Irish potato *(Solanum tuberosum)* is a cool weather crop which belongs to the *Solanaceae* family, whose other members include tomatoes, capsicums and egg plants, among others. In Kenya, it is one of the most consumed produce, acting as a staple food as well as a cash crop, and its production has been growing rapidly due to increased urbanization and fast food industries.
Irish potatoes can be mashed, made into French fries or baked and serve as good complements to a wide range of meals.

The major irish potato growing regions in Kenya include Nyandarua, Nakuru, Elgeyo Marakwet, Meru, Nyeri, Kiambu, Taita Taveta, Narok, Bomet, Trans Nzoia, Bungoma, Uasin Gishu, West Pokot, Kisii, Nyamira, Kirinyaga, Murang'a, Baringo, Nandi, Laikipia and Kericho.

HEALTH AND NUTRITIONAL BENEFITS OF IRISH POTATO

Irish potatoes are a rich source of nutrition and energy as they are rich in vitamins, minerals and essential organic compounds. Some of the benefits include the following;

- Rich in iron, calcium, phosphorous, magnesium and zinc which are essential in building and maintaining bone structure and strength.
- Contain significant quantities of fibre which helps in lowering the total amount of cholesterol in the blood thus reducing the risk of heart diseases.
- Rich in choline which helps with memory, brain development and muscle movement besides other benefits.
- Have folate which is important in DNA synthesis and repair.
- Source of vitamin B6 which plays a key role in energy metabolism by breaking down carbohydrates and protein into glucose and amino acids respectively, which are easily absorbed into the body.
- Good source of vitamin C and compounds like carotenoids and flavonoids which act as antioxidants.

NB; Green potato tubers, leaves and fruits are usually poisonous.

ECOLOGICAL REQUIREMENTS

Soils; Irish potatoes perform well in loose loamy and sandy loam soils that are well drained and aerated, rich in organic matter and with a pH range of 5-6.5. Impermeable soil layers limit the rooting depth thus affecting production. However, to improve on soil structure, 1kg HUMIPOWER® should be mixed with basal fertilizers e.g. DAP, CAN, TSP etc whenever applying them.
Temperature; optimum yields are realized where average daily temperatures range between 16 to 20^{o}C. Tuber development is highly inhibited when temperatures get below 10^{o}C and above 30^{o}C. Delayed tuber initiation occurs if planting is done when temperatures are high.
Rainfall; the crop does well in regions that receive a regular rainfall of 850-1400mm per annum.
Altitude; Irish potato does well at attitude range of 1500-2800 M above sea level.

SEED SELECTION

There are very many varieties, which differ in shape, size, colour, flavour and starch content. They include;

Tigoni, Shangi, Kenya karibu, Kenya Mpya, Sherekea, Ambition, Laura, Lady Amarilla, Derby, Markies, Sagitta, Saviola, Musica, Royal, Jelly, Faluka, Purple gold, Challenger, Evora, Panamera, Rodeo, Sifra, Konjo, Carolus, Zafira, Milva and Mayan Gold, among others.

The following factors should be considered during seed selection;

- Yield potential
- Maturity period
- Pest and disease tolerance
- Tuber characteristics
- Intended purpose of the produce

FIELD OPERATIONS

Land preparation

Usually, at least two ploughings are done with frequent harrowing and rolling in order to make the soil suitable for optimal productivity.

To get rid of both broadleaf and grass weeds, spray them with CATAPULT® 480SL 200ml/20L which is a systemic non-selective weedkiller.

Planting

Irish potatoes are commonly grown from seed potatoes (tubers or pieces of tubers). For optimal production, these tubers should be disease free and well-sprouted.

Procedure

1. Make hilled rows (ridges) on the prepared land.
2. Mix soil with manure and DAP. For efficient and improved nutrient uptake and stimulation of root development, among other benefits, mix 1kg HUMIPOWER® with 50kg DAP and /or 1 ton of manure.
- Place the seeds 12 inches apart and cover with about 3 inches of soil.

Tips!

- Seeds can be soaked in OPTIMIZER® 20ml/1L for 1-2 hours in order to break seed dormancy if any, and promote faster and uniform germination.
- The soil should be moist but not waterlogged.
- Germination usually takes place after 21-27 days after planting.

Spacing

Furrows are dug at a spacing of 75cm from one furrow to another and about 30cm from one seed to the other.

