

## **Week 6 . This week: Wildlife and Root Crops.**

So here are this week's questions to think about before you read on:

1. What do you know about the life cycle, habitats and predators of slugs?
2. What might accidentally be damaged by slug pellets?
3. How can try to minimise slug damage to a seed bed?
4. What barriers can help prevent slug damage?
5. What do you know about Biological Control of slugs?

### **Dealing with the problem of Slugs**

The best way to deal with the problem of slugs is to understand a bit about their life cycle, habitats and predators. There are about 30 species of slugs living in the UK. All are useful in decomposing organic waste and contributing to soil fertility. The major problems are caused by a minority of these species. E.g. the grey field, the garden slug and the keel slug. Each species can lay up to 500 eggs a year in small batches. The eggs are usually laid in damp crevices in the soil. At all stages of its lifecycle the slug needs moisture to survive and they will seek moist sheltered areas often quite deep in the soil. They are mainly nocturnal feeders.

Non organic growers use pellets containing chemicals such as metaldehyde to kill the creatures. Although these are inexpensive, the chemicals are easily washed away by heavy rain and may have an effect on beneficial creatures such as ground beetles, earthworms and song bird chicks (see below).

Organic growers have two distinct strategies to cope with the problem: 1. Prevention; 2. Partial elimination. We'll discuss these in the context of what we're growing at Ynys Las.

#### Prevention

Many crops will be started off in a protected environment that is fairly safe from slugs. E.g. brassicas, sweet corn, courgette, etc.

When we are preparing seed beds for crops which are difficult to start off in a protected environment (e.g. carrots) we need to take a lot of care. The seed bed wants to be very fine with no surface lumps and rubbish to provide damp hiding places for slugs. Before we plant we can leave a few bits of slate around the perimeter of our seed bed. We can collect slugs that take refuge there and feed them to our neighbour's hens.

Before planting we'll water the seed bed, insert the seeds and cover with dry soil. Once planted the seed bed needs firming down, perhaps with the back of a rake. We'll need to take care that we don't leave unnecessary slug hiding places on the remainder of our plots and paths. We'll need to remove the pieces of slate.

With some small plants, such as transplanted cabbage, it is worth surrounding the plants with dry gritty or absorbent material to discourage slugs. Crushed dried egg or sea shell, coarse sand, hair, bran etc. are all temporary deterrents until they become damp. Commercially, copper rings and sophisticated moats are available. A cheaper approach, is to hoe, hoe, and hoe again, the soil around the young plants. This effectively creates a dry desiccated surface that the slugs despise. It also may expose slug eggs to either predators or desiccation.

#### Partial Elimination (Biological Control)

As well as chickens, slugs have many other predators that you can see. Ground beetles eat their eggs, hedgehogs eat vast numbers of the adults, and they are part of the diet of blackbirds, song thrushes, frogs, toads and newts too. Encouraging these things into your growing area makes good sense. (See *Wildlife* below.)

You can play the part of these predators by going out with a torch on a damp, mild evening and picking the slugs off your plants. Try to find an environmentally sensitive way of moving them on!

If you're at your wits end and have some money you can resort to another creature to help you. A small parasitic worm (nematode) with the name *Phasmarhabditis hermaphrodita* seeks out slugs. It enters its air hole and introduces bacteria which initially destroy the slug's appetite and then the slug itself. The worm eats and breeds in the slug corpse. You can buy this biological control and apply it to vulnerable areas of your growing area.

About £12 will protect 40 square metres for up to six weeks.

## Wildlife.

Some questions to answer before you read on:

1. Why do organic growers need wildlife?
2. What does it mean when we say “We are aiming for balance!”?
3. What are your top five wildlife species to encourage in your organic garden?
4. What will you do before you start creating your mini nature reserve?
5. What kind of habitats could you create?

### We need wildlife

It has been clear from the beginning of this course that organic gardeners depend on wildlife.

For example, worms, slugs and other smaller creatures in the soil, convert organic material into plant nutrients that help grow better crops. Unfortunately, organic growers also know that some creatures have an interest in the food crops we grow. As well as the slug, for example, cabbage white butterfly and the carrot root fly will all eat our crops before we can, if we are not careful.

Non organic growers control this competition with chemicals but these may produce unintentional side effects. For example, “chemical growers” may temporarily eliminate a local slug population with pellets. However, unintentionally, they may at the same time effectively remove the protein supply for local song thrush chicks. These young birds depended on the slugs for protein rich food and can be accidentally starved when the pellets destroy their food supply!

