

# GROWING POTATO Fact Sheet



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High yields of good quality potatoes can be produced under Irish soils and climatic conditions if the crop is well managed throughout the growing season. The crop must also be carefully handled after harvest to maintain quality. Potato growers need to pay particular attention to site and crop rotation, seedbed preparation, disease control and harvesting.

Choosing a suitable field, soil-type and place in the crop rotation is an important first step to producing potatoes profitably.

Potatoes can be grown across a wide range of soil types and should not be grown more than one year in four in a rotation, otherwise potato cyst eelworm may cause a problem.

Deep cultivations to produce a clod free seed bed are required. Potatoes can be divided into three categories based on when they mature. Earlies normally mature in about three and a half months - 100 days or so. The second earlies will take about four months - 120 days or so. Maincrop potatoes can take between four and five months to fully mature. First earlies are normally sown in early February in Wexford and late February in the Northeast. Second earlies are sown from early to mid March and maincrop are sown from mid March (mainly April) to early May. See more on [page 8](#).

All of the above depends on season.

Plant maincrop potatoes in April, when soil temperatures rise above 7°C. Plant about 10 cm deep and in general 20-25 cm apart (in 80 cm drills). See more on [page 8](#).

Potatoes need significant amounts of N, P, and K nutrients and in some cases additional trace elements. Use the result of a recent soil test to decide the rate of fertiliser application. See more on [page 13](#).

Potatoes must be protected against competition from weeds. Use a herbicide or combination of herbicides to keep weeds under control. In an organic situation stale seedbeds, manual hoeing or gas burning can be considered. See more on [page 15](#).

Wireworms and slugs can be a problem following grass crops. Aphids can spread virus diseases, and need to be controlled in crops from which seed is to be planted. Eelworm fields must be avoided for at least 10 years. See more on [page 15](#).

It is essential to prevent potato blight entering the crop. Use a mixture of cultural and chemical control methods to keep the disease at bay. Start the fungicide programme in time and don't miss any applications. See more on [page 19](#).



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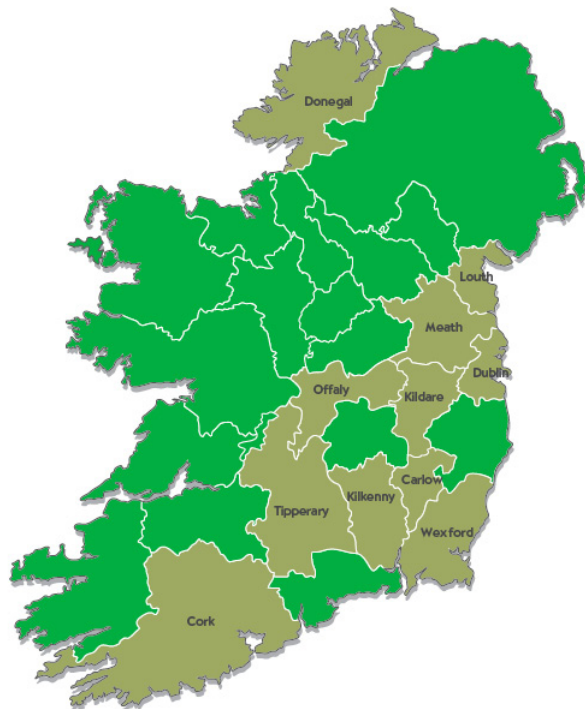
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## Production

### Production

Each year consumers spend approximately €162 million on potatoes. Penetration of potatoes into Irish households is at 95% and can be referred to as our staple food.



**Fig 1 Main counties of Commercial Potato Production**

#### Some Figures

The information in this document is based on a combination of data from the Central Statistics Office (CSO), IFA and from the Department of Agriculture Fisheries and Food (DAFF). Figures for production area are based on CSO data, while percentages for individual potato varieties are based on surveys of growers. All figures relate to production by commercial potato growers, defined as those growing 0.8 hectares (2 acres) or more of potatoes.

