

BBEST MAƆ GBƎJIANƆTOO HIƎGBELEMƆ

Ghana BBEST GbƎjianƆtoo HiƎgbelemƆ Nɔ Ni Ji 1

BSF Ɗaalee: Eji Naamɔmɔ Kɛha Hewɔniian
Naagbai Ni Ninaa Mɛi Ni Lɛɔ Kooloo Bibii,
Loo Kɛ Mɛi Ni Duɔ Dumɔ Nibii Yɛ Ghana



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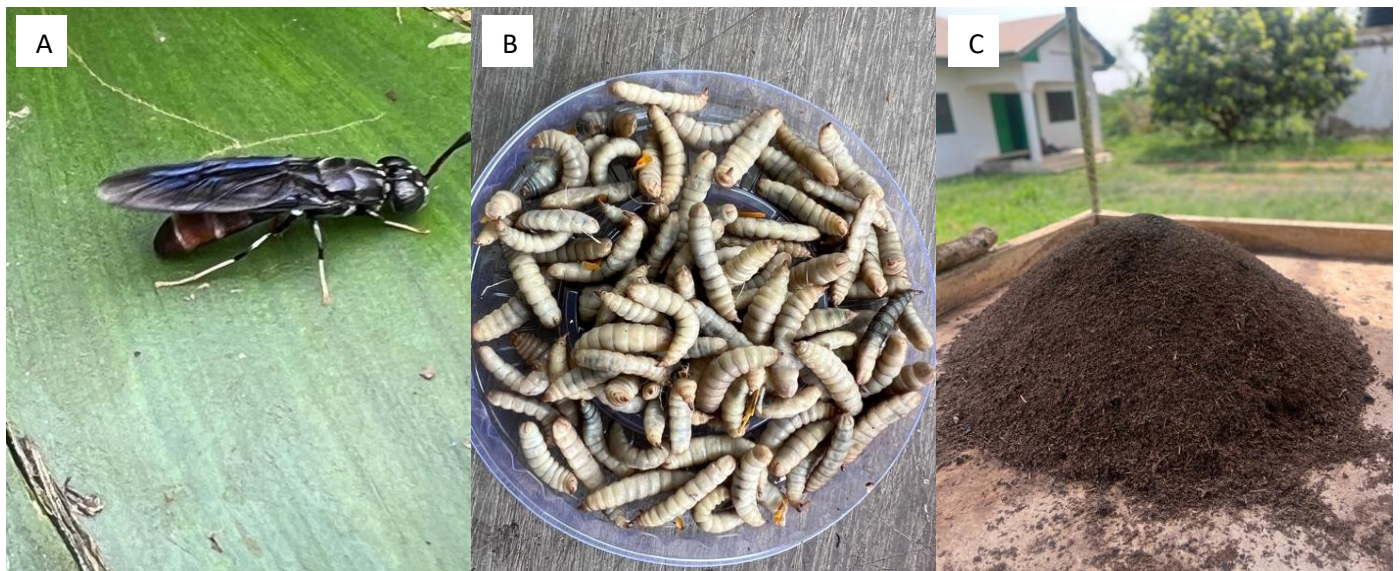
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SHISHITOO

