ibi bikurikira:

- Biba bimaze hagati y'amezi 4 na 7 bitewe n'ubutumburuke bwaho byahinzwe;

- Amababi nka yose aba yumye;
- Ibishishwa bipfutse ibigori bihindura ibara bigasa na kaki;
- Amahundo y'ibigori atangira gucurama bitewe n' ubwoko kuko hari ubutajya buyacurika;
- Akorongo k'umukara kaza ku ndiba z'impeke (black layer);
- Impeke ziba zikomeye zidashobora gupfumurwa n'urwara kandi zuzuye ifu



2. Uburyo bwo gusarura

Mu gusarura n'intoke, amahundo avanwa ku bigorigori akagumishwaho ibishishwa cyangwa bikavanwaho bitewe n'ubwanikiro buzakoreshwa, kandi bigomba gusarurirwa mu bikoresho bifite isuku hirindwa ko byahura n'ubutaka.

Mugusarura n'imashibe (harvet combiner), imashini inyura mu murima, ikagenda ikuta ibiti biriho ibigori, igahita itandukanya ibigori n'ibiti byabyo hamwe n'ibabi ibyo ikabijugunya. Ihita ikuraho ibishishwa ku bigori ikabijugunya, hanyuma igahungura, igatandukanya ibititiri n'impeke, ibititiri ikabijugunya impeke ikazijyana ahabugenewe.



3. Uburyo bwo gutwara ibigori biva mu murima bijyanwa mu bwanikiro

Mu gihe cyo kuvana ibigori mu murima, hakoreshwa uburyo butandukanye nko kubyikorera ku mutwe, gukoresha inkorofani ndetse no gukoresha ikamyo. Ariko ni ngombwa kwitwararika kugira ngo impeke zitangirika, kubitwara mubikoresho bifite isuku kandi bidashaje, ikindi ni ngombwa kwirinda ko ibigori binyagirwa cyangwa ngo bihure n'igitaka.

4. Kwanika

Kubera ko ibigori biba byasaruwe bitumye neza, ni ngombwa kubyanika kugira ngo byume neza. Ushobora kwifashisha ibikoresho bitandukanye nk'igisharagati, imbuga yabugenewe, ku mabaraza y' inzu, ku birago no kuri shitingi. Ushobora no gukoresha imashini zumisha (cob driers).

Icytonderwa:

- Kirazira kwanika ibigori ku rusenge kubera ko umwotsi wangiza ubwiza bw' umusaruro
- Kwirinda ko ibigori binyagirwa kuko bishobora gutuma hazamo uruhumbu rw' Afuratogisine (Aflatoxine) rugira ingaruka mbi ku buzima bw'abantu n' amatungo.



Hari ubwoko bwa shitingi bwanikwaho ibigori bwitwa Collapsible Dryer. Iyi shitingi iba ifite ibara ry'umukara, iryo bara rikurura izuba cyane iyo uyanitseho byuma vuba cyane. Ikindi iyi shitingi iba ifite ibice bibiri bihuzwa n'imashini (ushobora kuyifunga ukanayifungura) ku buryo iyo imvura iguye wanitse uhita uhuza impande zayo ugafunga, ukaza kubyanura imvura ihise. Ikindi iyi shitingi yanikwaho ibigori byinshi ugereranyije n'izindi zisanzwe.



Kumisha hakoreshejwe umurasire w' izuba (Solar dryer)

6. Guhungura

Mu gihe cyo guhungura ibigori bigomba gukoranwa ubushishozi hirindwa ko intete zimeneka, ushobora gukoresha intoki cyangwa imashini zabugenewe. Ni ngombwa ko mbere yo kugura imashini ihungura ugomba kubanza kumenya ko ifite ubuziranenge bityo bikakurinda kwangiza umusaruro.

Icytonderwa: Kirazira guhurira ibigori mu mifuka kubera ko byangiza cyane umusaruro kubera ko bimenagura intete z'ibigori.



Gutunganya umusaruro neza hakorwa ibi bikurikira:

- Gukuramo imyanda yose, umukungugu, amabuye, igitaka, ibyatsi n'ibindi
- Gukuramo izindi imbuto zitari ibigori
- Gukuramo intete zangiritse (izamunzwe, izamenetse cyangwa zahinduye ibara)

7. Guhunika

a. Guhunika ibigori bikorwa mu buryo bwitondewe hitabwa ku bintu by'ingenzi bikurikira:

- Guhitamo aho guhunika:
 - Hagomba kuba hatanyagirwa cyangwa ngo harekemo amazi;
 - Kuba hatari ubuhehere bwinshi;
 - Hashobora kwinjiza umwuka;
 - Kuba hatari ibyonyi nk'imbeba, imiswa n'ibindi.
- Gusukura aho guhunika no kuhaterwa imiti;
- Guhitamo uburyo bwo gupanga imifuka;
- Gusukura imyaka no kureba niba yumye neza ikaba ifite ubuhehere bwa 13%;
- Gusukura imifuka;
- Gutandukanya ubuhunikiro bw'ibigori by' ibigugu n'ibigisarurwe vuba;
- Kutarambika imifuka hasi hagakoreshwa imbaho cyangwa amabuye.

b. Ibintu by'ingenzi bigira uruhare runini mu kwangirika kw'ibigori mu buhunikiro

- Kuba ibigori bitumye neza mu gihe cyo kubihunika;
- Kuba mu buhunikiro hari ubuhehere cyangwa ubushyuhe bwinshi kuko bishobora gutuma hazamo uruhumbu rw' Afuratogisine (Aflatoxine) rugira ingaruka mbi ku buzima bw'abantu n' amatungo;
- Uburyo wapanze imifuka mu buhunikiro;
- Isuku nke mu buhunikiro;
- Kudahungira ibigori ku gihe.

c. Uburyo bunyuranye bwo guhunika



Silo



Warehouse

Hari uburyo bwishi bwo guhunika ibigori kuva kubunika igihe gito nk'imifuka no kugeza ku gihe kiramye nka "wharehouses" na "silos". Ikigomba kwitabwaho ni ubuhunikiro buba ari inyubako ifite igisenge gitume ibigori bihunitse bitanyagirwa kandi ikareka umwuka ukinjira mu bihunitswe. Muri iyo nyubako hagomba gukirikiranwa uko ubushyuhe n'ubuherehere bugenda buhindika hagamya ingaba iyo bigiye kurenga ibipimo ngenderwaho bya 27°C na 70%.

