

## Practical Weed Management

### Why control weeds?

- Protect yield and quality
- Maintain ease of harvest
- Prevent problems in following crops
- Reduce the spread of pests and diseases
- Lower crop contamination risks e.g. ragwort, black nightshade, and buttercups are poisonous
- Pride in growing the crop

### Weed control options

- Rotation: particular weeds are easier to control in some crops
- Cultivation: destroying weeds often by burying them
- Hygiene: not transferring seeds on farm machinery
- Hand removal (Roguing): costly, but the only option for some crops
- Increased crop competitiveness: such as under sowing with cover crops
- Chemical: general herbicides (pre or post emergence or planting)
- Mechanical control: including down-row/inter-row or in-row weeders

### Cultural control options

- Ploughing: buries the weeds, but stimulates weed seeds in the seed bank
- Crop rotation, including fallow: allowing dormant weed seeds to germinate and be desiccated easily
- Spring cropping: this allows the control of spring weeds before crop establishment
- Delayed autumn drilling or planting: waiting until conditions are less favourable for weeds
- Stubble hygiene (plus non-selective herbicide): products like glyphosate
- Stale seed bed: cultivating and allowing weeds to germinate and treating them with glyphosate, so that drilling or sowing is into a weed-free bed
- Competitive crops and cultivars: quick growing varieties that can out-compete weeds
- In-crop cultivations: typically down-row/inter-row or in-row weeding

### Weed identification

- It is important to be able to identify weeds as chemical weed control products tend to be specific to individual plant families (examples given later).
- The effectiveness of chemical control strategies is higher when the plants are smaller i.e. large woody weed plants are much harder to desiccate.
- This means that identification of a weed plants first leaves (cotyledons) and their first true leaves is critical.
- Weeds can be categorised as either grasses (monocotyledons) or broadleaf weeds (dicotyledons).
- The next two sections will cover common grass and broad leaf weed identification.

## Grass weeds

- Wheat: auricles present (extends partly), often hairy
- Barley: auricles present (crosses over each other), no hairs
- Oats: auricles absent



Barley

Wheat

Oats

- Annual meadow grass:
  - Leaf folded in the stem
  - Leaves are light green
  - Have a curved tip and the undersides have a distinct central ridge



- Black-grass:
  - Twisted leaf blades with blunt tips (fine, smooth and shiny with a pronounced groove)
  - Lower sheaths are often red/purple as stems sometimes



- Sterile (Barren) Brome:
  - Leaves covered in fine hairs and pointed
  - Stem bases – stripy pyjamas



- Cock's foot:
  - Can grow tall and tussocky
  - Blueish-green in colour, with a coarse texture.
  - Flower head resembles the foot of a cockerel



**Broad leaf weeds**

Cotyledon shapes

Choose cotyledon shape

long & thin	oblong or oval	round or wide	notched	complex	none or stipule
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Wild Carrot



Fumitory



Shepherd's Needle

long & thin	oblong or oval	round or wide	notched	complex	none or stipule
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Cleavers



Crisp dock



Flixweed

Choose cotyledon shape

long & thin	oblong or oval	round or wide	notched	complex	none or stipule
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Daisy



Small Nettle



Cranesbill

Choose cotyledon shape

long & thin	oblong or oval	round or wide	notched	complex	none or stipule
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Mustard









Cleavers



Cranesbill

Choose cotyledon shape

					
long & thin	oblong or oval	round or wide	notched	complex	none or stipule
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>









Amsinkia



Storksbill

Choose cotyledon shape

					
long & thin	oblong or oval	round or wide	notched	complex	none or stipule
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



Vetch



Pea

First true leaf shapes

Choose leaf shape

Oval or oblong	Roundleaf	Needle	Wavy edged	Divided to the stem	Whorls
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Groundsel



Shepherd's purse

Choose leaf shape

Oval or oblong	Roundleaf	Needle	Wavy edged	Divided to the stem	Whorls
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Fool's parsley



Cranesbill



Field bindweed

Choose leaf shape

Oval or oblong	Roundleaf	Needle	Wavy edged	Divided to the stem	Whorls
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Corn spurrey



Linseed

Choose leaf shape

Oval or oblong	Roundleaf	Needle	Wavy edged	Divided to the stem	Whorls
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Corn marigold



Poppy



Choose leaf shape

Oval or oblong	Roundleaf	Needle	Wavy edged	Divided to the stem	Whorls
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>



Shepherd's needle



Mayweed

Choose leaf shape

Oval or oblong	Roundleaf	Needle	Wavy edged	Divided to the stem	Whorls
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



