



Soil Association

the heart of organic food & farming

Soil Association
food and farming department

Effective use of crop covers

Briefing paper
Spring 2008

Phil Sumption

The Soil Association wishes to acknowledge the support of the England Rural Development Programme by the Department for the Environment, Food and Rural Affairs and the European Agricultural Guidance and Guarantee Fund.



Soil Association
food and farming department
South Plaza, Marlborough Street,
Bristol BS1 3NX
T 0117 914 2400
F 0117 314 5001
E ff@soilassociation.org
W www.soilassociation.org/foodandfarming

Introduction

Crop covers can be very useful tools for organic growers to advance crop maturity, extend the season, protect against frost and exclude pests. But choosing the correct cover for the intended purpose and careful management is essential for effective use. An ever-growing variety of fleeces, meshes and nets are available to growers.

This briefing paper looks at the different types of cover available, their use in controlling pests, problems associated with particular crops and additional areas to consider.

Fleece

Fleece was originally developed to advance maturity of vegetable crops. However, it can also be very effective at excluding pests and protection against frost. Lightweight fleeces of around 17g/m² are the norm for general use, providing 2–3°C degrees of frost protection, with heavier weights of 30g/m² protecting down to -5°C or -6°C.

Fleece is the cheapest crop cover option. According to the *Commercial Grower*, prices have fallen to 3.5p/m², mainly due to the influx of cheap imports from China. There are quality issues, however, and while imported fleece is more likely to use recycled material, UK manufacturers argue that imports have a shorter life span and can tear down the seams. Reinforced edges help to prolong life, as can increased hair strength – provided this does not also reduce light transmission.

Fleece is flimsy and easily damaged by large vertebrates like deer, or raptors trying to access small animals sheltering underneath. Even rabbits are capable of making holes with their feet. Any damage will increase the likelihood of pests gaining entry to the crop, and you should only use damaged sheets where crop advancement is more important than pest exclusion. When storing fleece, always ensure it is fully dry and out of reach of small rodents who like to nest in it.

The best use of fleece is early in the season to make use of the temperature lifts gained underneath. However, this can be too much for summer crops and any leaves in contact with the fleece can get scorched. Fleece can also promote soft growth, which will be more vulnerable to autumn frosts. In cauliflowers, the use of fleece can delay maturity in winter crops by up to seven days as curd initiation is triggered by accumulation of units of relative cold.

A major disadvantage is the difficulty of seeing what is happening underneath and of inspecting crops. For example, weeds can advance at a pace under the fleece so that it is all too easy to miss crucial weeding windows.

Mesh

Mesh is more expensive than fleece but you can spread costs over several seasons, with some manufacturers justifiably claiming a life of up to 10 years. Consequently, this significantly reduces the total amount of resources used.

There is considerably less crop advancement or frost protection under mesh when compared to fleece. However, the greater airflow and lower humidity should mean less disease problems, although the tighter the mesh size, the less air flow. Choose the mesh size according to the pests you want to exclude. A 1.3mm mesh will exclude cabbage root fly, carrot fly, aphids and most caterpillars, with the exception of the diamond back moth. This size reduces flea beetle activity but 0.8mm mesh will exclude them altogether, while 0.17mm x 0.37mm mesh will exclude thrips. For some crops it may be necessary to use hoops to prevent damage, particularly with the heavier meshes and on delicate plants such as baby-leaf spinach. Take care to secure the edges because they can easily ride up as the crop grows, providing entry points for pests.

Pest control

The most important principle of using crop covers to exclude pests is that the cover must be in place before the pest infestation – including egg laying – has taken place. The cover must also remain intact until the target pests are no longer a threat as any tears can let them in. If possible, use pest forecasting to predict risk (see below). You must seal the edges well, preferably by burying the edge – or at least the edge exposed to the prevailing wind. You must also take care when removing covers for physical weed control as this can expose the crop to pests. It is also important to check that transplants are pest-free before planting and covering.

Bear in mind that some pests have been observed to lay eggs through mesh on leaves that are touching the cover, and that it is easy to trap pests like flea beetles under the mesh if they are put on late. You should not use covers on crops where the pest is already in the soil. Remember that many pest predators are also excluded along with the pest, and predators and parasites will struggle to attack the pests if they are excluded. If pests gain entry the problems can be worse than if the crop was left uncovered. Slugs can also be more of a problem under covers. So, while for many situations crop covers are necessary and useful, we should also be looking to develop alternative strategies, where possible.

Carrots

Crop covers are extremely effective for controlling carrot fly, particularly when used in conjunction with the HRI/HDC carrot fly forecast, which uses weather data to predict the timing of the two main carrot fly generations. Thanks to the work of Rosemary Collier and Stan Finch at Warwick HRI, Wellesbourne, the population dynamics are well understood (see *Organic Farming*, Issue 72, winter 2001).

You must apply the covers before flies start to enter the crop. Many growers use covers, particularly fleece, for early season crops to protect against the peak of egg-laying and leave later sown (late May/Early June) carrots uncovered, depending on risk from late generations.

Brassicas

Brassicas are subject to many pests and crop covers are used to keep off cabbage root fly, mealy aphids and caterpillars, as well as larger pests such as birds and rabbits.