Ridging/Earthing up

This involves mounding soil from between the rows around the main stem of the crop. It maintains the crop in an upright posture, prevents pests like the potato tuber moth from accessing the tubers and helps in preventing development of weeds.

Irrigation
Irish potatoes are very sensitive to water stress especially during the middle and late stages of growth, and this can cause production of misshapen tubers and low yields. Soil moisture content should therefore be maintained at a relatively higher level in order to promote optimal production.

Weed control
Weeds cause significant losses as they compete for growth factors like nutrients and water and harbour pathogens which could attack the crop. Proper weed control should therefore be done in order to give the crop a competitive advantage.

Proper weed control with CATAPULT® 480SL 200ml/20L during land preparation and application of HOTLINE® 450SC 50ml/20L prior to transplanting significantly reduces weed development throughout the season.
Shallow cultivation should be done in order to avoid root injury.

Crop rotation
This helps in pests and disease management by breaking their development cycles. Rotation should be done with non-solanaceous crops like cereals and brassicas.

Manure and fertilizer application
At planting, apply 50kg of DAP or TSP in one acre. These are rich in phosphorous which is highly needed at early developmental stages of the crop. Two weeks after emergence, spray the young plants with LAVENDER SUPER STARTER® 20ml/20L or GATIT SUPER START® 50g/20L to promote rapid root development, ensure balanced crop growth and increase the crops' resistivity to infections and weather stress.
After 3 to 4 weeks, top dress the crop with 50kg of CAN in one acre, and after 4 to 5 weeks, at rate of 100kg per acre. Top dressing can also be done using other nitrogen-rich fertilizers like N.P.K 23.23.0. Spray the crop with GATIT SUPER GROWTH® 50g/20L or LAVENDER SUPER GROWTH & VEGETATIVE® 20ml/20L, which promotes a faster vegetative growth, increases crop resistance to infections and weather stress and ensures a balanced growth of the crop.
Spraying the crop with GATIT SUPER FLOWERS & FRUITS® 50g/20L or DIMIPHITE® 20ml/20L or GOLDCHANCE MULTISUPER K® 50g/20L or LAVENDER SUPER FLOWERS & FRUITS® 20ml/20L or BIODISTINCTION XTRA® 20ml/20L promotes production of quality tubers.
Tips!

- Soil testing is important. It helps in determining the soil fertility status.
- All basal fertilizers should be mixed with HUMIPOWER® at a rate of 1kg of HUMIPOWER® into 50Kg of fertilizer.
- OPTIMIZER® is an organic biostimulant which is essential for plant growth and stress management. It can be applied at all or any growth and development phase of the crop.
- Application of manure is important especially for soils with little or no organic matter.

MAJOR PESTS AND DISEASES

Pests

Tuber moths- these are white-flying insect pests whose larvae enter directly into tuber making slender tunnels along or deep into the tubers. These tunnels don't heal thus provide avenues for entry of other pathogens, e.g. diseases like soft and dry rot.

Spray ESCORT® 19EC 10ml/20L or BACIGUARD® 16WDG 15g/20L or OCCASION STAR® 200SC 3ml/20L or LEXUS® 247SC 8ml/20L

Root knot nematodes- they are microscopic parasites living in the soil which feed on the roots. The infested tubers develop swellings, making them unattractive.

Drench the planting holes with ALONZE® 50EC 10ml/20L or mix basal fertilizer, 50kg with 2kg of ADVENTURE® 0.5GR.

Leafminers– they feed between the upper and lower epidermal leaf surfaces creating whitish serpentine or blister mines. This reduces the surface area for photosynthesis leading to stunting and reduced yields.

Spray ALONZE® 50EC 5ml/20L or ESCORT® 19EC 10ml/20L or LEXUS® 247SC 8ml/20L or OCCASION STAR® 200SC 3ml/20L

Aphids; these are tiny black and green soft –bodied insects which suck sap from leaves and stems of plants causing leaf curling and distortion and as they feed, they also secrete honeydew which facilitates the development of sooty mold. Aphids are also vectors of diseases like Potato Leaf Roll disease.

Spray KINGCODE ELITE® 50EC 10ml/20L or PENTAGON® 50EC 10ml/20L or LEXUS® 247SC 8ml/20L

To get rid of the sooty mold, spray JAMBO CLEAN® 100ml/20L.