### Production Area

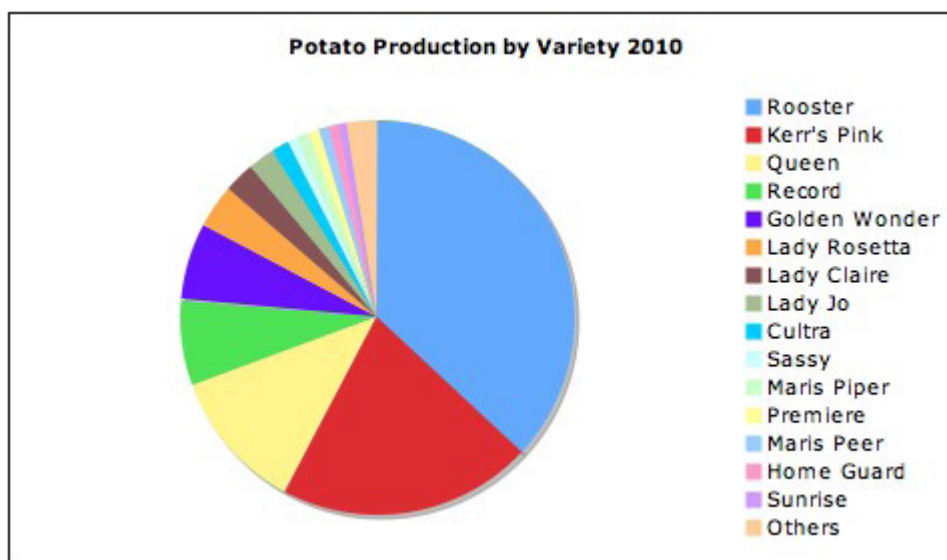
Ireland's total production area in 2012 was over 8,700 hectares.

### Varieties Grown

Key Varieties – % of area grown in 2011: Rooster 56%; Kerrs Pink 10%; Queens 8%; Golden Wonder 3%; Records 2% and others 21%.

### Grower Location

Key Potato Production Counties – % of area planted by county: Meath 22%; Dublin 15%; Wexford 13%, Louth 12%; Donegal 10%; Cork 8% and others 20%



## Agronomic requirements

### Sites and Soils

#### Location

Maincrop “ware” potatoes can be produced in most parts of the country. The term “ware” potatoes are those which are sold fresh for eating by consumers. Crops destined for processing are best located near the processing factory so that the crop can be quickly transported at a relatively low cost.

#### Site and soil type

An ideal site is a slightly sloping, south-facing field with shelter from winds.

Satisfactory yields of potatoes can be achieved on a wide range of soil types. Potatoes are also suited to acid soils, pH 5.5 to 6.9 is ideal.

Heavy clay soils are suitable provided they are well drained and ploughed early. Light or shallow soils are prone to drought and yields of maincrop potatoes will be lower if a shortage of water occurs during the growing season. Proximity of the site to a water course is also important, ensuring the crop can be irrigated. This allows the crop to pass for washed pre packs which command a higher premium for the grower.







### Rotation

A correct rotation is required to avoid the build-up of potato cyst eelworm, disease and volunteers. Potatoes should not be grown more often than one year in four, but in areas of intensive ware production a longer interval may be required.

**Potato cyst nematode (eelworm)** may persist in soil for 20-30 years. **Volunteer potatoes**, in addition to contributing to the eelworm problem are also a source of blight and virus disease, and should be controlled where possible in succeeding crops. See section on pest control:- [Pest Control](#)



## Soil Preparation

Quick, even emergence and good early crop growth are essential in the quest for good yields of quality potatoes.

Where grass is ploughed up it is recommended that the grass is burned off in advance of ploughing using Glyphosate. Deep cultivation (down to approximately 25 cm) is an essential start to seedbed preparation.

The aim of subsequent cultivations is to provide a fine seedbed with 12 - 15 cm of clod free tilth. Loose cloddy seedbeds will dry out, causing slow growth, irregular emergence and low stem counts. Wait until soils are dry enough, and then use an appropriate implement for cultivation.

Cultivating soils that are not dry often results in compaction, and damage to soil structure. This restricts the rooting capacity and subsequent yield of the potato plant.

Ploughed ground is usually cultivated with a heavy tine cultivator prior to bed tilling and ridging. Bed tilling and ridging involves cultivating the soil to a depth of 15 -18 cm, and leaving it in large ridges between 175 – 185 cm in width.

### **A firm fine seedbed is essential for planting**



## Stone separation

Stone separation is the process of removing stones and clods from the formed ridges, and burying them between alternate rows. This substantially reduces tuber damage during harvesting, and greatly increases harvester output.

The ridges should have been adequately cultivated prior to stone separation to ensure there are no excess clods to be removed. Soils need to be dry to ensure good separation whilst also avoiding damage to soil structure.



Planting the Crop

Which Variety

Consumers prefer high dry matter varieties with red skin. Rooster is the most popular variety in Ireland today.

