

# Creeping Thistle Management Strategies in Organic Systems

## Why is creeping thistle a problem for farmers?

- Creeping thistle (*Cirsium arvense*) is the most common perennial thistle to invade both grass and arable land
- It spreads rapidly and forms large patches that compete with crops, interfere with harvesting and reduce yields
- It also interferes with grazing, contaminates hay and can cause health problems in livestock
- Dispersal is by seed and root fragments and once established creeping thistle is difficult to control

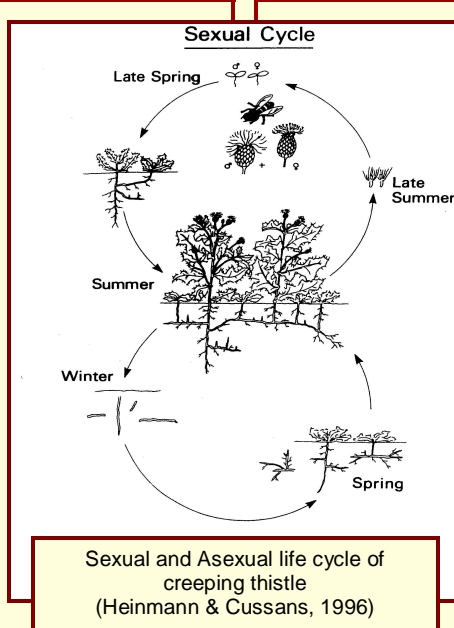
## Biology

- Creeping thistle flowers from July-September
- Plants from single clones have only male or female flowers
- A thistle patch may consist of several different clones
- It takes 8-10 days from flowering for viable seed form
- Seed set is very variable and many seeds are lost to predation
- There may be 680 seeds per stem
- Wind dispersal is possible, but rare, as the feathery parachute of hairs separates easily from the seed
- Thistle-down carries few seeds
- The main seed germination period is from April to May, but seed can germinate throughout the year
- Fresh seed is important for colonising new habitats
- Unless buried deeply seed does not persist for many years in the soil
- Seedlings are sensitive to early competition for light
- Seedlings with two true leaves they are capable of regrowing after topping
- Creeping thistle is common in older swards
- It prefers low P, or high K soil
- The plant dies back to just below soil level in late autumn after building up reserves between July and October
- In spring shoots develop on storage roots and plant reserves are minimal between May and July.



Thistle down

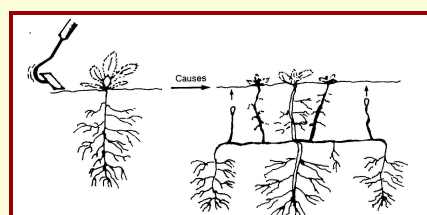
- Creeping thistle is thought to have allelopathic properties that may inhibit the growth of other plants



## Vegetative spread

- The initial taproot is slender
- It soon produces far creeping laterals with many shoot or rhizome buds.
- The roots can go deep but over 50% are found in the plough layer
- Following cultivation, both the roots beneath the cultivated zone and the broken fragments can regrow to form new shoots
- Fragments smaller than 2.5cm (1") tend not to regrow whilst 6cm (2") fragments regenerate readily
- Longer 20cm (8") fragments can develop new shoots and roots within seven weeks of planting
- Fragments buried deeply (20cm or 8") take longer to regrow than those that are shallowly (5cm or 2") buried

- Disturbing the fragments after regeneration (at the four to seven leaf stage) may stop or delay further regrowth, especially of those plants that are regenerating from smaller fragments



Effect of cutting creeping thistle in spring (Lampkin, 1990)

- Undisturbed fragments can remain viable for many years
- Cultivation can carry creeping thistle roots from the headland into the field

Peacock butterflies on creeping thistle



## Can it be useful?

- It provides shelter and food for birds, insects and other small animals
- The female flowers are fragrant and very attractive to honeybees
- The foliage is high in copper, iron and trace elements
- Most stock will graze the young shoots, goats and llamas are partial to the flowers
- See <http://www.english-nature.org.uk/baps/species/results.asp> for more details

