

IMUNGU Y'IKAWA MURI AFURIKA Y'IBUR-ASIRAZUBA

Imungu y'ikawa (*Hypothenemus hampei*) (Ishusho ya 1), ni udukoko dukomeye mu bihugu bihinga ikawa ku Isi. Ikomoka ku ikawa yitwa robusta ihingwa ku butumburuke bwo hasi muri Afurika yo hagati no mu burengerazuba kandi yibasiye uturere hafi ya twose duhinga ikawa ku Isi.



Ishusho ya 1: Imungu y'ikawa ikuze
© Bioexploradores Farallones / inaturalist



Ishusho ya 2: Elmungu ya kawa yinjirira mu bitumbwe bitarera neza © Whitney Cranshaw / bugwood

Uko Imungu y'ikawa yangiza

1. Ibitumbwe byuma bikiri bito (bitarashya):

Imungu zikuze zijya kwangiza ibitumbwe bikiri bito, bitarashya (ishusho ya 2) iyo imbuto zeze zabaye nke mu ntangiriro z'igihembwe cyanga z'igihe cy'isarura. Ibi bishobora gutuma ibitumbwe bikiri bito bidakura neza, bikabura, cyangwa bigahunguka, ibyo bikaba byagabanyaga umusaruro n'ubwiza bwa kawa.



Ishusho ya 3: Aho imungu ya kawa yinjirira mu mbuto za kawa zeze © Whitney Cranshaw / bugwood



Ishusho ya 4: Igaragaraza ko imungu ya kawa yaremye udutsiko © Whitney Cranshaw / bugwood

2. Kugabanuka k'ubwiza n'ingano y'ibitumbwe bya kawa:

Imungu ya kawa yangiza imbuto inyuze mu gutobora ku mutwe w'igitumbwe (Ishusho ya 3) hanyuma igakora udutsiko (Ishusho ya 4) mu rutumbwe. Uko imungu ya kawa ikiri nto nikuze zigenda zirya kawa bigabanya umusaruro n'ubwiza bwayo.

3. Kwandura izindi ndwara mu buryo bworoshye:

Kwangirika kw'ibitumbwe ku ruhu rwabyo rwo hejuru bituma zandura izindi ndwara ziterwa na bagiteri n'uduhumyo, kuko ahangiritse haba nk'inzira y'izindi ndwara. Byongeye kandi, imungu ya kawa ifite ubushobozi bwo kwangiza kafeyine isanzwe ikora nk'imiti yica udukoko twangiza.

Imikurire y'imungu ya kawa

Imungu ya kawa (Ishusho ya 5) imara amezi 2 kugira ngo ikure. Muri icyo gihe, imungu ya kawa inyura mu byiciro bitandukanye by'imi-kurire: Nyuma yo gutera amagi, havamo imungu nto. Imungu nto irya ibitumbwe bya kawa bikangirika cyane. Ikomeza gukurira imbere mu mbuto za kawa ikageraho ikaba imungu ikuze.

Imungu z'ingore, ubusanzwe zikubye kabiri ubunini ingabo, zishobora kubaho iminsi 68, mu gihe ingabo zibaho iminsi 48 ahantu hari ubushyuhe buri hagati dogere selisiyusi 20o na 30o n'ubuhehere bugereranije buri hagati ya 70 na 90%.

Imungu ya kawa ikoresha kafeyine nk'isoko ya karubone na azote bitewe na bagiteri ya symbiotic *Pseudomonas*. Ubu buryo bworohereza imungu kurya no gukurira imbere mu gitumbwe cya kawa, bituma iba yihariye ugereranyije n'ubundi bwoko bwa *Hypothenemus*.