Whiteflies; these are tiny white winged insects which suck sap from the plants causing damages and reducing plant vigour. As they feed, they produce honeydew which induces growth of sooty molds. They are also vectors for plant diseases.

Spray TAURUS® 500SP 10g/20L or LEXUS® 247SC 8ml/20L or KINGCODE ELITE® 50EC 10ml/20L

Spray the crop with JAMBO CLEAN® 100ml/20L to clean the sooty mold.

Diseases

Late blight- it attacks leaves, stem and tubers. Infection leads to development of small pale to dark green spots that later turn into brown or black lesions, which appear water-soaked during conditions of high humidity and cool temperatures.

Spray GEARLOCK TURBO® 250WP 25g/20L or FORTRESS GOLD® 720WP 40g/20L or TOWER® 720WP 50g/20L

Bacterial wilt- this is commonly spread by infested tubers and develops faster in areas with poor drainage. Infection causes stunting and wilting. When the stem or tubers of an infected crop are cut, whitish droplets of bacterial cream ooze out of them.

Spray GREENCOP® 500WP 50g/20L, a copper-based products which suppress the activity of the pathogen.

Potato leaf roll- this is a viral disease, usually transmitted by aphids. Infected leaves roll/fold and do not broaden, and this reduces the photosynthetic surface area, eventually causing stunted growth.

Spray KINGCODE ELITE® 50EC 10ml/20L or PENTAGON® 50EC 10ml/20L or LEXUS® 247SC 8ml/20L to control the vectors (aphids).

Fusarium Wilt; On infection, symptoms appears like vein clearing on the younger leaves and dropping of the older lower leaves, which subsequently turn yellow and wilt. Yellowing and wilting progress up the stems and tubers which develop brown discolouration. Vascular tissue become brown but do not produce a slimy substance when cut under water like in bacterial wilt.
Drench with GREENCOP® 500WP 100g/20L
Foliar spray PYRAMID® 700WP 50g/20L or ABSOLUTE® 375SC 10ml/20L after every 2 weeks.
Early blight- it majorly affects the leaves and stems and can cause considerable defoliation if not controlled in time resulting in to reduced yields. Infection leads to formation of brown circular spots on leaves and stems.
Spray FORTRESS GOLD® 720WP 40g/20L or TOWER® 720WP 50g/20L or RANSOM® 600WP 15g/20L or ABSOLUTE® 375SC 10ml/20L

Tips for pest and disease management

- Use recommended pesticides
- Use tolerant and resistant varieties
- Practise crop protection
- Plant healthy and certified tubers
- Ensure field sanitation
- Ensure timely and proper weed control
- Ensure adequate spacing
- Plant early
- Ensure proper crop nutrition

Note!

- Whenever doing any foliar spray, mix the product with INTEGRA 3ml/20L, which is a sticker, spreader and penetrant that increases its efficacy.
- Use CADILAC® 800WP 50g/20L, which is a preventative fungicide against fungal diseases.
- Alternating different chemicals during the crop's season prevents resistance build-up by the pest/pathogen.

HARVESTING & POST-HARVEST HANDLING

Maturity period varies from one variety to another and can be indicated by yellowing of the crop's leaves and easy separation of tubers from their stolons. Harvesting is done using a fork, plough or commercial potato harvester, depending on the scale of production. To facilitate harvesting, the vines should be removed 1-2 weeks before digging up the tubers.

It is very important to avoid any injuries to the tubers because the bruises/damaged parts serve as entry points for storage pathogens.

The tubers should be dug on a dry day. However, if the soil is too wet, the potatoes should be air-dried before packaging.

Tubers meant to be stored (not to be consumed immediately) should be left in the soil in order to allow their skins to thicken, which prevents shrinkage due to water loss and storage pathogens. However, they should not be left for too long as that may expose them to a fungal incrustation known as black scurf.

Sorting before storage is very important. Spoiled potatoes should be removed in order to prevent the healthy ones from spoiling.

Harvested tubers are subject to deterioration and therefore proper storage should be ensured, in

order to prevent post-harvest losses.

Tips!

- Do not store the tubers with ethylene-producing produce like bananas to avoid spoilage.
- Do not store tubers in the refrigerators
- Do not wash tubers until right before you use them as washing shortens their shelf-life.
- Curing of harvested potato tubers is very important because it allows any cuts or bruises to heal.
- The storage room should have good air circulation.
- Fully grown Irish potatoes can store up to 2months.