



A grower guide

Hardy Nursery Stock

Practical weed control for nursery stock

Fully revised 2013

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Introduction

Achieving consistent good weed control without crop damage is one of the major challenges facing the nursery stock grower. The HDC has recognised this and has invested heavily in weed control research in nursery stock.

This guide is intended to summarise information on weed control in nursery stock in an easy-to-use format. It should provide both a quick guide to formulating weed control programmes as well as providing more in-depth reference data. It should be useful for both spray operators and nursery managers.

The data sources for this guide include HDC research projects, manufacturers' data and best commercial practice. However as a result

of the wide range of nursery stock grown and the sensitivity of some species to herbicides, it is inevitable that crop damage can occur from time to time even when trials have indicated a herbicide to be non-damaging on some species and varieties. Unfortunately the number of herbicides with label recommendations for nursery stock is limited and is diminishing as manufacturers are increasingly unwilling to take the risk of claims for crop damage.

To be of practical use this guide refers to some off-label herbicide uses which have been included as treatments in HDC trials. Such information is provided in good faith but must be regarded as a guide rather than a definitive recommendation as any such usage is at the grower's own risk.

Every effort has been made to ensure that the information in this guide is complete and correct at the time of going to press but the HDC and the authors do not accept liability for any error or omission in the content, or for any loss, damage or other accident arising from the use of products listed herein. Omission of a product does not necessarily mean that it is not approved and available for use. No endorsement of named products is intended nor is any criticism implied of other alternative, but unnamed, products.

The product information has been selected from official sources and from manufacturers' labels and product manuals

of pesticides approved under the Control of Pesticides Regulations 1986 and the Plant Protection Regulations 2005 and available for weed control applications in the United Kingdom.

It is essential to follow the instructions on the approved label before handling, storing or using any crop protection product. Off-label and extrapolation uses are made entirely at the risk of the user.

The contents of this publication are based on information received up to 1 January 2013.

Weed control in container-grown nursery stock

Section 1: Principles of weed control

Principles of weed control in container nurseries

Introduction

Weed control is an important element of container-grown nursery stock production. The moist, fertile conditions provided for container plants are also ideal for weed germination and growth throughout most of the year.

Hand weeding is prohibitively expensive, at least thirty times more costly than an efficient herbicide programme, and rarely very effective on its own. The presence of even small weeds in containers can reduce the growth of the crop and render it unsightly. An increase in certification schemes with 'zero tolerance' for weeds may well result in weed infested pots becoming unsaleable.

When developing a weed control strategy it is important to consider the extent of the problem, the degree of control required, what other non-chemical measures can be used and, if herbicides are to be used, the safety and environmental implications of their use.

Herbicides however, will continue to play an important role in weed control of container-grown nursery stock, although the wide range of plant species grown and production under protection makes careful selection of herbicides important. The following sections consider the range of herbicides available and their uses, drawing on results of HDC and Defra funded ADAS trials work.

Weed control strategy

Planning

An initial review should be undertaken to assess the individual nursery circumstances. Key areas for consideration include:

- Nursery hygiene and current sources of weed.
- Weed spectrum and severity at each site.
- Crops grown and past experience of herbicide safety.
- Application equipment availability and suitability.
- Whether the COSHH assessment is up-to-date.
- Staff training and experience.

Following the review, a plan of action should first consider:

- Nursery hygiene measures to minimise weed spread onto and within the nursery.
- Whether herbicide use is necessary or whether cultural and physical methods of control will be sufficient for the required level of weed control in each situation.

If it is decided that herbicide use is necessary, the following factors are important when selecting a particular product:

- Is it approved for the intended use and situation?
- Will it control the weed species present or anticipated?

- How persistent is the control, will re-application be required?
- Is it damaging to the crop?
- Can it be safely prepared and applied with the available equipment?
- Can all usage restrictions be complied with?
- Does it pose the least risk to human health, the environment and other relevant creatures that may be sensitive to pesticides?

The main source of information to allow a user to use a pesticide safely and effectively is the product label. Information in this weed control guide may be used to select herbicides for programme planning purposes, but it is essential that the product label is read and understood before the product is used as it informs the user on safe and proper use and provides the basic information needed to do a COSHH assessment (see Appendix 2).

If it is deemed necessary to use a pesticide, health and safety considerations must be taken into account. Many pesticides are hazardous to health. COSHH requires a suitable assessment of the risks to health from the use of a pesticide before work starts.