Since the Rooster’s release in 1991, the area under production has grown to over 55% of the total potato ware area in Ireland today. The success of Rooster is due largely to its excellent taste and cooking quality, as well as its superior agronomic characteristics.

There are a number of important factors to consider when selecting a potato variety for the ware trade.

These include:

- ❖ Yield
- ❖ Eating quality
- ❖ Maturity
- ❖ Keeping quality
- ❖ Disease resistance
- ❖ Seed availability

**Yield** – High yields are essential to enable producers to make a profit. Variety is a major determinant of yield.

**Eating quality** – Although quality preferences of consumers are changing most consumers prefer high dry matter potatoes and red skinned varieties.

**Maturity** – Choose varieties which mature in succession – aim to have harvesting completed by the end of October.

**Keeping Quality** – Varieties differ in their suitability for prolonged storage. Varieties like Golden Wonder and Rooster store well. Kerr’s Pink is difficult to store.

**Disease Resistance** – Varieties differ in their resistance to disease. Losses can be reduced or eliminated by being familiar with the disease resistance of the varieties being grown so that adequate control measures can be taken.

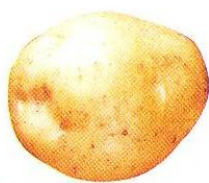
Table 1 Main Crop Varieties for the Home Ware Market

Maturity	Varieties
Early Main Crop	Record
Late main crop	Kerr’s Pink, Rooster
Very late main crop	Golden Wonder





Record



**Record** is a yellow fleshed early main crop variety with moderate yields. It is subject to internal bruising if harvested in cold condition or handled improperly. It is susceptible to foliage blight and virus yellow but is resistant to sprang. Good for chips and boiling

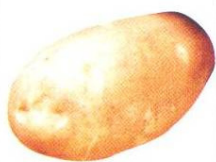
Kerr's Pink



**Kerr's Pink** is a red skinned late main crop variety with deep eyes. It is a white fleshed, high dry matter, floury variety used for boiling, baking and home chipping.

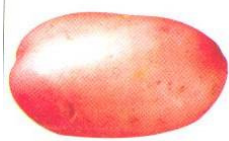
It is susceptible to foliar and tuber blight and to common scab. Because of its poor keeping quality it is difficult to store. In some years it may be adversely affected by secondary growth.

Golden Wonder



**Golden Wonder** is a very late main crop variety which is slow to sprout and is suitable for prolonged storage. It is susceptible to the main foliage diseases but the tubers are resistant to blight, common scab and gangrene. It is a very high dry matter variety, is very floury to eat and is popular for boiling.

Rooster



**Rooster** is a moderately high yielding red skinned and yellow fleshed variety. Rooster is susceptible to foliage blight but tuber blight resistance is fairly good. It has good resistance to common scab and leaf roll virus. It is classed a medium dry potato and is used mainly for boiling, roasting and baking.

**Cultra** has a white skin with pink eyes and a cream flesh. It is probably the most popular home grown white potato in the country. The potato is slightly waxier in texture with a good skin finish. The variety is suitable for baking, boiling steaming and roasting.



**Home Guard** is the traditional first early potato grown in Ireland. Typically available from mid May in small quantities with loose fluffy skins. Texture improves as the season progresses.

Home Guards tend to be gone from the market by early July.

**Queens** are a second early potato variety and are available from late June to September. Generally Queens begin to replace Home Guard in late June and become the mainstay of the Irish potato market for the summer. The variety has white skin and flesh, an excellent floury texture, beautiful taste and can be used for boiling, steaming, roasting and chipping

### Sourcing Seed

Certified seed should be ordered and purchased from an approved source. The use of uncertified seed may lead to virus and fungal disease outbreaks.

The Department of Agriculture operates a seed certification scheme:-

[Seed Certification Scheme - Department of Agriculture, Food & the Marine](#)

Seed potatoes need to be stored over winter in a refrigerated store at 4°C to prevent over-sprouting. Poor storage of seed results in excessive sprouting and sprout breakage which in turn leads to:

- ❖ Poor crop vigour
- ❖ Irregular germination
- ❖ Wide range of stem numbers

Chitting is the controlled production of sprouts on potato tubers. This is done to bring forward harvest date and to increase yield and quality. More and more main crop producers are chitting their seed for early maturity, and to lengthen the harvest window. In chitting, light and temperature are controlled to ensure the production of 1cm long strong sprouts.