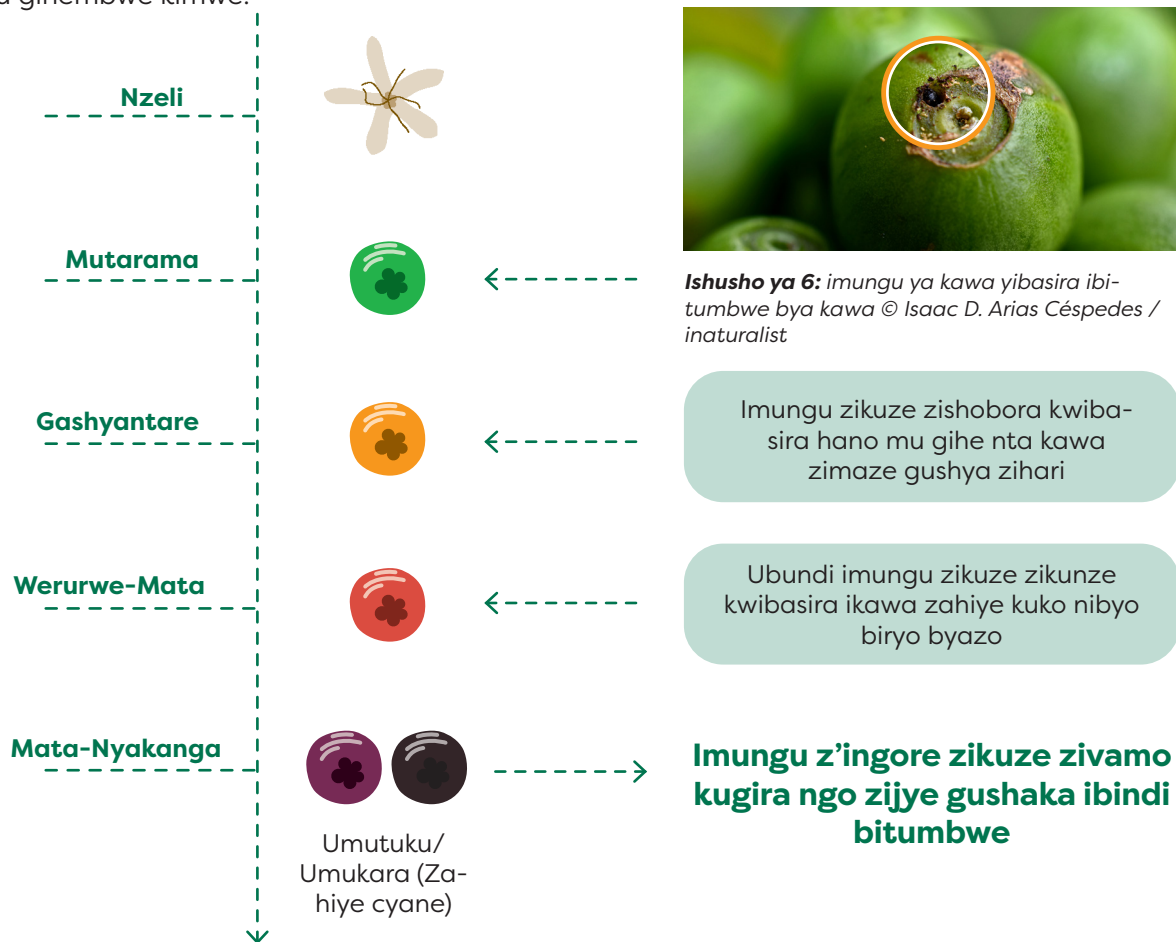


Ishusho ya 5: Imikurire y'imungu ya kawa. Ishusho yakuwe muri Góngora, Carmenza E., n'abagenzi be. (2023)

Uburyo imungu ya kawa yangiza

Mu bisanzwe, mu gitumbwe kimwe usangamo imungu y'ingore imwe. Ariko mu gihe cy'uburwayi bukomeye ushobora gusanga irenze imwe.

Imungu zikuze zikunze kwibasira imbuto zeze zimaze kuba umutuku kuko arizo biryo byazo (Ishusho ya 7), ariko iyo nta mbuto zikuze zihari, zibasira n'ubundi ibitumbwe by'ikawa zitarashya (Ishusho ya 6). Kuko imungu zibaho igihe kingana n'iminsi 45-60, zishobora kwibasira urubuto rwa kawa mu byiciro byinshi ndetse zibasha kwangiza kugera ku musaruro wa kabiri mu gihembwe kimwe.



Ishusho ya 7: icyiciro cy'imbuta za kawa zishobora kwibasirwa n'imungu ya kawa

Ingamba zo kurwanya imungu ya kawa: Gukoresha uburyo gakondo

Gukoresha uburyo gakondo bisobanura gukora ibikorwa bitandukanye mu murima bituma uduko twangiza tutabasha kuhaba ndetse bikaba byagorana ko tuhororokera tukaba twakonona ibihingwa. Ubu buryo bukoreshwa muri rusange mu gukumira ibyonnyi byakwibasira umuri-ma bugafasha umuhinzi kuzigama amafaranga n'igihe (Ishusho ya 12).