Such assessments must include:

- Consideration of the hazards presented by the pesticide.
- Deciding who could be harmed and how.
- Identification of action to prevent exposure, or achieve adequate control of exposure, and to comply with COSHH requirements.
- Recording of the findings of the assessment when necessary.
- Revision of the assessment when required.

Detailed instruction on carrying out COSHH assessments are beyond the scope of this guide, further information can be found in the *Code of Practice for using Plant Protection Products*. Defra, PB11090, <http://www.pesticides.gov.uk/Resources/CRD/Migrated->

[Resources/Documents/C/Code_of_Practice_for_using_Plant_Protection_Products_-_Complete20Code.pdf](#).

Further consideration should be given to protecting wildlife and the environment. Some details of these aspects are given in the Code of Practice referred to previously. Specific aspects are considered in more detail in *Protecting our Water, Soil and Air - A Code of Good Agricultural Practice for farmers, growers and land managers*. Defra, ISBN 978-0-11-243284-5, <http://www.defra.gov.uk/publications/files/pb13558-cogap-090202.pdf>.

Monitoring

Whilst a weed control plan may include provision for dealing with unexpected circumstances, regular monitoring is essential.

This might include checking:

- Nursery hygiene – is good practice being carried out.
- Presence of unexpected or resistant weeds.
- Crop damage.
- Factors that might affect herbicide efficacy e.g. weather or soil conditions.
- Factors that might affect crop tolerance to herbicides e.g. soft plant growth.

Regular monitoring enables prompt action to be taken, including the removal of any weeds about to set seed or altering the choice of herbicide applied.

Nursery hygiene

Even the most expensive and comprehensive herbicide programme will not work if the nursery is under extreme weed pressure. Take

a critical look at the nursery to see if some of the sources of weeds can be eliminated to alleviate weed pressure.

Aspect	Action
Growing media ingredients	Keep heaps of peat and other ingredients covered to avoid contamination from wind-blown seeds. Some peats can be naturally infested with sorrel and rushes (buy from a reputable source).
Dirty pots and trays	If pots and trays are re-used always clean and sterilise them before use.
Irrigation water	Weed seeds can be spread via the water supply to the nursery. Cover tanks where practical. This will also prevent the build-up of algae and spread of mosses and liverwort. For large reservoirs, where it may be impractical to cover, ensure the banks are clear of flowering weeds, particularly near the abstraction point.
Cuttings	To prevent weed seeds contaminating cuttings, keep stock plant areas clear of weeds. Due to the risk of herbicide damage to stock plants, woven black plastic ground cover materials or a bark mulch can be used to control weeds.
Waste heaps	Do not keep waste heaps next to the container area. Cover heaps or regularly remove waste in skips.
Old stock	Try to avoid placing freshly potted stock in amongst old stock which may have a higher level of weed infestation. Before spring potting, gather old stock together in an area away from that intended for the new stock.
Standing beds	Clean beds as soon as each area is cleared. Although in many cases the application of herbicides over the crop will also give control between the pots, on many sites a specific herbicide treatment will be helpful.
Surrounding areas and paths	To prevent problems with wind-blown seed, such as willowherb, groundsel and sowthistle, keep adjoining fields mown or sprayed off. Windbreaks, fence lines, paths and areas between tunnels should be treated with herbicides. A number of products are cleared for use on pathways and non-cropped areas.

Non-chemical methods of weed control

Background

There is an increasing interest in non-chemical alternatives for weed control. Loose-fill mulches such as bark chips, grit and crushed nut shell are some products which along with pot-toppers now offer genuine potential to control weeds, moss and liverwort. They offer benefits in that only one application at potting

is needed, no formal training or certification is required for their use, they are safe and pleasant to use and they can be used in herbicide sensitive crops where herbicide application may carry a high degree of risk.

Materials trialled

Mulches

Loose-fill mulches are more suitable for multi-branched or herbaceous subjects. A range of materials are available including bark chips, crushed nut shells, grit, waste wool pellets and potato cork flakes ('Biotop'). However, bark and cocoa shell mulches do tend to break down after a few months outdoors. They are better suited to short-term crops and plants in small pots such as liners, herbs, heathers or alpines where the use of a pot-topper is impractical. Spillage of loose-fill mulches when pots blow over, and removal of the mulch by foraging birds, can be a problem outdoors. Mulches can affect nitrogen availability. Bark and potato cork products can lock up nitrogen whereas waste wool products can give a 'flash' release of nitrogen.

