

Sweetpotato production guide

Prepared by:

***Sweetpotato Programme, National
Agricultural Research Organisation (NARO)
Sweetpotato production guide***

Introduction

Sweetpotato (*Ipomoea batatas*) is an important food crop grown and consumed by a majority of Ugandans. The crop can be produced under difficult soil, climatic and environmental conditions, where most other crops would not survive. Storage roots maybe eaten boiled or processed into simple products like chips, local brew, pan-cakes and composite flour. Foliage is normally fed as supplementary feed to livestock. Some orange-fleshed sweetpotato varieties, recently released by the National Agricultural Research Organisation (NARO), contain beta-carotene, a substance which, when eaten, is digested into Vitamin A. Vitamin A is a building block for the body's immune system for defense against diseases and for maintenance of normal vision. This booklet gives guidelines about some of the new varieties, how to grow them and management methods of major pests and diseases.

Land Preparation

Seed bed must be well prepared in good time for planting. Stony soils must be avoided as they limit tuber expansion. Loose and well-drained soils enable the roots to expand. Most farmers use mound seed-bed, while in other areas ridges are used. The latter seed-bed is recommended for use in sloppy areas and for mechanized crop production. In sloppy areas, ridges should be made running a long the contour in order to slow down speed of running rain water, thus reduce soil erosion. Mounds or ridges should be spaced at 70-100 cm. Three vines can be planted on each mound, while single vines spaced at 30 cm apart can be planted on top of the ridged seed -bed.

Planting

Planting should be done at time convenient to the farmer and when there is adequate moisture in the soil. Tip cuttings of 30 cm long are used for planting. About 20 cm length of the vine is buried into the ground. Sweetpotato is usually planted in pure stands. Short-maturing crops like beans can planted on sides of mounds/ridges.

Field Management

Average soils will not require fertilizers. Compound fertilizers of phosphorus and potassium may be applied to increase yield where soil fertility is low. Nitrogen fertilizers are not recommended for tuber production because they increase vine formation at the expense of the roots. Plants give early ground cover so only an initial early weeding is required.

Harvesting

Sweetpotato is usually harvested piece-meal as required. This is because fresh roots store for only few days before they rot. In this method, mature storage roots are harvested, leaving the young ones to continue growing. Mature roots are detected by cracks, which form in the soil. These roots are dug up using sharp sticks or fork and not by the hoe. First roots are ready in 35 months after planting. Some farmers wait when most roots are mature then harvest the whole mound/ridge.

Pests

There are five major categories of pests of sweetpotato in Uganda, viz: sweetpotato weevils, millipedes, sweetpotato butterfly, vermin and rodents. The weevils, *Cylas brunneus* and *C. puncticollis* cause the most serious problems because they destroy the roots and vines. Larvae bore and damage roots and stems. Damage is most serious during dry seasons. Pests can be managed by applying integrated pest management (IPM) methods like: planting healthy vines and avoiding planting stem bases, planting crop away from old infested field, crop rotation and destruction of infested plant parts. Crop should be planted in good time for it to mature and be harvested before the dry season. Weed crop carefully and hill up base of plants and cover soil cracks where weevils enter the roots. Crops should be harvested as soon as it is mature.

Sweetpotato butterfly - caterpillars of this pest chew and destroy foliage of the crop. Again damage can be serious during the dry season when high temperature increase growth rate of young stages while at the same time activity of natural enemies are suppressed. Reduce pest damage by physical destruction of larval nests, planting crop early for it to escape destruction during dry season, and spraying contact insecticide when attack is high.

Millipedes, bore and eat their way into the roots thus destroying root quality. To reduce millipede attack, sweetpotato and ground-nuts should not be planted one after another in the same field. Also crops planted early first rains tend to have more damage than crop planted 1.5-2 months when rains start. Millipede traps have been developed. Also method used for weevil control also controls a multitude of other soil pests and stem borers.

Vermin-Major vermin pests are the monkeys and wild pigs. To control damage by vermin, crop should be planted away from forests where the animals live. Crops can be planted in blocks and guarded against vermin and livestock by farming community. If damage is severe farmers should consult staff of the Uganda Wildlife Authority to help control the

animals. Animals should not be poisoned or killed indiscriminately. Main pests categorized under rodents are rats and squirrels.

Rodents: Rats attack crops, which usually are weedy or are over-mature. Management methods include cultural control methods like weeding the field and surrounding areas, harvesting crop as soon as it is mature, digging up and destroying nesting sites, and trapping. 'Mutoto Traps' have been developed for trapping root and mole rats. Domestic cats can be a useful biological control option against rats.

Sweetpotato virus disease

Sweetpotato virus disease- caused by a combination of many viruses. Symptoms include discoloration and distortion of leaves and stunting of plants. Viruses spread by white fly and aphid vectors and when infected vines are planted. Disease controlled by planting resistant varieties and healthy vines.

Alternaria disease- Symptoms include black lesions on leaves and stems, often leading to plant death. Control disease by planting resistant varieties and following good sanitation practices.

