

BBEST MAŊ GBẺJIANŊTOO HIẺGBELEMŊ

Ghana BBEST Gbẹjiaŋŋtoo Hiẹgbelemŋ Nɔ Ni Ji 1

BSF Ɗaalee: Eji Naamŋmŋ Kɛha Hewŋniian
Naagbai Ni Ninaa Mɛi Ni Lɛɔ Kooloo Bibii,
Loo Kɛ Mɛi Ni Duɔ Dumŋ Nibii Yɛ Ghana



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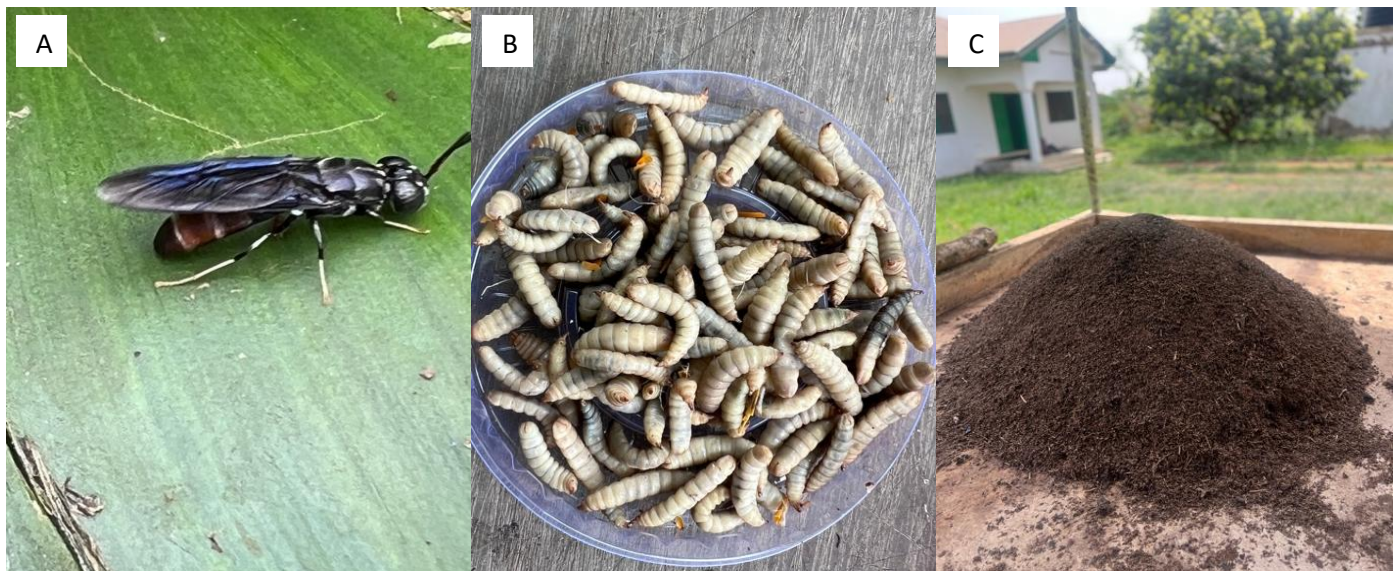
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SHISHITOO

Yɛ jɛŋ muu fɛɛ lɛ, aɛ ake 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 ake dumɔ nii aafee 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 ake, 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 ake ɛji milio nyɔŋmai-ɛnyɔ yɛ Ghana lɛ, bɛ ɛtsɔɔ ake 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 wɔhewɔniiŋ fitɛmɔ, kɛ jɛŋtsakɛmɔ kɛ hɛwalɛnamɔ hɛ naagbai baa. Ake ni mɛi ayibɔ kahe miiya ŋwɛi, ni niyɛnii taomɔ yɛ jɛŋ fɛɛ hu yaa ŋwɛi nɛɛ, ɛhɛ hia ake 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) ŋaaleɛ haa hienɔkamɔ ko, ni ji gbɛjianɔtoo kehɛ 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 ake BFS ŋaaleɛ wo Ghana okwaayeli nifeemɔ kɛ jwɛi kuramɔ gbɛjianɔtoi amlɛ lɛ, maŋ lɛ baanyɛ ni ɛba tsakɛmɔ fɔŋ ni okwaayeli kebaa adebɔɔ nibii ashihilei amlɛ lɛ naa shi, titri yɛ jɛŋtsakɛmɔ kɛ wɔhewɔniiŋ fitɛmɔ. Nakai nɔŋŋ hu ni ɛbaapia niyɛnii shweshweeshwefeemɔ, ni ɛbaayɛ ɛbua kooloo bibii alɛɛ kebaa amɛyi.