Pot-toppers

A pot-topper may be defined as a covering material or mat which, when fitted around the base of the plant, forms a mulch over the growing medium surface. For best results and efficient handling, the pot-topper should be fitted when the plant is potted. However, pot-toppers are not suitable for multi-branched or herbaceous subjects where the cover can be difficult to fit and tends to become separated from the growing medium.

HDC project HNS 66 identified a number of materials with genuine potential to provide commercially acceptable levels of weed control. The best performing pot-toppers were those developed from coir, waste wool and jute. Each of these proved quick and easy to apply and provided weed control outdoors for a one year period following spring or summer potting.

Pot-toppers, typically made from coir or wool are now commercially available to fit a range of different pot sizes.

Practical guidelines

To be successful mulches and pot-toppers need to be:

- Permeable to water and non-phytotoxic.
- Light excluding to discourage weed growth.
- Stable and resistant to being removed or dislodged by wind and capable of sustaining weed control for up to 12 months.
- Easy to apply with the potential to combine with machine potting operations.
- Accurately cut and non-shrinking to achieve a good, precise fit.
- Cosmetically attractive at point of sale.
- Easily available and price competitive.

The future

The use of non-chemical weed control fits in well with the environmental policies of major retailers or suppliers to reduce chemical inputs. This can be an important selling point with some retailers and will result in these methods being adopted more widely.

For further information see the HDC Factsheet 25/12 '*Non-chemical weed control for container-grown hardy nursery stock*'.

Weed control in container-grown nursery stock

Section 2: **The weeds**

Weeds of container nurseries

Weed biology

An understanding of the biology and life cycle of weeds will assist in better weed control management, whether cultural or chemical. It will also save labour and spray costs through better targeting of the weed control measures employed.

Many of the weeds found on container nurseries are rapid growing annuals, taking only a short time from germination to flowering. Flowering and germination periods can be seasonal, and such information is useful in planning hygiene and cultural control methods and in the timing of herbicide applications to ensure that most germination occurs well within the persistence period of the applied herbicide.

Flowering times are important as many weeds are prolific seeders and can spread rapidly through the nursery. A planned programme of hand weeding may be necessary if an important weed is coming into flower and

seed dispersal is to be avoided. Knowledge of the source and seed distribution method of weeds is important in developing a hygiene programme for the nursery. Priority should be given to removing weeds dispersed by wind or exploding pods as these are likely to spread most rapidly.

When developing a weed control strategy it is important to first identify the range of weeds present on the nursery and consider which are the most important. This information is essential when drawing up an herbicide programme as most herbicides will only control a specific range of weeds. Over reliance on one herbicide can also lead to a build-up of resistant weeds.

Some weeds are easier than others to hand weed. Control of the difficult to weed subjects must be given priority whilst the weeds are small.

Weed profiles

This section includes a description of the key weeds that are often found on container-grown nursery stock along with their distribution on nurseries and their methods of dispersal.

Information is also given on the relative effectiveness of herbicides against each key weed. This information is largely drawn from the results of HDC projects HNS 35f, HNS 70 and HNS 139a. Some of the herbicides mentioned do not have label recommendations for use on nursery stock but may be used off-label either under an Extension of Authorisation and Consent for a Minor Use of a Plant Protection Product (EAMU) or via the Long Term Arrangements for Extension of Use (LTAEU). These are indicated as off-label approvals and

may only have limited applications or uses. Further information on individual herbicides is given in Section 3.

Annual meadow-grass (*Poa annua* L.)

Characteristics

A low spreading annual grass, sometimes perennial, 5-30cm. Leaves hairless. Flower spikelets 3-10mm long, 3-10 flowers.



Flowering period

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Germination period

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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 main period of germination/flowering

 germination/flowering may also occur during this period if conditions are favourable

Distribution

Frequently found in propagation units throughout the year and on outdoor crops over winter from autumn germination.

Seed dispersal

The seed can be spread via clothing, on cutting material, re-used pots and trays and from old stock.

General information

Difficult to hand weed once established in the container. Flexidor 125 does not control annual meadow-grass, so over reliance on Flexidor 125 in the herbicide programme (e.g. under protection) will lead to a build up of this weed.

Control measures

Cultural

- Remove weeds before they set seed.

Herbicides pre-emergence

- On-label: Devrinol, Ronstar 2G, Sultan 50 SC.
- Off-label: Dual Gold, Sumimax, Venzar Flowable.

Herbicides post-emergence

- On-label: None.
- Off-label: Aramo.