Improved Sweetpotato Varieties

Naspot 1

Other names: NIS/91/52	Fresh root yield: 7-45 t/ha
Origin: Bred by NARO (OP selection)	Dry matter content: 31%
Growth habit: Spreading	Beta carotene: Low
Vine pigmentation: Green	Consumer acceptability: Good
Mature leaf shape: Lobed	Weevil resistance: Susceptible
Mature leaf colour: Green	Virus disease resistance: Moderately susceptible
Immature leaf colour: Green with purple edges	Alternaria disease resistance: Susceptible
Root skin colour: Cream	Recommended production areas: Short grassland agro-ecological zones
Root flesh colour: Pale yellow	
Maturity period: Medium (4 months)	

Naspot 2

Other names: NIS/91/178	Fresh root yield: 7-33 t/ha
Origin: Bred by NARO (OP selection)	Dry matter content: 28%
Growth habit: Spreading	Beta carotene: Low
Vine pigmentation: Green with purple tips	Consumer acceptability: Good
Mature leaf shape: Lobed	Weevil resistance: Susceptible
Mature leaf colour: Green	Virus disease resistance: Resistant
Immature leaf colour: Moderately purple	Alternaria disease: Moderately susceptible
Root skin colour: Red	Recommended production areas: Tall and short grasslands agro-ecological zones
Root flesh colour: Cream	
Maturity period: Medium (4 months)	

Naspot 3

Other names: NIS/91/218	Fresh root yield: 5-29 t/ha
Origin: Bred by NARO (OP selection)	Dry matter content: 38%

Growth habit: Spreading	Beta carotene: Low
Vine pigmentation: Green with dark purple tips	Consumer acceptability: Good
Mature leaf shape: Lobed	Weevil resistance: Less susceptible
Mature leaf colour: Green	Virus disease resistance: Resistant
Immature leaf colour: Mostly purple	Alternaria disease: Resistant
Root skin colour: Brown orange	Production areas: Tall grasslands and highlands agro-ecologies
Root flesh colour: Cream	
Maturity period: Late (5 months)	

Naspot 4

Other names: NIS/91/282	Fresh root yield: 5-38 t/ha
Origin: Bred by NARO (OP selection)	Dry matter content: 29%
Growth habit: Spreading	Beta carotene: Low
Vine pigmentation: Green with purple tips	Consumer acceptability: Good
Mature leaf shape: Lobed	Weevil resistance: Less susceptible
Mature leaf colour: Green	Virus disease resistance: Resistant
Immature leaf colour: slightly purple	Alternaria disease: Moderately susceptible
Root skin colour: Red	Recommended production areas: Tall grasslands
Root flesh colour: Pale yellow	
Maturity period: Late (5 months)	

Naspot Naspot 5

Other names: NIS/91/316	Fresh storage root yield: 7-28 t/ha
Origin: Bred by NARO (OP selection)	Dry matter content: 30%
Growth habit: Spreading	Beta carotene: High (2 mg/100g fwt)
Vine pigmentation: Green with dark purple tips	Consumer acceptability: Good
Mature leaf shape: Lobed	Weevil resistance: Less susceptible
Mature leaf colour: Green with purple lower veins	Virus disease resistance: Moderately Resistant
Immature leaf colour: Green	Alternaria disease: Resistant
Root skin colour: Cream	Recommended production areas: All production areas
Root flesh colour: Orange	
Maturity period: Medium (4 months)	

Naspot 6

Other names: NIS/91/324	Fresh storage root yield: 7-28 t/ha
Origin: Bred by NARO (OP selection)	Dry matter content: 30%
Growth habit: Spreads	Beta carotene: High (2 mg/100g fwt)
Vine pigmentation: Green	Consumer acceptability: Good
Mature leaf shape: Deeply lobed	Weevil resistance: Less susceptible
Mature leaf colour: Green	Virus disease resistance: Moderately resistant
Immature leaf colour: Green	Alternaria disease: Resistant
Root skin colour: Cream	Recommended production areas: All production areas
Root flesh colour: White	
Maturity period: Medium (4 months)	

Tanzania

Other names: Osukut, KEMB10, SPN/0, Simama	Fresh storage root yield: 5-58 t/ha
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Origin: Farmer's variety
Growth habit: Semi-erect to spreading
Vine pigmentation: Mostly green
Mature leaf shape: Deeply lobed
Mature leaf colour: Green
Immature leaf colour: Green
Root skin colour: Cream
Root flesh colour: Pale yellow
Maturity period: Early (3-5 months)

Dry matter content: 32%
Beta carotene: Low
Consumer acceptability: Good
Weevil resistance: Very susceptible
Virus disease resistance: Resistant
Alternaria disease: Moderately resistant
Recommended production areas: All
production areas

Diro me Puro Icok

Coc Man Jo Oyubo Tio Bang:

***Sweetpotato Programme, National
Agricultural Research Organisation (NARO)***

Luo: Agony Leb obedo Dr. B. Odongo

Nyuto

Icok (*Ipomoea batatas*) obedo gin apura apire tek pien en cem dok dang ocato me kelo lim bot opur apol i lobo Uganda. Icokongo dang nywal kadi kono opuru i lobo ape ber, apinyere otwo onyo lyeto mere tye malo. Lwit icok oromo camo ka otedo, obulo onyo ka ogeto ote twoyo doko otere. Jami okene ame oyiko iyaa ikom icok obedo kongo ting, igati kede moko kwon. Pot icok kede tyene ducu tye kede cem abeco me pito, kede medo gin acama bot leyi ame ogwoko paco. Acocoki, icok ame kome ame ocamo ni rangi mere rema-rema cal kede me a karot, (Orange), tye ame odiro tic me NARO me Ministry me Agirikaca, ocwalo ooko bang opur. Kodi icok magi tye kede cem abeco ikom gi anyinge 'beta-carotene', ame ka ocamo icok man dano nwongo cem me kom, Vitamin A. Jami man konyo kom ilweny itwo apapat kede dang mio wang neno aber naka iwor. Coc ame tye ipapara man obedo me miyo ngec pi kodi icok apapat ame tye, kite me puro icok kede diro me jwiko kudi kede two agin apita. Nying mogo ame obedo leb munu kede Latin dang tye ame omio pi joo atye kede mit me medo ngec gi ikom gin ame okobo kan.

