



Reed Canary Grass

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Reed canary grass is a grass species native to Ireland which can be grown as an energy crop on marginal soils. The principal markets for the crop are electricity and heat production.

Introduction

Reed canary grass (*Phalaris arundinacea* L.) is a perennial grass which is naturally distributed throughout Europe and in temperate regions of North America and Asia. The grass is tall and leafy and in natural conditions is most commonly found growing along water margins. Reed canary grass (RCG) grows rapidly under Northern European conditions and has long been recognized as a crop with a high biomass potential. Interest in RCG as an energy crop began in Sweden in 1981 and it since been evaluated throughout Europe.

Reed canary grass has not been grown as a crop in Ireland. However, research work in the UK has shown that the crop can be grown throughout England and Scotland. This work has shown that RCG does well in more northerly latitudes although it does not appear to have quite the yield potential of other energy crops.

Growth

Reed canary grass can be grown from seed, once mature it reaches a height of 150-300 cm. It spreads underground by rhizomes approximately 1 cm thick, it can root to as deep as 3m. New shoots are produced from the underground rhizomes in early spring, typically in February or March. Flowers are produced in early summer after which the crop matures. The crop can be expected to remain productive for up to eight years after which its productivity declines.

Where it can be grown

Reed canary grass grows well on most types of soils, it is one of the best grass species for poorer soils and is very tolerant to flooding. It thrives particularly on wet humus rich soils where it gives the highest yields and best quality of biomass, heavy clay soils are less suitable for establishment and early growth. It is more drought resistant than many other grass species even though it grows naturally in wet places. Optimum pH is 6-7.

Sowing

Seedling establishment is the most critical stage in the maintenance of a good RCG stand. Best stands are obtained when seed is sown not deeper than 1-2 cm into a well prepared, firm seedbed.

Rolling before and after sowing is highly recommended. Seed is typically sown in rows 12.5 cm apart, recommended seeding rate is 15-20 kg ha⁻¹. Best time to sow is May. Varieties which have shown promise include bamse, chiefton and palaton.

Weed control

Seeds of reed canary grass are generally rather slow to germinate and weed competition can be a problem in the first year. From the second year on, weeds are less of a problem as established stands are more competitive and the early growth pattern of reed canary grass tends to suppress weed competition.



A contact herbicide (glyphosate, paraquat) should be applied in the autumn before sowing and again several weeks prior to sowing. After sowing, broadleaf species can be controlled with common herbicides. Herbicides which have been used on reed canary grass include: chlorpyrifos, dimethoate, mecoprop-P, bromoxynil and fluroxypyr. Grass weeds can be suppressed by mechanical mowing just above the reed canary grass seedlings.

Fertilisation

Like other energy crops the response to fertiliser is variable and appears to depend on soil fertility to a large extent. Reed canary grass does appear to have greater nutrient requirements than other energy crops particularly with regard to nitrogen. Best advice is to

- Maintain P & K levels in the soil
- Use N sparingly in the first year to avoid stimulating weed competition
- Apply N in year 2 onwards at 60-100 kg N ha⁻¹

Pests and diseases

Reed canary grass can be attacked by the larvae of various insect species, the larvae kill the stems by feeding inside their base. This damage can occasionally cause significant yield reductions. Double lobed moths and fritflies have both been associated with stem damage in reed canary grass. Aphids and leaf miners can also attack reed canary grass. Significant insect damage has been reported in UK trials with subsequent effects on yield. Grazing by rabbits and slugs may also be a problem particularly in the establishment year.

Diseases have been reported on reed canary grass although not at levels which might cause concern. Brown rust, mildew, buff spot, powdery mildew and *rhynchosporium* have all been reported on reed canary grass.

Harvest

Reed canary grass can be harvested with conventional grass harvesting machinery. The crop is typically mown first before being baled. Energy crops are typically left in the ground over the winter period and harvested the following spring. The over-winter period allows crops to dry avoiding the need for expensive artificial drying. Combustion quality also improves over the winter period. The optimum harvest time is different for reed canary grass compared to other energy crops. Reed canary grass should be harvested before spring. Earlier harvest date confers an advantage as supply of biomass from energy crops will not be confined to one part of the year.

Reed canary grass can be expected to reach full yield potential in the second or third year after sowing whereas switchgrass and Miscanthus can take four to five years to reach full yield potential. Dry matter yield, however, is lower than other energy crops (<7t DM/ha) and productivity can be expected to decline after seven years or earlier.

Problems

Lodging can be a problem in reed canary grass crops and can affect biomass yield. There are differences in the degree of lodging between varieties although crops appear to be able to recover from mild lodging.

Insect pests can be problematical on reed canary grass crops. Pests cause damage by feeding inside the base of the stems, killing the stems. In many cases damage can be slight although in UK trials up to 50 per cent of stems have been damaged by insects with a subsequent effect on yield.

Although native to this country, reed canary grass is an invasive species and can spread to adjoining fields where it can be difficult to control. Surrounding fields should be monitored on a regular basis to check for the presence of reed canary grass volunteers.

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Two approaches can be used to control volunteers in cereal crops. Herbicides used to control grass weeds in cereal crops can be used. Alternatively, a broad spectrum herbicide can be applied after the cereal crop has been harvested. Control in pasture is more difficult, cutting and mowing to prevent flowering is possibly the best strategy to prevent flowering and further spread.

Markets

At present, the production of electricity and heat are the largest potential markets for reed canary grass. The government has set a target that 30 per cent of peat burned in the three peat fired power stations will be replaced by biomass by 2015. This will require growing approximately 80,000 hectares of energy crops which could include reed canary grass. The crop can be burned to produce heat or electricity, its combustion characteristics are similar to miscanthus although ash content can be higher. Other potential uses include chemical processing into pulp and as a feedstock for biofuel production.

Conclusions

Reed canary grass is an energy crop which offers alternatives to other energy crops such as Miscanthus and willow. Biomass yields on mineral soils are unlikely to be as high as other energy crops and unit production costs will be higher. However, reed canary grass grows well on poor, wet soils on which other crops will struggle. Additionally, its earlier harvesting interval facilitates a greater year around spread in biomass supply. Consequently, it occupies its own niche and should offer growers an alternative on poorer soils. Reed canary grass has not been grown in Ireland although it has been grown successfully throughout the UK and north west Europe.

Reed canary grass is easier to establish than other other energy crops although good seedbed preparation and timely weed control is still necessary during the establishment phase. The crop will take two to three years to reach full yield potential which can be expected to be 5-7 tonnes of dry matter per hectare. Reed canary grass can remain productive for up to eight years after establishment. Insect pests and lodging can be problematical affecting biomass yield in some cases. Harvesting can be carried out with conventional grass harvesting equipment.

Supplying biomass to the peat burning power stations is the largest potential market for reed canary grass at present. Pellets for heat production can also be produced from reed canary grass.



Reed canary grass after mowing