

THE GREEN LIST**Green Products suggested for use in place of chemical controls listed in the National Trust
Gardens, Woods and Countryside Endorsed List of Professional Products**

TARGET/USE	PRODUCT NAME	TYPE OF PRODUCT	NOTES
ACARICIDES			
Cultural techniques			
Red spider mite		Cultural	Dislikes high humidity. Overwinters in plant debris and greenhouse crevices – ensure thorough clean up each autumn/winter.
Biological controls			
Red spider mite	<i>Phytoseiulus persimilis</i>	Biological Predator	A mite whose predatory larval stages consume eggs and young. Optimum lifecycle occurs at 22°C and should not exceed 30°C. Can be used in sheltered conditions out of doors where the temperature rises above 16°C.
Red Spider mite	<i>Amblyseius californicus</i> and <i>Amblyseius andersoni</i>	Biological Predator	Predatory mites - feed on most pest mite species. Better for use at temps above 30°C and at lower humidity – i.e. summer months. Licensed for glasshouse crops only.
Red spider mite	<i>Feltiella acarisuga</i>	Biological Predator	Predatory midge. Eggs laid amongst spider mite colonies, larvae feed on all stages of spider mite and can eat up to 5 young or 3 mature mites each day. Good when used in support of <i>Amblyseius</i> , but unlikely to be effective on its own.
Products			
Mites (also aphids, thrips, whitefly and leafhoppers) on fruit, vegetables & ornamentals - including protected varieties	Majestik (Certis) Natural organic plant extract	Contact acaricide/insecticide Works by physical action	Effective on all growth stages of mites, aphids, thrips, whitefly and leafhoppers. Product may be used in conjunction with biological control agents: spray 24hours before they are introduced. NB: If bees are being used for pollination, ensure hives are closed before application and ensure spray has completely dried on the plants before releasing bees. (Majestik is also on the GWC Endorsed List of Products, Ref. GWC 214)
Spider mite (plus aphid, whitefly etc) on edible/ornamental crops	SB Plant Invigorator (Fargro) <i>Urea</i>	Contact pesticide/mildewcide and foliar feed	Can be used all year round & in IPM regimes – compatible with many beneficial insects. Pests will not become resistant. Biodegradable and non-toxic. NB: also on GWC Endorsed List of Products.

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ALGICIDES			
Algae in ponds	Barley Straw		Unprocessed/untreated barley bales placed in water flow can help control algal levels in water bodies.
FUNGICIDES			
Cultural techniques			
Fusarium patch <i>Microdochium nivale</i>	Resistant turf grass cultivars	Cultural	
Fusarium patch <i>Microdochium nivale</i>		Cultural	Is more likely where there is considerable tree shelter, deep thatch, high levels of nutrients (particularly nitrogen) or alkaline turf. Cultural controls involve switching/brushing in mornings to remove the dew, or any practices that reduce thatch and improve drainage or airflow over the lawns. Avoid application of nitrogen fertiliser in autumn. Spike lawns well. Never walk on snow covered grass.
Biological controls			
Fusarium patch <i>Microdochium nivale</i>	Using soil bacteria to help improve the turf grasses' health.	Microbial	Soil bacteria are necessary for the breakdown of organic matter and conversion into readily available nutrients for plants. <i>Nitrosomonas europaea</i> and <i>Nitrobacter winogradskyi</i> are especially important in making nitrogen available to plants which in turn stimulates healthy growth and the ability to ward off disease-causing organisms such as <i>Microdochium nivale</i> , the fungus causing Fusarium Patch.
Honey Fungus	<i>Soil Life</i> (Amenity Land Services)	Microbial	Use of mycorrhizal inoculations to reinvigorate soil and help plants to fight off honey fungus infections. (Note: native woodlands contain honey fungus, but plants have optimum conditions for growth and are therefore able to resist infection unless diseased or weakened in another way.)
Rose Replant	<i>Soil Life</i> (Amenity Land Services) <i>Rootgrow</i> Professional (PlantWorks)	Microbial Microbial	Use of mycorrhizal inoculations to reinvigorate soil and allow the replanting of roses without replant problems. Should be combined with good double digging and incorporation of organic matter.