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

NAAMOMɔ NI Yɔɔ MOMO SHI EYEEE EMUU

Kooloo bibii alɛɛ, loo kɛ dumɔ nibii ahe nitsumɔ lɛ naa naagbai babao yɛ bɔ ni ŋmenɛŋmenɛ 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 ewa 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 gbɛfɔŋgbɛ, ni asɔŋ ɛyɛɛɛ ɛbuaaa wɔhewɔniiŋ yibaamɔ, ni ɛkomɛi po ɛjaaa yɛ gbɛ nɔ ake akɛtsu nii. Nɛkɛ nibii nɛɛ ahɛwɔ ni ɛhɛchiaa waa ake, abaana gbɛjianɔtoo kroko ni jara waaa, shi moŋ ɛbaanyɛ ɛyɛ ɛbua kewula shi kɛpia yibii babao namɔ kɛ niyɛnii hɛ gbɛjianɔtoi ni sa, beiaŋ ni ɛbaa naagbai ni baa adebɔɔ nibii atɛŋ sharamɔ mli lɛ ashi.

Kɛfata hɛ lɛ, ŋmenɛŋmenɛ gbɛi anɔ ni atɔɔ kekuraa jwɛi ni jɛɔ okwaayeli kɛ niyɛnii ahe nitsumɔi amlɛ tamɔ, jwɛishaa, kɛ jwɛi kpɔtɔmɔ lɛ kɛ jɛndɔlɛwoo kɔɔyɔɔ fɔŋi woo jɛ lɛ mli. ɛnɛmɛi hu nyɛɔ eke jɛŋtsakɛmɔ baa. Yɛ jɛndɔlɛwoo kɔɔyɔɔ fɔŋi asɛɛ lɛ, jwɛi ni ashaa ni gbɛjianɔtoo kpakpa ko bɛ hɛ lɛ kɛ nibii krokomei ni fiteɔ wɔhewɔniiŋ baa, titri lɛ, patikuleeti maata (particulate matter), kaabɔn diŋ (black carbon), tsofai ni ehiii haaa hɛwalɛnamɔ (toxic chemicals) kɛ dadei ni hiɔɔ 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 ake hiŋmɛi folo ana amɛ, dumɔ nibii, kooloi kɛ gbɔmɛi fɛɛ anɔ. Yɛ jwɛi kpɔtɔmɔ gbɛfɔŋ hu lɛ, esa ake ana hɛ ko kpakpa ni sa kehɛ 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 kehɛ adɛsa kɛ adebɔɔ nibii krokomei ashihile.

BBEST PROJETI LE NAAMOMO NI EKEBAA

Black Soldier Fly ḡaalee (Mfo. 2) ji nɔ ko ni shishito damɔ kooloi kɛ tsei ahenitsumɔ kɛ niyenii he gbejianotoi anɔ. Okwaayeli kɛ niyenii he gbejianotoi kɛ jwei ni jɛɔ kooloi loo tsei amli babao baa, tamɔ dumɔ nibii ashishi, kooloi awamɔ kɛ niyenii ni efite, kɛ asan jwei ni jɛɔ niyenii hie tsakemɔ mli. Nakai nɔḡḡ hu ni blema gbejianotoi ni akekuraa jwei (tamɔ bu tsii, jwei shaa ni gbejianotoo kpakpa ko bɛ he, kɛ jwei kpɔtɔmɔ ni tsɔɔ gbe kpakpai anɔ) le fɛɛ nyɛɔ haa ni jɛḡḡlewoo kɔɔyɔɔ fɔḡ (tamɔ meteeni, kabɔn daiɔsaidi), fu kɛ naji-ekpaatsemɛi anaagbɛi baa, ni nakai nɔḡḡ hu eke nu kɛ su hiekatamɔ baa (Makkar *et al.*, 2014).

