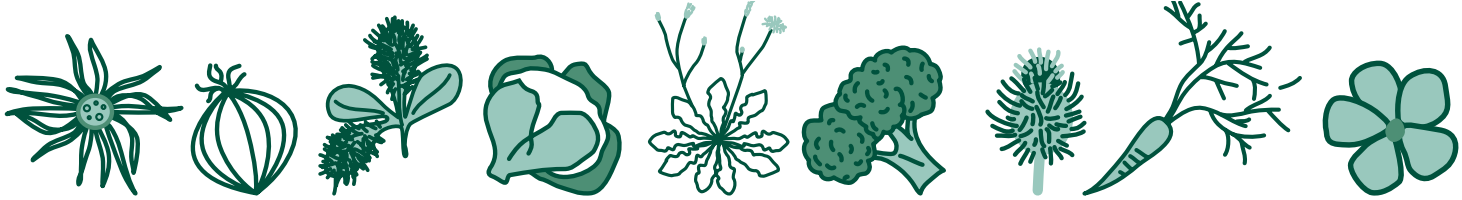
COMMON VEGETABLE WEEDS



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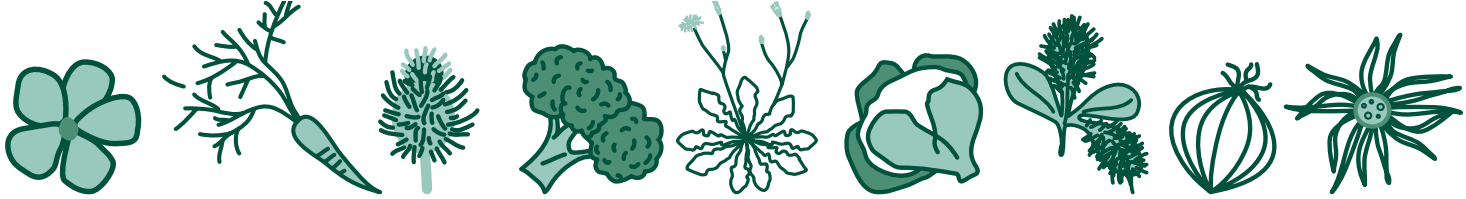


Common weeds in vegetable crops

This section should be used as a basic introduction to weed identification and weed management. It was not possible to cover every weed of importance to the vegetable industry in this manual. However, at the end of the manual you will find useful references and links to other weed related information. Your local rural adviser should be able to provide more information regarding the management of specific weeds.

What is a weed?

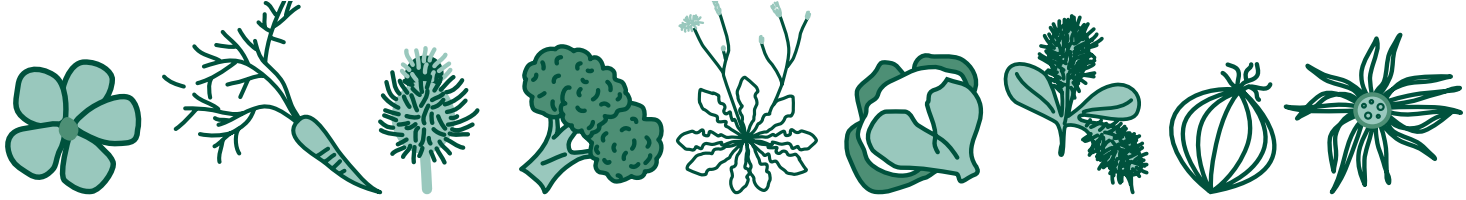
The term 'weed' has long been used to refer to plants that are causing a nuisance in a particular situation such as food crops, gardens or the natural environment. A plant can be a weed in some situations and not in others. For example, potatoes grown as a crop are not regarded as weeds by the grower, but volunteer potatoes in subsequent years and crops are classed as weeds. There is no single definition, but for the purpose of this manual a weed is 'a plant growing where it is not wanted'.

In most row cropping situations there are two weed management challenges:

- Inter-row weeds - weeds that grow in the space between the rows (Figure 5.1).
- Intra-row weeds - weeds that grow between the crop plants within each row (Figure 5.1).

Various tools and techniques can be used to effectively manage both inter-row and intra-row weeds.

Figure 5.1 Inter-row and intra-row weeds in a carrot crop.