1. Gukonorera:

Gukonorera neza ibiti bya kawa bigomba gukorwa ku mashami yumye, naho gutema amashami maremare cyane mu gihe cyo gusarura bituma haza umwuka mwiza n'umuco w'izuba ukagera mu murima. Kuko imungu ya kawa ikunda kuba mu bushyuhe bwinshi, imirima idakonorerwa neza ishobora gutuma imungu ya kawa ihororokera cyane. Gukonorera bigomba gukorwa nyuma yisarura rya nyuma na mbere yuko kawa yongerera kurabya mu itangira ry'igihembwe gikurikiyeho. Ibi

kandi bigabanya amahirwe yo kuba umurima waba ahantu hashobora kororerwa imungu za kawa zikuze zishobora kwihisha mu mbuto zeze.

2. Uburyo bwo gucunga igicucu:

Nubwo igicucu ari ingenzi cyane kubiti by'ika-wa, igicucu cyinshi gishobora kwangiza kuko gishobora kurema ikirere cyiza (ubuhere) gifasha imungu ya kawa kubaho. Rero, igicucu ntabwo kigomba kurenza 40% (ishusho ya 8).

3. Kuvanaho udushami tugishibuka tukiri duto:

Kuvanaho udushami tugishibuka ku giti cya gikuru kugira ngo tutazabyara ibindi biti (ishusho ya 9) mu rwego rwo kugabana umubare w'ibiti n'amashami kugira ngo umuria udahinduka ahantu hashobora kororokera imungu ya kawa. Ibi kandi bifasha kugira ngo igihingwa kibashe gutanga imbuto nziza.

4. Isuku mu murima:

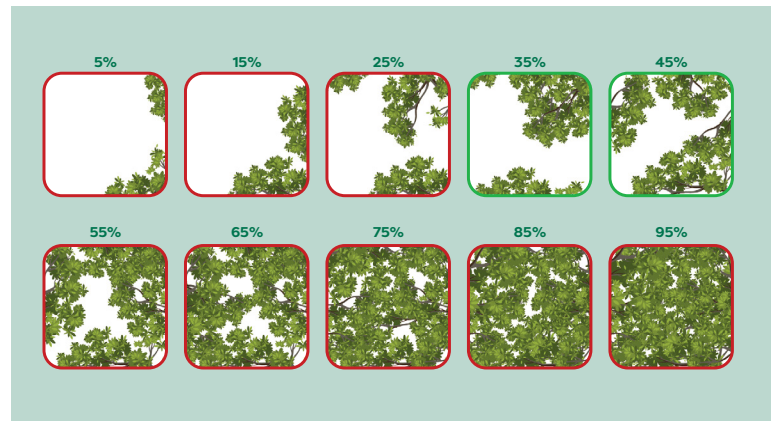
Umurima ugomba guhorana isuku nta myanda ya kawa zasaruwe isigaye haba ku biti cyanga mu murima. Ibi bituma ntaho imungu ya kawa ibona yakororokera.

5. Uburyo bwo gusarura:

Gasura kenshi gashoboka: Gusarura bigomba gukorwa buri byumweru 2 kugeza kuri 3 mu gihe kawa yeze. Ni ngombwa kugira ibihe byo gusarura kenshi kandi neza kugirango wirinde imungu ya kawa. Hasarurwa gusa imbuto zeze kandi zikuze, ku giti hagasigara izitarera neza kugirango zikomeze gukura neza.

Gutandukanya imbuto zanduye: Shyira imbuto zose z'umutuku, z'umukara (zihye cyane) hamwe nizikuze (zishaje) mu mazi. Imbuto ziri bujye mu ndiba ziraba zeze kandi zifite ubuzima bwiza naho imbuto za kawa zireremba hejuru, ziba zarahye cyane cyangwa zirwaye (Ishusho ya 10).