Cabbage root fly is probably the most damaging of pests, especially of root brassicas and even non-organically the options are limited. Crop covers are effective against cabbage root fly unless pest pupae are present in the soil, which is a good argument against double-cropping of brassicas – even when allowed in the standards. Flea beetle is increasingly a problem for brassica growers and can be excluded by fleece, if not already present. The beetle can get through wider mesh sizes, however, and there is anecdotal evidence of flea beetles dropping their eggs through the mesh holes.

Other crops

You can use covers to exclude pests on any crop where it is practical to do so. You can cover lettuces to prevent root aphid damage, for example, or leeks for thrips. The balance is between the potential economic damage of the pest and the cost and effort involved in covering the crop.

Additional costs

While undoubtedly a useful tool, we must also be aware of our carbon footprint and of consumer perception about the visual impact of fleece on local landscapes. With the mantra 'reduce, re-use and recycle', we should first question whether the cover is necessary or if good biodiversity and habitat management measures can deliver instead. If covers are unavoidable, it is better to use a product that will last longer, and ensure it stays intact long enough to do its job. There are also considerable real costs of crop covers, not just in the material but also in the handling. In HDRA real farms studies, the handling costs (mainly to allow weed control) varied from £45–£300/ha for calabrese, rising to £700/ha in carrots for one grower.

Work is underway on developing biodegradable crop covers, some of which are already commercially available. This is driven by the increase in costs of disposal as it is now illegal to burn or bury waste plastic covers on farm. The HDC in Cambridgeshire have trialled a number of products on early lettuce. Covers using bio-polymers manufactured from starch or cellulose, such as Mater-bi from Capatex, are more acceptable than degradable plastic products – but are only suitable for early production and not pest control. A partially degradable viscose fleece is available from Capatex but its susceptibility to tearing and wind damage, together with difficulty pulling it out of the soil for removal, suggests it is not suitable for organic production. It was also not as effective as normal fleece at raising temperatures and had the lowest temperatures at night of any of the materials tested.

There is still plenty of work to do to provide acceptable materials for organic growers at a suitable price and sensible widths – at present there are technical difficulties manufacturing widths over 2m. The liking of the non-organic producers for fleece, which you can spray and irrigate through, is surely going to drive future innovation in this direction.

This article was kindly adapted from an article in *The Organic Grower*, the journal of the Organic Growers Alliance. See box below for more information.

Phil Sumption is research officer with HDRA. Contact him on psumption@hdra.org.uk

The Organic Growers Alliance

Join the Organic Growers Alliance and help to build an effective representative organisation for organic horticulture.

Membership includes entry to all OGA events at cost, free subscription to *The Organic Grower*, access to other forms of communication, and support from a recognised representative body in dealing with any regulatory and bureaucratic problems that may affect your business. Annual subscription is £25. For more information on the wide-ranging benefits email ogamembership@gwnhome.demon.co.uk or write to OGA, Bradshaw Lane Nursery, Pilling, Preston PR3 6AX. Visit www.newoga.org.uk

Copies of The Organic Grower are also available to non-members at £2.50 (incl. p&p).

SOIL ASSOCIATION FOOD AND FARMING DEPARTMENT

The Soil Association's food and farming department is an independent membership-based team within the Soil Association charity, dedicated to helping farmers, growers, primary processors – and the wider organic sector.

We are independent of the organic certification process and are here to provide you with information, advice and support.

WHY NOT BECOME A MEMBER?

1,000's of organic farmers and growers across the UK already benefit from our membership services, which include:

Use of our help line

Our advisors have practical, on-farm experience and can answer your questions and provide up-to-date technical and marketing information. We also have a wealth of experience in group facilitation and developing local food networks.

National and regional support

We deliver local support through our Scottish office, as well as our network of regional and national partnerships across the UK.

Discounts

Receive discounts for our training events and our annual conference.

Representation

We represent your interests in all major agricultural, environmental and food industry forums, lobbying the Government to support organic food and farming.

***Organic Farming* magazine**

The UK's leading organic journal, *Organic Farming* covers the latest developments across all enterprises, providing invaluable technical and market information.

www.soilassociation.org/foodandfarming

Access our huge range of fact sheets and technical guides from the comfort of your desk.

JOIN US TODAY!

Before you even enter conversion, take up **food and farming membership** with the Soil Association for the information, support and advice that you need to plan your conversion – and beyond! At just **£14** by monthly Direct Debit, this represents great value! And if you sign up with **Soil Association Certification Ltd** you will automatically receive our services free of charge! For further information on the services available call **0117 914 2400**.

SUPPORT IN YOUR AREA

The Soil Association is based in Bristol but we work across the UK. We have strengthened the local support we provide to farmers, growers and other organic businesses by establishing organic centres across the UK. Contact your local centre:

North East Organic Programme

County Durham, Northumberland, Tees Valley and Tyne and Wear. Call 0845 122 7645 or visit www.northeastorganic.org

Northwest Organic Centre

Cheshire, Cumbria, Merseyside, Greater Manchester and Lancashire. Call 01995 642206 or visit www.nworganiccentre.org

Organic South West

Cornwall & the Isles of Scilly Call 01208 78988 or visit www.organicsouthwest.org

Yorkshire Organic Centre

Yorkshire, North Lincolnshire and the Humber region. Call 01756 796222 or visit www.yorkshireorganiccentre.org

Soil Association Scotland

Call 0131 666 0847 or visit www.soilassociationscotland.org

To discuss developments in other areas *call the Bristol office on **0117 914 2400***