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Products			
Powdery mildew	SB Plant Invigorator (Fargro)	Contact mildewcide, pesticide and foliar feed	Biodegradable, non-toxic plant stimulant suitable for use all year round. Can control mildew on edible and ornamental crops.(NB: also on NT GWC Endorsed List of Products)
HERBICIDES			
Cultural techniques			
Clover		Cultural	Indicates poor soil and low nitrogen. But: - good for bees.
Daisies		Cultural	Common where soil is compacted, where lawns cut very short and where pH is high.
Yarrow		Cultural	Indicates lawns in poor condition on soil low in nitrogen and humus.
Moss		Cultural	Can be symptomatic of a range of different conditions: Water logged soils/ Infertile sandy soils/Acid soils Shade/Grass mown very short/Result of summer drought
General weed growth	Green Manures	Cultural	Quick-growing, weed smothering plants that improve soil structure and add nutrient. Use whenever ground is to be left bare for long periods (6 weeks +). Also helps prevent nutrient from leaching out of bare ground. Turn crop into top soil at end of period. Especially good over winter. E.g. Alfalfa, mustard, buckwheat, Phacelia, Vetches, etc.
Products			
Ragwort	<i>Barrier H Natural</i> (Barrier Biotech) Citrus-based plant extract	Contact herbicide	A spot treatment for ragwort in the rosette stage. Can also be applied to aerial growth in ragwort. Apply away from bees. NB: also on GWC Endorsed List of Professional Products, ref. GWC 206
INSECTICIDES			
Cultural techniques			
Aphid	Hover flies	Cultural	Naturally occurring – over 100 garden species. Larvae's main diet is greenfly. Adults feed on pollen and nectar – grow umbels and compositae to attract adults. Grow strongly scented, nectar-rich flowers near glasshouse entrances (e.g. angelica, borage, mint) to encourage adults into glasshouses to lay eggs.

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General	Beneficial insects e.g. Hover flies, Ground Beetles, Rove Beetles, Anthocorid Bugs, Centipedes, Earwigs,	Attractants	Many beneficial insects are attracted by umbelliferous and simple compositae flowers. A range of these species included in the garden will help encourage beneficials that will control insect pests. Especially important are early spring flowering plants providing pollen and nectar to help beneficials that have over-wintered.
Biological controls - Insecticides			
Aphid under glass	Vertalec (Fargro & Koppert) (<i>Verticillium lecanii</i>)	Biological parasite	A pathogenic fungus that infects the target pests and destroys them. Use as part of biological control programme. Do not use a fungicide within three days of using <i>V.lecanii</i> . NB: also on GWC Endorsed List of Professional Products, ref. GWC 217)
Aphid under glass Esp. <i>Myzus persicae</i> (peach potato aphid), <i>Aphis gossypii</i> (melon/cotton aphid)	<i>Aphidius colemanii</i>	Biological Parasite	Black parasitic wasp, native to Britain. Eggs laid into body of aphid and the hatched larva kills its host in 1-2 weeks. Is good at seeking out aphids. Can be used at any time of year under glass, but a minimum temperature of 10°C is better. Can provide long term control.
Aphid under glass – most aphids	<i>Aphidoletes aphidimyza</i>	Biological Predator	Nocturnal native midge. Lays orange eggs on aphid-infested plants. Larvae feed on many aphid species, eating 5 adult or 15 young aphids. Need average temp of min 10°C to remain active, and there needs to be some soil or compost below the plants on which the larvae can pupate undisturbed. Can clear up moderately serious infestations on plants on which they are placed, as well as later producing midges to fly to other plants.
<i>Aphid macrosiphum</i> – potato aphid & <i>aulacorthum</i> – glasshouse aphid	<i>Aphelinus abdominalis</i>	Biological Predator	Parasitic wasp
<i>Aphid Macrosiphum</i> & <i>Aulacorthum</i> sp.	<i>Aphidus ervi</i>	Biological Predator	Parasitic wasp
Aphid - outdoor	Lacewing - <i>Chrysoperla carnea</i>	Biological Predator	Native species. Adults green, with slender bodies, long antennae and transparent wings. Larvae are grey-brown voracious aphid predators, killing more than 20 per day. Also eat whitefly, thrips, sawfly larvae, small caterpillars and red spider mites. Lacewing larvae can be introduced from May onwards as soon as the temperatures are above 10°C.
Aphid – outdoor and under glass	Ladybirds	Biological Predator	Ladybirds - red with black spots, yellow with black spots or orange/brown with white spots. Generally both larvae and adults prey on aphids; larvae eat 200-400 aphids before pupating. Can be used under glass when temperature is minimum 10°C, or introduced outside between May and mid August as temperatures rise above 10°C.
Caterpillar in vegetables, soft fruit, ornamentals & amenity horticulture	DiPel DF (Fargro) (<i>Bacillus thuringiensis</i> var. <i>kurstaki</i>)	Biological insecticide	A bacterial insecticide for control of caterpillars. Achieved by ingestion by caterpillars of the treated plant material. NB: also on GWC Endorsed List of Products, Ref. GWC 211