Cleavers

Common horticultural weeds

Creeping buttercup



Perennial sow thistle



Creeping thistle



Field Horsetail



Liverwort



Field bindweed



Fat Hen



Groundsel



Chickweed



Mayweed



Red dead nettle



Small nettle



Craine's bill



Hairy bittercress



Cleavers



Volunteer potatoe



Dock



### Chemical control options for outdoor crops (15/02/2024)

#### Asparagus

1	2,4-D
2	Aclonifen
3	Carfentrazone-ethyl
4	Clomazone
5	Clopyralid
6	Fatty acids: pelargonic acid
7	Fluazifop-P-butyl
8	Flufenacet
9	Glyphosate
10	Isoxaben
11	Metribuzin
12	Pendimethalin
13	Pyridate

#### Rhubarb

1	2,4-D
2	Aclonifen
3	Carfentrazone-ethyl
4	Clomazone
5	Clopyralid
6	Fatty acids: pelargonic acid
7	Fluazifop-P-butyl
8	Glyphosate
9	Isoxaben
10	Metribuzin
11	Pendimethalin
12	Propyzamide

#### Cabbage

1	2,4-D
2	Carfentrazone-ethyl
3	Clethodim
4	Clomazone
5	Clopyralid
6	Cycloxydim
7	Dimethenamid-P
8	Fatty acids: pelargonic acid
9	Glyphosate
10	Metazachlor
11	Napropamide
12	Pendimethalin
13	Pyridate
14	S-metolachlor

#### Broccoli, Calabrese and Cauliflower

1	2,4-D
2	Carfentrazone-ethyl
3	Clomazone
4	Clopyralid
5	Cycloxydim
6	Dimethenamid-P
7	Fatty acids: pelargonic acid
8	Glyphosate
9	Metazachlor
10	Napropamide
11	Pendimethalin
12	Propyzamide
13	Pyridate
14	S-metolachlor

### Carrots

1	2,4-D
2	Aclonifen
3	Carfentrazone-ethyl
4	Clethodim
5	Clomazone
6	Cycloxydim
7	Diflufenican
8	Fatty acids: pelargonic acid
9	Fluazifop-P-butyl
10	Flumioxazine
11	Glyphosate
12	Isoxaben
13	Metribuzin
14	Pendimethalin
15	Propaquizafop
16	Prosulfocarb

### Parsnips

1	2,4-D
2	Aclonifen
3	Carfentrazone-ethyl
4	Clethodim
5	Cycloxydim
6	Diflufenican
7	Fatty acids: pelargonic acid
8	Fluazifop-P-butyl
9	Flumioxazine
10	Glyphosate
11	Isoxaben
12	Metamitron
13	Metribuzin
14	Pendimethalin
15	Propaquizafop
16	Prosulfocarb

### Onions

1	Carfentrazone-ethyl
2	Clethodim
3	Clopyralid
4	Dimethenamid-P
5	Ethofumesate
6	Fatty acids: pelargonic acid
7	Fluazifop-P-butyl
8	Flumioxazine
9	Glyphosate
10	Isoxaben
11	Pendimethalin
12	Propaquizafop

### Leeks

1	2,4-D
2	Aclonifen
3	Bentazone
4	Carfentrazone-ethyl
5	Clethodim
6	Clopyralid
7	Cycloxydim
8	Dimethenamid-P
9	Fatty acids: pelargonic acid
10	Fluroxypyr
11	Glyphosate
12	Isoxaben
13	Metazachlor
14	Pendimethalin
15	Prosulfocarb
16	Pyridate

### Baby leaf

1	2,4-D
2	Carfentrazone-ethyl
3	Clomazone
4	Cycloxydim
5	Dimethenamid-P
6	Fatty acids: pelargonic acid
7	Fluazifop-P-butyl
8	Glyphosate
9	Lenacil
10	Napropamide
11	Pendimethalin
12	Propyzamide
13	S-metolachlor

### Lettuce

1	2,4-D
2	Carfentrazone-ethyl
3	Cycloxydim
4	Dimethenamid-P
5	Fatty acids: pelargonic acid
6	Fluazifop-P-butyl
7	Glyphosate
8	Pendimethalin
9	Propyzamide
10	S-metolachlor

### Spinach

1	2,4-D
2	Carfentrazone-ethyl
3	Clomazone
4	Clopyralid
5	Cycloxydim
6	Fatty acids: pelargonic acid
7	Fluazifop-P-butyl
8	Glyphosate
9	Lenacil
10	Napropamide
11	Phenmedipham

### Radish

1	2,4-D
2	Carfentrazone-ethyl
3	Fatty acids: pelargonic acid
4	Fluazifop-P-butyl
5	Glyphosate
6	Propaquizafop