IWM tools and techniques

Integrated Weed Management (IWM) tools and techniques fall into three main categories:

- Preventative
- Competitive
- Direct control

The most important management tool in an IWM strategy is preventing weeds from becoming a problem in the first place. This is done by planning ahead and putting in place management tools to minimise the risk of weeds becoming a problem during the growth of the crop. Various techniques can be used to improve the competitiveness of the crop so that it shades or outgrows the weeds. When weeds do become established in the crop, a range of other techniques can be used to directly reduce the weed population. These include physical, biological and chemical approaches.

The most important management tool in an IWM strategy is preventing weeds from becoming a problem in the first place.

Preventative techniques

Site history and mapping

Knowing what weeds grow on your property is essential when implementing an integrated weed management strategy. Farm mapping is a useful tool for developing an informative picture of where your greatest weed risks are located. A farm map with weed risk information will allow better planning of crop rotations to minimise weed competition, or strategic management of infested areas using targeted cultivation, grazing or spraying.

Farm hygiene and quarantine

Weed seeds spread easily with the movement of vehicles, farm machinery, people and animals. A wash down facility to remove soil and weed seeds from vehicles and farm machinery is an essential component of a farm hygiene strategy. Diligent cleaning of vehicles and farm machinery will prevent soil and weed seeds (as well as soil borne diseases) from entering or leaving your property.

Crop rotation

This can assist with weed management by varying the crop competition, and by allowing the use of different herbicides to reduce the risk of herbicide resistance developing.

Knowledge

A basic understanding of the growth habit of weeds and how they interact with the crop can greatly enhance weed management. The growth cycle and habit of the weed plant, and how it interacts with the crop plant, will determine the most effective combination of control techniques to be used. Figure 5.2 gives examples of weeds with different life cycles.

Weed Lifecycle	Description	Example
Summer annuals	Seed germinates in spring	*Chenopodium album* (fat hen) *Amaranthus powellii* (Prince of Wales feather)
Winter annuals	Seed germinates in autumn/ winter	*Cerastium glomeratum* (chickweed) *Capsella bursa-pastoris* (shepherd's purse)
Biennials	2 year life (year 1- vegetative, year 2 - flowers and seeds)	*Senecio jacobaea* (ragwort)
Perennials	Lives for many years, multiple seeding seasons	*Cirsium arvense* (Californian thistle)

Figure 5.2 Examples of lifecycles of different weeds.

Competitive techniques

Cover crops

Cover crops can be used to suppress weed emergence, establishment and seeding (Figure 5.3). Depending on the crop, they may be planted between the crop rows, or over the entire crop area, with the crop sown directly into the mulch cover. Cover crops are very effective in suppressing weed growth. Cover crops also improve soil structure and health, and prevent erosion (refer to Section 2 of the manual). In some cases (eg vegetables following cereals) it may be possible to retain the stubble from the cereal crop to help with weed suppression.

Figure 5.3 A rye corn cover crop in broccoli

Planting density

Increasing plant density through a higher sowing rate, or a different arrangement of row spacings, may restrict the amount of sunlight reaching the soil surface and therefore prevent the emergence or restrict the growth of weeds.

Crop variety

Crops that grow quickly and rapidly to produce a large plant biomass are less susceptible to weed infestations. Shading effects from large crop plants can be very important in restricting the emergence and growth of weeds in the crop.

Transplants

Using transplants is an advantage in controlling intra-row weeds. Transplants may be planted into a stale seed bed that has been cultivated to remove weeds. In addition, transplants are already more advanced in their growth and are therefore able to compete more effectively against newly emerged weeds.

Allelopathy

Some plants exhibit allelopathic effects. They produce and release natural chemicals that prevent the growth of other plants, such as weeds. Rye corn, oats and barley are thought to have allelopathic effects, and can be grown in conjunction with the crop to suppress weed growth.

Transplanted vegetable crops such as brassicas, and large seeded crops such as pumpkins are more likely to tolerate being planted in to allelopathic cover crops. Small seeded crops like onions and carrots may not be as tolerant.

Direct control

Mulches

Weeds can be physically excluded from the crop using artificial or organic mulches on the soil surface (eg. plastic films, paper, fleece, organic materials such as pyrethrum marc or bark mulch).

