

Data requirements for Turf Fungicides, Herbicides, Insecticides and Plant Growth Regulators.

Introduction

In general for demonstration of efficacy, 6 trials carried out over at least 2 years, with results that are fully supportive of the effectiveness of a product are sufficient to provide a recommendation for use against a major target species, or for use as a plant growth regulator. For fungicides, insecticides and herbicides where a major target is appropriately supported, it may be sufficient to have a reduced number of trials for minor targets, typically a minimum of 3 and conducted in a single season. However, if relevant major targets have not been supported, then the primary target for that product should be supported by a minimum of 6 trials results. This efficacy guideline provides guidance on the number and type of trials required to demonstrate the consistent efficacy of a new product for use as a professional fungicide, insecticide, herbicide or plant growth regulator on amenity turf, including managed amenity turf.

For advice on efficacy requirements for home garden products see [Efficacy Guideline 211](#) 'Efficacy Data Requirements for Home Garden Products' for more information.

Fungicides

Results from a minimum of six trials over two years should provide sufficient evidence to demonstrate consistent effectiveness for major diseases. For minor diseases, three trials should be sufficient if effectiveness against a major disease has been demonstrated. These requirements may be reduced where data are presented for related diseases or in a situation where data are available for a similar formulation. Major and minor diseases are listed below.

Major and Minor Diseases of Turf

MAJOR DISEASES

Fusarium patch (*Microdochium nivale*)
(MONGNI)
Red thread (*Laetisaria fuciformis*)
(LAESFU)
Dollar spot (*Sclerotinia homoeocarpa*)
(SCLEHO)
Anthracnose (*Colletotrichum cereale*)
(COLLCE)
Leaf spot (*Drechslera siccans*) (DRECSI)
on perennial ryegrass winter sports
pitches (e.g. football)

MINOR DISEASES

Leaf spots/Melting out (*Drechslera* spp.,
(1DRECG); *Cladosporium phlei*) (CLADPH)
Brown patch (*Rhizoctonia solani*)
(RHIZSO)
Fairy rings (each type requires a separate
data package)
Take-all (*Gaeumannomyces graminis*)
(GAEUGR)

The number and timing of applications should reflect the proposed recommendations. In particular, trials must include multiple applications if they are proposed on the label, with corresponding assessments over the course of the trial, and if both curative (control of established disease) and preventative (control of disease when applied at the first signs of disease) activity is claimed, evidence must be submitted to support both claims.

Herbicides

Amenity Grassland

For major weeds in amenity grassland, a minimum of six trials per species over two years is generally required, with a minimum of three for intermediate and one for minor species. Extrapolation from agricultural grassland or newly sown managed amenity turf may reduce this requirement.

Invasive weeds such as Giant Hogweed, Japanese knotweed and Himalayan balsam, are considered to be very important species. While PSD accepts that site selection may be limited, a minimum of six trials over two years would normally be required for these species. PSD may consider cases for 'limited claims' based on lesser numbers of trials.

Weeds of Amenity Grassland

MAJOR WEEDS
Common chickweed (<i>Stellaria media</i>) (STEME)
Nettles (<i>Urtica</i> spp.) (1URTG)
Thistles (<i>Cirsium</i> spp.) (1CIRG)
Common Ragwort (<i>Senecio jacobaea</i>) (SENIA)
Brambles (<i>Rubus fruticosus</i>) (RUBFR)
SPECIAL WEEDS
Giant Hogweed (<i>Heracleum mantegazzianum</i>) (HERMZ)
Japanese knotweed (<i>Fallopia japonica</i>) (POLCU)
Himalayan balsam (<i>Impatiens glandulifera</i>) (IPAGL)

INTERMEDIATE AND MINOR WEEDS
Intermediate
Ox-eye daisy (<i>Leucanthemum vulgare</i>) (CHYLE)
Greater knapweed (<i>Centaurea scabiosa</i>) (CENSC)
Volunteer oilseed rape (<i>Brassica napus</i> var. <i>arvensis</i>) (BRSNN)
Mayweeds (<i>Matricaria</i> spp.) (1MATG)
Minor
Docks (<i>Rumex</i> sp) (1RUMG)

Managed Amenity Turf

For major weeds in managed amenity turf generally a minimum of six trials are required, for intermediate weed species generally three trials (or less where data are submitted on other related species), and for minor weeds generally one trial should be sufficient.