**Chitted seed**

### Time of Planting

The optimum planting time for maincrop potatoes is March - April. As a general rule planting should not take place in unsuitable soil conditions, i.e. soils which are cold and wet. Ideally, soil temperatures should be around 7°C for three consecutive days before planting. In areas where frost is a risk (i.e., inland, low-lying areas) sowing after mid-March reduces the risk of frost damage to the crop.



## Depth of Planting

Potatoes should be planted at a uniform depth of about 12-15 cm below the surface of the ridge and 4 cm above the base of the furrow to protect the seed in wet periods. Very small seed should not be planted too deep, as it may struggle to emerge and be less vigorous. Some varieties e.g. records need to be planted deep (below 10 cm) to avoid greening.

## Seeding Rate and Spacing

Seeding rate depends on what spacing is chosen between the ridges and the distance between tubers in the same ridge.

A ridge width of **80 cm** is recommended, but row widths of up to **90 cm** can be used.

**Wide rows** have certain advantages:

- a) More weathered or cultivated soil is available to make a **good ridge**.
- b) The sides of the ridge are **less likely to be compacted** by tractor tyres, thus reducing clod formation and tuber greening.
- c) **Faster work rate** when planting the crop.

Research generally indicates that row width of up to 90 cm has little or no effect on yield providing that the seeding rate is not altered, i.e. seed is planted closer in wider rows.

Seeding rate is important for two main reasons:

- (a) Seed is a **major cost item** and therefore must be used effectively.
- (b) Seeding rate has a **large influence on the size of the tubers** produced, and so must be adjusted to suit **market requirements**.

Split grading of seed, 35 – 45 mm and 45 – 55 mm is advisable to facilitate easier planting and accurate spacing of tubers. Split grading of seed will produce a more uniform crop. Seed size should match the capacity of the planter cups. Plant at the correct speed to obtain accurate placement. Ensure that the planter is in proper working order. Spot checking of the planted drills and the planter, on an ongoing basis, is necessary to ensure accuracy.



Table 2. Optimum Spacing for Maincrop Potato Varieties - Planted in 80 cm rows

	Records	Kerr’s Pink	Golden Wonder
Small seed ( 35 - 45 mm )	20 – 25cm	20 – 25cm	20 – 25cm
Large seed ( 45 - 55 mm)	28 – 33cm	28 – 33cm	28 – 33cm

In wider rows, the spacing between tubers should be reduced to maintain the seed rate per hectare. For example, if the rows are 90cm apart, then plant small seed (35-45) at 17-21 cm spacings. The optimum seed rate and seed spacing varies greatly depending on the type of production (i.e. the size of tubers required), variety, conditions of growth and the cost of seed. To increase tuber numbers and reduce tuber size, increase the seeding rate with larger seed and /or closer spacing. Do the reverse to reduce tuber numbers and increase tuber size i.e. small seed with wider spacing.



If placing fertiliser at planting time ensure that it is positioned 10cm away from the tuber to avoid scorching. Fertilisers can be reduced by 20% if placed in the row.



## Crop Nutrition

High yielding crops of potatoes require adequate quantities of nitrogen (N), potassium (K) and phosphates (P) if they are to be allowed achieve their potential. Up to 40 kg/ha of phosphates accumulate in the growing parts of a potato crop.

Fertiliser application has an effect on yield, tuber size and quality. It is also a major cost factor in production.

### The Effects of Nitrogen

Raising the level of N application up to a certain point, increases tuber yields. However, higher applications delay the development of tubers. These tubers end up with a watery texture, and of low cooking quality. The foliage of these plants with excessive nitrogen is very susceptible to blight and also delay potato set and maturity of the potato.

### The Effect of Phosphorus

Phosphorus encourages early rooting as well as later maturity, harder skins, and may reduce tuber blight. P can increase dry matter.

### The effect of Potash

Potash increases tuber size, but excess K (even excess sulphate of potash) may slightly reduce dry matter content. The use of sulphate of potash instead of muriate of potash (chloride) will tend help to increase tuber dry matter.

### Recommended Fertiliser Rates

Fertiliser application should be based on the basis of a recent soil test.

For maincrop potatoes, the generally recommended range of fertiliser application is as follows:

**Table 3. Recommended Nutrients for main crop potatoes**

Nutrient	Low (kg/ha) High
Nitrogen	95-170
Phosphate	50-125
Potash	120-305

### Choice of Compound

Suggested compounds of N,P,K to use are **10:10:20 (N:P:K)** or **7:6:17(N:P:K)** or a combination to give the required amounts of N, P and K.

There should be little adverse effect on potato quality provided excess nitrogen is avoided and the variety grows to as near maturity as possible.