Yubo lobo

Lobo ame oyero me pito icok myero oneni oyubo con ame kare me coto icok pwod bor. Ka opito icok kan obedo gwegweng, mio lwit icok pe dongo. Kan apii jole iyee dang pe ber pien mio tee icok top okoo. Pol ajoo maro coto tutuno ame olungu alunga. Joo okene coto tutuno ame olulura (ridges)-. Tutunu olure ber pi tyen kop aryo: ka poto tye ilung , dok ka ngatoro amito tic kede kweyi dyang onyo twakta. Ka icoto icok tutuno olulunga, myero ineni ocoto aria-ria, wek geng mol apii kede bale alobo dok piny ilung. Tutunu olulungo onyo en ame oluluro myero olagoro akina gi aromo 70-100 cm. Ikare me pito, myero ocung tyen icok gin 3 owi itutunu olungo acel. Pi tutuno olure, oboke acel oromo cungo iwi tur, ame lagoro iyi akina oboke myero bed 30 cm.

Pito

Pito icok oromo timo ikare moro keken ame apur oyero teki piny dyaka. Tyen icok ame angolo me apita yero oyer tutung wie apwod ngic dok yom, ento pe tung tere, ame otego ni. Wii icok tye nono abongo kudi atopo icok. Ber oboke myero bed aromo 30 cm. Ikare me pito, oboke oromo cungo tutung tere iyi ilobo aromo 20 cm. Pol apoti me icok bedo ken gi ape orubo kede gin apura okene iyee. Ento kare okene opur mogo pito kodi anyak pio pio, acalo orange, ame magi myero opit ilanget tutuno.

Tic poto

Dwong alobo ame opito icok iye pe mito medo cem agin apita, onyo 'fertiliser'. Ento ka lobo obale ame miti me 'fertiliser' tye, oromo medo cem agin apita ame orubu 'Phosphorus' kede 'Potassium', ame miyo icok nywal aber. Cem ame 'Nitrogen' tye iye pe ber pi icok pien mio icok bedo bungere ento te nywal agoro. Icok ka opito tero kare anonok te lak wumu piny neko doo okoo. Man omio doyo icok polere otimo tyelo acel onyo aryo keken.

Kunyo

Pol akare, kunyu icok otimo nucu nucu, kun nwongo oyero en adongo mere keken. Icok ka okunyu adwong iwang acel pe ote tic kede oyot oyot, romo top okoo iot. Ngat ame

akunyu icok myero tii kede lut atitidi awie bit me kuro tutuno, ame myero otim kede diro, wek okwany icok kit acalo mite. Icok otego maro baro tutuno. Dwong icok tero dwete 35 me tego. Opur okene weko icok bedo nakanaka ipoto ka pol icok dong otego aber iyi tutuno, ote dang kuro tutuno ducu awang acel.

Kudi

Tye kudi kede leyi abedo ilum apapat ame balo icok, ame oromo keto gi iyi iryonget abic. Leyi magi gin (1) kudi icok (weevils), (2) okolo, (3) apwopwor, (4) leyi abedo ibung kede (5) oyoo (rodents).

llobo me Uganda kan, kudi icok ame topo icok dok boboro yii tyene, tye kwone aryo, gin aye *Cylas brunneus* kede *C. puncticollis*. Apokapoka iyi akina kudi magi aye ni *C. brunneus* kome titidi dok rangi kome, ka iporo kede *C. puncticollis* ame man dit dok kome col cuc. Otino akudi magi camo icok te kelo top onyo too atyen icok. Icok top atek ka piny otwo dok lyet, pien wel kudi magi mede malo ikare man. Jwiko bal akudi kelo romo cobere ka opur orurubo diro apapat, onyo diro me 'Integrated pest management methods'. Diro orubere ni mogo obedo, ngolo kede pito wii icok kan ayomere ni, ame kudi nok iye, miyo poto lagoro kede poto acon, loloko kodi apapat ipoti, kede gwaro, wango onyo yiko piny icok otop. Icok myero opit con wek tego ote kunyu oko ame ooro peru oromo. Doyo icok myero otim kede diro dok lobo ame obabara iwi tuturo myero owum, wek kudi pe dony tun ikom icok. Icok otego myero okwany okoo.

Apwopwor- Otino apwopwor camo te lwero pot icok atek meicel. Bale icok bedo adit ka piny otwo dang lyet, ame man mio kudi nywal apol dok otino gi te dongo oyotoyot. Igum arac lyet apiny neko dok jero tic okwor kede two aneko apwopwor. Me gengo peko ame apwopwor kelo, myero onen ni okukuro boo ame otino apwopwor mimino me kane gi ibang okwor. Pito icok myero otim con wek oroo pe nwong icok pwod tye tino ipoto. Ka kudi pwod otany ipoto, ame tic imalo nu pe orwenyo gi, oromo dunyo yat ame tye iyi dul me 'contact insecticide' me neko gi. Kudi apwopwor too apol meicel ka kot odwogo, dong man dang obedo yore okene me rwenyo peko man.