Tillage

A range of tools and techniques exist for mechanical control of weeds, particularly in row crops. Tools that are used to varying degrees include finger weeders, torsion weeders, brushweeders, hoes, ticklers and modified rotovators. Physical weed control implements are used to remove weeds during the early stages of growth, and significantly restrict the ability of weeds to establish and grow. The timing of mechanical weed control operations is critical for a number of reasons. Good knowledge of weed lifecycles and growth habits is important in planning mechanical control strategies. Soil conditions (moist, dry etc.) can be critical in determining the success of many mechanical weeding operations. The relative growth stages of the weed and the crop are also very important. Generally, mechanical weeding operations are best done when weeds are small. If crop plants are also small, they are less prone to damage from the weeding equipment. On the other hand, it is an advantage in some crops for the crop plants to be larger, particularly if the weeding operation relies on moving soil into the crop row to smother intra-row weeds, or working implements close to the row. There is always a risk of damage to the soil, such as compaction or erosion, with the use of mechanical weeding operations. Therefore mechanical weed control should be managed with soil effects in mind to minimise any undesirable effects.

Figure 5.4 Flaming is accepted as a method of non-chemical weed control

Flaming

Flaming is gaining acceptance as a method of non-chemical weed control in situations where it is desirable to avoid tillage. The technique kills weeds by applying sufficient heat to disrupt cell structure and destroy plant tissue. Flaming can be used prior to planting instead of tillage, but its greatest advantage comes as an alternative to non-selective knockdown herbicides in post-plant/ pre-emergence weed control operations. Flaming just prior to emergence can be very effective in reducing weed pressure in newly emerged crops. Some crops (eg. onions) can tolerate a degree of flaming, allowing control of small weeds with the use of post-emergence flaming. See Figures 5.4 and 5.5.

Figure 5.5 The beds on the left have been flamed, the right side has not

Herbicides

The most widely used weed management tool is chemical control with the use of herbicides. Herbicides are divided into two broad categories - selective and non-selective herbicides. Selective herbicides are suitable for use on certain crops to enable weeds to be controlled without affecting the crop. Non-selective herbicides are more likely to be used in fallow and pre-emergent situations to kill all weeds without the risk of exposing the crop plants to the herbicide.

Common weed identification

ASTERACEAE FAMILY

Groundsel (*Senecio vulgaris* L.)

- Widely distributed throughout the State, but not a major problem.
- Occurs as a weed in waste areas and gardens.
- Germination occurs in autumn or spring.
- Leaves are somewhat succulent and are deeply and irregularly lobed. They develop singly, with early leaves having no hairs, but will later have many hairs on both sides of the leaf surface.
- The mature plant is erect reaching a height of 150-400 mm. The stems branch but are usually single stemmed.
- See Figure 5.6.

Figure 5.6 Mature groundsel plant

Scotch/Spear thistle (*Cirsium vulgare* Savi.)

- Located in all farmed areas in the State. Native to Europe, the Mediterranean area and Western Asia.
- Occurs in crops, pasture, waste areas and on roadsides.
- Reproduces from seed, which can be windblown over long distances.
- Germination occurs in autumn, although seedlings may be produced in all seasons if adequate moisture is available.
- Seedling produces single leaves 20-25 mm in length. Multi-cellular hairs appear on the upper surface where strong spines arise.
- The mature plant is erect reaching 1.5 m in height, with small, stout hairs and a mat of long, fine hairs arising from the stem. Leaves take on a 'spear' shaped appearance. They are 200-250 mm long with small, stout hairs on the upper surface. The lower surface is covered in a mat of fine hairs.

Figure 5.7 Scotch thistle seedling

Figure 5.8 Mature scotch thistle

- The flower is purple in colour and approximately 40 mm in diameter.
- See Figures 5.7 and 5.8.

Sow or Milk thistle (*Sonchus oleraceus* L.)

Figure 5.9 Sow thistle seedling

- Occurs in most parts of the State and is native to Europe.
- Is a weed of waste areas and sometimes in crops.
- Germination occurs in spring and autumn.
- The seedling has singly growing leaves with spines around the margin and a few scattered on the upper surface.
- The plant develops a rosette about 250 mm in diameter.
- The mature plant is erect in habit reaching a height of 1.5-2.0 metres.
- The stems are hairless with longitudinal red striations. Stem leaves are hairless and clasping.
- The plant secretes a milky substance when cut.
- The flowers are yellow, 10-15 mm in diameter and 20-25 mm long.
- See Figures 5.9 and 5.10.