### Other Nutrients

Small amounts of manganese and magnesium are also required by the growing crop.

#### Manganese

A deficiency of manganese is characterised by pale green yellow leaves, with brown spots appearing between the veins. Spray with manganese sulphate at 9.5 kg/ha in 1,000 litres of water to correct any shortage.

#### Organic Manures

Where organic manures are used, artificial fertilisers should be reduced based on the nutrient value of the organic manures.

#### Magnesium

The main symptoms of magnesium deficiency are a yellowing of the leaf tissues between the veins, and stunted growth. Apply 25 kgs/ha in 1,000 litres of water of magnesium sulphate.



## Weeds, Pests and Diseases

As with all crops, potatoes need to be protected from weeds, diseases and pests. In the case of potatoes, a severe attack of potato blight can totally wipe out the crop.

### Weed Control

Weeds compete with potatoes for light, nutrients and water and if not controlled will affect tuber population, delay harvesting and reduce quality. Work at Teagasc in Oak Park has shown that weeds left unattended in a potato crop will result in a yield loss of 50% or more.

Weed control in potatoes is normally achieved by using herbicides. However weed control can also be carried out by mechanical weeding if weather and soil conditions are favourable.

### Herbicides

At present there is a wide range of herbicides available for weed control in potatoes.

Herbicide selection will be dictated by three guidelines:

1. The **spectrum of weeds** present or anticipated in the crop,
1. The **variety** and **crop growth stage**, and
3. The **cost** of the product.

In general, potato herbicides may be divided into three main groups - **contact**, **pre-emergence** and **post-emergence**.

### Contact Herbicides

These include Basta, Retro, and Spotlight which are used to kill early emerging weed seedlings. These herbicides have no residual effect, and are often applied in combination with other residual herbicides to give season long control.

### Pre Emerge Herbicides

These are generally soil-acting and require rainfall soon after application to get the best effect. **Linuron**, **Metribuzin (Sencorex)**, and **Defy** are typical examples of these groups. They persist in the soil for 6-8 weeks after application, and create a chemical barrier to any subsequent weed growth. Any form of soil disturbance after application will break this barrier and allow weeds to germinate.

Be sure to read the product label very carefully, as the rate of herbicide to be applied will depend on soil type. Always check varietal restrictions when using metribuzin (Sencorex).



### Examples of pre-emergence options

#### **Pre-emerge :-**

Metribuzin (Sencorex) 1.0 kg/ ha

Plus

Diquat 2 L/ha

plus Agrol

**or**

#### **Pre-emerge:-**

Linuron 1.0-2.0 L/ha

Plus

Diquat 2 L/ha

plus Agrol

**or**

#### **Pre-emerg**

Metribuzin (Sencorex) 0.5 kg

Plus Defy 4 L/ha

Plus Diquat 2 L/ha plus Agrol

### **Post Emerge Herbicides**

This group has definite foliar action as well as soil acting abilities, and is very useful in situations where an earlier application has been delayed due to bad weather. This groups includes **Metribuzin (Sencorex)**, **Rimisulfuron (Titus)**, **Pendimethalin (Stomp)**, which may be applied to crops up to 15 cm high.

The best results are achieved when the majority of the weeds are at the cotyledon stage of growth. Be sure to read the product label carefully, as these products cannot be used safely on every variety.

#### **Post emerge :-**

Titus 25g/ha

+ Sencorex 0.35 kg/ha

+ NonIonic Wetter 0.1%

Follow in 10 days with

Titus 25g/ha + Non Ionic Wetter 0.1%

#### **(Or use this on its own)**

Titus 50g/ha + Non Ionic Wetter 0.1%

### **Control of other weeds**

Scutch grass can be a serious problem in potatoes. There are a number of grass herbicides (or **graminicides** as there referred to) which can control scutch. These products e.g. Fusilade must be applied to young growing scutch (about 10-15 cm high). Most graminicides will also control volunteer cereals, wild oats, ryegrass, bent grasses and onion couch grass at the early growth stages. They do not, however, control broad leaf weeds or annual meadow grass. Consult the individual product label for more specific information



## Pest Control

There are four pests which can cause significant damage to potato crops:

### Wire Worm

Wireworms are the larva of the Click beetle, and damage tubers by boring into them. Adult click beetles lay their eggs in grassland or weedy crops, and the wireworms can remain in the soil for 4-5 years. Avoid planting potatoes immediately after permanent grass.

Chemical control can be achieved by incorporating **Nemathorin 10G** into the soil when the wireworms are at a medium to low levels. High risk situations should be avoided.