Ni ngombwa gutandukanya imbuto zanduye n'izimeze neza (ishusho ya 11) kugirango wirinde gukwirakwiza uburwayi. Bika imbuto zanduye mu mufuka wa palasitike kugirango imungu za kawa zitabona uko zihunga. Shyira imbuto nzi-za ukwazo mu mufuka. Imbuto zanduye uzijyana kuzitaba kure y'umurima kugirango wirinde



Ishusho ya 8: Ingero zitanduanze z'igicucu © La Disciplina de Fitotecnía en Cenicafé



Ishusho ya 9: Igiti cya kawa bakoreye © Hannah Vernon

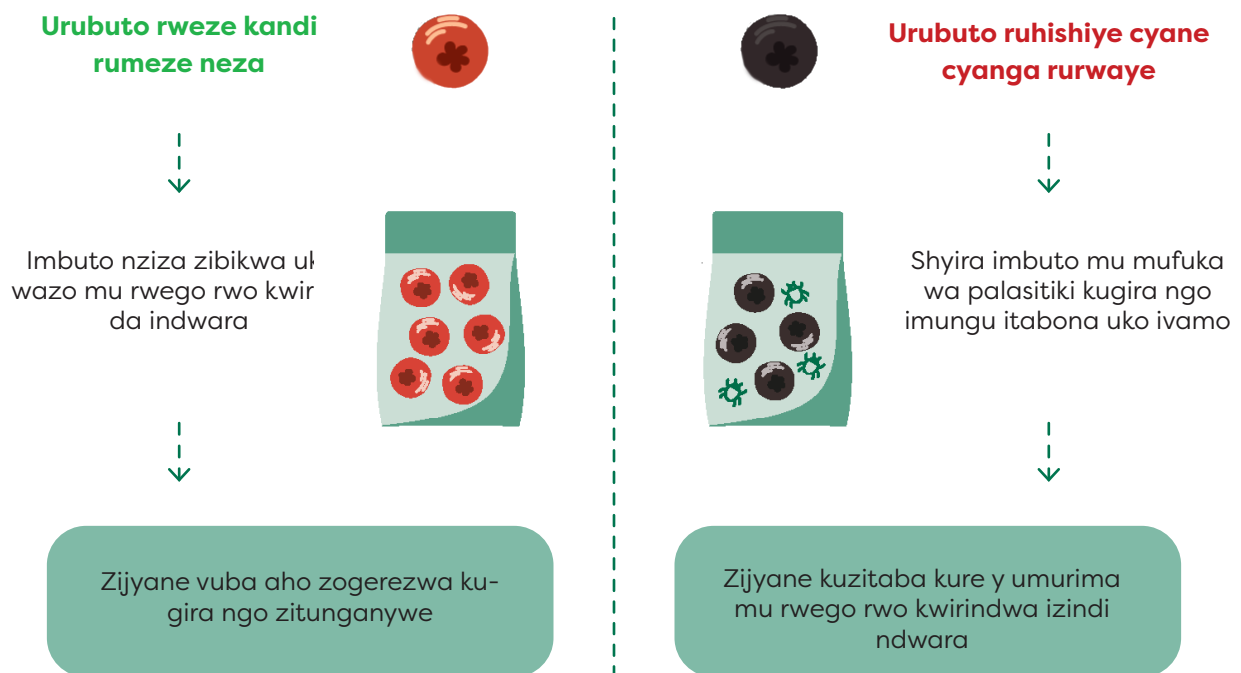
ko umurima wakongera kwandura.

Nyuma yo gusarura, mbere yo kohereza imbuto aho bogereza ikawa yasaruwe, ni byiza kubiza imbuto mu mazi kugirango wice imungu ya kawa yaba yasigaye n'izindi zaba zitarakura neza.

Nyuma yo gusarura imbuto zeze zigomba guhita zoherezwa aho zitunganyirizwa vuba bishoboka kugirango imungu ya kawa idakwirakwira mu zindi mbuto.



Ishusho ya 10: Gusuzuma ukoresheje amazi imbuto zirwaye cyanga zihye cyane zikareremba & naho imbuto zeze zimeze neza zikajya mu ndima© Amanda Bensel



Ishusho ya 11: Gutandukanya imbuto zirwaye n'imbuto zimeze neza nyuma yo gusarura