Figure 5.10 Mature sow thistle

Prickly sow thistle (*Sonchus asper*)

Figure 5.11 Mature prickly sow thistle

- Occurs in all parts of the State and is native to Europe.
- It is a weed of wasteland areas and to some extent in many crops.
- Germination occurs in the spring and autumn.
- The leaves are stiff with margins also having stiff spines. The leaves grow singly, the first being 12-18 mm long. Some white hairs can occur on the upper surface of the leaves, but leaves become hairless as the plant matures.
- The mature plant is erect in habit, reaching 1.0-1.2 m in height. The stems are hairless with some scattered purplish hairs towards the top.
- A milky latex is secreted when the leaves and stems are cut.
- The flowers are yellow.
- See Figure 5.11.

Californian thistle (*Cirsium arvense* (L.) Scop)

- Occurs in all farming areas across the State, but not as common in dry areas such as the midlands. Most prolific in high rainfall areas of the north-west, north-east and in the south.
- Occurs in pastures, cropping land, roadsides and waste areas. Difficult to control and competes with crop growth, occasionally interfering with harvest operations.
- Seedling produces early leaves about 15-20 mm long with short, merging petioles.
- Plant develops a rosette 20-30 mm in diameter.
- Mature plant grows in an erect habit with branching stems. Stems have a pithy core and a polygonal cross section.
- Flowers are terminal and composite, long, narrow and strongly scented.
- Root system is quite extensive in certain situations where the ground is not disturbed. Extent and depth of the root system may impact on control of techniques required.
- See Figures 5.12 and 5.13.

Figure 5.12 Californian thistle flower

Figure 5.13 Californian thistle rosette

GERANIACEAE FAMILY

Common Storksbill (*Erodium cicutarium* L.)

- Found in all parts of the State. Native to Eurasia.
- A weed of waste lands, crops and pastures.
- In crops it germinates in spring through to summer where moisture is present.
- The seedlings have singly arising leaves with single hairs on the surface. The plant develops a rosette with a diameter of about 400 mm.
- The mature plant is semi-erect in habit with stems branching from both the base and along their length. Hairs are also present.
- Stem leaves have a blade approximately 400 mm in length with single hairs.
- The flowers are 8-12 mm in diameter with five pinkish-purple petals.
- See Figures 5.14 and 5.15.

Figure 5.14 Common storksbill foliage

Figure 5.15 Common storksbill flower

CARYOPHYLLACEAE FAMILY

Figure 5.16 Mature spurry plant

Spurry (*Spergula arvensis* L.)

- Common weed throughout the State and important weed in cereal and vegetable crops. A native of Europe.
- Frequent weed in pastures and can be competitive.
- Germination occurs in spring and autumn and in summer on irrigated land.
- The young leaves are about 20 mm long and less than 0.5 mm in diameter. The first leaves have some hairs.
- The plant doesn't form from a rosette.
- The mature plant is erect in habit. Stems reach 400 mm in length and branch from the base and along their length.
- Flowers are made up of five white petals that are sweetly scented and 8-12 mm in diameter.
- See Figure 5.16.

Figure 5.17 Chickweed seedling

Chickweed (*Stellaria media* (L.) Villars)

- Occurs in all parts of the State. Native of Europe and Asia.
- Common in waste areas and can be a competitive weed in many crops.
- Germinates in autumn and spring and if there is sufficient moisture it will continue to germinate through the summer months.
- The leaves have few or no hairs except on the margin at the base.
- Seedling leaves grow in pairs and are 10-20 mm long.
- The plant often has a sprawling, spreading habit as it matures.
- Flowers have five deeply bisected white petals, are terminal or auxiliary on a long stem and about 6 mm in diameter.
- See Figures 5.17 and 5.18.

Figure 5.18 Chickweed plant

BRASSICACEAE FAMILY

Indian hedge (*Sisymbrium orientale* L.)