Okolo- kudi man golo yii icok te donyo, camo icok naka itop. Me jwiko tic okolo, myero pe opit icok iyoge putu amaido, dok dang pe opit oyot oyot iyo nge dwogo akot, ento kong okur kare lagoro bala dwe acel inucu naka idwete aryo iyonge kot idwogo. Diro me mako okolo dang tye ame oyubo I NARO. Kodi diro ame otio kede me jwiko kudi atopo icok dang tio ikom okolo kede kudi apol abedo iyii lobo.

Leyi bung- Leyi ame ya ibung te yelo icok dwongere obedo ayom, onger, abim, kede opego. Me pe miyo leyi magi balo cem, myero opur poto abor kede bung. Med ikom man, opur romo jogere ote pito poti gi kara acel wek ryem o leyi lum kede me paco bed ayot. Ka bale acem omede atek ateka, opur romo tero koko gi bang dul a bumente ame olwongo ni Uganda Wildlife Authority (UWA). Myero onen ni jo pe owalo leyi lum pien timo man obedo turu cik me lobo, ame oromo tweyo dano ibuc iye.

'Rodents' - oyoo, bu-bu, kede ayita gi- Leyi magi maro yelo icok ame tye iyi doo, poto ame lak ngete oumere kede lum, onyo ka icok orii atek ipoto. Dong myero onen ni odoo poto acil, okunyu icok ame otego okoo, okukuru ote babalo udi aleyi magi, kede, ka twere, ciko owic me mako leyi magu. Owic, onyo ayuta-pio acel tye ame oyubo

ame olwongo ni 'Mutoto Trap' me mako bu-bu. Puc obedo lee aber ame romo dwaro naka irwenyo oyoo/ayita oko ipoto.

Two icok

Two ajonyo icok onyo 'Sweetpotato virus disease'- kudi atitino (viruses) ame kelo gi tye apol dang kwon gi papat. Icok ame tye kede two inwongo pote titino, rangi mere odoko yelo ka iporo kede en ame kom gi yot, dok inwongo icok man oran iyo kede dongo. Kudi (insects) aryo ame kobo two magi obedo lwangi atar (whitefly), kede 'aphids'. Two dang kobere ka opito oboke ame two tye ityene onyo ipote. Dong pi man two romo, doko anak ka apur opito ipone icok ame kanyo two dok ame kom gi yot.

Two awango icok, 'Alternaria'- Icok ame two man omako inwongo tyene kede pote owang, ocido acol. Two romo mede te tuno naka itwoyo icok, medo kede miyo nywal icok bedo agoro. Jwiko two ni romo timere ka apur opito koti icok ame kanyo two, tyen icok akome yot, kede kwanyo, kede wango tyen icok atwo omako.

Kodi icoke anyen ame NARO omio bot opur

Naspot 1

Nyinge okene: NIS/91/52 Nywal icok: 7-45 t/ha
Oyaa ikwene: Koti oyaa iyi atura ibot NARO Pekere ka otwo: 31%
Kit dongo mere: Lak piny Kom icok pala-pala tye iye?: Nok
Rangi pot wie atino: Lum lum ame lak ngete rema. Mitere ka otedo: Mit
Rangi me pote otego: Lum lum Kanyo kudi atopo icok: Top
Kekela apote otego: Okekela anonok Ganyo two ajonyo icok: Two mako
Rangi del kom icok: Tar Ganyo two awango tyen icok: Two mako
Rangi me yii icok: Tar kede yelo atitidi Kan ame oromo puro iye: Kan ame lum
Rangi tyen icok: Lum lum iye dongo icecego
Kare me tego mere: Rii dyere dyere (Dwete 4)

Naspot 2.

Nyinge okene: NIS/91/178 Nywal icok: 7-33 t/ha
Oyaa ikwene: Koti oyaa iyi atura ibot NARO Pekere ka otwo: 28%
Kit dongo mere: Lak piny Pala-pala ikome rom mene: Nok
Rangi pot wie atino: Rema-remam Mitere ka otedo: Mit
Rangi me pote otego: Lum lum Kanyo kudi atopo icok: Top
Kekela apote otego: Okekela anonok Ganyo two ajonyo icok: Kanyo
Rangi del kom icok: Rema Ganyo two awango tyen icok: Twoye anonok
Rangi me yii icok: Tar Kan ame oromo puro iye: Kan alum dongo
Rangi tyen icok: Lum lum awie obedo pala pala iye acecego kede aboco.
Kare me tego mere: Dyere dyere (Dwete 4)

Naspot 3.

Nyinge okene: NIS/91/218 Nywal icok: 5-29 t/ha
Oyaa ikwene: Koti oyaa iyi atura ibot NARO Pekere ka otwo: 38%
Kit dongo mere: Lak piny Pala-pala ikome rom mene: Nok
Rangi pot wie atino: Dwongere papa-pala Mitere ka otedo: Mit
Rangi me pote otego: Lum lum Kanyo kudi atopo icok: Top anonok
Kekela apote otego: Okekela anonok Ganyo two ajonyo icok: Kanyo
Rangi del kom icok: Lobo-lobo Ganyo two awango tyen icok: Kanyo
Rangi me yii icok: Tar Kan ame oromo puro iye: Kan alum dongo
Rangi tyen icok: Lum lum awie obedo pala-pala iye aboco naka ikor godi.
Kare me tego mere: Rii atek (Dwete 5)

Naspot 4.