Yɛ jɛŋ muu fɛɛ lɛ, alɛ akɛ okwaayeli, ni loo lɛɛ kɛ kooloi alɛɛ fata hɛ lɛ haa anaa niyɛnii ni naa shɛɔ tɔn milio 23.7 daa gbi (FAO, 2017), shi yɛ ɛnɛ feemɔ mli lɛ, eke naagbai babao baa adebɔɔ nibii anɔ. Jɛndɔlɛwoo kɔɔyɔɔ fɔŋ aaafɛ oha mlijaa nyɔŋmai-ɛnyɔ-kɛ-ekome (21%) jɛɔ okwaayeli nitsumɔ mli, ni ɛnɛ kɛ naagba fɔɔ adebɔɔ nibii atɛŋ sharamɔ nɔ (Duque-Acevedo *et al.*, 2020). Efɔɔ kaa akɛ dumɔ nii aaafɛ oha mlijaa nyɔŋmai-ɛtɛ keyashi nyɔŋmai ɛjwɛ (30-40%) pɛ ji niyɛnii ni anaa ni akpaa yɛ niyɛnii komei tamɔ yeli wui, aduawai, aloo yeli nibii krokomei atɛŋ. Nakai yeli nibii ni aduɔ lɛ amlɛ oha mlijaa nyɔŋmai-ɛkpaa keyashi nyɔŋmai-kpaanyɔ (60-70%) lɛ fiteɔ yɛ okwaayeli nitsumɔ lɛ mli. Kɛfata hɛ lɛ, abu akɔntaa ni ana akɛ, aaafɛ yibii ni akpaa lɛ mli oha mlijaa nyɔŋmai-ɛjwɛ (40%) (ni fɛɔ tɔn bilio 2.5) ji nɔ ni fiteɔ (WWF, 2021). Maŋtiase mli bii ayifalɛ hu ji oti kroko yɛ shihilehɛi ajɛwiwoo babao feemɔ lɛ mli. Kɛji akwɛ mɛi ayifalɛ yɛ afi 2023 ni abuo akɛ ɛji milio nyɔŋmai-ɛnyɔ yɛ Ghana lɛ, bɛ ɛtsɔɔ akɛ jwɛi tɔn milio ɛtɛ ji nɔ ni anaa yɛ shihile hɛi amlɛ daa afi yɛ Ghana, ni ɛmli aaafɛ oha mlijaa nyɔŋmai-ɛnumɔ-kɛ-ɛjwɛ keyashi nyɔŋmai-ɛkpaa-kɛ-kpawo (54-67%) ji nɔ ni jɛɔ kooloi loo tɛɛi amlɛ. Anaa jwɛi tɔn milio kome yɛ Ga pɛ daa afi. ɛnɛ mli titri lɛ ji nɔ ni ashio ni ɛkpɔtɔɔ, aloo ashaa, aloo akɛyatsio bui, ni ɛnɛ kɛ wɔhewɔniiaŋ fitɛmɔ, kɛ jɛŋtsakɛmɔ kɛ hɛwalɛnamɔ hɛ naagbai baa. Akɛ ni mɛi ayibɔ kahe miia ɲwɛi, ni niyɛnii taomɔ yɛ jɛŋ fɛɛ hu yaa ɲwɛi nɛɛ, ɛhɛ hia akɛ abaana naamomɔ hɛi amrɔ amrɔ ni baanyɛ akura nibii ni fiteɔ kɛjɛɔ okwaayeli mli, maŋtiase mli kɛ niyɛnii agbɛjianɔtoi amlɛ yɛ gbɛ kpakpa nɔ.

Black Soldier Fly (BSF) ɲaaleɛ haa hienɔkamɔ ko, ni ji gbɛjianɔtoo kɛha jwɛi ni jɛɔ kooloi loo tɛɛi amlɛ lɛ akuramɔ yɛ gbɛ kpakpa nɔ. Black Soldier Fly lɛ (*Hermetia illucens*) (Mfo. 1A) haa gɔgɔmii ni ɛyimɔ obɔbɔi kɛ protein, ni ɛhaa anaa nidumɔ tsofa ni jɛ kooloo mli (Mfo. 1D).

Kɛji akɛ BFS ɲaaleɛ wo Ghana okwaayeli nifeemɔ kɛ jwɛi kuramɔ gbɛjianɔtoi amlɛ lɛ, maŋ lɛ baanyɛ ni ɛba tsakɛmɔ fɔŋ ni okwaayeli kɛbaa adebɔɔ nibii ashihilei amlɛ lɛ naa shi, titri yɛ jɛŋtsakɛmɔ kɛ wɔhewɔniiaŋ fitɛmɔ. Nakai nɔŋŋ hu ni ɛbaapia niyɛnii shweshweeshwefeemɔ, ni ɛbaayɛ ɛbua kooloo bibii alɛɛ kɛbaa amɛyi.



Mfoniri 1: Black Soldier Fly (A), Black Soldier Gɔgɔmi ni akpa (B) kɛ Nidum tsofa ni ana yɛ kooloo mli (D). Namɔhɛ: BBEST Proje/BNARI