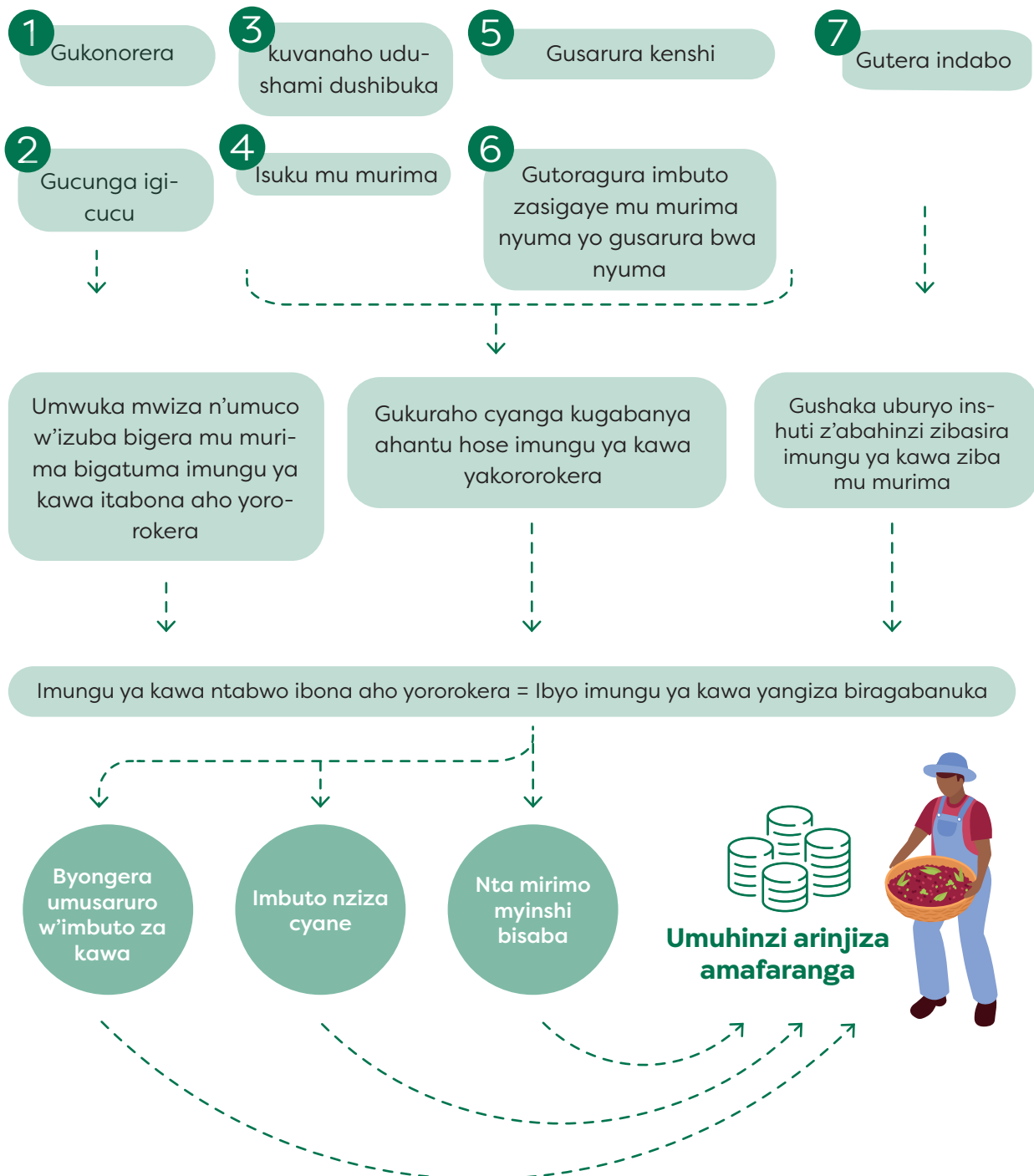
Uburyo bwo gusarura bwa nyuma usarurira ku giti: Gusarura bwa nyuma bigomba gukorwa mu buryo usarurira ku giti imbuto zose zisigaye. Isarura rya nyuma rigomba gukorwa mbere yo gukonorera, naho ubundi imbuto zihye cyane n'izumye zishobora kugwa mu butaba bigatuma imungu ya kawa ibona aho yorokera umwaka ukurikiyeho.

6. Nyuma yo gusarura:

Nyuma yo gusarura bwa nyuma, kura ku giti imbuto zose zisigaye zitaragera gutunganywa, kimwe n'imbuto zaguye muni y'ibiti bya kawa, hanyuma uzijyane kuzitaba kure y'umurima, kuko imungu z'ingore zishobora kororokera aho zaguye mu murima.