Nyinge okene: NIS/91/282 Nywal icok: 5-38 t/ha
Oyaa ikwene: Koti oyaa iyi atura ibot NARO Pekere ka otwo: 29%
Kit dongo mere: Lak piny Pala-pala ikome rom mene: Nok
Rangi pot wie atino: Rema-remam Mitere ka icamo: Mit
Rangi me pote otego: Lum lum Kanyo kudi atopo icok: Top anonok
Kekela apote otego: Okekela anonok Ganyo two ajonyo icok: Kanyo
Rangi del kom icok: Rema Ganyo two awango icok: Twoye anonok
Rangi me yii icok: Tar kede yelo atitidi Kan ame oromo puro iye: Kan alum dongo

Rangi tyen icok: Lum lum awie obedo pala pala iye aboco.
Kare me tego mere: Rii atek (Dwete 5)

Naspot 5

Nyinge okene: NIS/91/316 Nywal icok: 7-28 t/ha
Oyaa ikwene: Koti oyaa iyi atura ibot NARO Pekere ka otwo: 30%
Kit dongo mere: Lak piny Pala-pala ikome rom mene: Malo (2 mg/100 g fwt)
Rangi pot wie atino: Rema-remama anonok Mitere ka icamo: Mit
Rangi me pote otego: Lum lum Kanyo kudi icok: Top anonok
Kekela apote otego: Okekela anonok Ganyo two ajonyo icok: Kanyo
Rangi del kom icok: Rema Ganyo two awango tyen icok: Kanyo
Rangi me yii icok: Cal kede karot Kan ame oromo puro iye: Kanoro ducu ame
Rangi tyen icok: Lum lum ame wie ipala-pala anak opuru icok iye
Kare me tego mere: Dyere dyere (Dwete 4)

Naspot 6

Nyinge okene: NIS/91/324 Nywal icok: 7-28 t/ha
Oyaa ikwene: Koti oyaa iyi atura ibot NARO Pekere ka otwo: 32%
Kit dongo mere: Lak piny Pala-pala ikome rom mene: Pe tye
Rangi pot wie atino: Lum lum Mitere ka icamo: Mit
Rangi pote otego: Lum lum Kanyo kudi atopo icok: Top anonok
Kekela apote otego: Okekela anonok; pot gi titino Ganyo two ajonyo icok: Kanyo
Rangi del kom icok: Cal kede pot yat otwo Ganyo two awango tyen icok: Kanyo
Rangi me yii icok: Tar Kan ame oromo puro iye: Kanoro ducu ame
Rangi tyen icok: Lum lum opuru icok iye
Kare me tego mere: Dyere dyere (Dwete 4)

Tanzania.

Nyinge okene: Osukut, KEMB 10, SPN/0, Simama Nywal icok: 5-38 t/ha
Okelo ikwene: Farmer's variety Pekere ka otwo: 32%
Kit dongo mere: Lak piny Pala-pala ikome rom mene: Nok
Rangi pot wie atino: Lum-lum Mitere ka icamo: Mit atek
Rangi me pote otego: Lum lum Kanyo kudi atopo icok: Top atek
Kekela apote otego: Okekela atek Ganyo two ajonyo icok: Kanyo
Rangi del kom icok: Tar Ganyo two awango tyen icok: Twoye anonok
Rangi me yii icok: Yelo Kwene apure iye: Kanoro ducu ame
Rangi tyen icok: Lum lum awie obedo pala pala opuru icok iye
Kare me tego mere: Con (Dwete 3-5)

Nutupan Kanu Ekoriei Kalo Acok

Aitolomunet Naka:

***Sweetpotato Programme, National
Agricultural Research Organisation (NARO)***

Dr. B. Odongo & Agnes Alajo: Ajulan

NUEGEARETE:

Eraasi acok ediofet otoma onyamat alu idila ainyam ko Uganda. Ekorio acok kotoma odistrikitan alu ipu anu adumuna inyamat arai bo nat ipesan/isirigin. Eraasi da acok iraan lu epedorete apolo kotoma aitutubena nu mam ice iraan epedorete apoloo.

Iponesio lu enyamere acok:

Etapit ainyam acok oipone alo aidor arai bo nat aiget kwape amukeke nu da eloyo owono do aidor ewokitosi, itemonokino da anu aisub ajono, emugati lo ibasio loenyaritai ekabalagala, irieo da amukeke anu adumun akiria. Ejokuka akwii da anu aitaria akituk.

Ejaatar acok inyamat lu enyaritai '**beta carotene**', ibore yeni da epedori akuwan aijilil anu aitolomun "*Vitamin A*". Erai "*Vitamin A*" abila lo inyamat lu ingarakit osi aitiji adekasinei ka aikweny da na ajokan. Erai eitabo lo itodikini ituen eipone lo ekoriere acok.

Aitemonokin na amisiri:

Ite monik amisiri kon kotoma apak na da edolit,ojokuna anu aira. Inacite alupok nu ingaroikitosi naarai imikete acok apolo ka aimini da. Alupok da nu enonok da ecamakitosi acok aimini. Akoriok lu ipu ebokete apanyia arai bo nat etut do ice da itosomaete apanyia nu itoripitai nu da enyaritai atuta. Apanyia nu iculitai arai bo nat nu itoripitai ekoto ojaasi ka alaikina na 70-100cm. Epedoro airaikin akwii auni (3) toma angin apanyido da akiot adope kotoma alaikina na 30cm opone alo itutubitere anu apanyia anu itoripitai ari bo nat etuta (ridges).