TARGET/USE	PRODUCT NAME	TYPE OF PRODUCT	NOTES
Biological controls-insects/Contd.			
Caterpillar under glass	<i>Trichogramma evanescens</i>	Biological Parasite	Parasites to control moth eggs. Larvae develop inside host which turns black as the larvae pupates. Female wasp lays 60 to 70 eggs over two week lifespan.
Chafer grubs in lawns (a) Chafer grubs in lawns (b)	Nemasys Chafer Grub Killer/ Nemasys G (<i>Heterorhabditis megadis</i>)	Biological Parasite	(a) Rolling the ground in spring can help to reduce numbers (b) Parasitic nematode. Apply to moist soil from July onwards when soil temps are above 12°C.
Leatherjackets in lawns (a) Leatherjackets in lawns (b)	Nemasys Leatherjacket Killer (<i>Steinernema feltiae</i>)	Biological Parasite	(a) Mostly found on poorly drained lawns – improve drainage and aeration to reduce. (b) Parasitic nematodes. Apply to moist soil from late August through to end of October when soil temp is above 12°C.
Mealy Bug <i>Pseudococcus obscurus</i> , <i>Planococcus citri</i> ,	<i>Cryptolaemus montrouzieri</i>	Biological Predator	Brown beetle. Female lays eggs into mealybug masses. Adult beetles and young larvae feed on mealybug eggs and nymphs, large larvae feed on all stages of most mealybug species. Temperature must be between 16°C and 33°C. Requires good light – use between May and Sept. Best for use on larger plants. Introduced as adults.
Citrus Mealybug (<i>Planococcus citri</i>)	<i>Leptomastix dactylopi</i> <i>Anagyrus pseudococci</i>	Biological Predator Biological Predator	Parasitic wasp) Requires temperatures of 18-30°C Parasitic wasp) for development
Glasshouse Mealybug (<i>Pseudococcus viburni</i> syn <i>P. affinis</i>)	<i>Leptomastix epona</i> <i>Anagyrus pseudococci</i>	Biological Predator Biological Predator	Parasitic wasp) Requires temperatures of 18-30°C Parasitic wasp) for development
Mealy bug - Citrus mealybug <i>Planococcus citri</i>	<i>Leptomastix dactylopii</i> and <i>L. epona</i>	Biological Predator	Parasitic wasp effective against well-dispersed mealybug populations. Requires temps above 16°C.
Mealy bug – glasshouse	<i>Leptomastix epona</i>	Biological Predator	Parasitic wasp
Mealy Bug	<i>Hypoaspis</i>	Biological Predator	A mite that feeds on a range of small insects. Best for use on smaller plants (less than 1ft).
Mealy Bug	Lacewing Larvae	Biological Predator	Lacewing larvae – can help control outbreaks of mealybug.
Scale insect	<i>Steinernema feltiae</i>	Biological Parasite	Parasitic nematode applied to the foliage of an infected plant and kept moist. Nematode invades the body of the scale insects and introduces a bacteria that kills the host and from which the nematodes feed. NB: scales remain on the plant even once killed.