External wireworm damage



Internal wireworm damage

### Slugs

Slugs cause losses by feeding on the tubers and reducing their quality. Losses are greatest in heavy clay soils, particularly following a wet season. Slugs are most active in mild moist weather. Some varieties, such as Cara and Record, are more susceptible to slug damage than others.

In very high risk situations, early harvesting for immediate sale may have to be practised. Broadcasting metaldehyde and methiocarb slug pellets over the crop during July in a moist period gives good results. This should be repeated if necessary.



Keeled slug



Slug damage

### Aphids

Aphids can damage potato crops in two ways: They may reduce yield directly by feeding on the shoots and therefore lowering the plant vigour, or they may spread virus infection.





**Aphids on a potato leaf**

## **Potato Cyst Eelworm**

High populations of this pest can cause severe losses. Prevention is by far the best approach. This can be achieved by practising a good rotation. If eelworm is confirmed in a field, it should be put down to



*Potato cyst nematode*



## Disease Control

**Potato Blight** is still the most serious disease of potatoes in Ireland despite recent advances in fungicides, improved varieties, better disease forecasting, and so on. As yet there is still no means of eradicating an outbreak in a crop. Therefore on disease prevention is key. There are two main factors to be considered:

- (a) The **Source** of the disease, and
- (b) The **Spread** of the disease.

### Source of Potato Blight

Potato blight is caused by the **Phytophthora Infestans**, which is an oomycete pathogen. The fungus survives the winter in blighted tubers. These may remain in the soil after the previous crop, or in dumps where potatoes have been discarded after grading. Planting blighted tubers is also a potential source of the disease. Therefore make every effort to ensure that all tubers are picked at harvest time and that volunteer potato plants are not allowed to grow the following year. These plants can act as a source of infection for nearby potato crops. Destroy all potato dumps by applying **Glyphosate** or **Diquat** based products, and make sure that only blight free tubers are sown.

### Spread of Blight

Blight is commonly recorded for the first time each season in unsprayed maincrop potatoes around mid to late July. Weather conditions which favour the spread of the disease occur when temperatures rise above 10°C and relative humidity rises above 95%. The typical mild, damp Irish summer is ideal for the spread of the disease. The meteorological service issues forecasts of the spread of potato blight whenever the temperature and relative humidity are suitable for the spread of the disease.

### Symptoms of potato blight

**Foliage:** Stem blight can occur early in the season. It occurs in the axil of the leaf below the growing point, and if conditions are suitable dark brown or black lesions occur. Leaf blight occurs later on in the season, the symptoms can be found on the leaflets and petioles. The fungus can be seen as a white mould on the lower surface of the leaf at the margin of the lesion. If not treated, the plant will become completely destroyed.



Symptoms of blight on potato leaves. The whitish growth on the leaf underside is the fungus.



**Tuber:** Heavy tuber infection can occur even when foliage blight levels are as low as 1%, if suitable weather conditions occur. Rain washes the spores into the soil and creates a film of water around the tubers which facilitate the spread of disease onto them. Infected tubers can be identified by slightly sunken water soaked areas on the tuber surface and by the rusty brown colour under these areas when the tuber is cut. It is very common for blight infected tubers to develop bacterial soft or dry rot as a secondary infection during storage.

Potato blight is controlled by a combination of chemical and cultural control methods.



Tuber blight



Tuber blight

### Cultural Control of Blight

The three main aspects of cultural control are **hygiene**, **choice of variety** and **fertilisation levels**.

As already mentioned, potato dumps and unpicked tubers allowed to grow the following season are sources of the disease that should be eradicated before they become a problem. Spray off dumps and volunteer potatoes so that they don't develop into sources of infection. Use only certified seed. Maintain a good soil cover on tubers in the ridges. Allow at least two weeks between haulm killing and harvest.

Choose a variety with the highest blight resistance, all other factors (yield, quality characteristics, etc.) being equal.

Do not use excess nitrogen as it leads to extra foliage and creates conditions very favourable to the spread of the disease. Lodging may also result from excess nitrogen and when this happens, it is very difficult to prevent blight occurring.

Good cultivations also slow down the development of the disease. Large, well earthed-up and pointed drills help to prevent tuber blight by preventing spores being washed down to the tubers.

A list of recommended seed suppliers is available on the Department of Agriculture and Foods website [www.agriculture.gov.ie](http://www.agriculture.gov.ie).