Airayo na acok:

Airayo na acok ekoto iriamara ka apak na akorion ka da apalalu na alupok, atutubeta nu akwii anu ebeit aira ngesi da ekoto aitub kotoma awojau na 20 cm.

Etapit da akoru arai bo nat aira acok akec amisiri bon konye epedorio aira iraan lu ekokete atipet kwape nat emaroge awiaitin nu apanyia anu acok.

Aidario na amisiri:

Amisiri na iboliaikit sek mam bobo edolit bobo aiyatakin ebolia. Ebolia lo egwelio oduka lo enyaritai *phosphorous* nepepe ka *potassium* ngesi etapit aiyat amisirin nu acok anu aiyatakin ebolia aboisio nu da edisiar ebolia. Ebolia lo itopolo acok

Lo da enyaritai nitrogen ngesi mam itojokitai aitosom acok naarai iyatakini apolo na akwii imikite da apolou na acok. Isunyakinete iraan airap akwap atipet aso anu angun ipudai do aicap acok irwana na atipe na egei.

Aibelio na acok:

Iponesio iyarei etapit aitosiom anu aibel acok, lo da erai autunun acok lu epolok nu ideletele kokuju naarai edautu apoloo kwangin edit apak kec na aiboi alupok edautu awojau etapit aibos. Eusio do acok nu apolok/eburok ojalanakinete nu edisiak anu kesi da aburor. Ejenuno na ationore na acok ka awanyunet na acilicileta nu ejaasi alupok nu apanyia anu acok. Itosomao da akitoi na ewit anu alemununa acok nu mere emeleku.

Etiokete acok nu sodit akaulo na ilapio iuni (3) kitoni ilapio ikany (5) akaulo na adaun eraikin acok, elomuni awojau na otoma epone alo acokit ana irait ijo. Ace akoriok idareunete kitoni ne etiokotor acok kere omisiri ido aibelun kere irwana atipet.

Ikur nepepe da itiang lu etapit amunamuna acok

Ejaasi da iponesio ikany lu ikur alu etapit amunanar acok ko' Uganda lu da imoriaritosi: **ikonyelen, agolu, epelepelet, idokolen, ipegei lu ekutui kede imirio.**

Ikonyelen lu itobosete acok: Ejaasi iknyelen iponesio iyarei lu itobosete acok: '**Cylus brunneus**' lo erengerengit ka '**Cylus puncticollis**' lo epol iriono, eraasi ikur lu lu da idilasi apakio nu ewonitor akwap. Elomari amijit na ebekuna abeet toma acokit ka atenun nu acok. Epedoro da apedor ikur lu oipone lo aimorikin aitotosom iponesio lu egitigita lu da enyaritai ka alongwau ebe *Intergrated pest control (IPM)* kwape nat: aira kwii nu engaaete nepepe da acoit aira kwap na akit, aira da arai bo nat aitotosom amisiri na elwana ane ejai amisiri na amojongan, aijulujulo na amisirin kede da amuna muna ari bo nat aicwe na atutubena nu iraan lu epedipedit ekurut. Edolit da aira acok kotomanik apak na edolit tetere etioni eroko akamu edoluna. Ocap acok kon ocoite ido da iyasi /iiculi alupok kwap na irasit osodi da orapi acilicileta nu da itorete ikonyelen elomarete acokit. Edolit da aibelun acok nepe iwanyuna ijo ebe atiokoto.

Agolu: Elomari agolu ido ainyam onyai eke erot kitoni ne emunara ejautene lo acokit kotoma ajijim ka etee ke. Anu aitidisaar asurokin na agolu, mam edolit aira acok nepe ka emaido otupakina ojulujule lo amisiri amisirin. Osodi da acok nu irayo komanik ageunet na idoon ngesi etapit amunaar adepar lu irayo ilapiio 1.5 -2 akaulo na idoon ageun. Etolomun da akameta (traps) nu agolun. Kede da eipone lo itosomao aitikitiko ikonyelen, ngesi da epedoro aitotosom anu aitikitiko ikur da ice lu ipu lu iboyete alupok ka lu da iwodowodete atenun nu akwii anu acok.

Epelepelet lo acok: Ikur lu epelepelet kesi da enyakaete ka amunaar akwii nu acok. Iyatakina amunaar na acok kotomani apak na ewonitor akwap ne da ikiyarar amwanis na da iyatakini apolo na adokete anu didik lu epelepelet kotoma apak ana da edisar aswam na ikur alu ebeit aitiji epelepelet. Itidisa amunaar na ikur kotoman oipone lo: amunyumuny amijit na ikur alu, aira da iraan da kotomanik apak na edolit anu aipu amunaro na iraan ewonit akwap/kamu kede da aisik ekiya lo eyari ikur lu ne epolor aibos na acok.