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Biological controls-insects/Contd.			
Sciarid flies	<i>Hypoaspis miles</i>	Biological Predator	Mites feed on sciarid larvae, springtails and other insects or mites associated with its habitat. Live in the top few centimetres of compost.
	<i>Steinernema feltiae</i>	Biological Parasite	Parasitic nematode
Sciarid flies	<i>Atheta coriaria</i>	Biological Predator	Effective at wide temperature range of 4-35°C. Voracious fast-moving beetles. Adults and young stages feed on larvae of Sciarid and Shoreflies.
Thrips/Thunder fly	<i>Amblyseius cucumeris</i>	Biological Predator	A small mite that eats thrips during their young developmental stage. Best introduced in June and before thrip colonies are able to establish.
Thrips	Oriline (<i>Orius laevigatus</i> and <i>O. majusculus</i>)	Biological Predator	A predatory bug that controls thrips, aphids, young caterpillars and some mite species. The nymph is predatory. Adults fly well and spread through glasshouse. Is effective between April and August and works well in conjunction with <i>Amblyseius</i> . Best released in early morning or late afternoon.
Thrips	Nemasys F (<i>Steinernema feltiae</i>)	Biological Parasite	Actively hunting Entomopathogenic nematodes. Control Western Flower Thrips and leafminer larvae. The nematodes invade the bodies of thrips and release symbiotic bacteria which kills the host.
Vine weevil	Nemasys L (<i>Steinernema kraussei</i>)	Biological Parasite	Entomopathogenic nematodes actively seek out prey - vine weevil larvae and sciarid fly larvae and some other soil dwelling insects. The nematodes carry symbiotic bacteria which are released into the host, causing death. The nematode feeds on the bacteria and host tissue, reproducing thousands of infective larval nematodes released 10 to 14 days later. Gives control at temperatures down to 5°C.
Whitefly under glass	<i>Encarsia formosa</i>	Biological Parasite	Parasitic wasp which lays its eggs in the scales where the larvae develop. Needs temp of 10°C min at night and reaching 18°C during the day; prefer humid conditions; are most active in sunny weather.
Whitefly under glass	<i>Delphastus pusillus</i>	Biological Control	Beetle of ladybird family - eats all stages of the whitefly, but prefer eggs and nymphs. Both larvae and adults are predators. Adults fly to whitefly colonies - detect odours emitted by immature whiteflies. Min temp of 15°C; prefer high humidity. Inhibited by dense leaf hairs. Effective against high populations of whitefly.
Whitefly under glass	Vertalec (Fargro & Koppert) <i>Verticillium lecanii</i>	Biological parasite	A pathogenic fungus that infects the target pests and destroys them. Use as part of biological control programme. Do not use a fungicide within three days of using <i>V.lecanii</i> . NB: also on GWC Endorsed List of Professional Products, ref. GWC 217