- Occurs in all parts of the State and is native to Asia and Europe.
- Common weed in wasteland areas, orchards and arable crops.
- Germination occurs in spring and autumn.
- The young leaves grow singly in a blade shape reaching 8-12 mm in length.
- The leaves elongate and become lobed as the plant matures and have longish hairs.
- The mature plant is erect in habit, reaching a height of 1.0 m or more.
- Stems are branched and have scattered hairs. The leaves have fine hairs on the upper and lower surface.
- The flowers are made up of 4 yellow petals.
- The seed pods reach about 120 mm in length and are attached to the stem of the plant.
- See Figures 5.19 and 5.20.

Figure 5.19 Indian hedge seedling

Figure 5.20 Mature Indian hedge plant

Wild radish (*Raphanus raphanistrum*)

- Found in most parts of the state and is native to the Mediterranean region.
- Mostly found in waste areas, crops and young pastures. Very competitive weed and one of the most important weeds in Tasmania.
- Germination occurs from spring through to summer.
- The seedling has single hairy leaves. The plant gradually develops a rosette 200-400mm in diameter.
- The mature plant is erect in habit, reaching a height of up to 1 metre.
- The stems have strong downwardly directed hairs.
- The flower is made up of four narrow petals that are pale yellow, white or lilac in colour, and often have distinct fine veins.
- See Figures 5.21 and 5.22.

Figure 5.21 Wild radish seedling

Figure 5.22 Mature wild radish plant

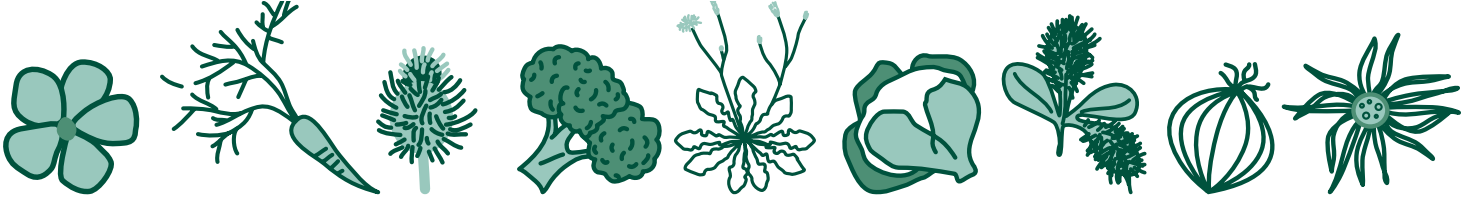


Figure 5.23 Wild turnip seedling

Figure 5.24 Mature wild turnip plant

Wild turnip (*Brassica rapa*)

- Found in most parts of the State, but not as common in the midlands.
- It's a major weed in all crops and is very competitive in young and low growing crops.
- Germination occurs in spring and continues through to summer when there is sufficient moisture.
- The seedling has single leaves. On the upper surface of the leaf a number of 'warts' appear in which short hairs arise. The plant develops into a rosette.
- The mature plant is erect, reaching a height of up to 1 m.
- The stems are hairless, with a solid pithy core.
- The flower is about 15 mm in diameter with four bright yellow petals.
- See Figures 5.23 and 5.24.

Figure 5.25 Shepherds purse plant

Figure 5.26 Shepherds purse plant

Shepherd's Purse (*Capsella bursa-pastoris*)

- Occurs in most parts of the State and is native to Europe.
- Common weed in arable crops and can become competitive in young crops.
- Germination occurs in autumn or spring.
- The young leaves are paired, have simple hairs and gradually grow singly becoming variable in shape.
- Annual erect plant growing from a rosette to a height of about 300 mm. Small heart shaped fruit are produced.
- Hairs occur along the length of the stem. The stem leaves are about 40 mm long with hairs on both sides of the leaf surface.
- See Figures 5.25 and 5.26.

LAMIACEAE FAMILY

Henbit (*Lamium amplexicaule L.*)

- Common in most parts of the State except the midlands. A native of Eurasia.
- Occurs in waste areas and in vegetable and cereal crops and can be competitive in seedling vegetables.
- Germination primarily occurs in spring but also in autumn.
- Cotyledon has a distinct semicircular notch at the base of the blade.
- The leaves are paired with hairs present on both sides of the leaf.
- The mature plant is erect in habit with stems up to 250 mm long which branch at the base.
- The flower petals are pinkish-purple in colour and form a distinct tube about 15 mm long.
- See Figures 5.27 and 5.28.