Weeds of Managed Amenity Turf

MAJOR WEEDS	INTERMEDIATE WEEDS	MINOR WEEDS
Daisy (<i>Bellis perennis</i>) (BELPE) White clover (<i>Trifolium repens</i>) (TRFRE) Greater plantain <i>Plantago major</i> (PLAMA) Ribwort plantain <i>(Plantago lanceolata)</i> (PLALA) Yellow suckling clover <i>(Trifolium dubium)</i> (TRFDU) Bulbous buttercup <i>(Ranunculus bulbosus)</i> (RANBU) Creeping buttercup <i>(Ranunculus repens)</i> (RANRE) Dandelion <i>(Taraxacum officinale)</i> TAROF) Pearlwort (<i>Sagina procumbens</i>) (SAIPR) Self heal <i>(Prunella vulgaris)</i> (PRUVU)	Common mouse-ear <i>(Cerastium holosteoides)</i> (CERVU) Ragwort <i>(Senecio jacobaea)</i> (SENIA) Slender speedwell <i>(Veronica filiformis)</i> (VERFI) Yarrow <i>(Achillea millefolium)</i> (ACHMI) Smooth sowthistle <i>(Sonchus oleraceus)</i> (SONOL) Toad rush <i>(Juncus bufonius)</i> (IUNBU) Field wood rush <i>(Luzula campestris)</i> (LUUCA)	Sea Stork's-bill <i>(Erodium maritimum)</i> (EROMA) Mouse-ear Hawkweed <i>(Hieracium pilosella)</i> (HIEPI) Thistles <i>(Cirsium spp.)</i> (1CIRG) Trefoils/Medicks <i>(Trifolium/Medicago spp.)</i> (1TRFG) (1MEDG) Hawkbits <i>(Leontodon spp.)</i> (1LEBG) Cinquefoils <i>(Potentilla spp.)</i> (1PTLG) Sorrels <i>(Rumex acetosa/acetosella)</i> (RUMAC) (RUMAA) Common Cat's-ear <i>(Hypochaeris radicata)</i> (HRYRA) Ladies/Heath bedstraw <i>(Galium vernum/saxatile)</i> (CCTGL) (GALHA) Mind-your-own-business <i>(Soleirolia soleirolii)</i> (SQLSO) Any other annual species

If applications are proposed in the spring and the autumn, the data submitted must cover control in both seasons.

Control or gradual replacement of ‘weed grass’ species in Managed Amenity Turf

For a claim of control or gradual replacement of ‘weed grass’ species (i.e. annual meadow-grass (*Poa annua*)) within the sward, a minimum of 6 trials over two years, is generally required. Where the product provides direct selective control, assessment should include both speed and duration of control. If control is rapid and prolonged, a strategy should also be considered for the prevention of re-invasion by ‘weed grass’ species. Where the product provides a gradual replacement of ‘weed grass’ species, as could be the case with differential inhibition by plant growth regulators, assessment should include both sward density and composition change over time, preferably at least two years. Other specific claims, such as inhibition of seed head production, should be accompanied by specific assessments to support those claims. In all cases, the necessary crop safety assessments, including direct phytotoxicity and colour, should be included.

Newly Sown Managed Amenity Turf/Amenity Grassland

For major weeds in newly-sown amenity turf/grassland, usually a minimum of three trials per species are required with a minimum of one acceptable trial result for intermediate and minor species. Extrapolation from newly sown agricultural grassland may reduce this requirement.

Weeds of Newly Sown Managed Amenity Turf/Amenity Grassland

MAJOR WEEDS	INTERMEDIATE AND MINOR WEEDS:
Common chickweed (<i>Stellaria media</i>) (STEME)	Intermediate
Mayweeds (<i>Matricaria spp.</i>) (1MATG)	Ragwort (<i>Senecio jacobaea</i>) (SENIA)
Knotgrass (<i>Polygonum aviculare</i>) (POLAV)	Redshank (<i>Polygonum persicaria</i>) (POLPE)
Field Bindweed (<i>Convolvulus arvensis</i>) (CONAR)	Minor
Fat hen (<i>Chenopodium album</i>) (CHEAL)	Fool’s parsley (<i>Aethusa cynapium</i>) (AETCY)
	Volunteer oilseed rape (<i>Brassica napus var. arvensis</i>) (BRSNN)
	Groundsel (<i>Senecio vulgaris</i>) (SENVU)
	Nettles (<i>Urtica spp.</i>) (1URTG)
	Thistles (<i>Cirsium spp.</i>) (1CIRG)
	Sow-thistles (<i>Sonchus spp.</i>) (1SONG)
	Docks (<i>Rumex sp</i>) (1RUMG)

Plant Growth Regulators

For any one claim, a minimum of 6 trials over two years are generally required. However, if application is recommended both in the spring and autumn, data must be provided for both seasons. Assessments should include height reduction, weight of cuttings/cutting frequency, and sward density/composition over time, in addition to other necessary crop safety assessments, including phytotoxicity and colour. EPPO Guideline PP 1/146(2) Retardation of growth in grass provides additional information on trials design and the type of assessments required. Other specific claims, as beneficial side effects of plant growth

regulation, such as shortening of internodal length, or inhibition of seed head production, should be accompanied by specific assessments to support those claims.