TARGET/USE	PRODUCT NAME	TYPE OF PRODUCT	NOTES
Products - Insecticides			
Aphid, whitefly, spidermite mealybug on edible and ornamental crops	SB Plant Invigorator (Fargro) <i>Urea</i>	Contact pesticide/mildewcide and foliar feed	Can be used all year round. Can also be used in Integrated Pest Management regimes – compatible with a range of beneficial insects and mites. Pests will not become resistant. Biodegradable and non-toxic. NB also on GWC Endorsed List of Products, ref. GWC 230
Aphids, mites, thrips, whitefly and leafhoppers on fruit, vegetables & ornamentals, inc. protected varieties	Majestik (Certis) <i>Natural organic plant extract</i>	Contact insecticide Physical action	If bees are being used for pollination, ensure hives are closed before application, and ensure spray has completely dried on the plants before releasing bees. Can be used on organic crops and also as part of a biological control programme. NB: also on GWC Endorsed List of Professional Products, ref. GWC 214
Caterpillars in vegetables, soft fruit, ornamentals and amenity vegetation	Dipel DF (Fargro) <i>Bacillus thuringiensis var. kurstaki</i>	Biological insecticide	Product based on a naturally occurring micro-organism. Highly selective stomach acting biological insecticide acts on target larvae after ingestion of treated vegetation & rapidly stops feeding. Can be used on Brown Tail Moth in amenity situations. Biodegradable. NB also on GWC Endorsed List of Professional Products, ref. GWC 211
Codling Moth in fruit	Pheromone	Trap	Pheromones lure male moths into trap from which they cannot escape. Use between May and June.
Whitefly under glass	Yellow glue traps	Attractant	Yellow sticky cards that can be hung in the glasshouse near the tops of the plants. Whitefly will be attracted to the card but biological controls tend to stay in amongst the foliage.
Winter Moth on fruit	Grease/glue bands	Barrier	Applied around the trunks of fruit trees from Sept-Dec and again in spring. Protects against winter moth and ants in summer.
MOLLUSCICIDES			
Cultural techniques			
Slugs	Ground Beetles, Rove Beetles, Centipedes		Naturally occurring garden insects that can be encouraged through leaving soil undisturbed, through applying organic mulch to soil to give hiding places and by using ground cover plants as appropriate. “Refuges” can be created with wood piles, etc. Very sensitive to pesticides. Active by night.
Biological controls			
Slugs	<i>Phasmarhabditis hermaphrodita</i>	Nematode worm	Enters bodies of slugs underground during the day to feed and multiply, carrying bacteria which damage and release more material for nematode to eat. Slugs die below ground – very effective against slugs which live permanently below ground. Require min temp of 5°C and damp soil. Works against slugs up to 3" long, and small snails

TARGET/USE	PRODUCT NAME	TYPE OF PRODUCT	NOTES
Products (Molluscicides)			
Slugs and Snails	Copper Tape		Used around plant pots, the copper tape carries a natural positive electric charge that deters the slugs and snails from crossing.
Snails	Snail mats		Copper impregnated mats that can be used to stand pots on. The snails will not try and cross the mat.
PLANT NUTRITION PRODUCTS			
Ornamentals & non-edible plants	Biosept All Clear Citrus oil / Natural plant extracts (Plant Solutions Ltd)	Plant biostimulant	Broad spectrum plant stimulant to help plants protect themselves against fungal and bacterial diseases or attacks by insects. Can be mixed with fungicide and most insecticide products as part of Integrated Pest Management (IPM) programmes. Safe for use with bees and other beneficial insects. Biodegradable. Organic Farmers & Growers approved. Biosept All Clear is for use on ornamental and non-edible crops.
Edible crops	Biosept Crop Gold Citrus oil / Natural plant extracts (Plant Solutions Ltd.)	Plant biostimulant	Broad spectrum plant stimulant to help plants protect themselves against fungal and bacterial diseases or attacks by insects. Can be mixed with fungicide and most insecticide products as part of Integrated Pest Management (IPM) programmes. Safe for use with bees and other beneficial insects. Biodegradable. Organic Farmers & Growers approved. Biosept Crop Gold is for use on edible crops.
Edible and ornamental crops	SB Plant Invigorator (Fargro) <i>Urea</i>	Plant stimulant/foiar feed	Product also has pesticide & mildewcide properties. Encourages healthy plant growth. Helps prevent chlorosis & improves leaf colour/vigour. Suitable for use all year round.
Wide range of crops & ornamental plants, including vegetables, nursery stock, top & soft fruit	Garlic Barrier Liquid Garlic Barrier Granules (Plant Solutions Ltd.)	Plant biostimulant	Compatible with Integrated Pest Management (IPM) programmes, with the exception of biological nematodes . Organic Farmers & Growers approved. Biodegradable. Safe in the environment. Harmless to beneficial insects. Treated plants & areas become odourless within minutes, with no residual flavours or taints. Garlic Barrier helps plants resist feeding damage from a range of insects eg. cabbage and carrot root fly (Liquiid), slugs and snails (Liquid and Granules)
Wide range of horticultural crops	Omex DP98 (Plant Solutions Ltd.)	Plant nutritional product	Phosphite-based product, suitable for foliar application. Aids plant health/vigour, which can result in greater tolerance of stress/disease. May also aid uptake of cations, eg. calcium
Ornamentals, nursery stock, top fruit, field & protected soft fruit and vegetables	Orosorb - citrus oil (Plant Solutions Ltd.)	Plant stimulant and Anti-Evaporant agent	Stimulates root & foliage development resulting in less susceptibility to p&d attack. Beneficial on young plants once they are showing four true leaves. Product application forms a protective barrier on plant surfaces, reducing the time made available for fungal spores to germinate. Compatible with Integrated Pest Management (IPM) programmes