BSF gɔgɔmii le yeɔ, ni etsakeɔ jwei ni jɛɔ kooloi kɛ tsei amli le ahie kefeɔ nibii ni he ye seɛnamɔ. Black Soldier Fly gɔgɔmii le baanye agbele jwei babao ni kpɔtɔ le ye bɛ kukuoo ko mli. Ketsɔ niyeli mli le, BSF gɔgɔmii le baanye aye jwei ni naa baashe oha mlijaa nyɔḡmai-kpawo (70%). Ketsɔ neke gbejianotoo nɛɛ nɔ le, abaanye atsake jwei ni kule, jara ko bɛ he le hie, kefee nibii ni jara yɔɔ he tamɔ baomaasi kɛ residua loo fraasi. Neke baomaasi ni gɔgɔmii nɛɛ feɔ le eyi obo kɛ protein ni abaanye akɛfee niyenii keha kooloi tamɔ loo, wuɔ kɛ kpolotoi. Nakai nɔḡḡ hu ni BSF fraasi le tsuɔ nii akɛ nidumɔ tsofa kpakpa ni eyi obo kɛ niyenii mli hewale, kɛ kooloo bibii ni anyɛɛ akɛ hiḡmɛi folo ana ni hiɔ su mli ni yeɔ buaa su le shweshweeshwefeemɔ le. Kefata he hu le, anaa gɔgɔmii mli fɔ kejeɔ BSF gɔgɔmii amli ni akɛfeɔ kooloi aniyenii, ni asan akɛtsuɔ nii ye nibii krokomei afeemɔi amli.



Mfoniri 2: Black Soldier Fly ḡaalee kɛnitsumɔ ye gbei srɔtoi anɔ. Namɔhe: BNARI

Black Soldier fly ḡaalee le jieɔ jwei ni kule, akɛbaayatsi bui ni nɔ baanye eke naagbai aba le ye jeme, ni ene baa wɔhewɔniiḡ ahiekatamɔ kɛ jɛḡḡlewoo kɔɔyɔɔ fɔḡ le ashii. Daalee nɛɛ hu baa fu gbonyo, naji ekpaatsemɛi naagbai, kɛ helai ni gbaa dumɔ nibii anaa ye okwaayeli mli le anaa shi. Jarayeli he seɛnamɔ ni anaa ye ḡaalee nɛɛ mli le eko ji, ebaa shika ni afiteɔ kekuraa jwei ni jɛɔ ḡmɔji kɛ niyenii ahietsakemɔ amli le naa shi. Asan, ehaa anaa gbejianotoo kroko ni haa shika ketsɔ gɔgɔmii, fɔ kɛ nidumɔ tsofa ahɔɔmɔ anɔ. Esaa ebaa shikafitemɔ ni yɔɔ heno ni akɛfɔ loo niyenii kɛ soya niyenii ni jara wala le anɔ le shi. Daalee nɛɛ piaa su hewalenamɔ ketsɔ fraasi kɛ nitsumɔ mli, ni ene feemɔ yeɔ buaa dumɔ nibii ayibii afale namɔ, ni eke niyenii mli hewale kɛ baomaasi saa wuɔ su le mli ekoḡḡ. Black Soldier fly ḡaalee yeɔ buaa adesa shihile mli ni ehaa adesa seɛnamɔi babao. Eko ji nitsumɔnamɔ ye nitsumɔ ni baá wɔhewɔniiḡ le yi, naji-ekpaatse kooloi aleɛ, kɛ niḡɔmɔ. Eyeɔ ebuaa niyenii shweshweeshwefeemɔ ketsɔ kooloi kɛ loo aniyenii ni jara waaa namɔ le nɔ.

NAAMUU

Black Soldier fly ḡaalee le haa anaa naamomɔ ni seɛ tseɔ keha Ghana jwei kuramɔ naagba, kooloi aniyenii ni jara wa, kɛ dumɔ su hewale ni naa baa shi le. Eyeɔ ebuaa sekula baokɔnɔmi, ni epiaa shihile mli shweshweeshwefeemɔ, titri le, keha oblahii kɛ oblayei. Neke ḡaalee nɛɛ haa naamomɔ ni baatse keha wɔGhana man nɛɛ mli naagba ni wɔyɔɔ ye jwei kuramɔ he, kɛ asan wɔhewɔniiḡ hewalenamɔ naagbai, titri le ye manḡtiasei amli tamɔ Ga neke, hei ni jwei ni jɛɔ kooloi kɛ 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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