



### **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

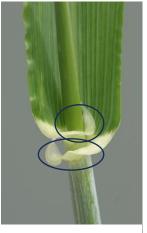
- It is important to be able to identify weeds as chemical weed control products tend to be specific to individual plant families (examples given later).
- The effectiveness of chemical control strategies is higher when the plants are smaller i.e. large woody weed plants are much harder to desiccate.
- 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 lead 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

# • Annual meadow grass:

- o Leaf <u>folded</u> in the stem
- Leaves are light green
- Have a curved tip and the undersides have a distinct central ridge





### Black-grass:

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







- <u>Sterile (Barren) Brome</u>:
  - o Leaves covered in fine hairs and pointed
  - o Stem bases stripy pyjamas



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

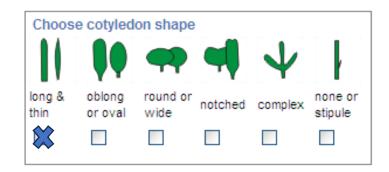








# **Cotyledon shapes**





Wild Carrot Fumitory Shepherd's Needle

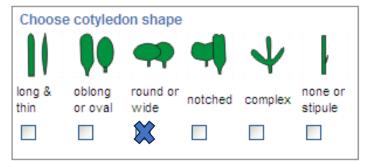




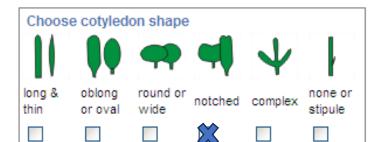
Cleavers Crisp dock Flixweed







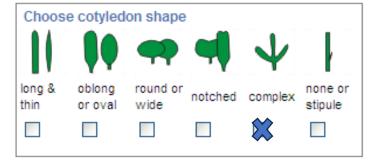








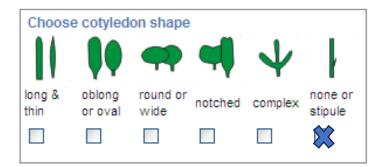








Amsinkia Storksbill





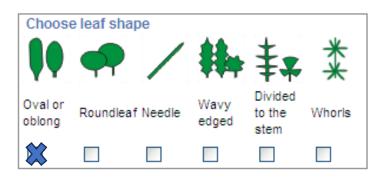


Vetch Pea





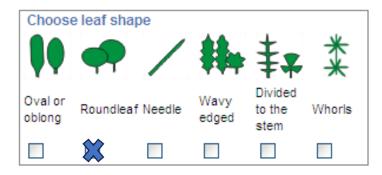
### First true leaf shapes





Groundsel

Shepherd's purse

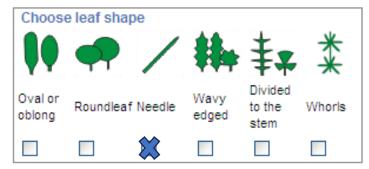




Fool's parsley Cranesbill Field bindweed



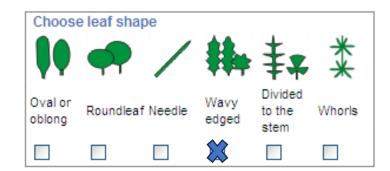






Corn spurrey

Linseed



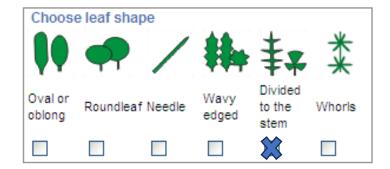


Corn marigold

Poppy





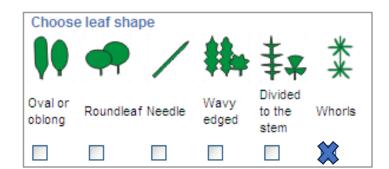






Shepherd's needle

Mayweed





Cleavers





# Common horticultural weeds

Creeping buttercup



Creeping thistle



Liverwort



Fat Hen



Perennial sow thistle



Field Horsetail



Field bindweed



Groundsel









Red dead nettle



Craine's bill



Cleavers



Dock





Mayweed



Small nettle



Hairy bittercress



Volunteer potatoe







# 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

# 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

### 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

# 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
J	acid
9	Fluazifop-P-butyl
10	Flumioxazine
11	Glyphosate
12	Isoxaben
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
U	acid
7	Fluazifop-P-butyl
8	Flumioxazine
9	Glyphosate
10	Isoxaben
11	Pendimethalin
12	Propaquizafop



# 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

# 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

urni	р	
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 Glyphosate10 Metazachlor11 Napropamide12 Propaquizafop

13	Propyzamide	
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	

# FARMING connect

### 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	

# 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	Triflusulfuron-methyl	



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	





1 2,4-D

Bentazone

4 Clethodim5 Clomazone6 Cycloxydim7 Glyphosate8 Pendimethalin

3 Carfentrazone-ethyl

Propaquizafop

10 S-metolachlor

2

9



1	2,4-D
2	Bentazone
3	Carfentrazone-et
4	Clethodim

S-metolachlor

3	Carfentrazone-ethyl	
4	Clethodim	
5	Clomazone	
6	Cycloxydim	
7	Glyphosate	
8	Pendimethalin	

# Herbicide - target weeds (examples)

Crop	Active Substance	Target Weeds
courgette (outdoor)	Dimethenamid-	annual meadow grass
	P/pendimethalin	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