Figure 5.27 Henbit seedling

Figure 5.28 Henbit flower

POLYGONACEAE FAMILY

Curled dock (*Rumex crispus*)

- One of the two main dock species present in Tasmania, it is found in all parts of the State.
- Common weed in lucerne crops, orchards and irrigated crops and is a competitive weed in crops and pastures.
- Germinates in autumn and spring.
- Young leaves are hairless and gradually become more elongated and narrow with wavy edges as the plant matures.
- Mature plant is erect reaching a height of 1.2 m, with more than one stem arising from the established rootstock.
- See Figure 5.29.

Figure 5.29 Mature curled dock

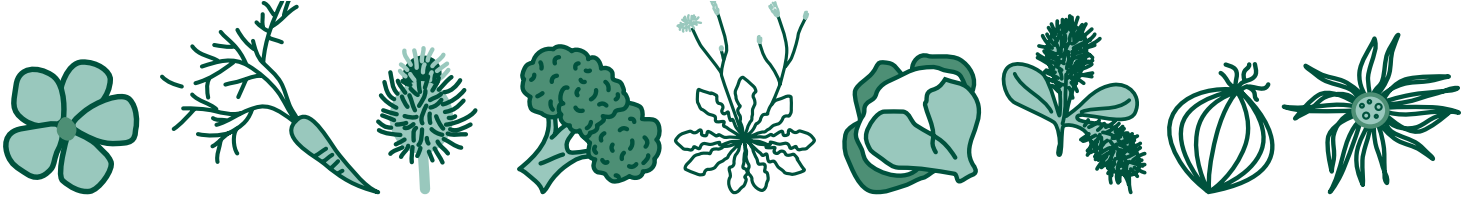


Figure 5.30 Broad leaf dock

Broad-leaved dock (*Rumex* spp.)

- Occurs in most farming areas throughout Tasmania as well as interstate. It is a native of Europe.
- Common on roadsides, waste areas and in pasture areas that are poorly drained or prone to high rainfall. It can become a competitive weed in pasture crops.
- Reproduces by seed which germinates in autumn or spring.
- Leaves develop singly, and are hairless. The leaves become elongated as the plant grows.
- The mature plant is erect reaching a height of 1.5 m.
- Flowers are produced in the upper branches, 2-3 mm in diameter. They are green at first then gradually turn red-brown and harden as the seeds develop.
- See Figure 5.30.

RUBIACEAE FAMILY

Figure 5.31 Cleavers plant

Cleavers (*Galium aparine* L.)

- Found in all parts of the State.
- Is a common weed in waste land and gardens, occasionally occuring in crops. Its climbing habit can interfere with harvesting.
- Germination occurs in autumn.
- Entire plant has a distinct sticky feel when touched.
- Mature plant has a scrambling and climbing growth habit.
- Stems are very branched and can grow to more than 1.5 m in length.
- Leaves have stout, hooked hairs on their surface and backwardly directed spines along the leaf margin.
- Flowers are white with four petals and are about 2 mm in diameter on a stem approximately 20 mm long.
- Fruit are produced in pairs. They are covered in tiny hairs and have a sticky feel.
- See Figures 5.31 and 5.32.

Figure 5.32 Cleavers foliage

FUMARIACEAE FAMILY

Fumitory (*Fumaria muralis*)

- Widely distributed across the State and is native to Eurasia.
- Common in red soils of the north-west and north-east.
- Major weed in cereal, arable, vegetable and forage crops.
- Germination occurs in spring and autumn and through summer on irrigated areas.
- Seedling is green-grey in colour with a slight purplish tinge.
- Leaves grow singly and are 15-30 mm long.
- Mature plant is semi-erect when small, becoming prostrate and scrambling as it grows.
- Stems are hairless and branched, reaching about 1 m in length.
- Flowers are 10-15 mm long, and pink with a blackish tip.
- See Figures 5.33 and 5.34.

Figure 5.33 Fumitory seedling

Figure 5.34 Fumitory flowers

AMARANTHACEAE FAMILY

Amarathus (*Amaranthus powellii*)

- Found in most parts of the state and is native to North and Central America.
- Can be a major pest in crops such as beans, peas, poppies and potatoes.
- It is primarily a weed of stockyards, waste areas and orchards.
- Germination occurs in spring.
- The seedling leaves develop in pairs, they are hairless, but have a few short hairs on the petiole. The leaves gradually develop into a kite shape. The plant doesn't form a rosette.
- The mature plant is erect in habit, reaching up to 1.5 m in height.
- The stem is reddish in colour and has fine sparse hairs on the upper stems.
- The lower stem leaves are about 70-90 mm in length and are hairless. The leaves developing at the top are shorter and more elongated.
- The flowers are packed tightly together into bristly, conical spikes. Each flower is green with five petals.
- See Figures 5.35 and 5.36.

