

# Peas

## VEGETABLE CROPS PRODUCTION GUIDE

### FOR THE ATLANTIC PROVINCES

*Prepared by the ADVISORY COMMITTEE ON VEGETABLE CROPS*

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#### **Introduction**

The pea is a member of the Leguminosae (legume family). *Pisum sativum* originated somewhere in the Eastern Mediterranean region and Near East. In Switzerland seeds have been found dating back to about 7000 BC. This crop was grown by the Greeks and Romans. In England it was an important crop in the 11th century. During the course of cultivation some became grown as a vegetable, some for seed and some for fodder. More recently edible podded types have been developed. Peas are viny annual herbs being either determinate (bush type) or indeterminate (climbing type).

Minimum germination occurs at soil temperatures in the 4 to 6 C range, optimum germination occurs at 16 C to 18 C. High soil temperatures lead to poor emergence. The best growth occurs when air temperatures are in the 15 to 18 C range. High summer temperatures at flowering time are detrimental and cause yield reduction. It is, therefore, important to plant early so that maturity is reached for most of the crop prior to high summer temperatures. Pea maturity is closely related to the number of growing degree days above 5 C accumulated from planting time. Cultivar differences range between 1200 to 1800 degree days. Before bloom, the crop can withstand some frost but the flowers and pods are susceptible to freezing conditions. A regular water supply promotes high yields but excessive rainfall induces root rot.

Peas require fertile and well drained soil. Sandy loams and loams well supplied with organic matter are best suited. Fields with excessive slopes should be avoided since peas do not offer much protection against soil erosion early in the season.

Pea seeding occurs from early April to late May. Harvesting for early and processing markets begins in early July. Yields vary between 2200 and 5500 kg per hectare, on a shelled basis and 4400 to 8800 kg per hectare on an unshelled basis.

Presently peas are grown for processing, fresh wholesale and direct to consumer markets.

Markets are potentially available for production of specialty crops, like edible podded peas. These markets are limited due to the requirement for handpicking though the market demand is high.

*Nutrient Content:* Excellent source of thiamine; good sources of Vitamin A and C, and folate, plus several minerals including iron, calcium and potassium. A 250 mL (1 cup) serving provides 121 kilocalories.

## **Crop Establishment**

**Seed Treatment** - Inoculate the seed with a commercial Rhizobium culture where no application of bacteria has been made to the field in the past or where the nitrogen application is low.

**Seeding/Planting** - Seed as early as possible. Seedlings are frost resistant. The market season can be extended by a succession of seedings of one cultivar, or by seeding early, mid-season, and late cultivars at about the same time. The latter method is better since early cultivars do not yield well when sown late. Processing companies schedule seeding on the basis of heat units. Depending on the moisture, seed peas from 1 to 4 cm deep. Largest yields result from rows sown 17 cm apart and 5 cm apart within the row. This may be less convenient in market garden crops. Such spacings require 250 to 400 kg per hectare, depending on the seed size and percentage of germination. Light rolling firms soil around the seed and encourages quick uniform germination. It is also necessary for mechanical harvest as it presses stones into the soil. It also levels the soil surface in preparation for application of herbicides.

## **Crop Management**

**Irrigation** - may be practical on this crop and significant yield increases may result from timely application. Field selection is critical in this crop as disease control by rotation must be accomplished. Choosing suitably drained fertile fields is also essential. Heavy rolling or packing is likely to reduce fertilizer uptake and pea root nodulation, and to increase the number of plants affected by root rot.

## **Nutrition**

ALL ADDITIONS OF LIME AND FERTILIZER OR MANURES SHOULD BE BASED ON RECOMMENDATIONS FROM A SOIL TEST.

Peas are generally considered to be a low fertility crop which do well on a fertile soil. Peas which receive granular fertilizers tend to remain in the fancy grades longer than in those crops that are poorly fertilized. Moderate amounts of manure may be used but avoid high applications.

**Lime** - Lime must be applied to maintain the soil pH in the range 6.0 to 6.5. Yield response to lime is high with this crop.