### Restoring the balance.

Organic gardeners take a different attitude to wildlife. They know, for example, that the slug that could eat their cabbage plant also degrades organic matter which helps provide nutrients for a future crop. They also know that the local song thrush will help keep the slug population under control. Organic gardeners know that it is in their interest to keep or create a balanced environment where food plants and other species can coexist. That’s why we talked about *Partial elimination* of slugs rather than *total elimination* in the section above.

Organic growers need to be patient. Remember it may take many years for an organic gardener to recreate these balanced conditions if they’ve been destroyed. In addition, while you’re doing your best to improve the environment you are still working against many other more powerful human influences.

### What are you working against?

The human activities that disrupt a balanced environment include: agricultural practices; forestry; housing development; road transport; industry and mining. All of these can destroy important local assets such as wildlife corridors and habitats.

### What do you really want in your garden?

It’s clearly impossible to evaluate the effect of every species of wildlife that lives in or visits your garden. However it is worth looking at a selection of common species as a guide to their potential as a friend or a pest. The stars in the column are my evaluation of the potential of the species to be a friend or pest. You might want to create your own rating.

Details of the behaviour which informs the star rating can be found in *The Organic Gardener’s Handbook (Elphinstone and Langley.)*

The grey rows indicate the species that need most encouragement into an organic garden as their benefit far outweighs any disadvantages.

Wildlife	Potential	
	Friend	Pest
Ant	*	*
Aphids		***
Bats	***	
Bees	***	
Birds	***	*
Cabbage B.fly	*	***
Carrot fly		***
Centipede	***	*
Chafer grubs		***
Chickens	***	**
Cutworm		***
Earthworm	***	
Earwig	*	*
Sawfly		**
Ground beetle	***	
Hedgehog	***	*
Hoverfly	***	
Ichneumon Fly	**	*
Lacewing	***	
Ladybird	***	
Leather jacket		***
Mice	*	*
Millipedes	*	*
Moles	*	*
Rats	*	***
Slugs	*	***
Toads and frogs	***	*
Wasps	*	**

### Looking at what you've got.

It is possible to create a great variety of wildlife habitats on a reduced scale in a garden. However, before creating mini garden nature reserves it makes sense to look carefully at what you've got. For example, that patch of weeds in the corner of the garden might be a great location for a garden pond but it may already be the home of some useful ground beetles. In addition it makes sense to look at the natural features that exist in the locality and any natural links or pathways between these areas and your garden. Hedges, roadside and railway verges etc. will all provide avenues for wildlife to travel to and from your garden. Think before you change something! In addition do what is appropriate. The underlying rock, soil type, climate, drainage, altitude and exposure to wind and sea spray will all affect the end product. There is not much point in trying to create a desert habitat in Machynlleth! (We have several hundred centimetres of rain each year!) Different areas of the garden will also be affected by micro climates. For example, the north side of buildings will be shaded from the sun and damp hollows are also likely to be cold frost pockets.

### Possible kinds of habitats.

Here is a basic list of habitats you might want to consider recreating in gardens in this area of West Wales.

The creation of any one of these habitats is likely to have an affect on another part of the garden. For example, creating woodland on the north of the vegetable plot could reduce exposure to cold winds etc.

### Leaving the landscape alone.

One strategy for creating a natural area is just to leave a piece of ground unmanaged. The Forestry Commission researched what happened to a variety of plots in different locations that were left in this way. They wanted to know how long it was until trees took over the site.

Where the soil was fertile, they observed that lots of grasses and herbaceous species competed with each other. Wind and bird sown tree seed found it difficult to germinate and thrive.

On less fertile soils, plant species such as bramble and gorse quickly became established. Wind blown tree seed (birch, alder etc.) and bird sown seed (rowan, bird cherry etc.) then thrived beneath the prickly protection of these shrubs which kept sheep and rabbits at bay!

Eventually beneath the canopy of birch and alder, hardwood trees such as oak and ash gradually established themselves.

### Food webs and energy flow.

The whole point of creating a natural area in a garden is to create feeding relationships between species. These may indirectly assist our organic cultivation.

When thinking about complex issues it helps to think in straight forward uncomplicated linear ways. So for example, simple feeding relationships are often called 'food chains.'

An example would be: the cat that ate the song thrush that ate the slug that ate the cabbage seedling.

In reality the whole process is more complex. All the organic matter is part of a complex web that is being continually recycled. E.g. While alive the cat and song thrush droppings will feed soil organisms, possibly even slugs, and once deceased, both cat and song thrush will be converted into plant nutrients by a complex array of organisms. In reality, the energy that powers all the creatures taking part in the process is solar.