### What encourages thistles?

- Poor grassland management
- Poaching and the creation of bare patches in the sward allows seedling thistles to become established
- Under utilization of pasture when thistles are present combined with overgrazing in winter produces an open sward that is slow to regrow and compete with the emerging thistles in spring
- Compaction caused by repeated cultivation at the same level
- It can be spread as a contaminant in crop seeds

### How can you prevent creeping thistle?

Weed management in an organic system should focus on using as many preventative measures as possible and creeping thistle management will certainly benefit from such an approach. Opportunities to manage thistles should be taken where they arise throughout the rotation. Prevention relies on breaking the cycle of seed production and root establishment. Thistles are also not very competitive as seedlings and establishment can be reduced by well managed, tight grass swards and crops. Some general principles are outlined below

#### In general:

- Do not allow thistles to flower and set seed especially on the headland where seeds may be dispersed into the field
- Over-sowing the headland with a vigorous wild flower mix may help to suppress, but will not prevent, thistle growth and spread
- Heat, aerate and ferment slurry to kill any viable thistle seeds present and prevent their dispersal onto fields
- In the field soil compaction is thought to favour thistles and should be avoided
- Lucerne being a deep rooting crop will disrupt the damp compacted conditions that encourage thistle growth, regular mowing of the crop will help to eliminate the thistle

#### When cutting:

- Thistles are most vulnerable to cutting at the early flower bud stage
- Remember that shoots cut down just 4 days after flowering may still develop ripe seed

#### In pasture:

- Manage grassland to encourage a dense sward of diverse and desirable grasses
- Avoid the creation of bare patches or poached ground
- Graze lightly in winter and spring
- Graze with cattle when thistle shoots are young from May-July
- Use goats when thistles are mature
- Do not tight graze in autumn and winter

### What are the management options in cultivated land?

Management options in cultivated land centre around mechanical curative techniques. However, general preventative techniques as outlined above should also be used if appropriate. Competition with a dense crop of spring barley has also reduced the regeneration of thistle roots and this might be generally true of other densely sown crops

- Severe infestation, especially on heavy land, may require a bare fallow to control the weed
- Bastard fallowing can also give good results
- Repeated deep cultivations ensure that roots are destroyed or exhausted, particularly from July to August when the plant's food reserves are low
- Follow ploughing with a cultivator or harrows and deep ploughing may be the best method of loosening and bringing roots to the surface
- Operations should be as deep as practicable and spaced through the growing season e.g. every 21 days
- Roots brought to the surface can be left to desiccate in the wind and sun but the thicker pieces can withstand some drying and may survive
- Repeated cultivations will exhaust regenerating root fragments which are most vulnerable at the 4-7 leaf stage



Creeping thistle moving into the field from headland

## What are the management options in grassland?

In grassland the aim should be to encourage a dense sward of diverse and desirable grasses that will prevent new infestations. Poaching should be avoided for the same reason. Research work in legumes has suggested that maintaining a dense competitive crop can be more important than mowing frequency in reducing creeping thistle

### When cutting:

- The thistles may be cut soon after emergence and at frequent intervals for the rest of the season
- Intense low mowing or cutting will prevent seeding and may eventually exhaust the thistles
- When topping is carried out it needs to be low enough to remove all the thistle leaves and avoid new shoots developing from buds in the remaining leaf axils
- Topping needs to be carried out at least twice a year and repeated over several seasons to gain the full benefit, the more frequent the topping the greater the reduction of thistles recorded
- Thistles are most vulnerable for topping at the early flower bud stage when food reserves are low
- If topping only once, top at the flower bud stage so as not to encourage coppice regrowth
- Cut for silage at an early growth stage

### Pulling:

- Pulling is more effective than cutting and avoids shoots developing at the base of the stem
- A pulling type machine e.g. the Eco - Puller can be used at maximum stem elongation when there is a difference between weed and pasture height

### When grazing:

- Close stocking (or cutting) at a young stage should help to reduce existing patches
- Stock will eat young thistle shoots and possibly the growing tips but in a mature state thistle is of limited palatability to stock
- Goats will eat thistles and the surrounding vegetation at any stage
- Cattle grazing may reduce shoot number more than sheep that favour the grass and hence allow thistles to survive
- The best option may be to graze lightly in winter and spring, then graze with cattle when thistle shoots are young from May-July