7. Uburyo bwo gukurura inshuti z'abahinzi:

Gutera indabyo nka Nyiramunukanabi n'imboga nk'ibitunguru ku mbibi z'umurima bishobora gukurura inshuti z'abahinzi zisanzwe zibasira imungu ya kawa.



Ishusho ya 12: Incamake y'akamaro ko kurwanya imungu ya kawa hakoreshejwe uburyo bwa gakondo.

Ingamba zo kurwanya imungu ya kawa: Uburyo bwo gukoresha ibinyabuzima

Uburyo bwo kurwanya imungu ya kawa ukoresheje ibinyabuzima mu murima, ni gukoresha inshuti z'abahinzi zisanzwe zica udukoko twangiza. Ibi binyabuzima bishobora kuba bisanzwe biba mu mirima ariko rimwe na rimwe hari ubwo dukenera kubizana mu murima ariko ubu buryo bushobora kuba buhenze.



Ishusho ya 13: *Beauveria bassiana* udhumyo twibasiye imungu ikuze © Luis Miguel Constantino



Ishusho ya 14: Ikimonyo kiri kwibasira imungu ya kawa. © G.Hoyos / Cenicafe

1. Udukoko turya utundi:

Udukoko turya utundi, urugero nka *Cephalonomia stepheneris*, *Prorops nasuta* na *Phymatidius coffea* dushobora kuba twarya imungu ya kawa ikiri nto ndetse n'imungu y'ingore imaze gukura.

2. Uduhumyo twica udukoko:

Beauveria bassiana nitwo dukunda gukoreshwa cyane mu kurwanya imungu ya kawa. Dutera imungu ya kawa y'ingore (ishusho ya 13) mbere yuko yinjira mu rubuto rwa kawa ndetse dushobora kwica izigera nko kuri 70% mu gihe turi ahantu hadufasha kororoka neza.

3. Iminyogoto:

Iyi minyorogoto ni inshuti z'abahinzi zisanzwe zica imungu ya kawa, iboneka mu butaka, kandi ishobora kurwanya indwara zishobora guturuka ku mbuto za kawa zaguye hasi. *Steinernema carpocapsae* na *Heterorhabditis* spp. zishobora kwibasira imungu ya kawa ikiri nto ndetse n'imaze gukura.

4. Ibimonyo:

Hari ubwoko bw'ibimonyo (ishusho ya 14) bishobora kwibasira imungu ya kawa ikiri nto nikuze. Bishobora kwibasira imungu ya kawa bikoreshe gutondagira ku biti cyanga bikarya imbuto zaguye hasi.

Uburyo bwo kurwanya imungu ya kawa ukoresheje ibinyabuzima bishobora kuba bitakunda ku mirima yose. Gukoresha imiti yica udukoko mu murima birahenze, kandi ni akazi kavunanye ndetse bigasaba kuba hari n'ibikoresho byabugenewe. Umusaruro wabyo ntabwo waba ku rwego rumwe buri gihe, kuko biterwa n'uburemere bw'uburwayi, ikirere cy'aho umurima uherere, ahantu heza ibinyabuzima byakororokera neza nibindi. Ariko imirima iteyemo ibiti bivanwa n'imyaka ishobora gufasha kubona no kubungabunga ahantu heza inshuti z'abahinzi zakororokera nk'inyoni, ibimonyo, iminyorogoto, ibitagangurirwa n'ibindi, bishobora kubuza imungu ya kawa kororoka.

Imbaraga nyinshi zigomba gushyirwa mu kurinda kwandura hitawe ku ngamba gakondo (Ishusho ya 12) habaho kubangamira imikurire y'imungu ya kawa kugira idakomeze kororoka. Ibi bizongera ubwinshi n'ubwiza bw'imbuta ndetse n'amafaranga umuhinzi abona aziyongera.

Aho byaturutse

Aristizábal, Luis F., Alex E. Bustillo, and Steven P. Arthurs. “Integrated pest management of coffee berry borer: strategies from Latin America that could be useful for coffee farmers in Hawaii.” *Insects* **7.1** (2016): 6.

Aristizábal, Luis. (2019). CBB Notes 02 Life Cycle of Coffee Berry Borer. 10.13140/RG.2.2.25113.77929.