**Nitrogen** - Sufficient nitrogen keeps peas immature and results in peas remaining in fancy grades

longer than on poorly fertilized soils. Low rates of nitrogen are required. When no phosphorus and potash is recommended then nitrogen also may be omitted.

**Phosphorus** - Usually some phosphorus is required in relatively small amounts.

**Potash** - This can be applied before planting and disked into the soil. Otherwise it must be banded far enough from the seed so that fertilizer burn does not occur.

**Calcium** - Limestone banded with the seed on low pH soils may be applied at 330 to 440 kg per hectare to potentially increase yields.

**Sulfur** - On soils low in organic matter and heavily cropped consider the application of gypsum.

**Fertilizer Application** - Either broadcast fertilizer and seed separately to avoid burning the seed or band 5 cm below and 5 cm to the side of the seeded row.

## **Pests and Pest Control**

### **Weed**

There are several effective preplant incorporated, preemergence and postemergence herbicides available for use on peas. Preemergence treatments provide good control of annual broadleaf weeds. When a heavy annual grass infestation is anticipated a preplant incorporated treatment should also be used. Postemergence treatments are available for both grass and broadleaved weed control. The timing of postemergence treatment is critical for the control of some species and control may be poor if applications are not properly timed.

### **Diseases**

#### **Damping-off (fungi)**

**Characteristics:** Damping-off occurs in seedlings which may topple over and die because of decay at the soil line. Surviving seedlings may be stunted because of a rot on the roots. Damping-off tends to be more severe when soil moisture is high and soil temperatures are in the range of 18 to 24 C.

**Control:** Control is improved by planting seeds of high vigor.

#### **Root Rot (fungi)**

**Characteristics:** The taproot shows various surface discolorations of reddish brown or dark brown and smaller roots may be rotted away.

**Control:** Root Rot is caused by a complex of several soil borne organisms. It is present in every soil and nearly all plants have some degree of root rot. In seriously infected fields long rotations

of 6 years or more are necessary. Pea refuse should always be placed in areas where peas will not be grown. Any pea refuse left on the field should be turned under deeply by fall plowing. Plant only on well drained, well fertilized soils. No resistant cultivars are available and there are no feasible chemical controls. An adequate supply of nutrients and moisture may enable infected plants to stay alive and produce an acceptable, though reduced crop. Green manures are beneficial in the rotation to reduce the potential of root rot.

### **Botrytis Rot or Gray Mold (fungus)**

**Characteristics:** This fungus may cause severe defoliation of the lower leaves and rotting of the stems in wet seasons. Infected leaves appear fuzzy and shrivel as the infection progresses. Tips of young pods are attacked which develop small tan water-soaked lesions. These spots expand and destroy the entire pod.

**Control:** Plant on well drained soils. Plow down refuse immediately following harvest. Don't over fertilize with nitrogen.

### **Sclerotinia Rot (fungus)**

**Characteristics:** Watery lesions develop on any plant parts that are not exposed to air circulation. A fluffy white growth develops and affected areas become slimy.

**Control:** Plant on well drained soil not recently used for soybeans, clover, beans, lettuce, tomatoes, carrots, parsnips, cucumbers, celery, or cabbage. Practice a 3-year rotation. Serious losses result when susceptible crops are grown for several consecutive years. Do not apply excess irrigation. Cultivate and pick when plants are dry. Avoid fields with a history of Sclerotinia. Plow plant refuse down immediately after harvest. Do not over fertilize with nitrogen.

### **Pod Spot and Ascochyta Blight (fungi)**

**Characteristics:** Symptoms develop on stem, roots, leaves and pods. Black to purplish streaks on stems reaching from the root zone to about 25 cm up the stem. Leaf spots are gray-purplish. Pod spots are gray-purplish and are sunken.

**Control:** Use disease free seed. In the absence of disease free seed, severely infected seed should be held over. The level of infestation drops to one-third of its original level when seed is held over for one year. Pea refuse should be disked and plowed under immediately after harvest.

### **Mosaic and Streak (viruses)**

**Characteristics:** Virus diseases are transmitted by aphids. Symptoms include misshapen, discolored leaves, stems and pods.