### Turnip

1	2,4-D
2	Carfentrazone-ethyl
3	Clethodim
4	Clopyralid
5	Cycloxydim
6	Dimethenamid-P
7	Fatty acids: pelargonic acid
8	Fluazifop-P-butyl
9	Glyphosate
10	Metazachlor
11	Napropamide
12	Propaquizafop
13	Propyzamide
14	S-metolachlor

### Swede

1	2,4-D
2	Carfentrazone-ethyl
3	Clethodim
4	Clomazone
5	Clopyralid
6	Cycloxydim
7	Dimethenamid-P
8	Fatty acids: pelargonic acid
9	Fluazifop-P-butyl
10	Glyphosate
11	Metazachlor
12	Napropamide
13	Propaquizafop
14	S-metolachlor

### Pumpkin

1	2,4-D
2	Carfentrazone-ethyl
3	Clomazone
4	Dimethenamid-P
5	Fatty acids: pelargonic acid
6	Glyphosate
7	Isoxaben
8	Pendimethalin
9	Propyzamide

### Courgette

1	2,4-D
2	Carfentrazone-ethyl
3	Clomazone
4	Dimethenamid-P
5	Fatty acids: pelargonic acid
6	Glyphosate
7	Isoxaben
8	Pendimethalin
9	Propyzamide

### Beetroot

1	2,4-D
2	Carfentrazone-ethyl
3	Clethodim
4	Clopyralid
5	Cycloxydim
6	Diflufenican
7	Ethofumesate
8	Fatty acids: pelargonic acid
9	Fluazifop-P-butyl
10	Glyphosate
11	Lenacil
12	Metamitron
13	Phenmedipham
14	Propaquizafop
15	Quizalofop-ethyl
16	Quizalofop-P-ethyl
17	S-metolachlor
18	Triflurosulfuron-methyl

### Chard

1	2,4-D
2	Carfentrazone-ethyl
3	Clopyralid
4	Cycloxydim
5	Fatty acids: pelargonic acid
6	Fluazifop-P-butyl
7	Glyphosate
8	Lenacil
9	Phenmedipham

### Pea – edible podded

1	2,4-D
2	Bentazone
3	Carfentrazone-ethyl
4	Clethodim
5	Clomazone
6	Cycloxydim
7	Fluazifop-P-butyl
8	Glyphosate
9	Pendimethalin
10	Prosulfocarb
11	S-metolachlor

### Beans - broad

1	2,4-D
2	Bentazone
3	Carfentrazone-ethyl
4	Clethodim
5	Clomazone
6	Cycloxydim
7	Fluazifop-P-butyl
8	Glyphosate
9	Imazamox
10	Isoxaben
11	Pendimethalin
12	Propaquizafop
13	Prosulfocarb



Beans - French

1	2,4-D
2	Bentazone
3	Carfentrazone-ethyl
4	Clethodim
5	Clomazone
6	Cycloxydim
7	Glyphosate
8	Pendimethalin
9	Propaquizafop
10	S-metolachlor

Beans - runner

1	2,4-D
2	Bentazone
3	Carfentrazone-ethyl
4	Clethodim
5	Clomazone
6	Cycloxydim
7	Glyphosate
8	Pendimethalin
9	S-metolachlor

**Herbicide - target weeds (examples)**

<b>Crop</b>	<b>Active Substance</b>	<b>Target Weeds</b>
courgette (outdoor)	Dimethenamid-P/pendimethalin	annual meadow grass broad-leaved weeds
radish (outdoor)	Propaquizafop	barley cover crops blackgrass common couch ryegrasses sterile brome volunteer barley volunteer rye volunteer wheat wild oats
broccoli (outdoor)	Dimethenamid-P/metazachlor	annual meadow grass charlock fat hen groundsel mayweed spp. Redshank shepherds purse small nettle
chard (outdoor)	Clopyralid	compositae weeds groundsel mayweed spp.
lettuce (outdoor)	Propyzamide	general weed control
pea (edible podded)(outdoor)	Prosulfocarb	black nightshade common chickweed common field speedwell cranes bill forget-me-not green field speedwell ivy-leaved speedwell red dead-nettle wall speedwell

Precision spray application

Smart spraying (Ecorobotix)



Band sprayers (Varidome)



Weed wipers



Examples of mechanical weed control machinery

Inter-row cultivator (Edwards Farm Machinery)



Inter-row rotavator (Edwards Farm Machinery)



In-row – manually controlled (Edwards Farm Machinery)



In-row – camera guided (Stout and Garford)



Autonomous drones (Farm Droid, Robotti and Naio Technologies)



Electric and concentrated-light weeders (Rootwave and Earth Rover)



Plastic mulch – can be laid and drilled/planted simultaneously



Roller crimper – to knock back a cover crop ready for drilling/planting