Insecticides

Results from a minimum of six trials over two years should provide sufficient evidence to demonstrate consistent effectiveness for major pests. For minor pests, three trials should be sufficient if effectiveness against a major pest has been demonstrated. These requirements may be reduced where data are available from other crops, where data are presented for related pests, or where data are available for a similar formulation. Major and minor pests are listed below.

Major and Minor Pests of Turf

MAJOR PESTS

Leatherjackets (larvae of Craneflies *Tipula* spp.) (1TIPUG)

Chafer grubs (larvae of various species but especially *Melolontha melolontha* (MELOME) and *Phyllopertha horticola* (PHPHHO))

Note that enquiries regarding products for use on 'casting' by earthworms (in managed amenity turf) should be referred to CRD

MINOR PESTS

Wireworms (larvae of Click beetles *Agriotes* spp.) (1AGRIG)

Fever flies (larvae of *Bibionid* flies including *Bibio marci* (BIBIMA) and *Dilophus febrilis*) (DILPFB)

Caterpillars (larvae of various species including Swift moth (*Korscheltellus lupulina*) (HEPILU) and Heart and dart moth (*Agrotis exclamationis*) (AGROEX))

Slugs

Aphids

Frit fly (larvae of *Oscinella frit*) (OSCIFR)

The number and timing of applications should reflect the proposed recommendations. In particular, trials must include multiple applications if they are proposed on the label, with corresponding assessments over the course of the trial.

Crop safety

The major turf grass species are: smooth stalked meadow-grass (*Poa pratensis*), annual meadow-grass (*Poa annua*), red fescue (*Festuca rubra*), perennial rye-grass (*Lolium perenne*), browntop bent (*Agrostis tenuis* and *Agrostis castellana*) and creeping bent (*Agrostis stolonifera*).

Evidence of crop safety is required on the major species and cultivars used in managed amenity turf. Evidence from replicated species/cultivar screens (3-4 cultivars of each of the major turf grass species) may be supported by observations of crop safety from effectiveness trials, where the species composition has been recorded. Normally, a minimum of two species/cultivar replicated screens are required in addition to observations from disease or weed control trials. However, this could be reduced if the effectiveness trials cover an adequate range of species/cultivars.

For fungicides, insecticides, herbicides and plant growth regulators it is possible to extrapolate from newly sown turf to established turf.

Where there is a recommendation for use on newly sown turf a minimum of 6 trials are required for herbicides and plant growth regulators, especially if there is no supporting data from effectiveness trials. For fungicides and insecticides it may be possible to extrapolate from established turf.

The number and timing of applications should reflect the proposed recommendations. Applications should normally be made at single (for insecticides and fungicides) and double dose (for herbicides and plant growth regulators). Where more than one application is proposed per season, application can be made at single dose, observing the minimum interval between applications. Where any phytotoxicity is recorded, it may be necessary to conduct trials at higher doses than the recommended dose to determine the margin of selectivity.

As turf is mown regularly, it is advised that assessments for crop injury are carried out shortly after application, (within 3 days) and then on a weekly basis, prior to mowing.

These requirements may be reduced in a situation where data are available for a similar formulation.

Other Guidelines

A number of other guidelines should also be taken into account when planning a trials programme.

EPPO guidelines (please refer to latest EPPO updates for relevant revised/new guidelines).

Diseases

PP 1/211(1) Fungal diseases on amenity grassland

Pests

PP 1/193(3) *Tipula* larvae in grassland

PP 1/217(1) *Oscinella* frit

Weeds

PP 1/136(3) Weeds in amenity grassland

PP 1/146(3) Retardation of growth in grass

Further Advice

Effectiveness and crop safety trials in managed amenity turf are very different to trials in agricultural situations. A good source of information is the STRI, Bingley, West Yorkshire. BD26 1AU (Tel: 01274 565131).

A very valuable source of information on herbicides for use in amenity turf is Naylor, R. E. L. (2002) Weed Management Handbook 9th edition. Further to this the Weed Control Handbook (WCH), Volume II 'Recommendations' Chapter 6 gives detailed guidance on the use of various active substances. Volume I 'Principles' Chapter 15 contains more general information.