NAAMOMɔ NI Yɔɔ MOMO SHI EYEEE EMUU

Kooloo bibii alɛɛ, loo kɛ dumɔ nibii ahe nitsumɔ lɛ naa naagbai babao yɛ bɔ ni ɲmenɛŋmɛnɛ okwaayeli nitsumɔ hɛ nibii tamɔ loo niyɛnii, niyɛnii ni jɛ soya mli, kɛ nidumɔ tsofa ni ɛjɛɛ kooloo loo tso mli lɛ jara wa ha lɛ hɛwɔ, kɛ bɔ ni po ɛwa dani nine shɛɔ nibii nɛɛ anɔ ahɛwɔ hu lɛ hɛwɔ (Makkar *et al.*, 2014). Nɛkɛ nibii nɛɛ kɛ okwaayeli nitsumɔ mliwoo lɛ jaraa yɛ shika gbɛfaŋgbɛ, ni asan ɛyɛɛ ɛbuaaa wɔhewɔniiaŋ yibaamɔ, ni ɛkomɛi po ɛjaaa yɛ gbɛ nɔ akɛ akɛtsu nii. Nɛkɛ nibii nɛɛ ahɛwɔ ni ɛhɛchiaa waa akɛ, abaana gbɛjianɔtoo kroko ni jara waaa, shi moŋ ɛbaanyɛ ɛyɛ ɛbua kewula shi kɛpia yibii babao namɔ kɛ niyɛnii hɛ gbɛjianɔtoi ni sa, bɛiaŋ ni ɛbaa naagbai ni baa adebɔɔ nibii atɛŋ sharamɔ mli lɛ ashi.

Kɛfata hɛ lɛ, ɲmenɛŋmɛnɛ gbɛi anɔ ni atɔɔ kekuraa jwɛi ni jɛɔ okwaayeli kɛ niyɛnii ahe nitsumɔi amlɛ tamɔ, jwɛishaa, kɛ jwɛi kpɔtɔmɔ lɛ kɛ jɛndɔlɛwoo kɔɔyɔɔ fɔji woɔ jɛ lɛ mli. ɛnɛmɛi hu nyɛɔ eke jɛŋtsakɛmɔ baa. Yɛ jɛndɔlɛwoo kɔɔyɔɔ fɔji asɛɛ lɛ, jwɛi ni ashaa ni gbɛjianɔtoo kpakpa ko bɛ hɛ lɛ kɛ nibii krokomei ni fiteɔ wɔhewɔniiaŋ baa, titri lɛ, patikuleeti maata (particulate matter), kaabɔn diŋ (black carbon), tsofai ni ehiii haaa hɛwalɛnamɔ (toxic chemicals) kɛ dadei ni hioɔ kɔɔyɔɔ mli ni ehiii haaa hɛwalɛnamɔ (heavy metals). ɛnɛmɛi fɛɛ nyɛɔ amɛbɔtɛɔ su ni akɛduɔ nii, nu mli kɛ dumɔ nibii amlɛ, kɛkɛ lɛ ɛbɔtɛ wɔniyɛnii amlɛ. Kɛji ɛba lɛ nakai pɛ, eke naagbai baa kooloi bibii ni anyɛɛɛ akɛ hiŋmɛi folo ana amɛ, dumɔ nibii, kooloi kɛ gbɔmɛi fɛɛ anɔ. Yɛ jwɛi kpɔtɔmɔ gbɛfaŋ hu lɛ, esa akɛ ana hɛ ko kpakpa ni sa kɛha koni niyɛnii mli hɛwalɛ ni ji nutrɛnti lɛ akalaajɛ, ni hɛ ko tamɔ nakai, kɛ gbɔmɛi ni baatsu nii lɛ anamɔ jaraa. No sɛɛ lɛ, jwɛi kpɔtɔmɔ nitsumɔ dadei ajara wa, ni kɛji atsuuu lɛ jogbaŋŋ hu lɛ, ɛjɛɔ fu ni naa wa kɛha adɛsa kɛ adebɔɔ nibii krokomei ashihile.

BBEST PROJETI LE NAAMOMO NI EKEBAA

Black Soldier Fly ñaalee (Mfo. 2) ji nɔ ko ni shishito damo kooloi ke tsei ahenitsumo ke niyenii he gbejianotoi ano. Okwaayeli ke niyenii he gbejianotoi ke jwei ni jeo kooloi loo tsei amli babao baa, tamo dumo nibii ashishi, kooloi awamo ke niyenii ni efite, ke asan jwei ni jeo niyenii hie tsakemo mli. Nakai nonnɔ hu ni blema gbejianotoi ni akekuraa jwei (tamo bu tsii, jwei shaa ni gbejianotoo kpakpa ko be he, ke jwei kpotoomo ni tsoo gbe kpakpai ano) le fee nyeo haa ni jendolewoo kooyo fɔn (tamo meteeni, kabon daisaidi), fu ke naji-ekpaatsemei anaagbei baa, ni nakai nonnɔ hu eke nu ke su hiekatamo baa (Makkar *et al.*, 2014).