Vermis- Lu ipu kotomani otiang alu kesi idokolen ka ipegei lu ekutui. Anu aitikitik ationis na itiang alu, ekoto awanyun ebe ebokio acok olwanikina ane ejai ekutui arai bo nat amagoro na da etapit itiang aiboyo. Epedoro da aira acok kotoma alukuneneta (**Blocks**) ido da idaritete akoriok tetere mam itiang lu nepe ka akituk elomakinete acok amunaar. Arai erono amunaar na itiang alu noi noi, itelekarit da akoriok awanyun eswamak lu Uganda Wild life Authority anu aingarakin kesi aitikitik itiang lu. Mam ibusakinit akorion ainakin elwera(poison) arai bo nat aiyar itiang tai. Itiang da lu etiakakitai okodet lo imirio kesi imoriaritosi **esolima, asiriany, emoro kede ekunyuk**. Etapit duc imirio lu asuronokin amisirin nu epolo edowan arai bo nat amisiri na etiokitosi iraan noi.

Eipone lo aitikitiki imirio luu imoriarit: aicap amisirin nepepe da asemun nu elukunitosi amisirin, aibel acok nepe ewanyuna ebe atiokoto, abokunun ka amunyumunyunaar aguit na ikur alu, kede aikam. Etolomun da akameta nu da enyaritai '**Mutoto Traps**' anu aikamia ikunyuko, kede Enyuru.

Igangakinete da ikapai lu ipisio ore kwape etijok lu imirio alu.

Adeka na acok na da esukusuki akwii (Sweetpotato virus disease):

Adeka na esukusuki akwii na acok/ abukalal : ngesi da eyauni ekurut lo eiseny lo ebakai 'virus'. Imoriarit da aitodunete ke: aijulakin na eriagi ka da asukusukun na akiot kede da esikun da irasit omam bobo epoloi. Ekorari da ariebo na kotoman icuc alu akwangak lu acok nepepe da ikur ngul lu etapit aiminaikina aijuju orasit lo emaido (*Aphids*)

Aitikitiko na ariebo ana: Airayo na akwii anu engalaete.

Adeka na icweyanari acok /Aisirion:

Imoriarit ajenunet na ariebo ana awadanareta nu irioninikitosi kotoman akwii nepepe ka atenun da nu duc etapit ayangaun atwanare na iraan.

Aitikitikio na ariebo ana: Itikitiko ariebo na kotomani aira na akwii nu mam ariebo etapit aikamunun nepepe ka aitupit iponesio lu ikamunitosi aitalao aria bo nat aregio na amisirin.

Abilasa nu Acok anu Itogogongitai anu Akoriok

Naspot 1:

Ece ekiror: NIS/91/52

Alibunet ke: Ipepeutai ko' Namulonge- NARO (eseuinatai kotoman ocok lu itolomunete acok)

Epoloe ke: Epesiara

Eriagi lo akwii: Lo'piria

Aputo na akiot ana icasit: Etiakatiaka

Eriagi akiot ana icasit: Lo'piria

Eriagi akiot ana elidio: Lo'piria keda aculuculeta nu apapol awaitin

Eriagi emukule alo acokit: edosoikit na ekwele

Eriagi etau acokit: Lo idosoikit ido okwele

Ationore na acok: Ejai kiding na ationore atipet ka aiyap akaulo na ilapio 4

Aimin na acok: Alanglur na 7-45 itanin angini misiri/ hectare

Aniniku na acokit: 31%

Etiai lo B-Carotene: Edit

Aisimarete na akoorion: Ejokuna cut

Agogongkit ekonyelet: Ejai kiding

Agogongkit adeka na esukusuki akwii: Ejai kiding

Agogongkit adeka na ewadanari ido da irininikini atenun: Ikamuni atipet ariebo na

Aibosio nu ibusakinit akoru acok nu: Aibosio nu etapit inya lu euriaka apolo

Naspot 2:

Ece ekiror: NIS/91/178

Alibunet ke: Ipepeutai ko' Namulonge- NARO(eseunitai kotoma ocok alu itolomunete acok)

Epoloe ke: Epesiara

Eriagi lo akwii: Lo'piria ojaasi alingeta akwesi kec

Aputo na akiot ana icasit: Etiakatiaka

Eriagi akiot ana icasit: Lo'epiria

Eriagi akiot ana elidio: erai Lo'papol

Eriagi emukule alo acokit: Lo arengan

Eriagi etau acokit: Lo'dos

Ationore na acok: Atiokere kec ejai akidingoit ilapio 4

AIMIN NA ACOK: ALANGIRU NA 7-33 ITANIN ANGINI MISIRI (HECTARE)

Aniniku na acokit: 28%

Etiai lo B-Carotene: Edit

Aisimarete na akoorion: Ejok cut

Agogongkit ekonyelet: Ebosana

Agogongkit adeka na esukusuki akwii: Egogongit

Agogongkit adeka na ewadanari ido da irininikini atenun: Etamakit agogongkit.

Aibosio nu ibusakinit akoru acok nu: Aibosio nu ewojak inya ka nu euriaka inya da

Naspot 3:

Ece ekiror: NIS/91/218

Alibunet ke: Ipepeunitai ko' Namulonge- NARO (eseunitai ocok alu itolomunete acok)

Epoloe ke: Epesiara

Eriagi lo akwii: Lo epiria olinganakina papol akwesi kec

Aputo na akiot ana icasit: Isiarara

Eriagi akiot ana icasit: Lo'epiria

Eriagi akiot anaelidio: epolo eriagi lo apapol kotoma

Eriagi emukulealo acokit: Loirionikit orengerengete

Eriagi etau acokit: Lo doso okwele

Ationore na acok: iyapete atiokore- akaulo na ilapio 5

AIMIN NA ACOK: ALANGIR NA 5-29 ITANIN ANGINI MISIRI/ HECTARE

Aniniku na acokit: 38%

Etiai lo B-Carotene: Edit

Aisimarete na akoorion: Ejokuna

Agogongkit ekonyelet: Mam ebosana

Agogongkit adeka na esukusuki akwii: Egegong, mam edekakin

Agogongkit adeka na ewadanari ido da irioninikini atenun: Egegong, mam edekakin

Aibosio nu ibusakinit akoru acok nu: Ibusakinit acok nu akoru aboisio nu ewojakatar inya ka da ne ejaasi iwukon.