TARGET/USE	PRODUCT NAME	TYPE OF PRODUCT	NOTES
Plant Nutrition Products/contd.			
Wide range of horticultural crops	Kelpak - kelp concentrate (Omex Ltd.)	Plant nutritional product	Organic liquid seaweed extract to aid strong root development and help plants combat heat wilt/water stress and pathogen damage
Ornamentals and nursery stock, protected crops, field vegetables and soft and top fruit	Biomax GP Citrus & coconut extracts (Plant Solutions Ltd.)	Plant growth stimulant	Promotes advanced root growth and improved cell structure in young plants and cuttings. Can result in a stronger plant, more resistant to disease/sap-sucking insects & with increased tolerance to heat wilt/drought/frost. Suitable for organic growers. Compatible with all Integrated Pest Management (IPM) programmes.
REPELLENTS			
Cats	Sonic repellent		Battery or mains operated unit that emits a high frequency sound that cats dislike. Is activated by movement. Safe to other animals, birds, etc and recommended by cats protection for keeping pets away from busy roads, etc.
RODENTICIDES			
Mice and Rats	Sonic repellent		Unit that emits high frequency sound to repel rats and mice. Battery or mains operated.

This list will be kept on the intranet and updated as and when new products and ideas are approved. Please refer to the intranet for the most up to date copy, or contact the Gardens & Parks Section at NT Centre for an updated paper copy.

SOURCES:

- **Amenity Land Solutions**,
Telford, Shropshire
Tel: 01952 641949 / Email: sales@amenity.co.uk
Web address: www.amenity.co.uk

- **Certis**, 1b Mills Way,
Boscombe Down Business Park
Amesbury, Wilts. SP4 7RX
Tel: 01980 676500 / Email: certis@certiseurope.co.uk
www.certiseurope.co.uk/Certis.uk/english/home/page.aspx/248

- **The Organic Gardening Catalogue**
Riverdene Business Park, Molesey Road
Hersham, Surrey KT12 4RG
Tel: 01932 253666 / Web address: www.organiccatalog.com

- **Fargro Ltd.** Toddington Lane,
Littlehampton, West Sussex BN17 7PP
Tel: 01903 721591 / E-mail: info@fargro.co.uk
Web address: www.fargro.co.uk

- **Koppert UK Ltd.** Unit 8, 53 Hollands Road,
Haverhill, Suffolk CB9 8PJ
Tel: 01440 704488
E-mail info@koppert.co.uk
Web address: www.koppert.nl

- **Omex Agriculture**, Bardney Airfield, Tupholme,
Lincoln LN3 5TP Tel: 01526 396000
Email: horticulture@omex.com
Web address: www.omex.co.uk

- **Plant Solutions Ltd**,
Pyports, Downside Bridge Road,
Cobham, Surrey KT11 3EH
Tel: 01932 576699
Email: info@plantsolutionsltd.com
Web address: www.plantsolutionsltd.com

- **PlantWorks Ltd.** (RootGrow/mycorrhizal fungi)
1/19 Innovation Buildings, Kent Science Park,
Sittingbourne, Kent ME9 8HL
Tel: 01795 411527 / Email: info@plantworksuk.co.uk
Web address: www.friendlyfungi.co.uk

- **Harrod Horticultural**, Pinbush Road,
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Email: enquiries@harrod.uk.com
Web address: www.harrodhorticultural.com

- **Green Gardener**,
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Web address: www.greengardener.co.uk