BSF gogomii le yeo, ni etsakeo jwei ni jeo kooloi ke tsei amli le ahie kefee nibii ni he ye seenamo. Black Soldier Fly gogomii le baanye agbele jwei babao ni kpotoo le ye be kukuoo ko mli. Ketsa niyeli mli le, BSF gogomii le baanye aye jwei ni naa baashe oha mlijaa nyonmai-kpawo (70%). Ketsa neke gbejianotoo nee no le, abaanye atsake jwei ni kule, jara ko be he le hie, kefee nibii ni jara yoo he tamo baomaasi ke residua loo fraasi. Neke baomaasi ni gogomii nee feo le eyi obo ke protein ni abaanye akfee niyenii keha kooloi tamo loo, wuo ke kpolotoi. Nakai nonnɔ hu ni BSF fraasi le tsoo nii ake nidumo tsofa kpakpa ni eyi obo ke niyenii mli hewale, ke kooloo bibii ni anyee ake hiñmei folo ana ni hio su mli ni yeo buaa su le shweshweeshwefeemo le. Kefata he hu le, anaa gogomi mli fo kejeo BSF gogomii amli ni akfee kooloi aniyenii, ni asan aketsuo nii ye nibii krokomei afeemoi amli.



Mfoniri 2: Black Soldier Fly ñaalee kenitsumo ye gbei srɔtoi ano. Namɔhe: BNARI

Black Soldier fly ñaalee le jieo jwei ni kule, akabaayatsi bui ni no baanye eke naagbai aba le ye jeme, ni ene baa wɔhewoniiɔn ahiekpatamo ke jendolewoo kooyo fɔn le ashi. Daalee nee hu baa fu gbonyo, naji ekpaatsemei naagbai, ke helai ni gbao dumo nibii anaa ye okwaayeli mli le anaa shi. Jarayeli he seenamo ni anaa ye ñaalee nee mli le eko ji, ebaa shika ni afiteo kekuraa jwei ni jeo ñmoji ke niyenii ahietsakemo amli le naa shi. Asan, ehaa anaa gbejianotoo kroko ni haa shika ketsa gogomii, fo ke nidumo tsofa ahoomo ano. Esaa ebaa shikafitemo ni yoo heno ni akfoo loo niyenii ke soya niyenii ni jara wala le ano le shi. Daalee nee piaa su hewalenamo ketsa fraasi ke nitsumo mli, ni ene feemo yeo buaa dumo nibii ayibii afale namo, ni eke niyenii mli hewale ke baomaasi saa woo su le mli ekoñ. Black Soldier fly ñaalee yeo buaa adesa shihile mli ni ehaa adesa seenamoi babao. Eko ji nitsumonamo ye nitsumo ni ba wɔhewoniiɔn le yi, naji-ekpaatse kooloi ale, ke nihoomo. Eyo ebuaa niyenii shweshweeshwefeemo ketsa kooloi ke loo aniyenii ni jara waaa namo le no.

NAAMUU

Black Soldier fly ñaalee le haa anaa naamomo ni see tseo keha Ghana jwei kuramo naagba, kooloi aniyenii ni jara wa, ke dumo su hewale ni naa baa shi le. Eyo ebuaa sekula baokonomi, ni epiaa shihile mli shweshweeshwefeemo, titri le, keha oblahii ke oblayei. Neke ñaalee nee haa naamomo ni baatse keha wɔGhana man nee mli naagba ni woyoo ye jwei kuramo he, ke asan wɔhewoniiɔn hewalenamo naagbai, titri le ye manɕiasei amli tamo Ga neke, hei ni jwei ni jeo kooloi ke tsei amli le fa waa ye le.

Kɛlɛ, nɛkɛ ɲaalee nɛɛ kɛ nitsumɔ yɛɲ emuu kɛʒi anaaa mla ni baakudo eke nitsumɔ, gbɛʒianɔtoi kɛha eke nitsumɔ tsumɔ yɛ shweshweeshwe mli, kɛ ehe gbɛʒianɔtoi krokomei. BFS ɲaalee henilee, shishinumɔ ni anaaa kɛ eke nitsumɔ nyanɛmɔ ni miiya nɔ ʒi naagbai komei ni yoo amro nɛɛ. Esa ake ana gbɛʒianɔtoi ni yoo faɲɲ, tsɔsemɔ kɛha mɛi pɔtɛɛ komei, shika kɛ mliwoo, kɛ nibii krokomei koni anyɛ ni atso nɔ keku naagbai lɛ anaa, bo ni afee ni anyɛ ni akɛgbele sɛɛnamɔi tamɔ niyenii yibaamo, ʒɛɲtsakemɔ he shifimɔ kɛ akrowai anɔyaa lɛ anaa.

SHIDAA

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