Bustillo Pardey, Alex Enrique. “A review on the coffee borer, *Hypothenemus hampei* (Coleoptera: Curculionidae: Scolytinae), in Colombia.” *Revista Colombiana de Entomología* **32.2** (2006): 101–116.

Damon, Anne. “A review of the biology and control of the coffee berry borer, *Hypothenemus hampei* (Coleoptera: Scolytidae).” *Bulletin of entomological research* **90.6** (2000): 453–465.

Escobar-Ramírez, Selene, et al. “Biological control of the coffee berry borer: Main natural enemies, control success, and landscape influence.” *Biological control* **136** (2019): 103992.

García-Méndez, Valentina, et al. “Effect of Microclimate on the Mass Emergence of *Hypothenemus hampei* in Coffee Grown under Shade of Trees and in Full Sun Exposure.” *Insects* **15.2** (2024): 124.

Harelimana, Anastase, Daniel Rukazambuga, and Thierry Hance. “Pests and diseases regulation in coffee agroecosystems by management systems and resistance in changing climate conditions: a review.” *Journal of Plant Diseases and Protection* **129.5** (2022): 1041–1052.

Jaramillo, J., C. Borgemeister, and P. Baker. “Coffee berry borer *Hypothenemus hampei* (Coleoptera: Curculionidae): searching for sustainable control strategies.” *Bulletin of entomological research* **96.3** (2006): 223–233.

Johnson, M. D., J. L. Kellermann, and A. M. Stercho. “Pest reduction services by birds in shade and sun coffee in Jamaica.” *Animal conservation* **13.2** (2010): 140–147.

Moreno-Ramírez, Natalia, et al. “Ecology and management of the coffee berry borer (*Hypothenemus hampei*): the potential of biological control.” *BioControl* (2024): 1–16.

Morris, Jonathan R., et al. “Ant-mediated (Hymenoptera: Formicidae) biological control of the coffee berry borer: diversity, ecological complexity, and conservation biocontrol.” (2018).

Perfecto, Ivette, John Vandermeer, and Stacy M. Philpott. “Complex ecological interactions in the coffee agroecosystem.” *Annual Review of Ecology, Evolution, and Systematics* **45** (2014): 137–158.

Vega, Fernando E., Francisco Infante, and Andrew J. Johnson. “The genus *Hypothenemus*, with emphasis on *H. hampei*, the coffee berry borer.” *Bark beetles. Academic Press, 2015. 427–494.*

Aho amashusho yaturutse

Ishusho ya 1: Bioexploradores Farallones, some rights reserved (CC-BY-NC), <https://www.inaturalist.org/observations/13989123>

Ishusho ya2: Whitney Cranshaw, Colorado State University, <https://www.bugwood.org/> CC BY 3.0, <https://www.invasive.org/browse/detail.cfm?imgnum=5614061>

Ishusho ya 3: Whitney Cranshaw, Colorado State University, <https://www.bugwood.org/> CC BY 3.0, <https://www.invasive.org/browse/detail.cfm?imgnum=5556068>

Ishusho ya 4: Whitney Cranshaw, Colorado State University, <https://www.bugwood.org/> CC BY 3.0 US, <https://www.invasive.org/browse/detail.cfm?imgnum=5556067>

Ishusho ya 5: Góngora, Carmenza E., et al. “Sustainable Strategies for the Control of Pests in Coffee Crops.” *Agronomy* **13.12** (2023): 2940.

Ishusho ya 6: © Isaac D. Arias Céspedes, some rights reserved (CC-BY-NC-SA), <https://www.inaturalist.org/observations/135077590>

Ishusho ya 8: Image designed by La Disciplina de Fitotecnica en Cenicafé, Smithsonian Bird Friendly Inspection Manual

Ishusho ya 9: Hannah Vernon, CC BY-SA 4.0, <https://bs.plantnet.org/image/o/fb7b6113bf8d912a50447198dbdfb30670fa534>

Ishusho ya 10: Amanda Bensel, <https://sites.mii.edu/amandabensel/2012/08/07/the-coffee-process-from-field-to-roastery/>

Ishusho ya 13: Luis Miguel Constantino



Itariki yavugurwe bwa nyuma: 08/2024.



yi nyandiko yahawe uburenganzira bwo gusakazwa kubuntu CC BY-NC-SA 4.0