**Control:** Use disease free seed. Resistance is bred into many cultivars.

## **Insects**

### **Seedcorn Maggot**

**Characteristics:** The larva (maggot) of the seedcorn maggot is 5 mm long and pale in color. The damage is caused by the maggot burrowing into the seed, often destroying the embryo. Damaged seed will either not germinate or produce a deformed plant. One generation may be as short as three weeks. The adult seed corn maggot fly deposits her eggs on the seed or plantlet. Seed corn maggot are attracted to soil where there is an abundance of decaying vegetable matter or manure. Cool wet weather that delays germination is favourable to seed corn maggot.

**Control:** Plant as shallow as needed in a well prepared seedbed. Early germination is necessary to get good plant stands and prevent injury. Later planted crops are not as susceptible to this pest. Good weather conditions are necessary to completely control the pest. Avoid planting susceptible crops in fields very recently manured. Chemical seed treatment is essential.

### **Pea Moth**

**Characteristics:** The small brown Pea Moth emerges about the time the peas are in bloom. Eggs are laid singly on the pods and plant parts. The tiny larva enters the pod after hatching. The larva feeds on the developing peas inside undetectable from the outside. The fully grown larvae overwinters in a silken cocoon in the soil. They are not usually a problem in commercial fields.

**Control:** Early planting of peas will avoid the egg laying period. After harvest remove vines or deep cultivate. Insecticide may be applied at first bloom.

### **Aphids**

**Characteristics:** Aphids are small, soft-bodied, slow-moving insects. They are often found in large colonies on the undersurface of leaves. A colony consists of winged and wingless adults and various sizes of nymphs. Aphids may be black, yellow or pink, but mostly are various shades of green. Aphids feed by sucking plant sap. Saliva injected while feeding may carry plant viruses or may be toxic to the host plant. Feeding by large numbers discolors foliage, curls leaves and damages developing buds. The plants may be covered by a sticky substance, called honey dew, which is excreted by the aphids.

**Control:** The Five-Spotted Lady Beetle and the Seven-Spotted Lady Beetle are helpful predators of aphids. Apply an insecticide only when aphid population is high.

SPECIFIC CHEMICAL CONTROLS FOR THE VARIOUS CROP PESTS DISCUSSED ARE FOUND IN "GUIDE TO PEST MANAGEMENT" FOR VEGETABLE CROPS.

### **Harvesting and Handling**

**Processing Peas:** Approximately three weeks following full bloom, peas are ready for harvest.

Quality of peas deteriorate with maturity. Hot dry weather during harvest speeds up maturity without corresponding increases in yield. Soils adequately supplied with nitrogen and/or organic matter result in increases in yield and mature less rapidly than those lacking sufficient amounts of these nutrients. For this reason peas produced on fertile soils remain at peak quality for a longer period, thus providing a greater opportunity for orderly harvest of peas.

Transportation to the processing plant and processing should be immediate so this limits distance peas can be grown from the processing plant.

**Green Peas:** The pods are harvested when they are well filled, but still succulent, before they harden and fade in color. The peas should not be hard and starchy. Peas are best picked and shelled just before cooking as the sugar content decreases rapidly after harvest. Two or three pickings are made as all the pea pods do not mature at the same time. The pods should be carefully pulled from the vine to prevent the plants from being uprooted. At the last harvest, the plant may be pulled up and all the pods picked.

**Edible Podded Peas:** These peas are picked when the pods are long and the peas just developing. Pods, three to five inches long, are produced five to seven days after flowering, and the pea seeds are slim and small. Pods need to be picked every other day to prevent them from developing large seeds and fibrous pods. If the seeds develop, they may be used similar to garden peas.

### **Storage and Conditioning**

Unshelled peas can be held a week or two if cooled to 0 C immediately after harvest, and held at 0 C with a relative humidity of 95%. Peas can be hydrocooled or wetted and vacuum cooled to remove field heat. Package ice is effective in keeping peas cold and minimizing wilting.

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(See also General References)

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