### Chemical Control of Potato Blight

Fungicides are used to prevent blight entering a potato crop and spreading through the crop. Start spraying main crop potatoes once the foliage is 10-15 cm tall. Continue spraying at 7 day intervals up to the time of burning off. Burn off two to three weeks before harvest to prevent tuber infestation.



### Stage for first blight spray

The chemicals used to control blight fall into four main groups.

- (a) Contacts
- (b) Mixtures of contacts and systemics
- (c) Translaminars
- (d) Mixture of translaminars and contacts

See the latest Crop Report for a list of Potato fungicides - <http://www.client.teagasc.ie/tillage/crop-report/index.asp>

### Burning off

Kerr's Pinks and several other varieties are very susceptible to blight, and should be sprayed with a chemical defoliant (burned off) no later than the stage when 5% of the foliage is blighted. Records, Golden Wonder and other varieties which have less susceptible tubers may be burned off at a later stage without increasing the risk of infections.

Burn off at least 3 weeks before harvest to prevent tuber infection. If regrowth occurs apply a fungicide to protect it against blight.

### Black Scurf (Stem Canker)

These two names refer to two different phases of the disease caused by (**Rhizoctonia solani**). Black scurf refers to the dark brown or black encrustations which are found at the end of the growing season and in storage on the surface of the tubers. On ware potatoes they may detract from the appearance of the tubers but are much more serious on tubers kept for seed. In severe cases of black scurf, the tips of the sprouts are killed in the sprouting house causing side sprouts to develop which may in turn be attacked and killed. Soon after planting, the fungus infects the young sprouts and kills their tips. Usually new sprouts will develop but this results in delay and uneven emergence and slow bulking of the new crop.

Infected emerged stems bear brown lesions. There is a constriction in the stem at soil level and aerial tubers are usually produced. Leaves on infected plants have an upcurled appearance.



Black Scurf



Stem Canker

### Black Scurf

### Stem Canker

Chemicals available for the control of Black scurf and Stem Canker include **pencycuron (Monceren)**. These chemicals are both applied to the seed at planting time. Azoxystrobin (Amistar) can be applied to the soil at planting to reduce the incidence of the disease.





### Blackleg and Soft Rot

This disease is caused by a **bacteria** and occurs in two phases. The **tuber phase** is softrot and may result in varying degrees of disintegration of the tuber but usually complete rotting occurs. Rotting may occur prior to harvest or during storage particularly in crops harvested from wet soil under poor conditions or which were rained on immediately after harvesting. The other stages of the disease, known as back leg, is very important in the **growing crop**. Many tubers which appear healthy may in fact be carrying the bacteria. These tubers, particularly if planted in cold wet soils may rot completely, resulting in gappy emergence of the crop. Where the seed tuber does not rot, the crop may be at risk at any time during the growing season. Diseased plants appear stunted with yellow foliage and upcurled leaves.

Stems are easily pulled up to reveal a soft black rot starting at the old tuber and often reaching to soil level or above. Badly infected stems often collapse completely.

There is no cure for blackleg but varieties vary in their susceptibility to the disease.



*Blackleg in the tuber*



*Blackleg in the plant*

### Common Scab

Common scab is caused by soil bacteria (*streptomyces scabies*). When a tuber is attacked, loose corky tissue is produced on the normal smooth skin. These scabs can either form deep depressions into the tuber (pitted and sunken scab) to growths above the surface. The disease is strongly influenced by soil type and soil moisture. Only young active tubers are infected especially in dry conditions at high temperatures. Tubers are sound beneath the scales but considerable wastage is unavoidable in peeling.

**Control** - Use certified seed only. Maintain soil at a low pH. Irrigate dry or sandy soils for six weeks after tuber initiation. Good crop rotation is also of benefit. There is no chemical control.



*Common scab*

### Common scab

## Harvesting Potatoes

The objective of the harvesting operation is to lift the crop with the minimum of damage to the tubers prior to storage, and with the minimum amount of clay, dirt, stones etc.

The first stage in harvesting potatoes is to **desiccate** or “**burn-off**” the foliage (haulms). This is particularly important in crops for storage. In the case of crops which are being graded and sold immediately it is less critical. Crops lifted with immature or blighted foliage carry a high risk of rotting in storage.

### Burning off

Potato foliage and stalks need to be removed before harvesting to prevent blight infection of the tubers and to facilitate the passage of the harvester. Burning off also removes any weeds which would interfere with the working of the harvester.