<b>Natural deciduous woodland</b>
<b>Conifer plantation</b>
<b>Coppice or biomass area</b>
<b>Upland heathland</b>
<b>Scree or rock habitat</b>
<b>Grassland or meadow</b>
<b>Ponds</b>
<b>Streams</b>
<b>Bog land and marshes</b>

### Root Crops

What do you know about root crops?

1. Which root crops need the soil feeding with compost before planting? (Read carefully)
2. Which root crops are brassicas and may need protection from club root?

The main root crops grown in the UK are carrots, parsnips, turnips, swedes and beetroot.

If you are working from a basic rotation model that we're using at Ynys Las these crops should follow brassicas and be planted near the onion family and salad crops. Both these other crops are useful in a variety of ways. The onion family can deter pests whilst some quickly maturing salad crops can fit in spaces between the slower developing roots.

### **Carrots, parsnips and beetroots.**

These like a sunny site where humified organic matter has been added for a previous crop (i.e. Most of the nutrients from humified organic matter have been digested but there will be plenty of humus in the soil.). They don't seem to like either fresh compost or manure. You'll need to gradually remove stones from your annual carrot /parsnip/beetroot beds to prevent the forking of the crops.

Prior to planting you will need to cultivate the soil to produce a fine, firm seed bed. You could bring in the chickens or suspend some bird feeders above the growing area to encourage predators to seek out pests lurking in the soil. Sow all these seeds with the lightest of coverings. Water the soil copiously before you sow and then cover the seeds. (See *Slugs* above)

#### **Carrots**

Carrots probably have to be sown where they'll grow. It's difficult to transplant carrots. Plant a succession of crops from March until August. Wait until the soil temperature is at least 10°C. Carrot seed is very fine. If you don't have a careful hand, mix the seed with dry sand prior to planting. Some growers advocate growing carrots in rows 15-30 cm apart. Others suggest sowing in a broad strip about 30 cm wide. In both cases the seeds need the lightest of coverings and after germination the plants have to be thinned to between 5 and 15 cm apart. Germination can be temperamental. The seed bed has to be kept moist (but not soggy) and warm. Fleece can help. The young seedlings are very attractive to slugs; however the real problem for organic growers is carrot root fly. You'll know you've got it by either yellowing foliage, wilting plants or harvested crops like veined blue cheese. (More on this pest later.)

#### **Parsnips**

Parsnips are slow to germinate and spend a long time in the soil. Warm up the soil with fleece to extend the growing season and sow in February or March. To make sure you can recognise the seedlings from those of weeds, sow clusters of seed 15 cm apart in rows 20-30 cm apart. Thin out all but the best seedling in each cluster. You can interplant with radishes to make the most of the soil area. When you're weeding take care not to damage the parsnip root as this may let infection into the plant. Parsnip roots also tend to split if watering is erratic.

Infected roots are often described as suffering from canker. Some cultivars claim to be more resistant to these bacterial and fungal infections. However I suspect careful weeding is probably as important.

#### **Beetroot**

Sow later than parsnips, April - June. Sow pairs of seeds 10 cm apart in rows 20 cm apart. Remove the weakest seedling. Harvest and eat alternate plants when they reach golf ball size allowing space for other plants to mature. Harvest the entire crop before the first frost. Some Leaf Miners can make a mess of the plants leaves during growth. If you notice small white tunnels in the leaves remove and hot compost the damaged material. This will minimise the damage to the plant.

#### **Turnips and Swedes**

These are brassicas so be careful in your rotation as they can suffer from clubroot. The best defence is well rotated, compost fed soil with lime applied appropriately in the rotation. Turnips are quicker growing than swedes and the roots above. You can often use turnips as a catch crop after early potatoes but not winter cabbage! (Work out why!). Wait until late April before sowing either crop. Grow them in rows about 20 cm apart. Gradually, selecting the best, thin the seedlings to about 10cm apart for turnips and 20 cm apart for swedes

#### **Radish**

These tolerate a wide range of soil conditions, so grow them as a catch crop or as space becomes available. They like fertile soil. Sow small amounts in succession in rows 15 cm apart. Rapid growth in rich soil is the best defence against the flea beetle which gnaws holes in the leaves. A sharp spray with water deters this pest too. Otherwise, "grin and bare it!"

#### **Storing root crops.**

Most root crops can be stored in the ground until November or later. Then, all root crops can be stored above ground if "they are perfect in every way! They don't want to touch each other and they should be layered in dry sand, compost, peat (if you must), bark, sawdust or woodchips. The container wants to be in a cool, frost and mouse proof location.