Figure 5.35 Amaranthus foliage

Figure 5.36 Amaranthus foliage

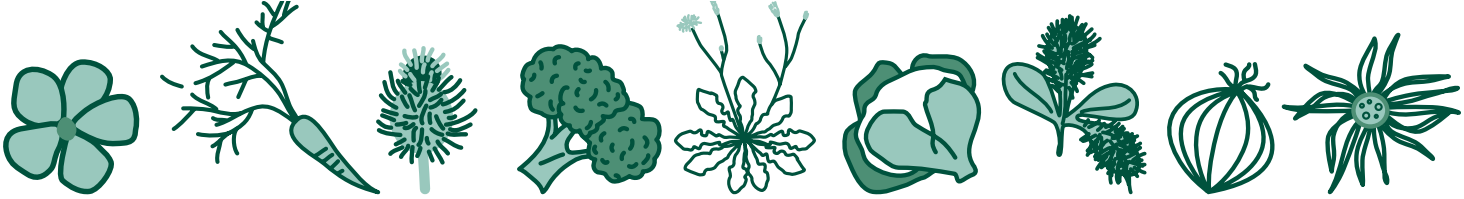


Figure 5.37 Fat hen seedlings

Figure 5.38 Fat hen plant

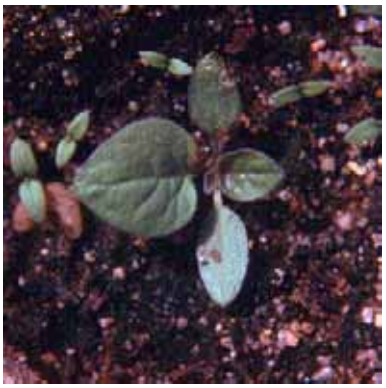


Figure 5.39 Blackberry nightshade seedling

Figure 5.40 Blackberry nightshade plant

CHENOPODIAC FAMILY

Fat hen (*Chenopodium album L.*)

- Occurs in most parts of the State and is a native of Europe.
- Is a major weed in cereals and arable crops and can become very competitive during the establishment of pasture and legume crops.
- Germination occurs in autumn and spring and continues through summer in irrigated areas.
- The leaves on seedlings and young plants are paired, with pairs at right angles to each other.
- The first leaves are 15-20 mm long with a petiole approximately 5 mm long.
- Leaves gradually develop lobed margins.
- Mature plant is erect, growing to a height of 1 m or more.
- Stem leaves are about 100 mm long, hairless and grey-green in colour.
- Flowers are terminal and clustered together, about 2 mm in diameter, five lobed and green.
- See Figures 5.37 and 5.38.

SOLANACEAE

Blackberry nightshade (*Solanum nigrum*)

- Common in southern and northern parts of the State but is less common throughout the central Midlands.
- Major pest in crops such as peas, beans, poppies and potatoes. Can contaminate crop at harvest, in particular peas.
- Germinates in spring.
- Erect bushy plant growing to a height of about 1 m.
- Leaves are about 60 mm long in the blade, with a petiole of about 20 mm.
- The flowers are 8-12 mm long with five white petals.
- The fruit are round, dark and about 3-6 mm in diameter.
- See Figures 5.39 and 5.40.

Rope Twitch (*Agropyron repens*)

- Found in most parts of the state. Originally introduced from Europe.
- Troublesome weed in horticulture and agriculture production. It is widespread in intensively cropped areas.
- Produces an extensive root system that produces several underground stems called rhizomes. Rhizomes may be several metres long.
- Shoots and roots develop along the length of the rhizome.
- Leaves are light green in colour with leaf blades ranging from 50 mm-250 mm in length and 60 mm wide.
- The inflorescence consists of spikelets 10-20 mm long, each with between three and eight florets. The spikelets are arranged alternately in two rows, one on each side of the stem.
- See Figures 5.41 and 5.42.

Figure 5.41 Twitch plant and roots

Figure 5.42 Mature twitch plant