**A desiccated potato crop ready for harvest**

Desiccation is the application of a special agrochemical designed to kill off the green foliage. The desiccant should be applied when the tubers have reached the desired size. Dig up tubers in different locations in the field to assess their size and make a decision. Allow a period of two to three weeks from the time of application of the desiccant to the start of harvesting.

This allows the tuber skins to mature and therefore be less prone to damage and disease at harvest time and in the store. Aim to harvest crops by mid - October, so that the operation can take place in relatively warm (7°C or greater) soils. Harvesting potatoes in cold wet soils will initially lead to a greater number of diseased and rotten tubers.

There are a range of chemical products on the market available for use as desiccants.

A number of the most popular products are based on the chemical **Diquat**, which works by contact and has limited translocation in the plant.

**Warning:** Haulm desiccants can damage tubers if applied during or shortly after dry periods. A “**dry period**” definition varies with soil and crop type, so read the product label carefully before use. Some varieties may also be susceptible to a particular chemical.





### Lifting and Harvesting

Healthy potatoes in the soil at harvest time are in perfect condition.

**Damage** to the tubers is caused by:

1. **Late harvesting** in November and December
1. Wide **tyres** encroaching on the ridges resulting in bruised and damaged tubers and the creation of clods.
1. Setting of the **digging share** either below or above the bed of tubers and excessive agitation of the webs of the harvester.
1. Worn and sharp edges on **machinery parts**.
1. **Allowing potatoes to drop** in height in excess of 20cm, thereby causing damage.

As much as 20% of tubers are damaged at harvest time. So it pays to follow the correct procedure to ensure losses are kept to a minimum.



**Harvesting potatoes**



# Question & Answer Section

***Q: What is the most popular potato grown and why?***

**A:** Rooster is by far the most popular potato grown in Ireland. Rooster occupies 55% of the total area of potatoes grown in Ireland. The reason its popular for the farmer is because: its locally bred (by Teagasc) and locally adapted, high yielding, good disease resistance, stores well, easy to grow.

From a consumers point of view; it has good flavour, floury, attractive skin finish, presents well when washed, with year round availability, versatility when cooking (boiling, baking, chips, mash, etc)

***Q: We grew 160 varieties of spud .. which one is your favourite and why?***

**A:** For me the new potato season starting with Home Guard followed by second earlies, Queens, with lashings of butter is the way to go... but everybody to his own taste.

***Q: I am growing potatoes for a number of years in the same position but they are not growing well over the past year, should I change the location of the potatoes?***

**A:** To grow high yields of healthy potatoes they must be grown in a rotation with other crops, i.e. they should be moved to a new growing position each year. Generally potatoes should not be grown in the same position for more than one year in four at a minimum with the more ideal being one year in seven. Growing potatoes too often in the same ground can lead to problems such as potato cyst eelworm, volunteer potatoes and carry over diseases such as blight can be an issue.

***Q: What are the supposed lower chemical requirements for control of blight? Organic can use zero chemicals for this.***

**A:** For any blight resistant potato (conventional or GM) the resistance will be challenged over time by evolving populations of blight. Use of low dose chemicals combined with varietal resistance seeks to reduce the chemical load on the environment while protecting and prolonging the useful life of the resistance in the variety.

***Q: I think I have blight in my potatoes but I am not sure. What does it look like and what do I do now?***

**A:** The root of the problem lies in the complex genetics of potato. It is a challenge to generate a potato variety that ticks the boxes of taste, floury texture and strong blight resistance; we know because Teagasc has been breeding potatoes for over 40 years. So for example, while S...arpo Mira has excellent blight resistance it unfortunately falls down in other traits. Now it has been proposed that GM can allow varieties that possess good post-harvest traits, to be supplemented with additional traits, such as blight resistance, which they may not have. But it is important to stress that we are not advocates of GM and the project is not about promoting one production system over another. Similarly, we have no intention of producing GM potatoes for market. On the contrary our goal is to investigate how blight responds to the novel sources of genetic resistance that are available from wild potato species. The GM line we are working with has only one such gene whereas Sarpo has up to 5 wild genes. We need to know how quickly blight will respond and the best way to do that is using the varieties that we have in the study. For any blight resistant potato (organic, conventional or GM) the resistance will be challenged over time by evolving populations of blight. Use of low dose chemicals combined with varietal resistance seeks to reduce the chemical load on the environment while protecting and prolonging the useful life of the resistance in the variety. These are all things we need to research further. If you wish to learn more about the AMIGA GM potato study please visit [www.gmoInfo.ie](http://www.gmoInfo.ie), where we have a comprehensive Q and A section that is constantly updated in response to public queries.