Naspot 4:

Ece ekiror: NIS/91/282

Alibunet ke: Ipepeunitai ko' Namulonge -NARO (eseunitai kotoma ocok alu itolomunete acok)

Epoloe ke: Epesiara

Eriagi lo akwii: Lo'piria olinganakina eriagi lo apapol awaitin

Aputo na akiot ana icasit: Isiarara

Eriagi akiot ana icasit: Lo'piria

Eriagi akiot anaelidio: Ecedakina eriagi lo apapol

Eriagi emukule alo acokit: Lo arengan

Eriagi etau acokit: Lo idosoikit okwele

Ationore na acok: Iyapete atiokore- akaulo na ilapio 5

Aimin na acok: Alangiru na 5-38 itanin angini misiri (hectare)

Aniniku na acokit: 29%

Etiai lo B-Carotene: Edit

Aisimarete na akoorion: Ejokuna

Agogongkit ekonyelet: Mam ebosi noi

Agogongkit adeka na esukusuki akwii: Egegong, mam edekakin

Agogongkit adeka na ewadanari ido da irioninikini atenun: Edekakin konye mere noi

Aibosio nu ibusakinit akoru acok nu: Aiboisio nu ecamunitosi inya lu awojak

Naspot 5:

Ece ekiror: NIS/91/316

Alibunet ke: Ipepeunitai ko' Namulonge-NARO (eseunitai kotoma ocok lu itolomete acok)

Epoloe ke: Epesiara
Eriagi lo akwii: Lo' epiria olinganakina eriagi lo apapol akwes kec
Aputo na akiot ana icasit: Isiarara
Eriagi akiot ana icasit: Lo' piria olinganakina eriagi lo apapol amorito nu okau akiot
Eriagi akiot ana elidio: Lo' piria
Eriagi emukule alo acokit: Lo' doso okwele
Eriagi etau acokit: Edoso lo idik

Ationore na acok: Ejai akidingot – awojau na ilapio 4
AIMIN NA ACOK: ALANGIRU NA 5-58 ITANIN ANGINI MISIRI (HECTARE)

Aniniku na acokit: 30%
Etiai lo B-Carotene: Epolo noi 2 mg/100g fwt)
Aisimarete na akeorion: Ejokuna
Agogongkit ekonyelet: Mam ebosana noi
Agogongkit adeka na esukusuki akwii: Etapit adeka na aikamun
Agogongkit adeka na ewadanari ido da irioninikini atenun: Egogong, mam adeka na ikamuni
Aibosio nu ibusakinit akoru acok nu: Aiboisio kere

Naspot 6:

Ece ekiror: NIS/91/324
Alibunet ke: Ipepeutai ko' Namulonge -NARO (eseunitai kotoma ocok alu itolomunete acok)
Epoloe ke: Epesiara
Eriagi lo akwii: Lo' piria
Aputo na akiot ana icasit: Isialakak
Eriagi akiot ana icasit: Lo' piria
Eriagi akiot anaelidio: Lo' piria
Eriagi emukule alo acokit: Idosoikit okwele
Eriagi etau acokit: Lo akwangan
Ationore na acok: Ationore acok anu ejai akidingot (ilapio 4)
Aimin na acok: alangiru na 7-28 ilatirin angini misiri/ hectare

Aniniku na acokit: 32%
Etiai lo B-Carotene: Edit
Aisimarete na akeorion: Ejokuna
Agogongkit ekonyelet: Etamakit agogongikin
Agogongkit adeka na esukusuki akwii: Egogong, mam edekakin
Agogongkit adeka na ewadanari ido da irioninikini atenun: Mam edekakin adeka ana.
Aibosio nu ibusakinit akoru acok nu: Aiboisio kere

Tanzania

Ece ekiror: Osukut,SPN/O, Simama
Alibunet ke: Ne ejai akoriok
Epoloe ke: Itenara oyapieie apesiar
Eriagi lo akwii: Lo' piria
Aputo na akiot ana icasit: Lo' piria

Eriagi akiot ana icasit: Lo'piria
Eriagi akiot ana elidio: Lo'piria
Eriagi emukule alo acokit: Edoso lo ekwele noi
Eriagi etau acokit: Lo idosoikit
Ationore na acok: Etiokete atipete akaulo na ilapio 3-5
Aimin na acok: Alangir na 5-58 itanin angini misiri/ hectare

Aniniku na acokit: 32%
Etiai lo B-Carotene: Edit
Aisimarete na akoorion: Epol noi
Agogongkit ekonyelet: Ebosana
Agogongkit adeka na esukusuki akwii: Egogong, mam edekakin
Agogongkit adeka na ewadanari ido da irioninikini atenun: Etamakit agogongkit.
Aibosio nu ibusakinit akoru acok nu: Aiboisio kere