## What can be done by hand?

- Manually pulling thistle shoots is only feasible on small patches but it reduces the plant's food reserves more than cutting because new shoots have to come from the underground organs
- Manual pulling, particularly just before flowering is very successful, at weakening dormant buds
- It is better to detect and destroy outlying populations before reducing the main infestations
- Manual chisel hoeing can be used to reduce the population
- Shoots need to be cut just below the ground
- Repeated action may be necessary in wet areas

## Can biological controls help?

Thistles have been spread around the world with the introduction of seed from Europe into new continents, and have become notable in Canada, the US, Australia and South Africa. Introduction of insects that feed on thistles in Europe has had some limited success in helping to manage thistles in these areas. Natural seed predation and plant herbivory can certainly help to weaken the plant or slow down its dispersal. The range of insects and birds that feed on thistle indicate its important role in maintaining biodiversity in farmed land

- Pre-dispersal seed predation by birds and by the larvae of various insects reduces seed production
- A shoot base-boring weevil (*Apion onopordi*) promotes systemic infections of rust fungus (*Puccinia puntiformis*) which taken together are a promising biological control
- Rust can also weaken and stunt the plant preventing flowering
- Larvae of the thistle-stem gall fly (*Urophora cardui*) produce galls on the stems of creeping thistle
- Caterpillars of the painted lady butterfly or swift moths can also defoliate the plant
- There are also larvae and adults of beetles and weevils that will eat the plant leaves
- There does not appear to be a definitive biological control currently on the market but all beneficial insects combine to give some background control of the thistle



## Further information and notes:

Please let us know of any observations you make on thistle management either by contacting us or through our website

The information for this leaflet has been produced from a range of sources, including farmers, advisors and researchers, and we gratefully acknowledge their contributions. Most of this information, and further details, are available on our website at <http://www.organicweeds.org.uk>

## Would you like to take part in our farmer trials?

- All farmers are experimenting with weed management on their farms, especially ways of managing thistles, and we want to collect and share this knowledge
- We also want to add to it by conducting simple trials on a range of different farm types and locations. These trials have been suggested by farmers and are conducted by farmers with two or three treatments
- One trial is investigating 'ballast rolling of thistles'. This involves counting the numbers of thistles in two patches, ballast rolling one patch (timing how long it takes) and leaving the other. The numbers of thistles in both patches are then counted several times over a period of time
- The more farmers that take part the more valid the information. All the information will be available on the website either as case histories or as trial results
- Contact us (see below) or visit the website for more details
- You can also get in touch and tell us what you would like to see researched or get involved with any of the 11 trials which are running at the moment

## Disclaimer

The information contained in this leaflet has been compiled from a range of sources. It is accurate to the best of our knowledge. Authors are not responsible for outcomes of any actions taken based on this information.

## Project information

This leaflet has been produced as part of the DEFRA funded project '[Participatory Investigation of the Management of Weeds in Organic Production Systems](#)'. The project aims to involve farmers and growers in all levels of research and is driven by their requirements. The project is led by IOR-HDRA in collaboration with IOR-EFRC, Warwick-HRI, ADAS and RULIVSYS. To date the project is funded until July 2006. The project website holds all information gathered on weeds and their management, including literature from science, the farming press and practical strategies from organic farmers. It can be found at:



[www.organicweeds.org.uk](http://www.organicweeds.org.uk)



## How can I get involved?

There are many ways to get involved:

- Send us your name and address and we will add you on to the database so you are kept informed about the project
- Offer to provide information about weed management on your farm, see 'Case studies' on the website
- Become a 'focus group' member (the farmer groups who steer the project direction)
- Take part in the farmer trials and surveys (see above or the website)
- Tell us what you want from the project by attending meetings, open days and joining discussions on the website

## Contact

Becky Turner or Gareth Davies, HDRA, Coventry, CV8 3LG. Tel: 024 7630 8200 Fax: 024 7663 9229  
E-mail: [bturner@hdra.org.uk](mailto:bturner@hdra.org.uk) or [gdavies@hdra.org.uk](mailto:gdavies@hdra.org.uk)